RESOURCE CONSERVATION DISTRICT of TEHAMA COUNTY

2 Sutter Street, Suite D ♦ Red Bluff, California 96080 ♦ 530-527-3013 ♦ Fax: 530-527-7451

December 3, 2021

State Clearinghouse
1400 10th St #12,
Sacramento, CA 95814

Re: **Submission of Initial Study/Mitigated Negative Declaration**
Restoring The Deer Creek Headwaters at Childs Meadows Project

Sir's

As CEQA Lead Agency, the Resource Conservation District of Tehama County submits an electronic version of the Initial Study and related appendices prepared for our **Restoring the Deer Creek Headwaters at Childs Meadows Project**. Also included are the RCD of Tehama County's **Mitigated Negative Declaration, Summary Form for Electronic Document Submittal** and **Notice of Completion and Environmental Document Transmittal**.

Your review and distribution of these items to responsible review agencies would be most appreciated. Please give me a call at 530-727-1293, if you have questions or need clarification. I can also be reached via email at **jbarrett@tehamacountyrcd.org**.

Thank You

Jon Barrett

Jon Barrett
District Manager
Resource Conservation District of Tehama County

Print Form

Summary Form for Electronic Document Submittal

Form F

Lead agencies may include 15 hardcopies of this document when submitting electronic copies of Environmental Impact Reports, Negative Declarations, Mitigated Negative Declarations, or Notices of Preparation to the State Clearinghouse (SCH). The SCH also accepts other summaries, such as EIR Executive Summaries prepared pursuant to CEQA Guidelines Section 15123. Please include one copy of the Notice of Completion Form (NOC) with your submission and attach the summary to each electronic copy of the document.

SCH #: ____________________________

Project Title: **Restoring the Deer Creek Headwaters at Childs Meadows Project**

Lead Agency: Resource Conservation District of Tehama County

Contact Name: Jon Barrett/District Manager

Email: jbarrett@tehamacountyrcd.org Phone Number: 530-727-1293

Project Area

The 404 acre Project area lies within the Childs Meadows complex located at the intersection of the Sierra Nevada and Cascades Mountain ranges in northeastern Tehama County. The Project area is located approximately 40 miles east of Red Bluff, 20 miles west of the Lake Almanor community, 10 miles east of the town of Mineral, 6 miles southeast of the Mill Creek community 40 miles east of Chico, and 10 miles south of the southwest entrance to Lassen Volcanic National Park. The Project area lies within the United States Geological Survey 7.5-minute Childs Meadows quadrangle map (T27N R3W, Mount Diablo Meridian) at approximately:

NW corner:
40°21'04.6"N -121°29'49.5"W
NE corner:
40°21'02.1"N -121°26'39.5"W
SW corner:
40°18'53.9"N -121°29'52.4"W
SE corner:
40°18'51.4"N -121°26'42.5"W

The meadow is adjacent to State Route 36E/89 to the east, and Forest Service Road 28N88 traversing north to south and 28N90 to the southeast. Childs Meadows is a riparian wet meadow complex in the headwaters of the Deer Creek watershed, just to the west of the Upper North Fork Feather River watershed. The meadow runs generally north to south along Gurnsey Creek, which flows into Deer Creek about 4 miles downstream from the end of the Project planning area. The meadow is on the west and south sides SR 36E/89 and accessible from multiple pullouts and dirt access roads from the highway.

Project Description (Proposed actions, location, and/or consequences).

See Attached "Detailed Project Description"

Identify the project's significant or potentially significant effects and briefly describe any proposed mitigation measures that would reduce or avoid that effect.

Significantly or Potentially Significant Environmental Issues
The following environmental issues were identified in the Initial Study as being significantly affected or potentially affected by project work and would require the implementation of Mitigation Measures in order to reduce impacts to a less than significant level

- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Transportation and Traffic
- Tribal Cultural Resources

See Attached Mitigation Measures

If applicable, describe any of the project's areas of controversy known to the Lead Agency, including issues raised by agencies and the public.

At the present time the Tehama County Counsel's Office is in the process of determining if the road decommissioning and closure options described in the attached **"Detailed Project Description"** could be implemented.

Provide a list of the responsible or trustee agencies for the project.

- Air Resources Board
- Cal Trans District #2
- Department of Conservation
- Department of Fish and Wildlife Region #1
- Department of Forestry and Fire Protection
- Native American Heritage Commission
- Office of Historic Presentation
- Water Quality Control Board Region #5
- Resources Agency

Project Description/Restoration Practices

The following is an overview of each practice to be used in connection with the **Restoring the Deer Creek Headwaters at Childs Meadows Project** that will restore hydrologic, geomorphic and biological conditions within the Childs Meadows complex. In addition to the practices themselves, construction and maintenance requirements are described as well. Importantly, in addition to the maintenance and motioning requirements described in this Initial Study/Mitigated Negative Declaration and **Appendix L Post Project Maintenance and Monitoring Plan for the Restoring the Deer Creek Headwaters at Childs Meadows Project** found in the Initial Study/Mitigated Negative Declaration (IS/MND), additional requirements may be established for project work in the future by regulatory and funding entities. **Figure 2. Overview of Childs Meadows Project Area with Specific Features Identified** of the IS/MND provides an overview of treatment locations. A visual description of proposed meadow treatments is shown in generalized schematic drawings found in **Appendix J.** of the IS/MND. General construction and implementation techniques for these meadow restoration practices follow those found in ***"Low-Tech Process-Based Restoration of Riverscapes: Design Manual. Version 1.0"*** shown among the references listed in the **References Cited** section of the Initial Study/Mitigated Negative Declaration. The Numbers adjacent to each practice described below refer to the Project areas described in the IS/MND.

Beaver Dam Analog (BDA) Areas 1,2 3, 4, 5, 8, 9, 10, 11, 12, 13, and 14

(See schematic drawings found Appendix J: and feature cross sections shown in Appendix K) of the IS/MND. BDA treatments will be used primarily in riparian meadow floodplain reaches. A summary of this treatment is found in **Table 2 Summary of Typical Hydraulic, Hydrologic and Geomorphic Effects of Beaver Dam Analogues (BDAs) and Post-Assisted Log Structures (PALS)** of the IS/MND. Backwater BDAs described below will also be used downstream of headcuts to reduce erosion. A total of between 48 and 91 BDAs will be developed throughout the overall **Restoring the Deer Creek Headwaters at Childs Meadows Project** area. BDA structures will be constructed using native materials and hand crews. As proposed, BDA structures will be a channel-spanning feature having a constant crest elevation. These structures will be constructed with a mixture of woody debris, rock, and soil to form a pond and mimic a natural beaver dam. The design and implementation of BDAs is non-destructive method to promote the depositional processes that are responsible for riparian floodplain habitat. BDAs will also be used to create immediate deep-water habitat to promote beaver colonization and to promote many of the same processes affected by natural beaver dams (e.g., increased channel-floodplain connectivity).

When channel incision is less than 1.21 meters, BDAs will serve to redirect flow from the channel over banks and onto the floodplain, at all flow rates including stream baseflows. These structures will be built greater than 100% and up to 300% of the bank-to-bank channel width. The crest elevations of BDAs will be up to .61 meters above the lowest bank height, but generally less than 1 foot. BDAs will be spaced such that the backwater from one dam reaches the next upstream dam so that the head differential from bank to pond is no greater than .46 meters at base flow. This will reduce the potential for scour below each dam, energy for end-run head cutting, and will allow beavers to travel safely throughout the complex with reduced risk of predation. When incision is greater than 1.21 meters, BDAs will serve as grade control to create a backwater effect that arrests headcuts within the channel or adjacent floodplain. BDAs structures will be built to 100% of the bank-to-bank channel width and up to 1.21 meters in height.

All BDAs will have a uniform crest elevation across their length. The structures will be straight or convex downstream (middle of the dam furthest downstream) so as to not concentrate flow in the center of the channel. BDAs will be constructed using native material sourced within the Project area including conifers, willow, sod, soil, forest duff, and rocks. Materials sourced for BDAs will follow the criteria in the material sourcing practices described below under the heading **Material Sourcing**. BDAs typically include posts driven into the channel bed and banks, with extensive additions of interwoven trees, branches, and roots; BDAs may also be constructed without posts. Finer material will be packed into the structure to provide a water seal that will reduce flow through BDA structures, redirecting flow over the banks/floodplain and/or overtop the BDA. An extensive curtain of woody material will be interwoven on the downstream side of the BDA to reduce scour from overtopping streamflow. The approximate fill volume for a BDA of 16' × 4' × 4' dimensions (L × W × H) is 10 cubic yards (c.y.), including 3-5 c.y. of wood and branches and 5-7 c.y. of sod, soil, and forest duff. For post-assisted BDAs, untreated pine posts up to 3" diameter will be driven into the ground at least ¼ of the final post length, spaced about 18-30" apart. BDAs posts will be installed with a portable hydraulic post pounder, or sledge hammer and manual post pounder. The remaining assembly will be by hand.

The construction of BDAs will require a light-duty truck or ATV to haul materials and equipment from the existing road network to BDA locations. All transportation equipment will be fitted with low pressure tires in order to prevent impacts to meadow vegetation and soil conditions. When transportation equipment is used, all cultural sites, areas with rare plants, fens and other sensitive areas of the Childs Meadows complex will be avoided.

BDA structures will be inspected and if necessary, maintained approximately every other month in the summers of years 1and 2 after installation. Maintenance will include adding material to seal leaks and pond water up to the bankfull or as-built height. Depending on the condition of the structures, maintenance will also include adding additional posts, weaving woody vegetation and/or patching small gaps using cobbles and sediment. Maintenance needs in years 3 through 5 will be determined through continued environmental monitoring conducted on an annual basis. Maintenance will be based on progress towards objectives identified in the monitoring plan developed for this project. Restoration efforts will utilize a process-based restoration approach and uses the dynamic hydrologic system within the Childs Meadows complex to alter the BDA structures. Consequently, intervention by Project proponents in order to maintain the restorative effects of Project work will be determined based on perturbation within the meadow system to effect achievement of Project objectives or significantly effecting timing of attaining those objectives. Substantial redundancies will be incorporated into Project work so that if some individual structures fail maintenance may not be necessary to achieve Project objectives. Maintenance and monitoring requirements will be formalized in a maintenance agreement established between the landowner and the RCD of Tehama County and as described in **Appendix L** of the IS/MND.

Post-Assisted Log Structure (PALS) Areas 1, 3, 4, 11, 14

This restoration practice will be utilized in riparian meadow transport reaches. A summary of this treatment is found in Table 2 of the IS/MND. Backwater BDAs described below will also be used downstream of headcuts to reduce erosion. Approximately 33-49 PALS will be constructed throughout the Project area utilizing native materials and hand crews. (**See schematic drawings found in Appendix J and cross sections in Appendix K to the Initial Study/Mitigated Negative Declaration)**. PALS structures are constructed using woody material of various sizes pinned together with untreated wooden posts driven into the stream bottom substrate and channel banks to mimic natural wood accumulations. These features are designed to influence hydraulic and geomorphic processes within stream channels. While PALS influence hydraulics at all flows, they are most likely to force geomorphic change during high flows when sediment is mobilized and as such require posts to provide temporary stability. Each PAL constructed will utilize a range of shapes and sizes based upon their location within the channel and desired function. In general, these features consist of larger diameter and longer length material than used in the construction of BDAs. PALS will be placed in reaches where incision is greater than 1.21 meters to accelerate the channel evolution processes of erosion and deposition and, in some cases, force overbank inundation during high flow. PALS will be built up to bank full 100% of the bank-to-bank channel width and up to 1.21 meters in height.

PALS are built with woody material and are intended to be porous. Construction materials will include trees, branches, and roots anchored using untreated pine posts up to 2.5" in diameter driven at least 2' into the channel bed and banks. Only those conifers meeting the criteria established for this material in the **Material Sourcing** section below will be felled and utilized in the construction of PALS. Posts will be installed with a sledge hammer, manual post-pounder, and portable hydraulic post pounder. The remaining PALS assembly is by hand. The approximate fill volume for a PALS of 12' × 4' × 3' dimensions is 5.5 c.y. of wood and branches.

The construction of PALS will require a light-duty truck or ATV to haul materials and equipment from the existing road network to PALS locations. All transportation equipment will be fitted with low pressure tires in order to prevent impacts to meadow vegetation and soil conditions. When transportation equipment is used, all cultural sites, areas with rare plants, fens, and other sensitive areas of the Childs Meadows complex will be avoided.

PALS will be maintained annually during baseflow conditions in years 1 through 3 after restoration. Maintenance includes adding and anchoring woody material up to the as-built height and up to the full channel width. Maintenance in years 3 through 5 will be determined by monitoring and is expected to be light and semi-annual. Maintenance will be based on progress towards objectives identified in the monitoring plan for this Project. Using a processed based approach, it is anticipated that the dynamic hydrologic system within the meadow complex will alter the BDA and PALS structures and thus intervention will be determined based upon the potential for any perturbation to effect achievement of Project objectives or to significantly effect timing in the attainment of those objectives. Redundancies will be built into the implementation of Project work so that if a portion of the individual structures fail, maintenance may not be necessary to achieve Project objectives. Maintenance and monitoring requirements will be formalized in a maintenance agreement established between and the RCD of Tehama County and shown in **Appendix L** of the IS/MND.

Mechanical Fill of Large Channels Areas 4 and 6.

Mechanical Fill treatments will be utilized in fens. Within treatment areas 4 and 6 incised and degraded channels at least .61 meters wide and .61 meters deep are located within and adjacent to fens. Due to the large fill volume required, mechanical equipment will be used to generate, transport, and place a mix of locally-sourced wood chips and mineral soil in large incised channels (up to 50% of fill will be wood chips). These locations are mapped as "Mechanical Channel Fill" and "Mechanical Borrow Area" in the plan view figures throughout the Initial Study/Mitigated Negative Declaration. The total eroded gully volume recommended for mechanical fill treatments is approximately 947 c.y.. The estimated total fill volume is 1,420 cubic yards of compacted material: approximately 710 cubic yards each of wood chips and mineral soil. Heavy-duty and light-duty equipment will access each restoration site from the existing road network and will not be operated on any meadow soils or plants. The mineral soil component excavated from the borrow areas will fill the gaps between the wood chips and shreds in the fill, helping anchor the saturated soil and preventing rapid subsurface flow. On all steep slopes, periodic permeable fill retainers such as organic erosion fabric or coir logs with interlaced wooden stakes hammered into beds and banks will be installed to reduce the risk of the saturated fill flowing down the channel before plant roots have a chance to grow, anchoring this material.

Earthen material will be excavated from hillslopes adjacent to the meadow as shown in plan views throughout the IS/MND. Multiple borrow locations have been identified from which fill material will be obtained. Most borrow areas will be located adjacent to the meadows and slightly higher in elevation than flood prone sites. In a number of instances, a portion of the borrow area may be located within the floodplain. These sites however will be utilized so that the invert elevation (i.e., difference between upslope and downslope edge) remains flat or less than .15 meters in height. A total of 1,966 c.y. of potential fill has been identified in the mechanical borrow areas however, no more than 1,420 c.y. (if no wood chips are used in fill mix), and as little as 710 c.y. (if 50% woodchips are used in fill mix), of this material will be needed to fill the large meadow gullies.

Prior to filling the channel, all sod and topsoil from within the channel will be removed and placed adjacent to the channel. After fill material is transported and placed in the channel, sod and topsoil will be replaced, and covered with natural-fiber (e.g., coir or jute) erosion fabric anchored into the adjacent fen surface. Disturbed areas not covered by replaced sod will then be planted with seeds and plugs of native fen sedges, whose roots and rhizomes anchor fen soil. No maintenance is expected to be necessary for this practice, however annual monitoring will be in place for up to 5 years to determine any need. If substantial erosion occurs, additional material (erosion control fabric, and revegetation) will be required. Maintenance requirements will be formalized in a maintenance agreement between the landowner and the RCD of Tehama County **(See Appendix L)** of the IS/MND. The finished grade elevation for channel fill will be set to a similar elevation as the adjacent banks/floodplain. All fill surfaces that receive overland flow will be covered with staked erosion fabric suitable for transplanting into and allowing plant growth and establishment (e.g., Rolanka BioD-Mat).

Within sites having slopes >4%, coir logs will be placed and staked in a herringbone pattern over erosion-fabric-covered fill to prevent overland flow downslope. Permeable coir logs of about 1.82 to 2.44 meters in length will be used rather than natural trees or wood structures. The permeability and short length of the coir logs will better reduce the flow concentration along impermeable and long flow barriers. In addition, coir logs will decompose under wetland conditions after approximately 5 years, by which time dense wetland vegetation will be established and resistant to erosion. Sod plugs of the desired meadow type (e.g., fens and meadows) will be hand dug and transplanted into the fill areas. Locally collected seed of native wetland sedges will be grown at a nursery and the seedlings transplanted back into the fill. All identified rare plant occurrences will be avoided as borrow areas for plugs. Sparsely vegetated remnant meadow surfaces (not sites containing fill material) that will be receiving dispersed overland flow as part of a restoration treatment will be evaluated for erosion fabric protection. If sufficient surface stability, root cohesion and early spring plant growth exists, no additional fabric will be required. If not, erosion fabric and transplants will be added to these rewetted but not filled areas.

Hand Fill of Ditches and Small Channels 4, 6, 16, and 17

This restoration practice will be utilized within fen and discharge slope meadows. In select small channels and ditches less than approximately 2' deep and 2' wide, hand crews will backfill steep sloping locations or place plugs in shallow sloping locations. This practice is referred to as "Hand Fill Chanel," "Hand Fill Ditch," and "Hand Borrow Area" in the legends of plan view figures displayed throughout this IS/MND. Two types of fill material will be used as appropriate, either a 50:50 mix of native alluvium and wood chips, or densely woven coconut coir logs. In both instances, hand crews will place the material within the channel. Coir logs will be staked in place. The alluvium and wood chips mix will fill gaps between the bed, banks, and the coir logs, helping to prevent piping and rapid subsurface flow.

The total ditch and small channel fill volume recommended for hand fill treatments is approximately 740 c.y. Roughly 370 c.y. each of wood chips and mineral soil will be required if coir logs are not use. 693 c.y. of potential fill has been identified in hand fill borrow areas. Using hand tools, any remaining sod within small channels will be salvaged and stockpile adjacent to the channel. Alluvium will be excavated from borrow areas using a combination of mechanical and hand tools. This material along with wood chips will be transported using whenever feasible, non-mechanized equipment. Transport routes will be established in areas that will not result in damage to meadow soils and vegetation resources. The salvaged sod will then be replanted with fill material packed to the required elevation. Jute fabric will be placed and staked in a manner similar to the mechanical treatment criteria described above if the area is at high risk of flood flows and erosion. No maintenance is expected to be necessary for channels and ditches filled by hand crews and annual monitoring will be in place for 3 years to determine any needs. If substantial erosion occurs, additional material, erosion control fabric, and revegetation will be required. Monitoring and Maintenance requirements will be formalized in a maintenance agreement between the landowner and RCD of Tehama County as described in Appendix I of the IS/MND.

Revegetation Areas 3, 5, 10, 11, 12, 13, 14

Revegetation practices described in this section will be used in and adjacent to riparian meadow floodplain and transport reaches. Riparian deciduous shrubs and trees will be planted in and adjacent to stream channels. These plantings are intended to accelerate the creation and enhancement of habitat for terrestrial and aquatic vertebrates. All plants will be locally sourced (collected locally and grown at a nursery). Willow cuttings will be sourced from within the Childs Meadows complex according to the criteria in the willow material sourcing practices described under **Material Sourcing** below. Revegetation will occur by hand within two years of hydrologic restoration activities. The Sierra Meadow Planting Palette tool developed by Point Blue Conservation Sciences (PBC) will be utilized to identify appropriate plant species in order to actively revegetate meadow sites within the Project area. Temporary protection (e.g., fencing, tubes) of plantings may be required to reduce impacts from cattle, deer, and other plant predators. If substantial loss of desired plant species occurs, additional planting (and protection) to maintain the desired species composition will be required. No maintenance is expected to be necessary for this practice, but occasional post-project monitoring will occur for up to 20 years to determine success and need for supplemental planting. Monitoring during the duration of the grant will occur as outlined in the monitoring plan shown in **Appendix L** of the IS/MND.

Material Sourcing

The following describes the requirements, procedures and standards for sourcing materials to be used in connection with the **Restoring the Deer Creek Headwaters at Childs Meadows Project**

Conifers

Approximately 3,890 non-merchantable live and recently fire-killed conifers will be required in order to implement proposed restoration practices: approximately 2,300 trees to generate 1,080 CY of woodchips for mechanical and hand fill treatments; up to 1,350 for wood structures (assuming 10 trees per BDA and PALS); and up to 235 for the conifer jackstraw treatments. These calculations assume an average tree size of 8" DBH. Live non-merchantable lodgepole pine, white fir, incense cedar, along with fire-killed non-merchantable conifers of any species, up to 12" DBH sourced from (1) within the boundaries of delineated wetlands outside of treed fens, and (2) within non-wetland habitat to 100 ft of the mapped wetland boundary of Childs Meadows will be utilized. The second sourcing area is within Collins Almanor Forest's Childs Meadows THP boundary. These sites are displayed in **Figure 1: Restoring the Deer Creek Headwaters at Childs Meadows Project Location Map** of the IS/MND. All cultural resource and rare plant sites will be avoided when sourcing conifers. When woody material is needed, all suitable trees required for a particular activity will be felled and immediately transported to restoration areas using pick-up trucks and

ATVs with trailers. Limbs and other unused material will be lopped and scattered in the areas from which they were sourced. Exact areas where conifers are sourced will be determined during construction and thus are not shown in the plan view figures.

Beaver Dam Analogs

Beaver Dam analogs will be constructed using native material sourced onsite, including conifers, willow, sod, soil, forest duff, and rocks. Conifers and willows will be sourced as described in their respective material sourcing sections described in the IS/MND. Approximately five c.y. of non-woody material (sod, soil, forest duff, and rocks) will be needed for each BDA structure. Soil, forest duff, and rocks will be sourced with hand tools from upland sites within 30 m of mapped Childs Meadows wetland boundaries, outside of all cultural resource areas. These sites are identified as “BDA Uplands Material Source” in plan view figures throughout this IS/MND. A total of 19.6 acres of potential BDA material locations have been mapped however, only 2% of this area will be disturbed in order to yield no more than 550 c.y. of upland soil, duff, and rock. The disturbance footprint created in obtaining this material will occur in patches no larger than 4 m^2, digging 30 cm (12 inches) deep, and no more than 4 m^2 will be disturbed from any 20 m^2 area. Sod for BDAs will be obtained from existing wetland surfaces, excluding fens and dewatered wetlands. Patches of sourced sod will be no larger than 1 m^2 and 30 cm deep, and no more than 2 m^2 will be taken from any 20 m^2 area of non-fen existing wetland surface. Up to 500 m^2 of sod (up to 200 CY of sod material) will be used throughout the entire Project area. Sod source sites have not been mapped in plan view figures but will exclude rare plants and cultural sites.

Willows

Willow cuttings are required for the construction of BDAs and for revegetation plantings. Most of the willow cuttings will be sourced from individuals found within the Project area. When willows are not available within 100 yards of a planned BDA structure or revegetation area, cuttings will be sourced from the lower extent of the Project area, within Area 14, or further downstream on CAF land where willows are abundant. Only branches less than 2” in diameter at the cutpoint will be used. No more than 20% of stems from an individual willow plant will be removed. No willow cuttings will be removed within existing Willow Flycatcher territories as described in the Biological Resources section of this IS/MND.

Cattle Grazing

Current and historical grazing is a key problem related to the degradation of Childs Meadows. There are 395 acres of wetlands on CAF property managed under the conservation easement now held by Collins Almanor Forest of which 243 acres is currently available for “full-season” grazing. Currently, where grazing within the Childs Meadows complex is conducted, the grazing strategy is incompatible with achieving long-term restoration objectives. In order for grazing to continue within the **Project Area** while at the same time ensuring its compatibility with desired Project outcomes, modifications will be made to the current grazing regime within the Project area. To continue this land use activity once Project work is completed will require improved grazing management by the landowner and lessee as well as an increased use of fencing and natural barriers (e.g., downed trees) to exclude grazing from sensitive areas of the meadow such as fens, stream channels, and large unfilled headcuts **(See Figure 23: Map Showing Approximate Locations of Proposed New Fencing and Extent of Childs Meadows Wetland Area on Collins Almanor Forest Land With Easement Held by TNC Available for “Full-Season” Grazing and Table 3: Length of Fencing to be Installed Within the Restoring the Deer Creek Headwaters at Childs Meadows Project)** of the IS/MND.

As proposed, approximately 5% (12 of 243 acres) of the area within that portion of the meadow complex managed under CAF's conservation easement will be removed from all grazing activity. 231 acres of these wetlands will remain available for "full-season" grazing which would once again be allowed in the year immediately following completion of restoration work. Continuation of grazing will require diligence by the grazer and/or landowner to ensure that cows stay out of sensitive restored sites and that fences are repaired in a timely manner. Improved cattle grazing operations will require installing approximately 1 mile of new fencing **(See Table 3 of the IS/MND)**. Additional grazing mitigation practices would be needed within the most sensitive areas to ensure minimal damage to soils and resources when fences are breached or circumvented by cattle. Achieving necessary levels of protection will require a substantial initial cost for fencing and other Mitigation Measures, a maintenance budget for fence upkeep and regular diligence to ensure fence integrity especially in the late season when cows are inclined to enter wetter, more productive areas. These measures will be pared with a reduction in cattle number to attain AUMs approximately 20% lower than currently exists. A reduction in AUMs would be achieved through a combination of reducing the number of animals or the duration with which they are present. Exact AUMs will be adapted annually based on water year/available forage and results from monitoring the effects of previous year's grazing impacts on restoration goals. Development of a rigorous grazing management plan will occur as part of this Project's implementation funding to detail and codify these concepts.

Grazing Management - Exclusion Fencing

Exclusion fencing will be used in and adjacent to fens in Areas 4 and 6 to exclude or discourage cattle from entering these sensitive sites thus meeting restoration objectives. The fence type will be split rail utilizing cedar sourced within upland forest stands within the Project area on adjacent Collins Almanor Forest lands or wildlife friendly barbed wire. The fencing material to be used will vary depending on local conditions . No digging will be necessary, though posts will be driven into the ground. Mapped fence locations are approximate and may change based on field conditions **(See Figure 23: Map Showing Approximate Locations of Proposed New Fencing and Extent of Childs Meadows Wetland Area of the IS/MND)**. Cattle exclusion fencing will be maintained for the first 3 years by RCD of Tehama County and CAF using grant funding. Following the initial 3-year maintenance period, fence maintenance will become the responsibility of the landowner, which at the present time is Collins Pine. Cost associated with fence maintenance will be offset from funds generated in connection with Project area grazing leases.

Grazing Management - Conifer Jackstraw

Jackstrawing of small conifers will be used in fens and discharge slope meadows in Areas 4, 6, 16, 17, and 18. In these areas, fens were identified that had significant hoof puncture impacts created by cattle and are at high risk of further degradation. Where these fens remain unfenced or have partial fencing, small diameter whole trees will be felled and placed across the meadow and meadow edge in a crisscross (jackstraw) patten in order to discourage overuse by cattle. This material will be placed at a density of 100 trees per hectare over an area of 2.34 acres. Approximately 234 trees will be used for this purpose. All trees will be sourced according to the conifer material sourcing practice described in the IS/MND. All areas containing rare plants whose development is incompatible with this action will be avoided. The conifer jackstraw treatment will be maintained for the first 3 years by RCD and CAF personnel through implementation grant funds. Following the 3-year implementation period, maintenance will be the responsibility of the landowner

Grazing under new management requirements would be allowed in the year immediately following restoration. Monitoring of modified grazing areas would be required of the grazer and CAF to ensure livestock is excluded from sensitive areas. CAF has stated a commitment to regularly assess the compatibility of the selected grazing regime with restoration objectives through long-term monitoring, adaptively managing grazing in the interest of meadow health and re-evaluating the grazing lease annually with the possibility of complete cessation of grazing within the meadow in the future.

RESOURCE CONSERVATION DISTRICT of TEHAMA COUNTY

2 Sutter Street, Suite D ♦ Red Bluff, California 96080 ♦ 530-527-3013 ♦ Fax: 530-527-7451

Resource Conservation District of Tehama County
Notice of Intent to Adopt a Mitigated Negative Declaration and Notice of Public Hearing for the Restoring the Deer Creek Headwaters at Chjilds Meadows Project

In accordance with the California Environmental Quality Act (CEQA), the Resource Conservation District of Tehama County has prepared an Initial Study and is considering the adoption of a Mitigated Negative Declaration for the **Restoring the Deer Creek Headwaters at Childs Meadows Project** at a public hearing before the Conservation District on December 8th, 2021 at 9:00 a.m. in the conference room of the RCD offices located at, 2 Sutter Street Suite D Red Bluff, CA 96080. The Resource Conservation District of Tehama County is established under Division 9 of the California Public Resources Code, by the rules of the Tehama County Local Agency Formation Committee as a locally governed agency with primary authority to implement local conservation measures.

Project Information

Project: Restoring the Deer Creek Headwaters at Childs Meadows Project

Project Proponent: Resource Conservation District of Tehama County, Red Bluff, CA.

Location:
The 404 acre Project area lies within the Childs Meadows complex located at the intersection of the Sierra Nevada and Cascades Mountain ranges in northeastern Tehama County. The Project area is located approximately 40 miles east of Red Bluff, 20 miles west of the Lake Almanor community, 10 miles east of the town of Mineral, 6 miles southeast of the Mill Creek community 40 miles east of Chico, and 10 miles south of the southwest entrance to Lassen Volcanic National Park. The Project area lies within the United States Geological Survey 7.5-minute Childs Meadows quadrangle map (T27N R3W, Mount Diablo Meridian) at approximately:

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SE corner:
40°18'51.4"N -121°26'42.5"W

The meadow is adjacent to State Route 36E/89 to the east, and Forest Service Road 28N88 traversing north to south and 28N90 to the southeast. Childs Meadows is a riparian wet meadow complex in the headwaters of the Deer Creek watershed, just to the west of the Upper North Fork Feather River watershed. The meadow runs generally north to south along Gurnsey Creek, which flows into Deer Creek about 4 miles downstream from the end of the Project planning area. The meadow is on the west and south sides SR 36E/89 and accessible from multiple pullouts and dirt access roads from the highway.

Proposal:
See attached scope of work

The California Environmental Quality Act requires this notice to disclose whether any listed toxic sites are present on the project site. The project site does not contain a listed toxic site.

The Initial Study/Mitigated Negative Declaration (IS/MND), and reference documents for this project are on file for public review until January 8th 2021, at the Resource Conservation District of Tehama County (RCDTC) office, located at 2 Sutter Street, Suite D Red Bluff CA 96080. The IS/MND is also available for review on the RCDTC website at http://www.tehamacountyrcd.org/notices. All persons are invited to review the document. Written comments will be accepted by the RCDTC at the above address or via email at **jbarrett@tehamacountyrcd.org**. Comments are encouraged to be submitted in writing at any time prior to the hearing or orally at the meeting listed above or as may be continued to a later date. If you challenge the above application in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice or in written correspondence delivered to the RCDTC at, or prior to the public hearing. For information call or send an email to **Jon Barrett 530-727-1293 or jbarrett@tehamacountyrcd.org.**

RESTORING THE DEER CREEK HEADWATERS AT CHILDS MEADOWS PROJECT

PUBLIC REVIEW OF THE INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

December 2021

PREPARED BY: Resource Conservation District of Tehama County
2 Sutter Street, Suite D
Red Bluff, CA 96080
(530) 527-1280

CEQA LEAD AGENCY: Resource Conservation District of Tehama County

PROPOSED MITITGATED NEGATIVE DECLARATION

Project: Restoring the Deer Creek Headwaters at Childs Meadows Project

Lead Agency: Resource Conservation District of Tehama County (RCDTC)

Public Review Period: A 30-day public review period shall begin on December 7th, 2021. Written comments must be submitted to the Lead Agency no later than 5:00 p.m. on January 7th, 2021.

Availability of Documents: The Draft Initial Study for this Proposed Mitigated Negative Declaration is available for review at:

http://www.tehamacountyrcd.org/notices

A printed copy is available to view during business hours (8:00 a.m. to 5:00 p.m.) at the Resource Conservation District of Tehama County (RCDTC) office located at 2 Sutter Street in Red Bluff.

Questions or comments regarding this Proposed Mitigated Negative Declaration and Initial Study may be addressed to:

Tom McCubbins
CEQA Projects Manager
2 Sutter Street, Suite D
Red Bluff, CA 96080
tom@tehamacountyrcd.org
(530) 200-1231

Project Location:
The 404-acre Project area lies within the Childs Meadows complex located at the intersection of the Sierra Nevada and Cascade Mountain ranges in northeastern Tehama County. The Project area is located approximately 40 miles east of Red Bluff, 20 miles west of the Lake Almanor community, 10 miles east of the town of Mineral, 6 miles southeast of the Mill Creek community, 40 miles east of Chico, and 10 miles south of the southwest entrance to Lassen Volcanic National Park. The Project area lies within the United States Geological Survey 7.5-minute Childs Meadows quadrangle map. NAD83/WGS84 Datum:

NW corner:
40°21'04.6"N -121°29'49.5"W
NE corner:
40°21'02.1"N -121°26'39.5"W
SW corner:
40°18'53.9"N -121°29'52.4"W
SE corner:
40°18'51.4"N -121°26'42.5"W

The meadow is adjacent to State Route 36E/89 to the east, and Forest Service Road 28N88 traversing north to south and 28N90 to the southeast. Childs Meadows is a riparian wet meadow complex in the headwaters of the Deer Creek watershed, just to the west of the Upper North Fork Feather River watershed. The meadow runs generally north to south along Gurnsey Creek, which flows into Deer Creek about 4 miles downstream from the end of the Project planning area. The meadow is on the west and south sides State Route 36E/89 and accessible from multiple pullouts and dirt access roads from the highway. **See Figure 1 Proposed Restoring the Deer Creek Headwaters at Childs Meadows Project Location Map.**

Project Description:

Project work to be completed in connection with the **Restoring the Deer Creek Headwaters at Childs Meadows Project** is intended to address current hydrologic and biological issues in order to increase hydrologic connectivity and recover other ecological processes lost due to human alterations of the Childs Meadows complex. These components were designed in a manner that will allow for treatment adjustments as necessary over time in order to assure long term meadow recovery. Project treatments have been designed so that natural materials will be used and energy within natural systems (e.g., sediment transport, beaver ecosystem engineering) can be effectively and efficiently utilized in order to implement some of the restoration work required to achieve Project goals and objectives. In-channel restoration actions have been supplemented with various Mitigation Measures related to cattle grazing and the elimination of livestock where possible; specific practices to recover and re-wet fens and discharge slope meadows that do not naturally have channels; and climate-smart planting plans to increase vegetative diversity and encourage beaver colonization from the lower meadow complex. The following is a list of Project treatments that will be implemented in completing this Project's scope of work. Details of each component are described in the Project Description and Project Description/Restoration Practices section within the attached **Initial Study/Mitigated Negative Declaration** below and are shown in **Figure 1 Restoring the Deer Creek Headwaters at Childs Meadows Project Location Map** as well as **Figure 2: Overview of Childs Meadows Project Area with Specific Features Identified**. Schematics of proposed meadow restoration features are shown in **Appendix J: Schematic Drawings** with cross sections shown in **Appendix K.**

Findings: An Initial Study was prepared to assess the proposed Project's potential effects on the environment and the significance of those impacts. Based on the Initial Study, the RCD of Tehama County has determined that the proposed Project will not have a significant impact on the environment as Mitigation Measures will be implemented to reduce impacts to less-than-significant levels. This conclusion is supported by the following findings:

1. **The proposed Project would have no impact on:**
    a. Agricultural and Forest Resources
    b. Land Use/Planning
    c. Population/Housing
    d. Public Services
    e. Recreation

f. Utilities/Service Systems

2. **The proposed Project would result in a less-than-significant impact on:**
    a. Aesthetics
    b. Energy
    c. Geology/Soils
    d. Greenhouse Gas Emissions
    e. Mineral Resources
    f. Transportation

3. **Mitigation Measures have been adopted by the RCDTC to reduce potentially significant impacts to less-than-significant levels on:**
    a. Air Quality
    b. Biological Resources
    c. Cultural Resources
    d. Hazards/Hazardous Materials
    e. Hydrology/Water Quality
    f. Noise
    g. Tribal Cultural Resources
    h. Wildfire (See Mitigation Measures related to Hazards and Hazardous Materials)

STATEMENT OF NO SIGNIFICANT EFFECT

In accordance with Section 21082.1 of the California Environmental Quality Act, RCD of Tehama County staff have independently reviewed and analyzed the Initial Study/Mitigated Negative Declaration prepared for the **Restoring the Deer Creek Headwaters at Childs Meadows Project** and find that the Initial Study and Proposed Mitigated Negative Declaration reflect the independent judgment of RCDTC staff.

The RCDTC has reviewed potential environmental effects related to implementation of the **Restoring the Deer Creek Headwaters at Childs Meadows Project**. Incorporated into this Mitigated Negative Declaration is an Initial Study in which potential impacts of the proposed Project are discussed. The Initial Study identified ten resource areas that could be potentially affected by the proposed Project. Those determined to be less than significant related to **Aesthetics**, **Energy**, **Geology and Soils**, **Greenhouse Gas Emissions**, **and Transportation**. Those resources in which potential Project related impacts could be significant and thus require the implementation of Mitigation Measures include **Air Quality**, **Biological Resources**, **Cultural Resources**, **Hazards and Hazardous Materials**, **Hydrology and Water Quality**, **Noise**, **Tribal Cultural Resources**, **and Wildfire.** A number of special-status animals and plants were identified within or around the Project area. Although the proposed Project is intended to benefit these species and the natural environment overall, adverse impacts from proposed Project implementation are possible. Various environmental commitments and formally established Mitigation Measures have been developed and described in the Initial Study to avoid or minimize impacts to such species that can typically occur during implementation of the proposed Project.

The RCDTC finds these environmental protection measures adequate to reduce potential impacts that could occur during proposed Project implementation to less than significant levels. Consequently, the RCDTC has determined that the **Restoring the Deer Creek Headwaters at Childs Meadows Project** as developed, implemented, and mitigated, would not have a significant impact on the environment.

-- **----------------------------**

Jon Barrett, District Manager **Date**
Resource Conservation District of Tehama County

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The environmental factors checked below would be potentially affected by this Project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Energy
☐ Geology/Soils	☐ Greenhouse Gas Emissions	☒ Hazards & Hazardous Materials
☒ Hydrology/Water Quality	☐ Land Use/Planning	☐ Mineral Resources
☒ Noise	☐ Population/Housing	☐ Public Services
☐ Recreation	☐ Transportation	☒ Tribal Cultural Resources
☐ Utilities/Service Systems	☒ Wildfire	☒ Mandatory Findings of Significance

Mitigation Measures

An array of Mitigation Measures has been developed and will be implemented by the Resource Conservation District of Tehama County, any contractors, and their subcontractors along with responsible agencies, in order to avoid or minimize potential environmental impacts during the execution of **Restoring the Deer Creek Headwaters at Childs Meadows Project** work. These are shown in **Appendix A: Mitigation Monitoring and Reporting Plan** along with the entity responsible for any required monitoring and reporting. Through the implementation of these Mitigation Measures, along with the Best Management Practices shown in **Appendix B: Best Management Practices Developed for the Restoring the Deer Creek Headwaters at Childs Meadows Project**) the potential for environmental impacts related to this Project will be reduced to a less-than-significant level.

LEAD AGENCY DETERMINATIONS/STATEMENT OF NO SIGNIFICANT EFFECT

The Resource Conservation District of Tehama County (RCDTC) has determined that the **Restoring the Deer Creek Headwaters at Childs Meadows Project** (proposed Project) would not have a significant adverse effect on the environment. This conclusion is based upon the Project design as well as the Mitigation Measures, Best Management Practices and environmental commitments that would be incorporated into the proposed Project. The RCDTC has identified the possibility of potential environmental impacts related to Project implementation that could be significant within the implementation Mitigation Measures. These include Air Quality, Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Tribal Cultural Resources and Wildfire. The proposed Project, its potential impact on the Project area, and the protection measures to be taken during Project implementation that avoid, reduce, or mitigate environmental impacts are described in this Initial Study. The evidence supporting this determination is drawn from information developed by RCDTC staff, others listed under the heading **List of Preparers and Contributors**, and this Project's Technical Advisory Committee consisting of personnel from Point Blue Conservation

Science, University of California, Davis, Collins Pine Company, The Nature Conservancy, Applied Ecohydrology Institute, United States Fish and Wildlife Service, and the RCDTC.

On the basis of this initial evaluation:

☐ I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by Mitigation Measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or Mitigation Measures that are imposed upon the proposed Project, nothing further is required.

____
Signature

____
Date

____
Print Name and Title

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Project Information

Project Title	**Restoring the Deer Creek Headwaters at Childs Meadows**
Lead Agency Name and Address	Resource Conservation District of Tehama County (RCDTC) 2 Sutter Street, Suite D Red Bluff, CA 96080
Contact Person and Phone Number	Tom McCubbins CEQA Projects Manager (530) 200-1231 tom@tehamacountyrcd.org
Project Sponsor's Name and Address	Point Blue Conservation Science 3820 Cypress Drive, Suite 11 Petaluma, CA 95954 Attn Ryan Burnett
Project Location	**Project Location:** The 404-acre Project area lies within the Childs Meadows complex located at the intersection of the Sierra Nevada and Cascades Mountain ranges in northeastern Tehama County. The Project area is located approximately 40 miles east of Red Bluff, 20 miles west of the Lake Almanor community, 10 miles east of the town of Mineral, 6 miles southeast of the Mill Creek community 40 miles east of Chico, and 10 miles south of the southwest entrance to Lassen Volcanic National Park. The Project area lies within the United States Geological Survey 7.5-minute Childs Meadows quadrangle map (T27N R3W, Mount Diablo Meridian) at approximately: NW corner: 40°21'04.6"N -121°29'49.5"W NE corner: 40°21'02.1"N -121°26'39.5"W SW corner: 40°18'53.9"N -121°29'52.4"W SE corner: 40°18'51.4"N -121°26'42.5"W The meadow is adjacent to State Route 36E/89 to the east, and Forest Service Road 28N88 traversing north to south and 28N90 to the southeast. Childs Meadows is a riparian wet meadow complex in the headwaters of

	the Deer Creek watershed, just to the west of the Upper North Fork Feather River watershed. The meadow runs generally north to south along Gurnsey Creek, which flows into Deer Creek about 4 miles downstream from the end of the Project planning area. The meadow is on the west and south sides SR 36E/89 and accessible from multiple pullouts and dirt access roads from the highway. (**See "Figure 1: Proposed Restoring the Deer Creek Headwaters at Childs Meadows Project Location Map" shown in the attached Initial Study document.)**
General Plan Designation	HR Habitat Resources T Timber GOV Government
Zoning	NR Natural Resources GOV Government TPZ Timber
Description of Project	The **Restoring the Deer Creek Headwaters at Childs Meadows Project** entails implementation of restoration practices that will address current hydrologic and biological issues within the Childs Meadows complex in order to increase hydrologic connectivity and recover other ecological processes lost due to human alteration. These components were designed in a manner that will allow for treatment adjustments as necessary over time in order to assure long term meadow recovery. These treatments were also designed to utilize natural materials and energy within natural systems (e.g., sediment transport, beaver ecosystem engineering) to achieve Project goals and objectives. The following is a list of the general practice that will be used in connection with Project work to restore hydrologic, geomorphic and biological conditions within the Childs Meadows complex. In addition to the practices themselves, construction and maintenance requirements are included in the proposed Project work. A visual description of proposed meadow treatments is shown in generalized schematics displayed in **Appendix J: Schematic Drawings.** Cross sections of these features are shown in **Appendix K.** **Beaver Dam Analogs (BDA):** Applicable Areas 1,2,3,5, 8, 9, 10, 11 and 12

	Post-Assisted Log Structure (PALS): Applicable Areas 1, 3, 11, 14 **Headcuts and Channel Fill in Fens:** Applicable to Areas 4 and 6 **Hand Fill of Ditches and Small Channels** Applicable to Areas 4, 6, 16, and 17 **Practices Common to the Implementation of Project Work Within Fens:** **(See description of these practices within the "Project Description/Restoration Practices" section in the Initial Study/Mitigated Negative Declaration Document shown below.)** **Revegetation:** Applicable to Areas 3, 5, 10, 11, 12, 13, 14 **Material Sourcing – BDAs:** Applicable to Areas 1, 2, 3, 5, 8, 9, 10, 12,13, 14 **Road Modifications (removing and lowering roadbeds):** Applicable to Areas 3 and 4 **Redirecting Tributary Streams:** Applicable to Area 19 **Cattle Grazing** Current and historical grazing is a key problem related to the degradation of Childs Meadows. In order for grazing to continue within the **Restoring the Deer Creek Headwaters at Childs Meadows Project** area while ensuring its compatibility with desired Project outcomes, modifications will be made to the current grazing regime within that portion of the Childs Meadows complex within the Project area. In general, proposed changes to the Project area's current grazing program relies on the extensive use of fencing in order to exclude livestock from the most sensitive areas of the Childs Meadows complex including fens, stream channels, and large unfilled headcuts. These practices include: **Grazing Management - Exclusion Fencing:** Applicable to Areas 1, 2, 4, 5, 6

	Fencing will be installed to permanently exclude cattle from some sensitive areas of the restoration Project in order to meet restoration objectives. The fence type will vary based on location. No digging will be necessary, though posts may be driven into the ground. Natural fence materials will be sourced offsite. Mapped fence locations are approximate and may change based on field conditions. **Grazing Management - Conifer Jackstraw:** Applicable to Areas 4, 6, 16, 17 Whole trees will be felled and placed in crisscrossing "jackstraw" patterns across the meadow surface in some areas at a density of 50 trees per hectare. Only lodgepole pine less than 8 inches DBH will be used. All material will be sourced according to the conifer material sourcing practice established for this project. This practice will be avoided in all areas with rare plants whose development is incompatible with such treatments. **Grazing Management - Exclusion Fencing** Fencing will be installed to permanently exclude cattle from some sensitive sites within the Project area. The exact fence type will be determined based upon the location of installation and will consist of natural materials sourced within the Project area or from existing on-site fencing located within the Project area. No digging will be necessary, though posts may be driven into the ground. In-channel restoration actions have been supplemented with various Mitigation Measures related to Project implementation and maintenance as well as ongoing cattle grazing (including the elimination of livestock where possible). A detailed list and description of Mitigation Measures can be found in **Appendix A: Mitigation Monitoring and Reporting Plan**.
Surrounding Land Uses and Setting	Surrounding land uses include ranching, timber production and outdoor recreation.
Other Public Agencies Whose Approval May Be Required	The proposed Project may require, depending upon the ultimate source of Project funding, permits or approvals from the following: U.S. Army Corps of Engineers, National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Forest Service/Lassen National Forest, Central Valley Flood Protection

	Board, California Department of Transportation, California Department of Fish and Wildlife, State Historic Preservation Office, Central Valley Regional Water Quality Control Board, Tehama County Air Pollution Control District, Tehama County Department of Public Works, and Tehama County Agriculture Department.
Have California Native American tribes traditionally and culturally affiliated with the Project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significant of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?	Concurrent with cultural and archeological investigations completed in connection with this project, Collins Almanor Forest prepared the Child Meadows Timber Harvest Plan (Plan No. 2-19-00153-TEH) inclusive to the Project Area footprint. Based upon an agreement reached by the managing partners, the current Native American coordination effort completed by Collins Pine for the Childs Meadows THP was adopted here and no new Native American coordination was pursued for this investigation. The Childs Meadows THP Native American coordination log was completed by Registered Professional Forester Glen Gerbatz. Due to the sensitive and confidential nature of information contained within that portion of the THP document, it was not included with the attachments to this Initial Study/Mitigated Negative Declaration. Additional information related to tribal consultation can be found in the **Tribal Cultural Resources** section of this Initial Study/Mitigated Negative Declaration below.

Acronyms and Abbreviations	
AQAP	**air quality attainment plans**
ARP	**Archaeological Research Program**
ARPA	**Archaeological Resources Protection Act**
BMP	**best management practice**
BOR	**United States Bureau of Reclamation**
CAA	**Clean Air Act**
CAF	**Collins Almanor Forest**
Cal Fire	**California Department of Forestry and Fire Protection**
CAL-IPC	**California Invasive Plant Council**
Caltrans	**California Department of Transportation**
CARB	**California Air Resources Board**
CCAA	**California Clean Air Act**

CDFW	**California Department of Fish and Wildlife**
CEQA	**California Environmental Quality Act**
cfs	**cubic feet per second**
CGS	**California Geological Survey**
CO2e	**carbon dioxide equivalents**
CRHR	**California Register of Historical Resources**
CSUC	**California State University, Chico**
c.y.	**cubic yards**
dB	**decibels**
DWR	**California Department of Water Resources**
EPA	**Environmental Protection Agency**
GHG	**greenhouse gas**
IS/MND	**Initial Study/Mitigated Negative Declaration**
LNF	**Lassen National Forest**
NAHC	**Native America Heritage Commission**
NEPA	**National Environmental Policy Act**
NEIC	**Northeast Information Center**
PBC	**Point Blue Conservation Science**
Proposed Project	**Restoring the Deer Creek Headwaters at Childs Meadows Project**
RCDTC	**Resource Conservation District of Tehama County**
SMP	**Smoke Management Plan**
TCAPCD	**Tehama County Air Pollution Control District**
TNC	**The Nature Conservancy**
THP	**Timber Harvest Plan**
UCD	**University of California Davis**
USFS	**United States Forest Service**
USGS	**United States Geological Survey**

Introduction

Authorization

The **Restoring the Deer Creek Headwaters at Childs Meadows Project** (proposed Project) is a meadow habitat and sediment load reduction effort. As of the date this Initial Study/Mitigated Negative Declaration's preparation, a source of implementation funding has not been secured thus authorization of Project work cannot be determined.

Lead Agency

The California Public Resources Code Sections 21000–21177 and California Environmental Quality Act (CEQA) Guidelines provide the statutory requirements for evaluating environmental impacts of proposed projects. The Resource Conservation District of Tehama County, a unit of local government under Division 9 of the California Code, is serving as the State Lead Agency and has prepared this Initial Study for CEQA compliance.

Anticipated Permits and Approvals

The RCDTC has the responsibility to ensure that all requirements of CEQA and other applicable regulations are met. Other potential permitting requirements for the proposed Project are listed in **Table 1** below.

Table 1: Permits and Approvals Potentially Required for the Childs Meadows Project*

Approving Agency	Required Permit/Approval	Required For
California Department of Fish and Wildlife	California Endangered Species Act Consultation (Section 2081)	Incidental take or otherwise lawful activities that may adversely affect State-listed species
	Lake and Streambed Alteration Agreement (Section 1601 of the Fish and Game Code)	Any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake
Central Valley Regional Water Quality Control Board	Clean Water Act Section 401 Certification	Discharge of pollutants into waters of the United States
National Marine Fisheries Service	Magnuson-Stevens Fishery Conservation and Management Act Compliance Federal Endangered Species Act Section 7 Consultation	Potential impacts to Essential Fish Habitat of species covered by the Act Potential impacts on federally-listed fish species Prior to implementation of impactive activities, the Project proponent shall consult with the National Marine Fisheries Service in order to obtain a finding of "no significant impact".
State Historic Preservation Officer	National Historic Preservation Act Section 106 Concurrence	Any actions that may have an adverse impact on historical resources

U.S. Army Corps of Engineers	Federal Clean Water Act Section 404 Permit	Discharge of dredged or fill material into water of the United States
U.S. Fish and Wildlife Service	Migratory Bird Treaty Act Compliance Federal Fish and Wildlife Coordination Act Report	Potential impacts on migratory birds Federal actions that may control or modify a natural stream or other water body
U.S. Forest Service Lassen National Forest	Road access permit	An Access permit may be required to utilize the adjacent USFS road system to transport personnel and equipment
Tehama County Public Works Department	Road access permit	An Access permit may be required to utilize the State highway right-of-way to access the Project area by personnel and deliver supplies and equipment

At the present time, the RCD of Tehama County and Point Blue Conservation are uncertain as to the ultimate source of implementation funding for this effort. As result an exact list of permits and approvals cannot be developed and could changes from those shown above. Those shown in Table 1 will be required regardless of the funder.

Project Area

The 404-acre Project area lies within the Childs Meadows complex located at the intersection of the Sierra Nevada and Cascades Mountain ranges in northeastern Tehama County, approximately 40 miles east of Red Bluff, 20 miles west of the Almanor community, 10 miles east of the Mineral community, and 10 miles south of the southwest entrance to Lassen Volcanic National Park. The Project area lies within the United States Geological Survey 7.5-minute Childs Meadows quadrangle map (T27N R3W, Mount Diablo Meridian). The four corners of the Project area are located at approximately:

NW corner:
40°21'04.6"N -121°29'49.5"W
NE corner:
40°21'02.1"N -121°26'39.5"W
SW corner:
40°18'53.9"N -121°29'52.4"W
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(See Figure 1: Restoring the Deer Creek Headwaters at Childs Meadows Project Location Map). The meadow is adjacent to State Route 36E/89 to the east, and Forest Service Roads 28N88 traversing north to south and 28N90 to the southeast. Childs Meadows is a riparian wet meadow complex in the headwaters of the Deer Creek watershed, due west of the Upper North Fork Feather River watershed.

The meadow runs generally north to south along Gurnsey Creek, which flows into Deer Creek about 4 miles downstream of the Project area's southern planning boundary. The meadow is on the west and south sides SR 36E/89 and accessible from multiple pullouts and dirt access roads from the highway. Most of the Childs Meadows complex and adjacent uplands is owned by Collins Almanor Forest (CAF). Other landowners within this meadow complex include two private resorts, Highlands Resort located on the north end of Childs Meadows on a 76-acre parcel and the Child Meadows Resort located across Highway 36. The Nature Conservancy (TNC) holds conservation easements on the entire parcel encompassing the Project area, as well as the 76-acre Highlands Resort parcel. The standards and requirements of the TNC easement have been incorporated into the restoration designs, Mitigation Measures and Best Management Practices (BMP) developed for this Project. In addition to Collins Almanor Forest, adjacent landowners include the United States Forest Service (USFS) who manage surrounding Lassen National Forest (LNF) parcels.

Project Purpose and Need

The purpose of the **Restoring the Deer Creek Headwaters at Childs Meadows Project** is to address a number of hydrologic and erosion problems within the Childs Meadows complex in order to recover ecological processes that created and maintained meadow biodiversity prior to human alterations which include a long history of cattle grazing, ditching, diversions, and other flow consolidation to accommodate grazing, as well as wildland road development and timber harvest on adjacent uplands. These current conditions within the Childs Meadows complex were analyzed using field and computer-based techniques and were described in a conceptual restoration plan.

Based upon this analysis the ecological conditions described above can be summarized into 6 categories: (1) redirected flows and areas of unnatural constriction due to abandoned and active roads and ditches, (2) cattle impacts to vegetation, flow paths, and channel stability, (3) deep channel incisions and head cuts that are draining and causing disconnection with the meadow surface, (4) where unburned by recent fires, altered forest structure due to forest management and fire suppression that has reduced available large woody debris and increased conifer encroachment, (5) where recently burned, erosion-prone soils, and (6) elimination of beaver from portions of the meadow. In order to maintain the ecological viability of the Childs Meadows complex along with water quality of Gurnsey Creek, a major tributary within the Deer Creek watershed system, this Project will address a number of these problems through a range of restoration practices, described in this Initial Study/Mitigated Negative Declaration under the heading **Project Description/Restoration Practices**.

Location Map

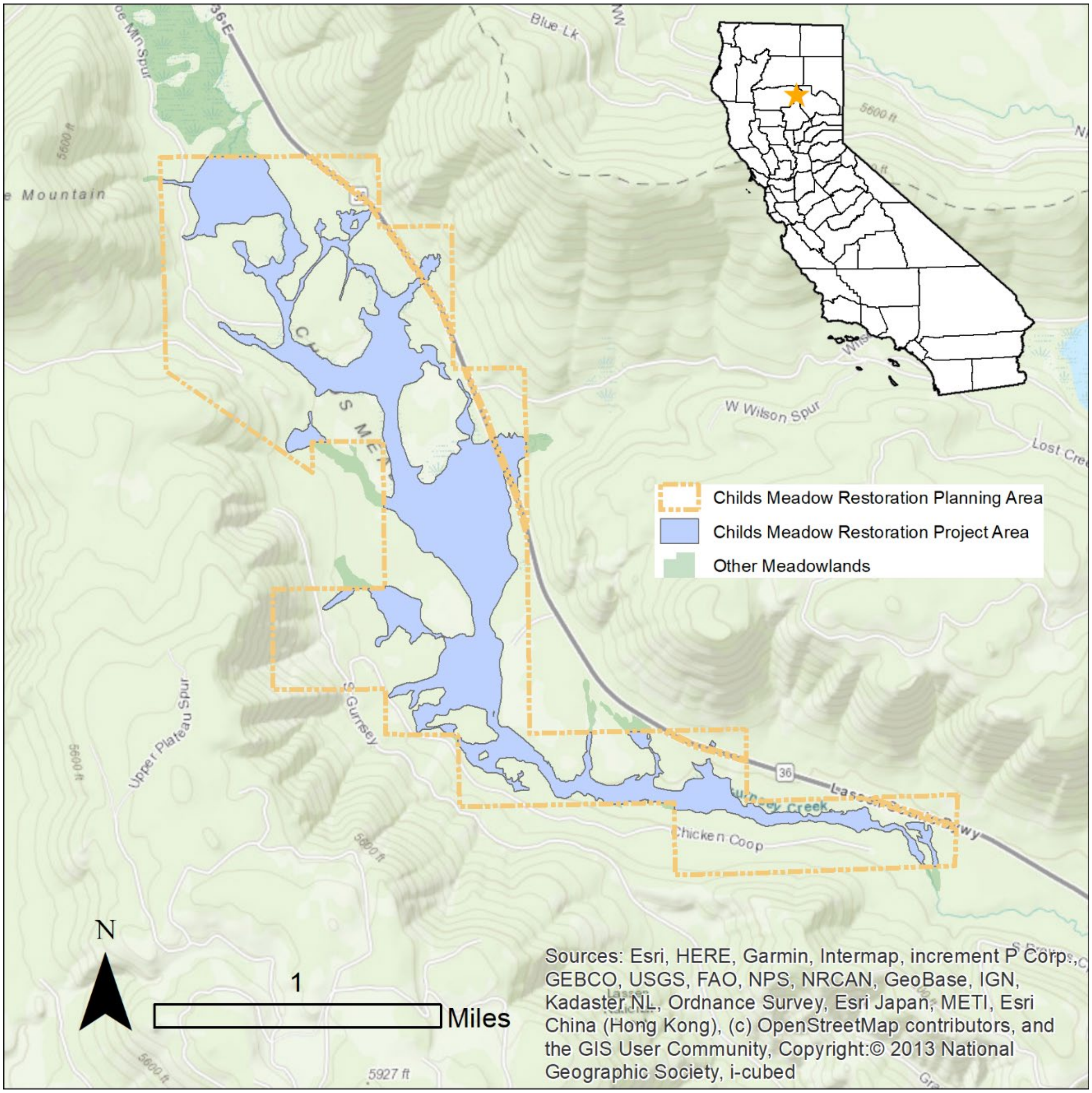


Figure 1: Restoring the Deer Creek Headwaters at Childs Meadows Project

Existing Conditions

The **Restoring the Deer Creek Headwaters at Childs Meadows Project** area includes a 404-acre riparian wet meadow complex with several large, carbon-rich fens owned primarily by CAF. The meadow complex is located at an elevation of between 4,750' to 4,900'. The Childs Meadows complex lies at the ecologically unique intersection of the Sierra Nevada and Cascade ranges and forms the headwaters (Gurnsey Creek sub watershed) of Deer Creek, a regionally significant anadromous watershed. Gurnsey

Creek, which flows through Childs Meadows, meets Deer Creek about 4 miles downstream from the end of the Project area **(See Figure 1: Restoring the Deer Creek Headwaters at Childs Meadows Project Location Map)**.

Over its 5-mile length along Gurnsey Creek, Childs Meadows drops 150' in elevation, resulting in an average slope of 0.57%, with locally steeper or shallower gradients. Compared to the size of the Childs Meadows valley, the watershed of the Childs Meadows complex is relatively small. As a result, the Childs Meadows floodplain is oversized relative to the fluvial energy currently moving through the system via Gurnsey Creek. The small watershed limits sediment supply from outside of the Project area. The watershed for the Childs Meadows complex is approximately 8.8 square miles in area. The valley floor and hillslope wetland complex both within and outside the Project area covers 404 acres of wetland and former wetland or approximately 9% of the Childs Meadows watershed. The wetland complex contains approximately 118 acres of fen, 249 acres of non-fen wetland, and 37 acres of dewatered former wetland.

100 years of non-indigenous human activities in the valley bottom and adjacent uplands of the Childs Meadows area has resulted in the degradation of the meadow complex. Stream channel incision, active head cutting, conifer encroachment, grazing, and diversions are impacting hydrologic function, and habitat quality. The complexity of Childs Meadows including several meadow lobes and constriction zones create natural resiliency in the system which allows shallow depositional zones to occur between areas with severe channel incision **(See Figure 2: Overview of Childs Meadows Project Area with Specific Features Identified shown below and Figure 1: Proposed Restoring the Deer Creek Headwaters at Childs Meadows Project Location Map above)**.

Cattle were formally grazed within most of the Project area under a 5-yr grazing permit held by The Nature Conservancy. 2020 was the final grazing season under the agreement with oversite passed from TNC to CAF. The current permit allows for 500 Animal Unit Months (AUMs) between mid-June and mid-November. As of 2021, the permittees operate a total of 440 AUMs from mid-June to late July and then again from early September to early November. Portions of the lower meadow have been fenced off to prevent cattle grazing since 2015 and a cross-valley fence was constructed in 2015 to exclude cattle from the downstream third of the meadow. A 15-acre parcel was fenced in fall 2015 to prevent grazing near a channelized reach of Gurnsey Creek as part of a controlled experimental demonstration project. The 345 acres of unfenced wetland meadow in the upper portion of the complex are all grazed by the same herd of cattle during the months of mid-June to late July and then again from early September to early November. This area includes CAF property inside and outside of the TNC-held easement, the Highlands Ranch Resort property, as well as a small amount of USFS-owned meadow.

In addition to cattle grazing, impacts to wetland function within the Childs Meadows complex include ditching, diversions, and other flow consolidation to accommodate grazing, roads, and timber harvest in adjacent uplands along with the installation of a utility cable at northern end of the Project area **(See Figure 3 Cable Route Location Within the Childs Meadows Complex below)**. Cattle directly consume aboveground vegetation, and damage soil and plant roots by hoof punching. These grazing impacts leave soil more vulnerable to erosion, as evidenced by several large erosion gullies in the meadow complex, some of which are actively headcutting. These gullies form topographic low trenches within an otherwise relatively uniform meadow floodplain that has been influenced by vegetation clearing, grazing, and removal of beaver. Surface and groundwater drain to these incised channels and flow rapidly downstream. Surface water flowing through incised stream channels and intentionally dug ditches can move up to three orders of magnitude faster than groundwater flowing through subsurface soils, resulting in rapidly dewatered meadow conditions. The loss of beaver and their dams further exacerbates these impaired conditions as there is little vegetative structure to impede and slow surface water flows. The combination of cattle grazing, beaver removal, channel incision, and ditching have impaired wetland functioning in Childs Meadows, resulting in a loss of key wetland habitat.

In addition to current land uses within the Project area, prior funding has produced research projects addressing an array of ecological concerns that will be addressed by this meadow restoration effort. To date, research within the **Restoring the Deer Creek Headwaters at Childs Meadows Project** area has focused on:

- Treatment and curtailment of conifer encroachment
- Increased groundwater levels and increased surface water availability resulting in restoration of floodplain connectivity, and restoration of healthy meadow hydrology, geomorphology, and ecology
- Reduction of trampling and degradation of riparian stream banks and vegetative cover produced by livestock grazing in sensitive areas
- Improved water quality for spring-run Chinook salmon and Central Valley steelhead spawning in Deer Creek

Other meadow restoration implementation efforts include improvements to on-site habitat for sensitive meadow species including the Cascades Frog, Willow Flycatcher, Greater Sandhill Crane, a variety of neotropical migratory birds along with the Tehama Deer Herd.

In August 2021, the Dixie Fire burned 51% of the 1,338-acre **Restoring the Deer Creek Headwaters at Childs Meadows Project** planning area and 71% of the Project area's 5,829-acre watershed. About 46% of the watershed burned at high severity **(See Figure 4: Dixie Fire Burn Severity Related to the Restoration of Deer Creek Headwaters at Childs Meadows Project)**. Of the 404-acres of meadow within the Project area, 38% is within the burn perimeter, but much less than that actually burned. Several bulldozer lines totaling approximately 2 km were cut into the meadow to create fire breaks **(See Figure 5: Dixie Fire Suppression Dozer Line Related to the Restoration of Deer Creek Headwaters at Childs Meadows Project, Photo 1: Dixie Fire Dozer Line Cut Through the Childs Meadows Complex Within the Project Area, Photo 2: Dixie Fire Dozer Line Cut Through Forested Upland Areas Adjacent to the Meadow Complex Within the Project Area and Photo 3: Burned Upland Forest Within the Project Area Adjacent to the Childs Meadows Complex)**. All bulldozer lines, except for one section 370 m in length, was repaired by CALFIRE and US Forest Service incident resource advisors during October 2021. Salvage logging may occur within upland forested areas of the

Gurnsey Creek watershed that surrounds the Project area on CAF and LNF lands. The extent of this activity however is not known. Hazard tree felling was also completed during October 2021 along Highway 36E within that portion of the Gurnsey Creek watershed inside the Project area where the forest burned. A portion of the logs cut in those efforts have not yet been removed. **Photos 1 through 3 show impacts of the Dixie Fire within forested upland areas inside the Project Area.**

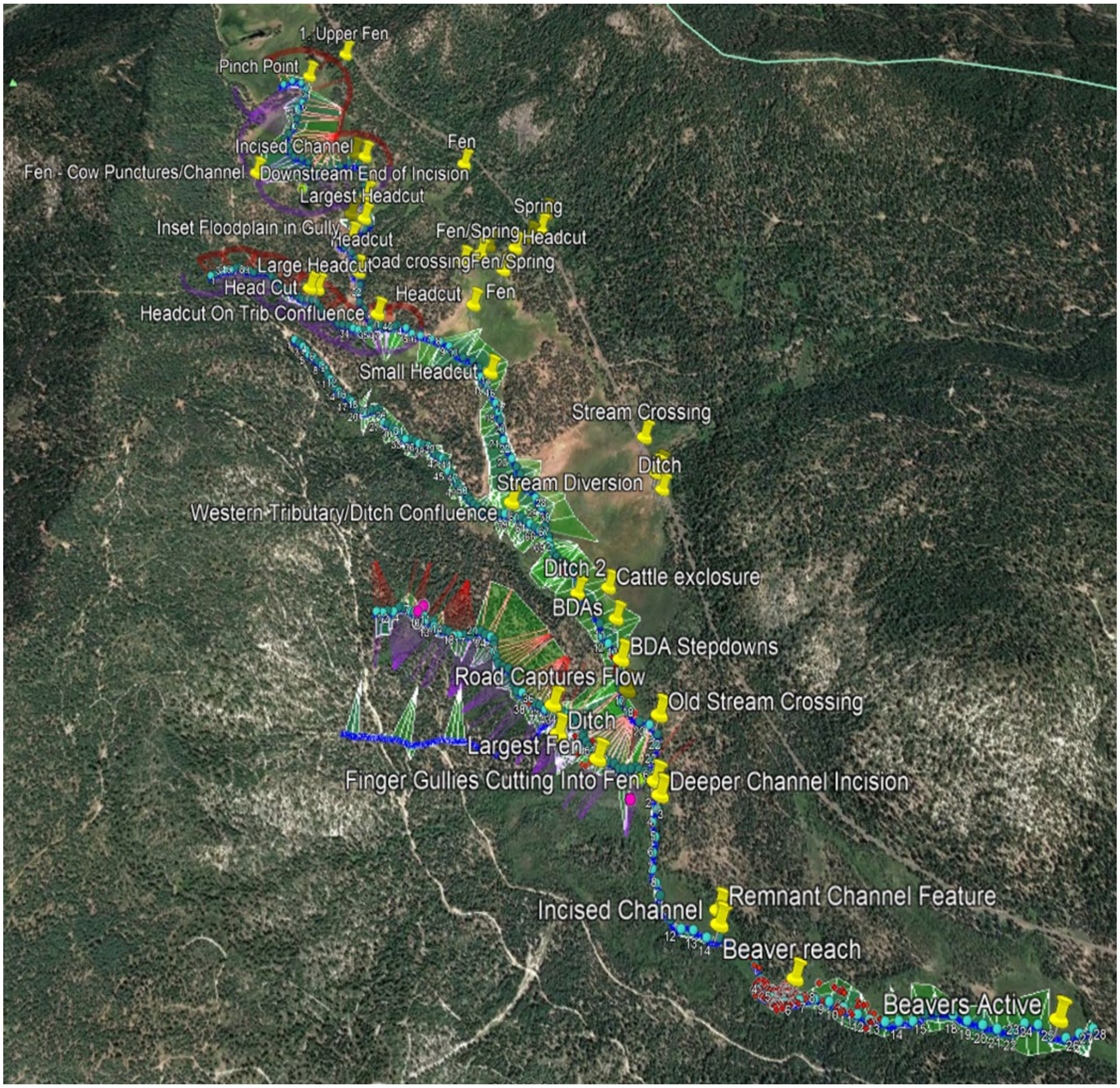


Figure 2: Overview of Childs Meadows Project Area with Specific Features Identified

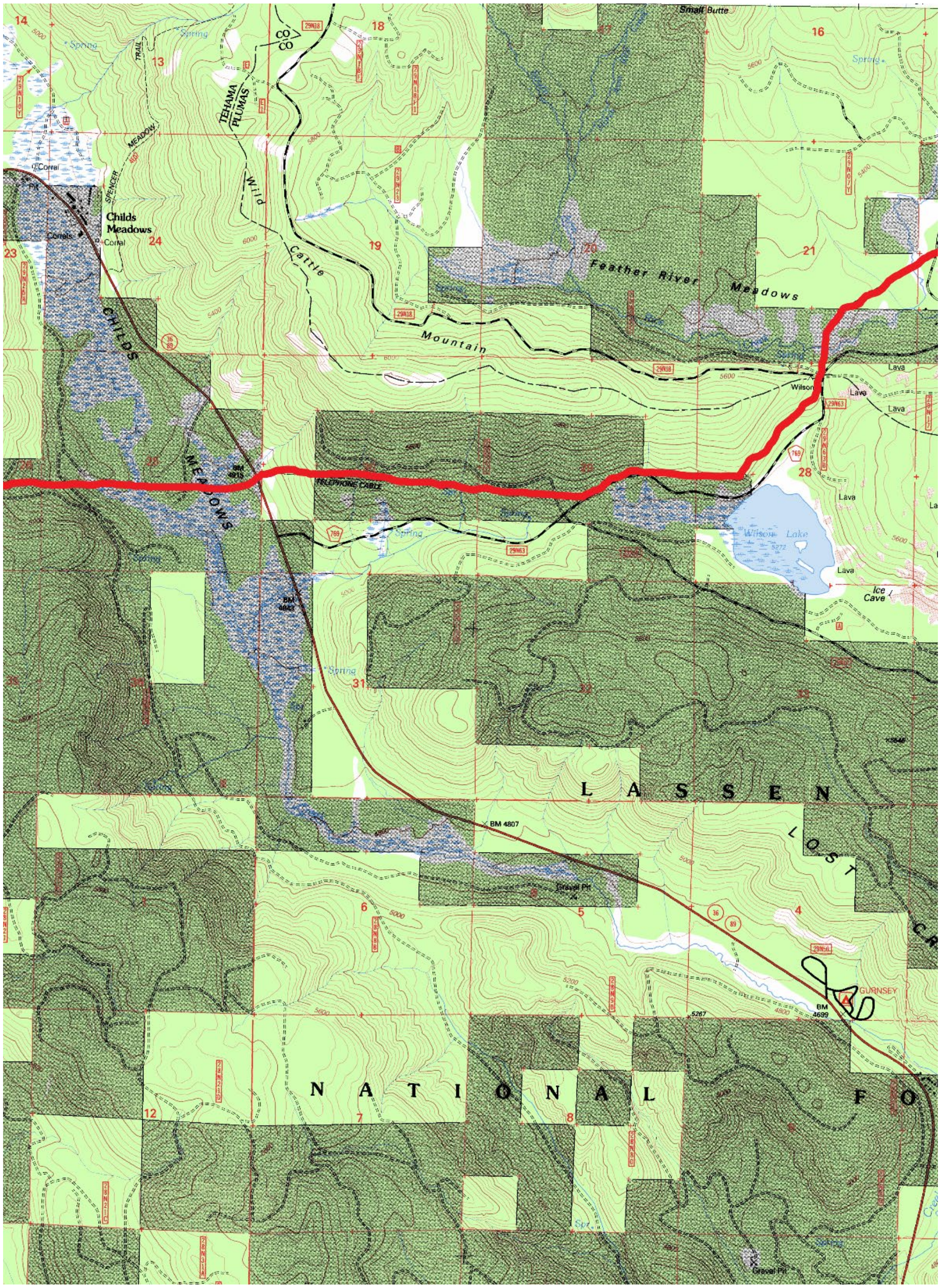


Figure 3: Cable Route Location Within the Childs Meadows Complex

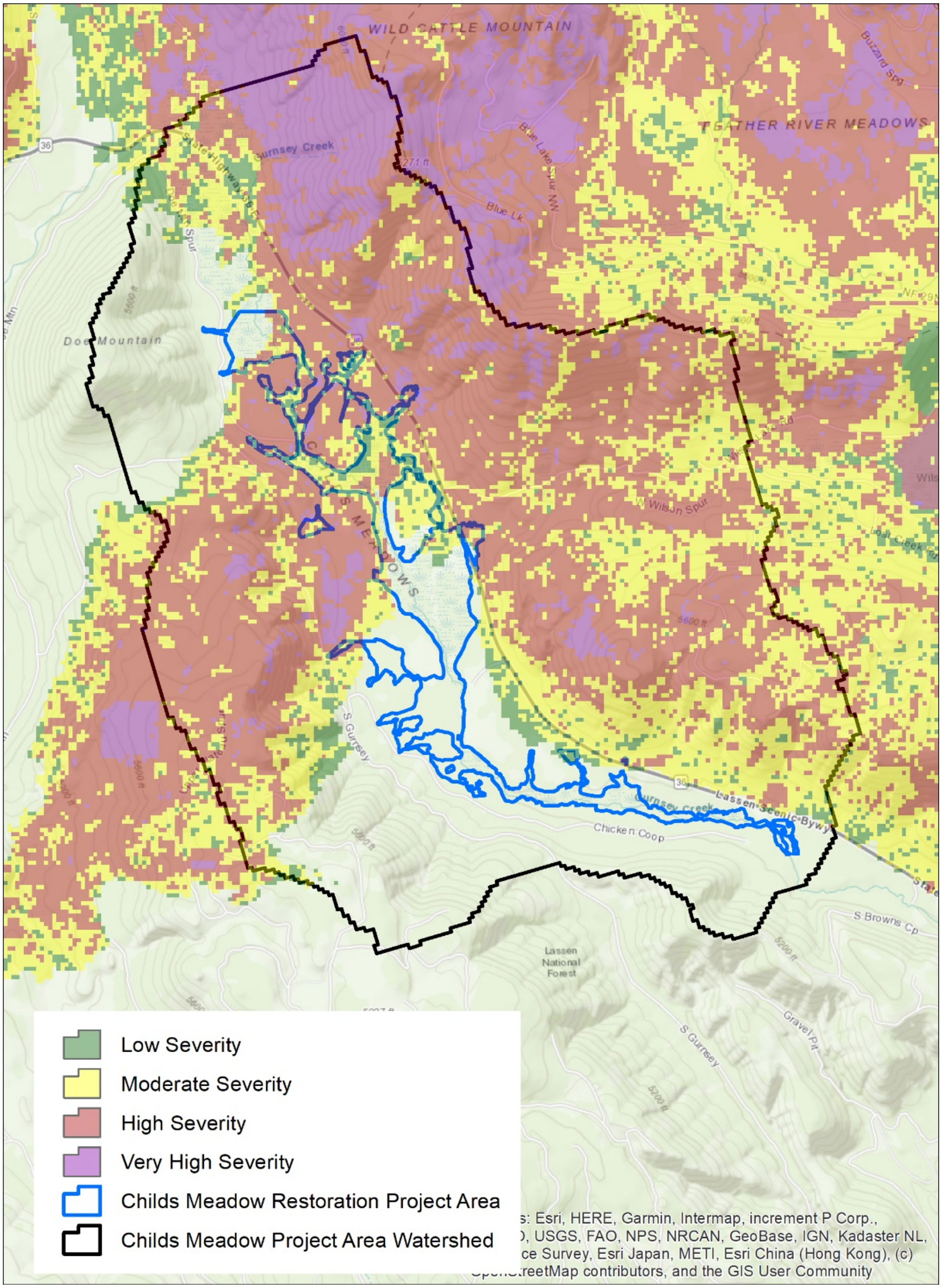


Figure 4: Dixie Fire Burn Severity Relative to the Restoring the Deer Creek Headwaters at Childs Meadows Project

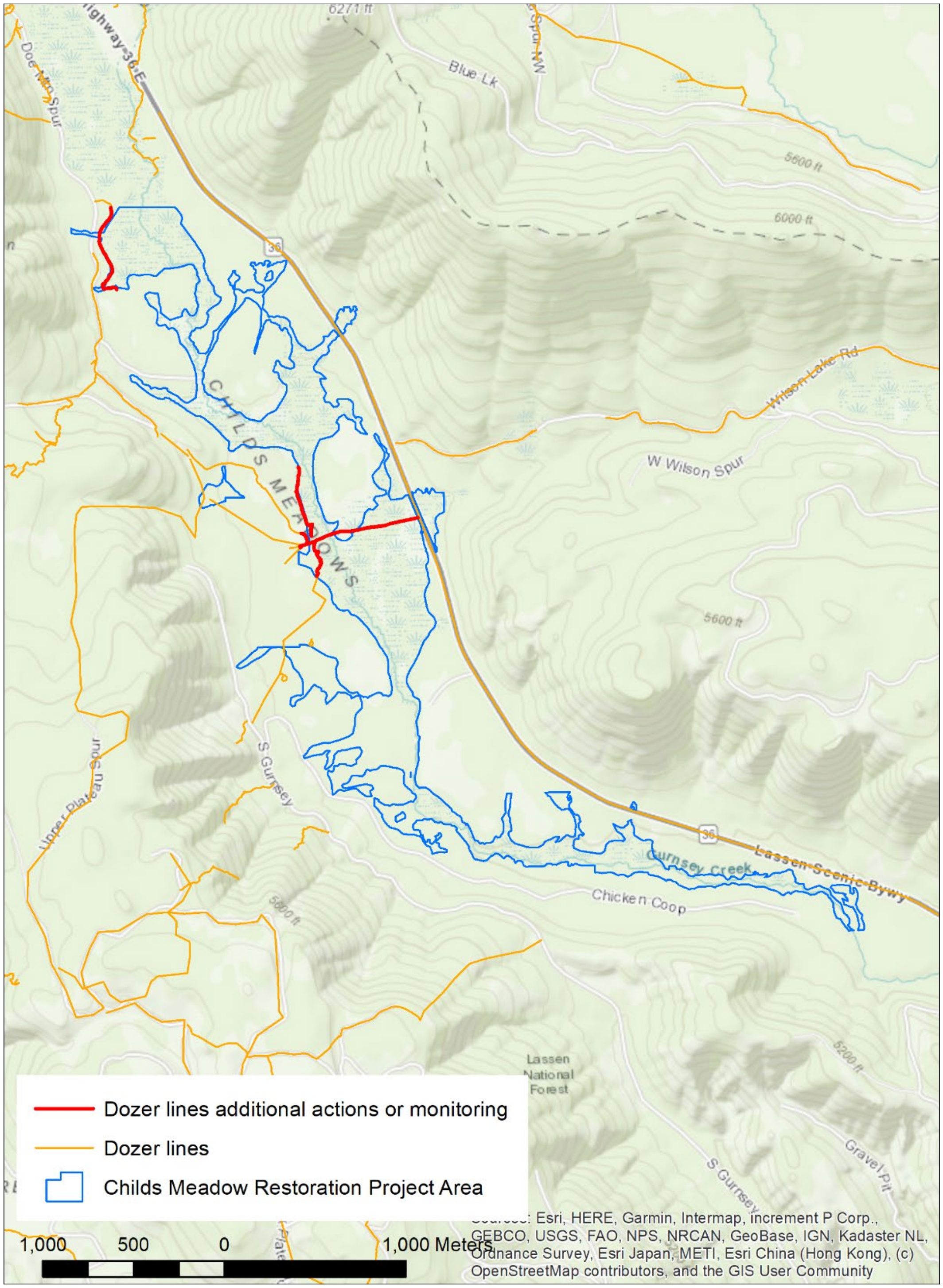


Figure 5: Dixie Fire Suppression Dozer Lines Relative to the Restoring the Deer Creek Headwaters at Childs Meadows Project

Photo 1: Dixie Fire Related Dozer Line Cut Through the Childs Meadows Complex Within the Project Area

Photo 2: Dixie Fire Related Dozer Line Cut Through Forested Upland Area Adjacent to the Childs Meadows Complex Within the Project Area

Photo 3: Burned Upland Forest Within the Project Area Adjacent to the Childs Meadows Complex

Maps and Descriptions of Specific Project Impact Sites (Areas 1 through 19) Within the Restoring the Deer Creek Headwaters at Childs Meadows Project Area

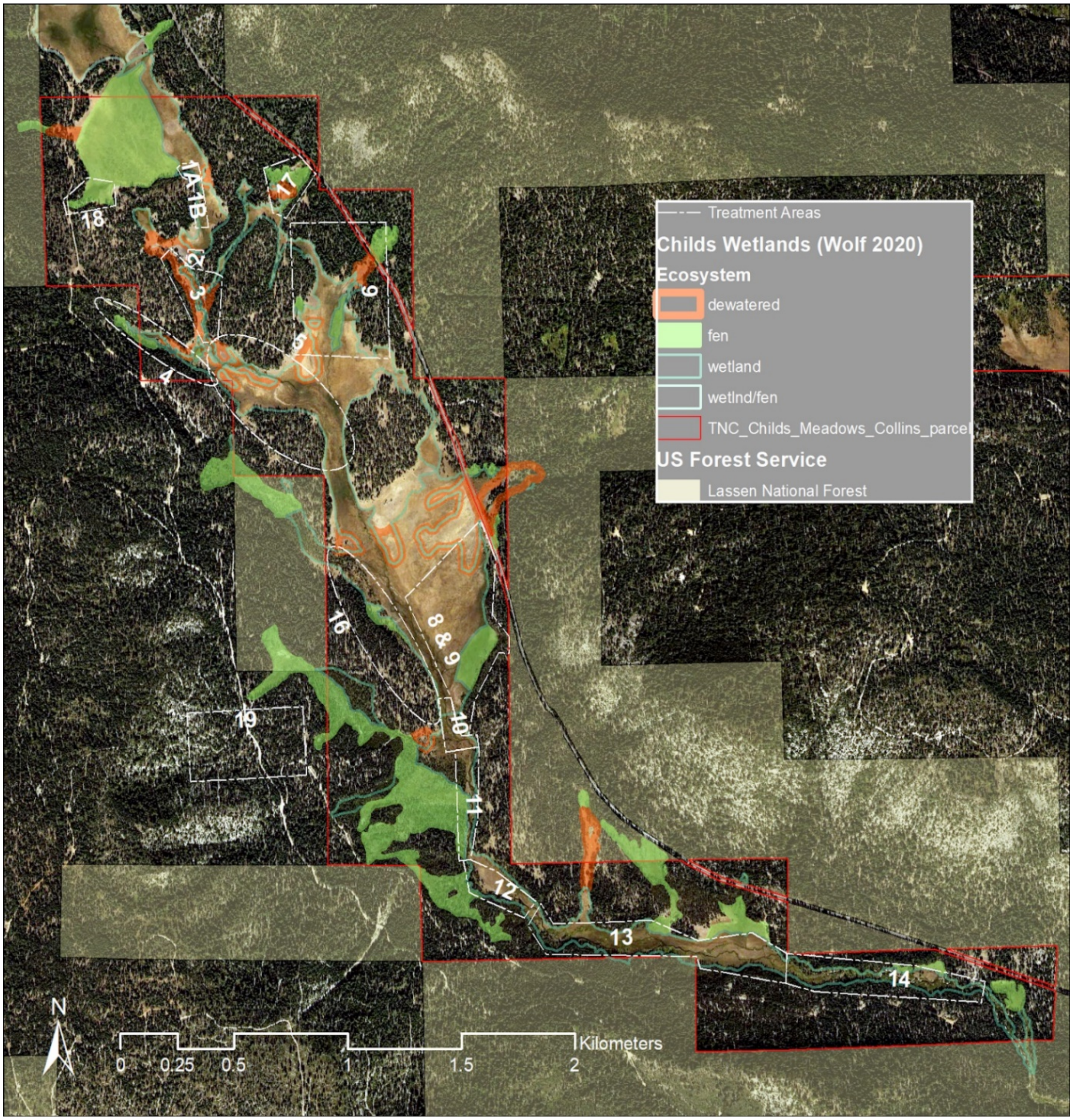


Figure 6: Overview of the Restoring the Deer Creek Headwaters at Childs Meadows Project Area with Numbered Treatment Sites (1 through 19)

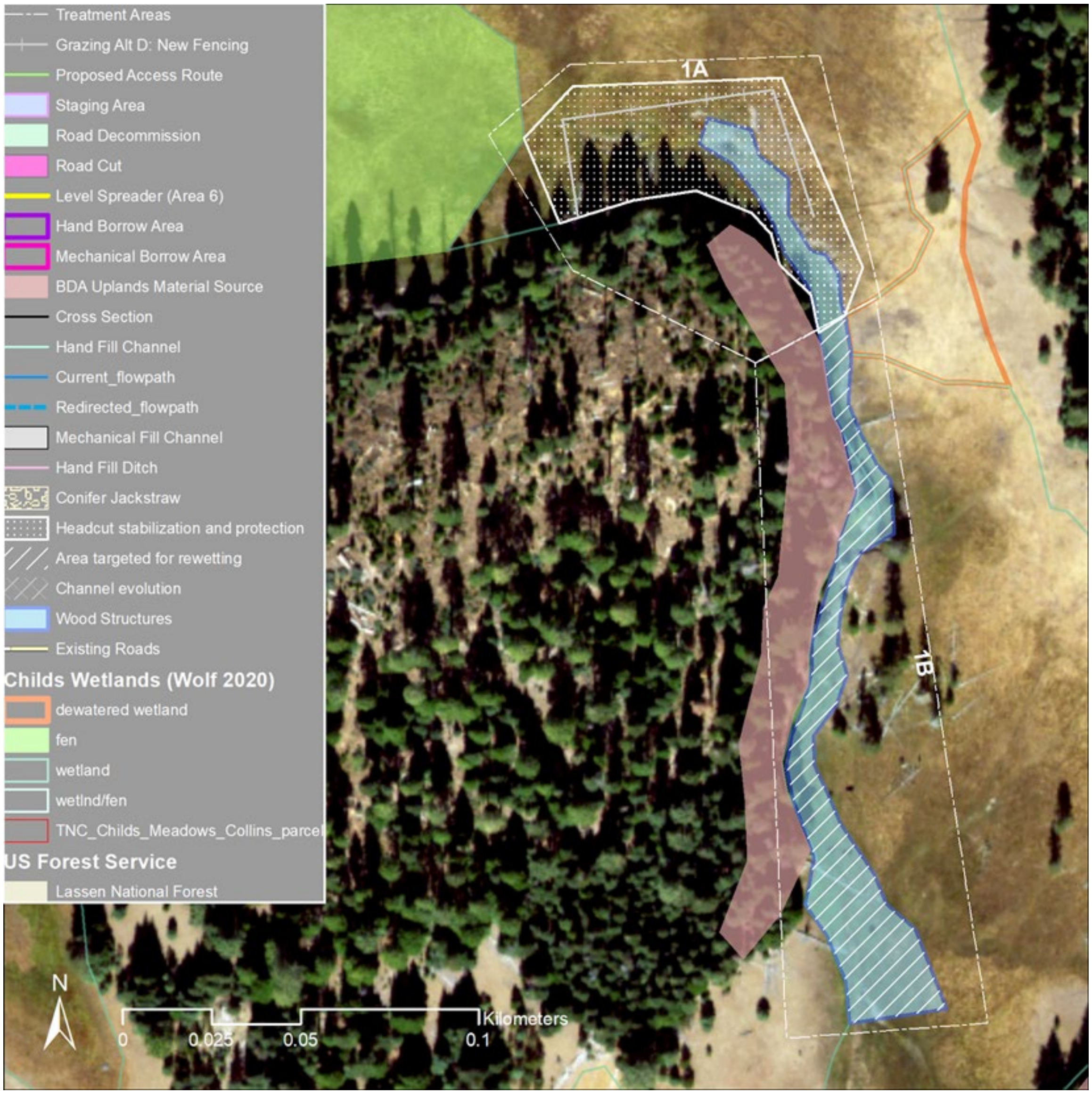


Figure 7: Design Plan View of Area 1, Including Area 1A and Area 1B

Area 1A and Area 1B

Location: Area 1 includes subareas 1A and 1B. Area 1A is the uppermost headcut just north of a west-east running barbed wire fence. Area 1B is the inset floodplain with channel incision just below the headcut downstream to the largest headcut at Area 2.

Current Site Conditions: There is an approximately 1-meter deep headcut at this location. The channel that is beginning to form with the migration of this headcut is capturing flow from the upstream wet meadow and fens. An inset floodplain is forming downstream of the headcut that is slowly filling in naturally from sediment eroded in the headcut; there is deep channel incision and widening occurring here. This incision appears to have significantly dried the adjacent meadow slope.

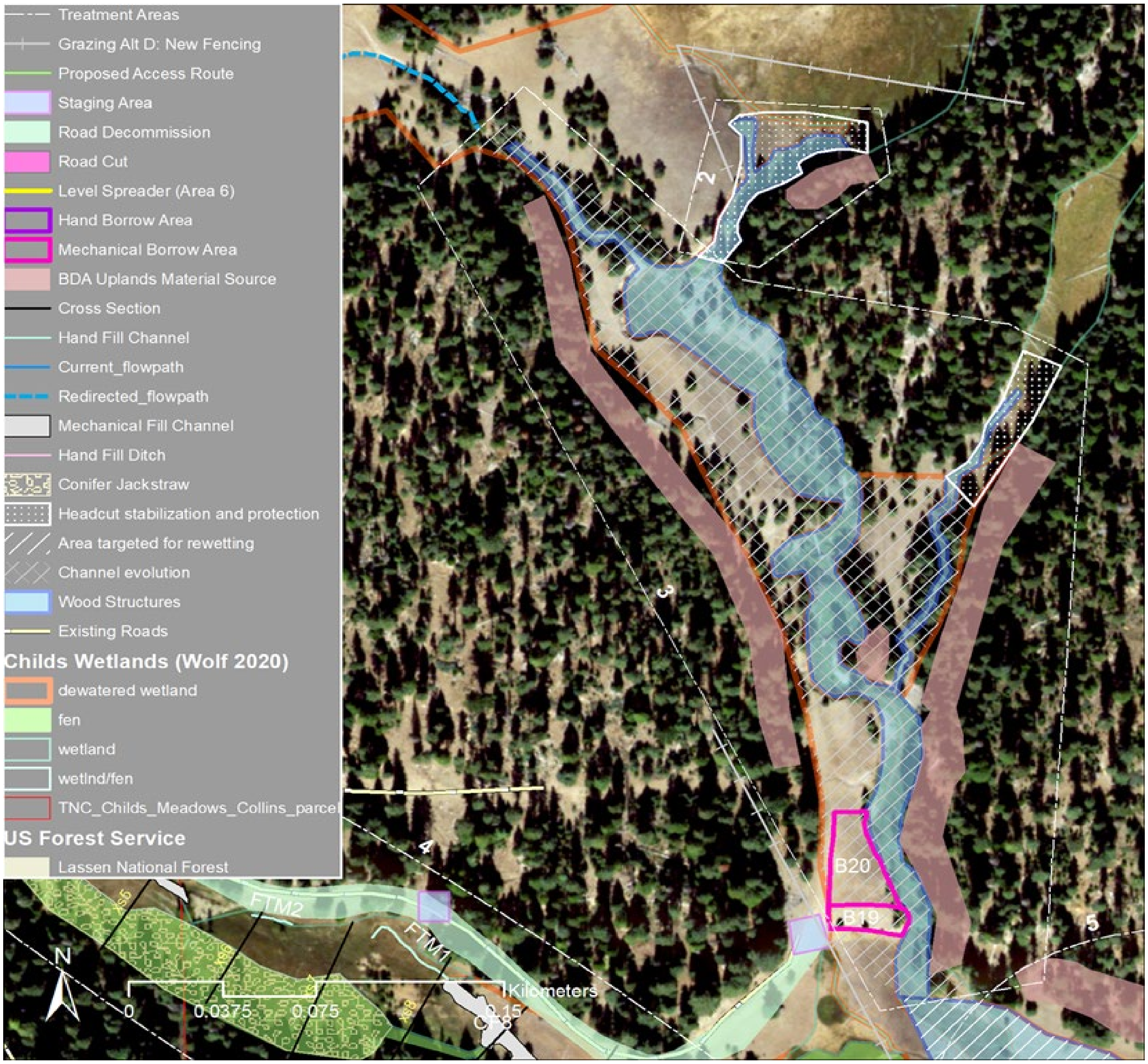


Figure 8: Design Plan View of Areas 2 and 3

Area 2

Location: Reach 2 is the largest headcut downstream to a natural constriction point in the Childs Meadow complex **(See Figures 1 and 2)**.

Current Site Conditions: A large headcut and plunge pool at this site has a vertical incision of over 1.52 meters. The downstream channel width is over 4.57 meters just below the head cut. This channel is incised, undercutting and widening having banks that are unstable and largely unvegetated. Banks that are more stabilized are being held in place by vegetation including the current low-flow water path immediately upstream of the headcut. There is a natural pinch point downstream where this channel and finger gully from a Ghost Channel converge and the valley width decreases **(See Photos 4 through 6)**.

Photo 4: Overview of the 1.5-Meter-Deep Head Cut and Surrounding Impacted Area
Note the significant amount of scour along both banks of the channel and the surface above.


Photo 5: Close Up of Downstream Channel Immediately Adjacent to the Head Cut
Note the considerable amount of fine sediment captured within this portion of the stream channel.

Photo 6: View of One Small Channel Feeding into Gurnsey Creek Near the Head Cut Site
The head cut area is located several hundred feet downstream from the lower right corner of the photograph.

Area 3

(See Figure 4 and Figure 6)

Location: Area 3 is the inset floodplain below the largest headcut **(See Photos 1 through 3)** downstream to an old road crossing, including a finger gully up the "Ghost Channel" tributary that will be reactivated with surface flows.

Current Site Conditions: There is a natural valley narrowing where the headcut channel and finger gully converge, downstream of which is an inset floodplain. Water is present across the inset floodplain surface immediately below the convergence, with willows and wetland plants. Willows are browsed to less than 1m tall. The inset floodplain elevation is closer to the original meadow surface downstream near the old road crossing at the end of Area 3.

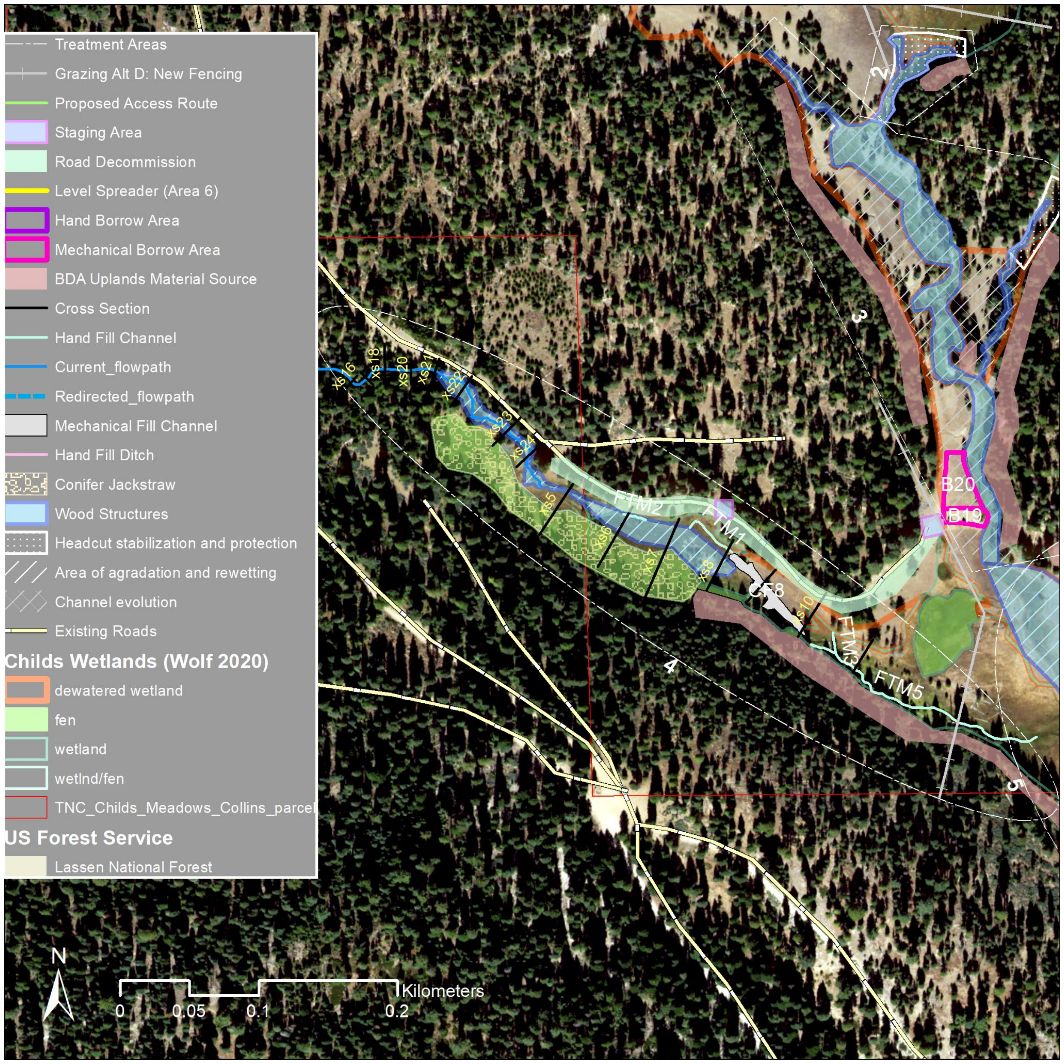


Figure 9: Design Plan View of Area 4

Area 4

Location: As shown in **Figure 9**, The upstream extent of this area includes two tributaries that have concentrated flow into what are now incised channels. They converge and then spill out onto the discharge slope meadow and associated fen.

Current Site Conditions: These tributary channels are very deeply incised upstream and adjacent to the current wetland extent. This concentrated flow is contributing excessive sediment delivery to the discharge slope and fen, dewatering the upper extent of the discharge slope, increasing incision of these channels, and contributing to the headcutting in the fen downstream. Two large headcuts are draining groundwater out of this fen system. There are also springs and associated fens on the hillslope that have livestock grazing impacts, including hoof punches and small incising channels. The gradient in this reach is steeper than the mainstem of Gurnsey Creek. There is also a ditch/channel along the south edge of the tributary meadow, downstream of the headcuts. The main cause of the headcut and the channel incision along the road has been determined to be the concentration of surface water from the historic diffuse flow paths into the fen to accommodate upstream road infrastructure upstream. Livestock grazing is degrading the fens and a ditch along the southern edge of this meadow reach is dewatering the meadow.

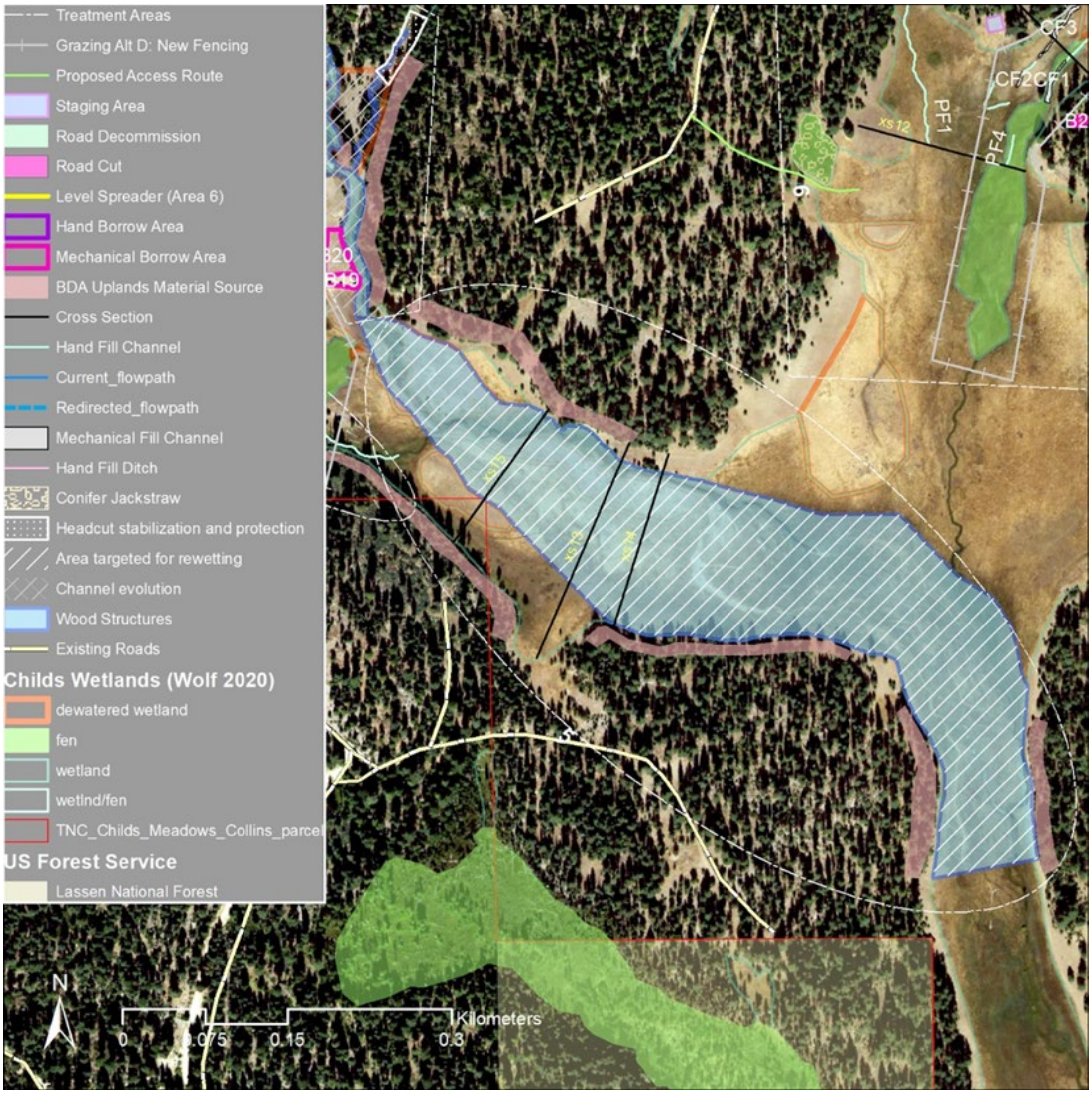


Figure 10: Plan View of Area 5

Area 5

Location: This treatment area includes the Gurnsey Creek main channel and associated valley bottom where the meadow widens below Area 3, extending downstream to the upstream border of the negative control reach related to a demonstration study.

Current Site Conditions: The main perennial stream channel has moderate incision and is experiencing channel widening.

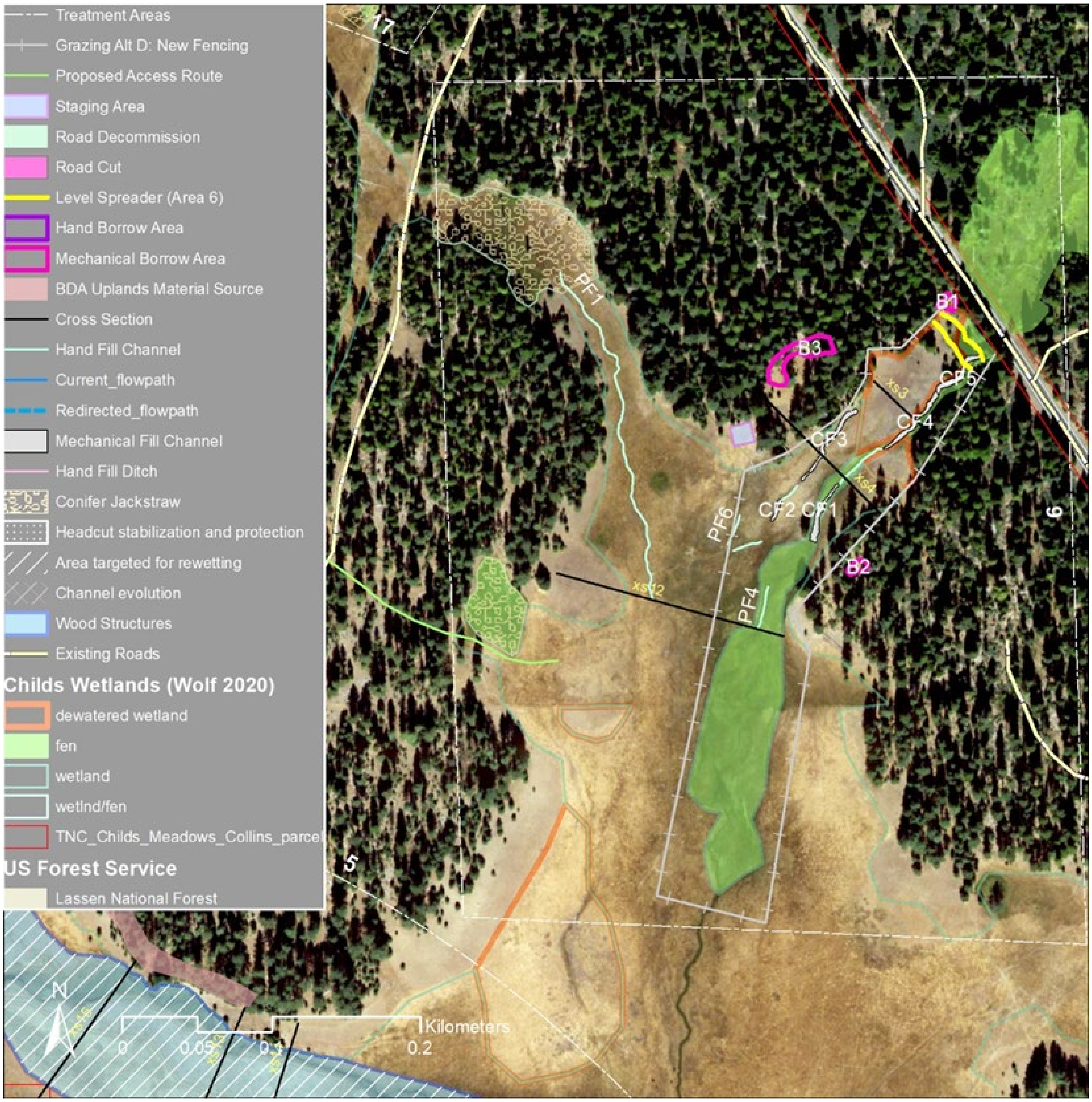


Figure 11: Plan View of Area 6

Figure 12: Detail Map of Area 6, Poppy's Fen, With the Intact Upstream Section to the Northeast of State Route 36E

Area 6

Current Site Conditions: A large gully receives concentrated flow from a culvert under Highway 36 **(See Photo 7)**. The flow is generated from subsurface and surface flows from the fen, springs located to the north and from a small catchment northwest of Poppy's Fen captured by the Highway 36E road fill prism. The gully and other artificial channels below the highway are also likely capturing subsurface flow from the fen and springs below the highway. As evidenced by the presence of peat soils and remnant peat plants in currently dry areas, the natural condition of this entire area would have contained groundwater-saturated soils maintained and stabilized by dense wetland plants resistant to the formation of erosive, dewatering channels.

Photo 7: View Looking Upstream at Concrete Culvert Under Highway 36E
The intact portion of Poppy's Fen located within Area 6 upstream of the road is visible in the left background.

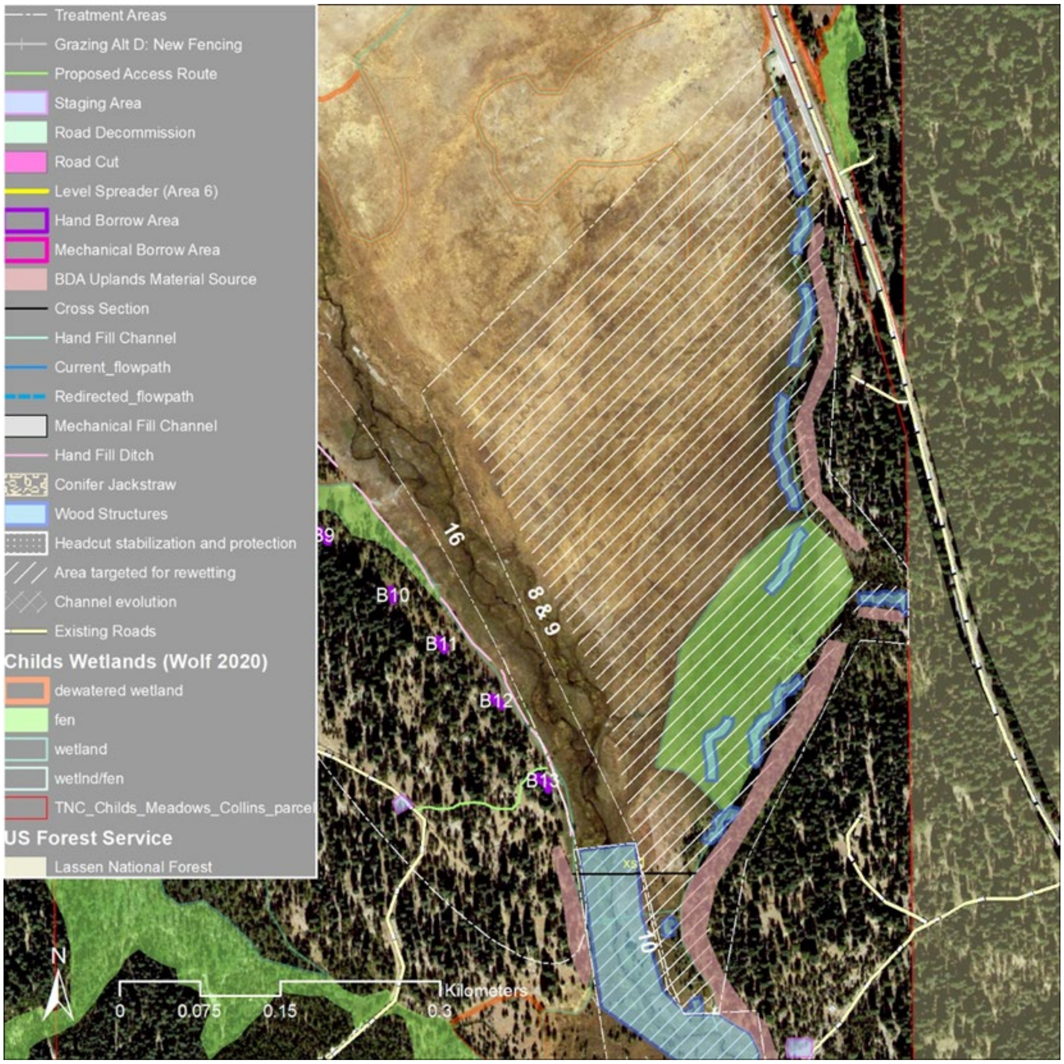


Figure 13: Plan View of Areas 8 and 9

Areas 8 and 9

Location: Area 8 includes the stream reach west of the highway near the pilot-project parking pullout that is diverted along the forest edge. Area 9 includes a wet depressional meadow (fen) northeast of an existing split rail fence and associated tributary channels south of a split-rail fence that connect with Gurnsey Creek.

Current Site Conditions: Stream diversions and the highway crossing have led to drying of the meadow on the alluvial fan in this area. The culvert under the highway is directing stream flow into the wet depressional meadow northeast of a split rail fence. Some of the surface flow through this wet depressional meadow is entering from the north via the large culvert and associated diversion near the parking pullout, though most of the surface flow seems to be coming from a tributary that crosses the highway farther south. Water leaves the depressional meadow bowl via an apparent ditch along the meadow edge that is leading to the water moving quickly through the system, entering Gurnsey Creek downstream of the split rail fence where it is actively headcutting.

Photo 8: Ditched Flow in Area 8

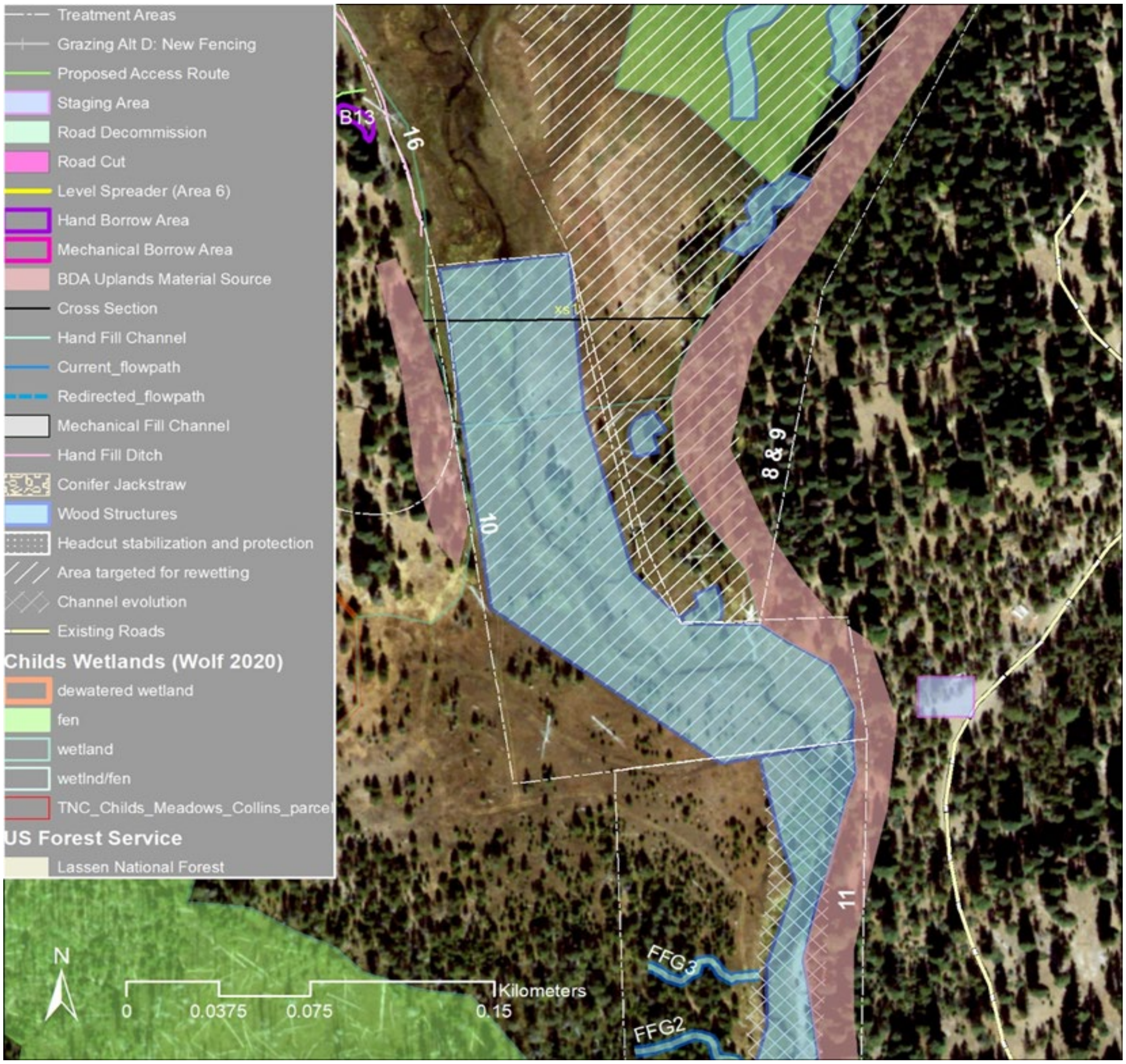


Figure 14: Plan View of Area 10

Area 10

Location: The Gurnsey Creek channel from the last BDA on the pilot treatment area to an abandoned road crossing downstream.

Current Site Conditions: Modest channel incision, channel widening, and headcutting up tributary channels.

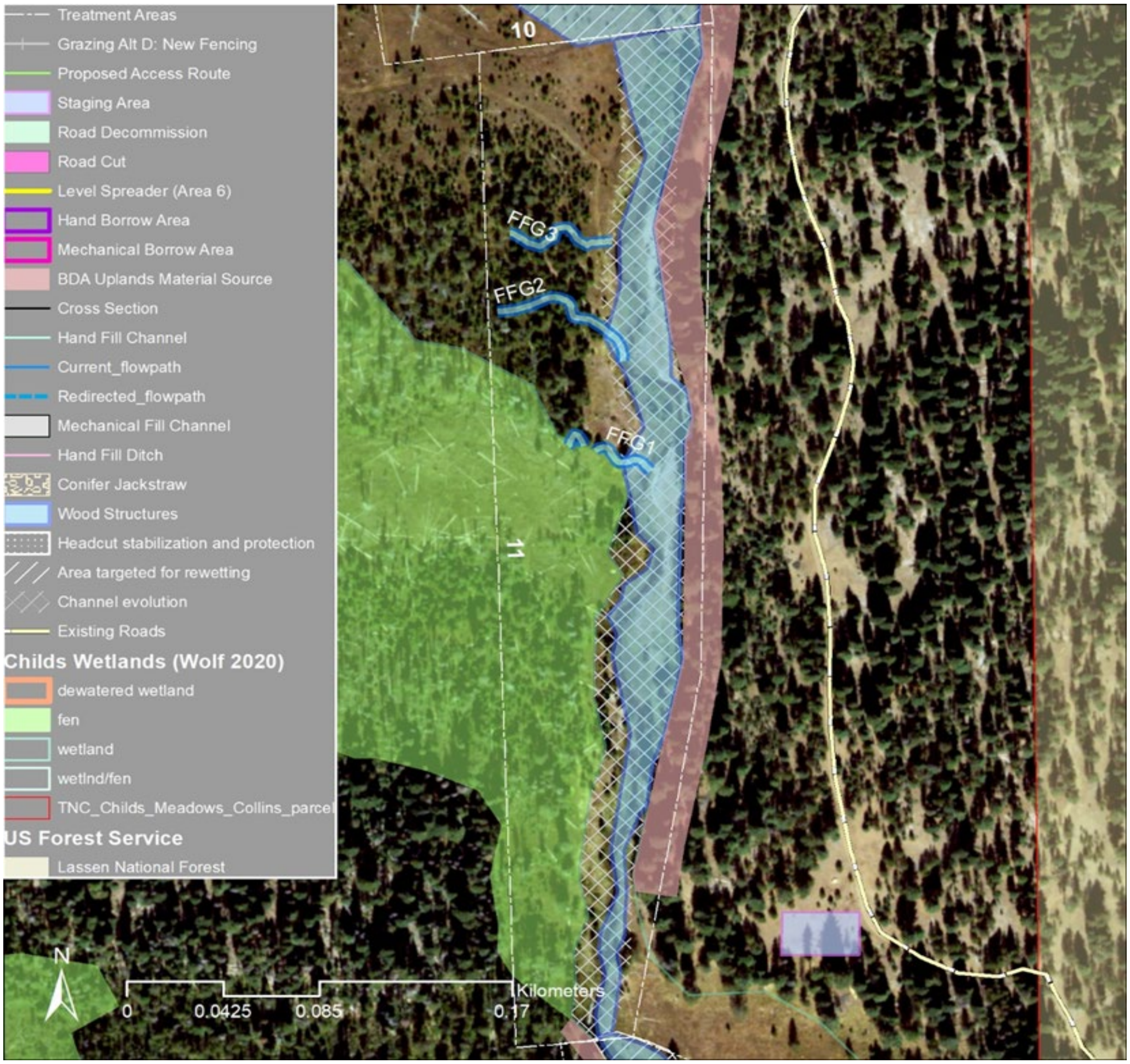


Figure 15: Plan View of Area 11

Area 11

Location: Transport reach starting just downstream of the abandoned road crossing mentioned above, including small gullies descending into the channel draining the adjacent fen on the west side (river right).

Current Site Conditions: This is an incised transport reach, at a natural valley narrowing in the meadow complex. The channel is incised 1.21 to 1.82 meters. On river-left, the stream channel cuts into the conifer-covered uplands with small headcuts. On river right the hillslope transition is more gradual, stepped into multiple sedge-dominated terraces. Here there is incision cutting into the meadow surface along the tributaries emanating from the fen where the tributaries join the incised channel of Gurnsey Creek.

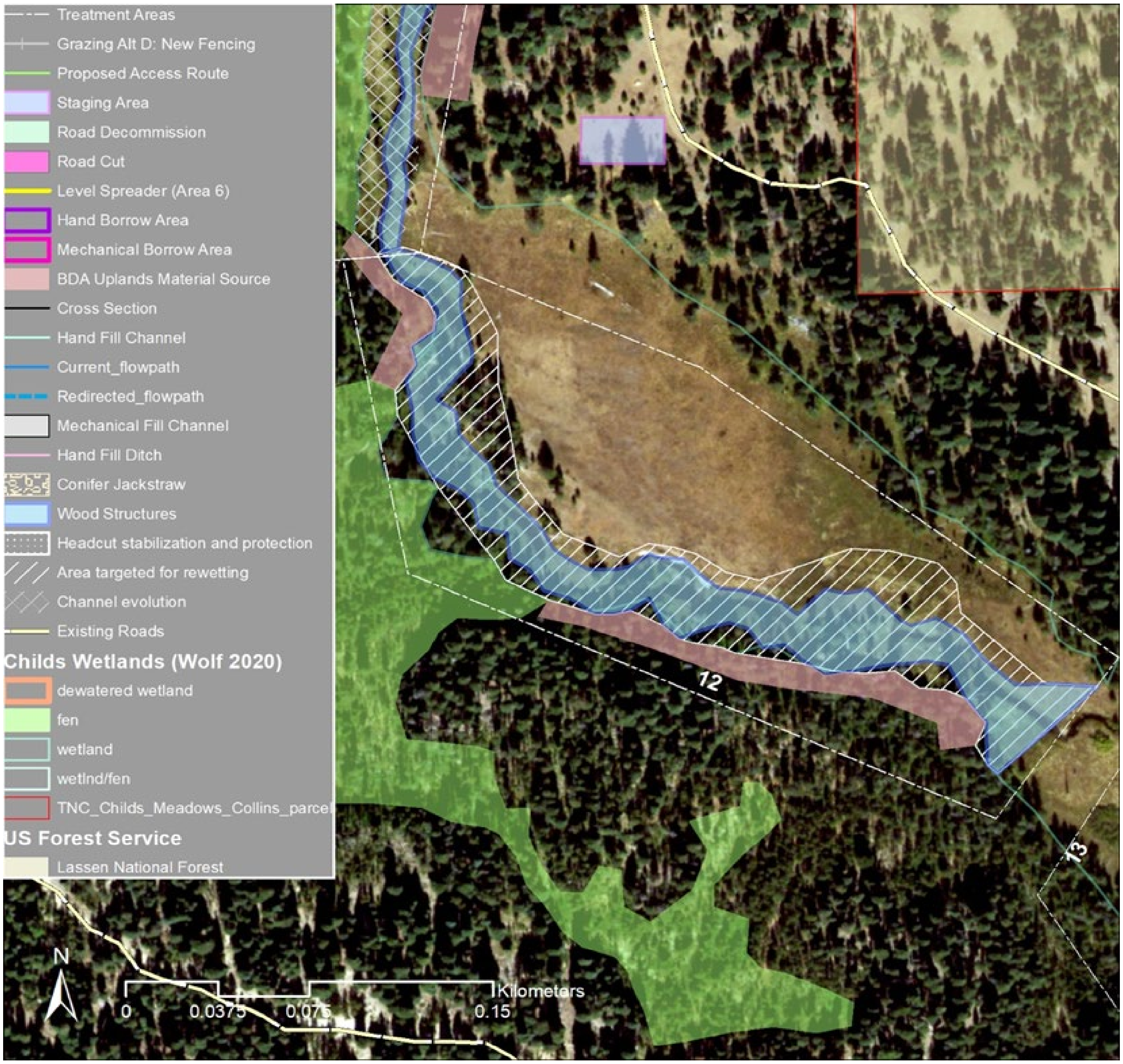


Figure 16: Plan View of Area 12

Area 12

Location: Floodplain reactivation reach starting downstream of the large fen where the meadow widens up to the start of the positive control reach from the pilot study.

Current Site Conditions: Channel incision, channel widening, meadow drying, and conifer encroachment.

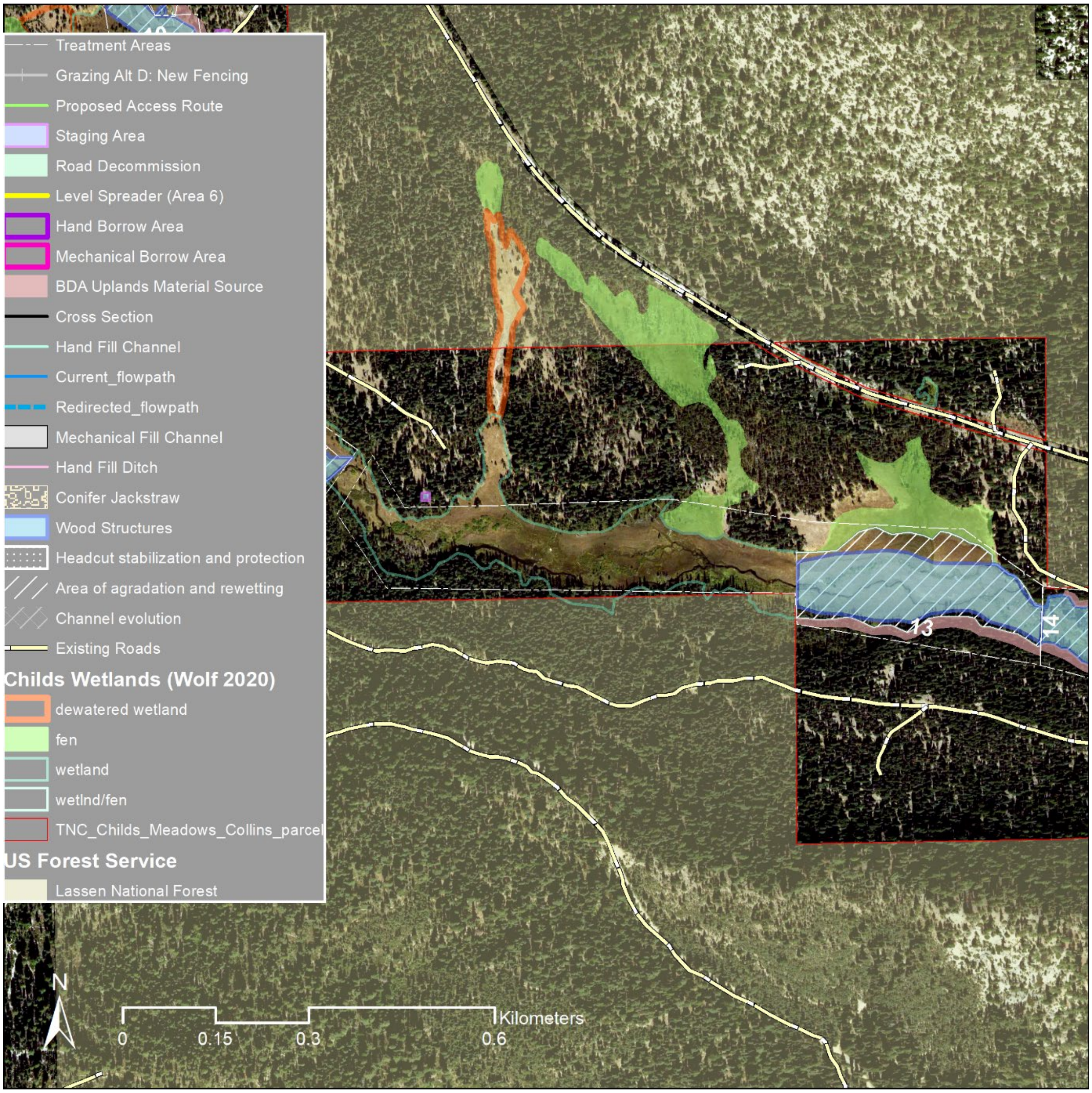


Figure 17: Plan View of Area 13

Area 13

Location: From the upstream end of the positive control reach within the original pilot study downstream to the Cowboy Camp.

Current Site Conditions: This is an area that has historically been occupied by beavers. Nearly all the beaver dams were blown out during high flows in the winter of 2016-17. Beavers are now starting to re-occupy sections of this reach. The downstream third of this reach may have insufficient willow cover to promote dam building activities.

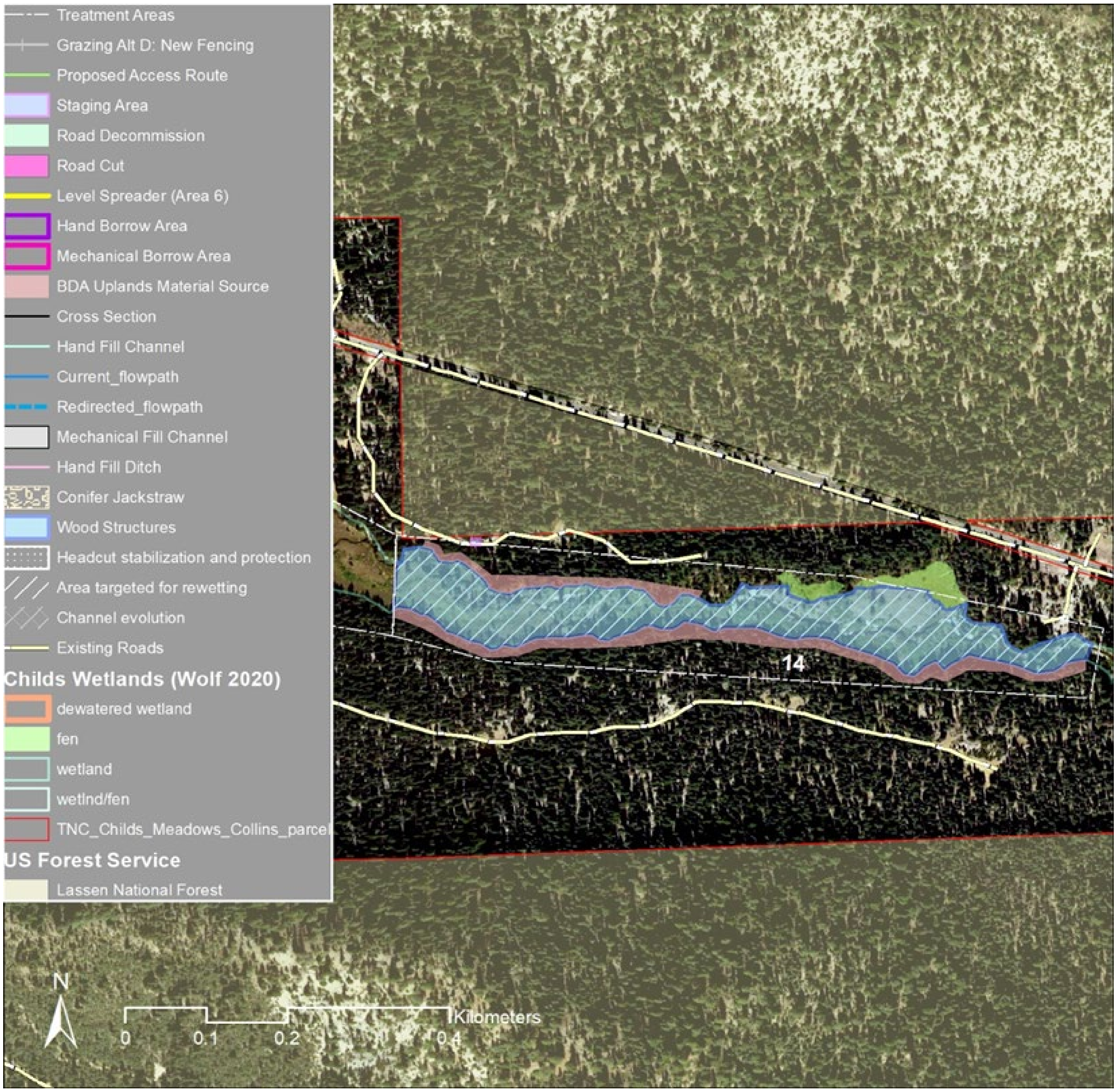


Figure 18: Plan View of Area 14

Area 14

Location: From the Cowboy Camp downstream to a constriction point where Gurnsey Creek makes a sharp turn to the SSE.

Current Site Conditions: Stream widening and incision, .61 to 1.21 meters below floodplain surface. Conifer encroachment.

Note: Area 15 was developed during the initial Project planning process and later eliminated from proposed implementation efforts.

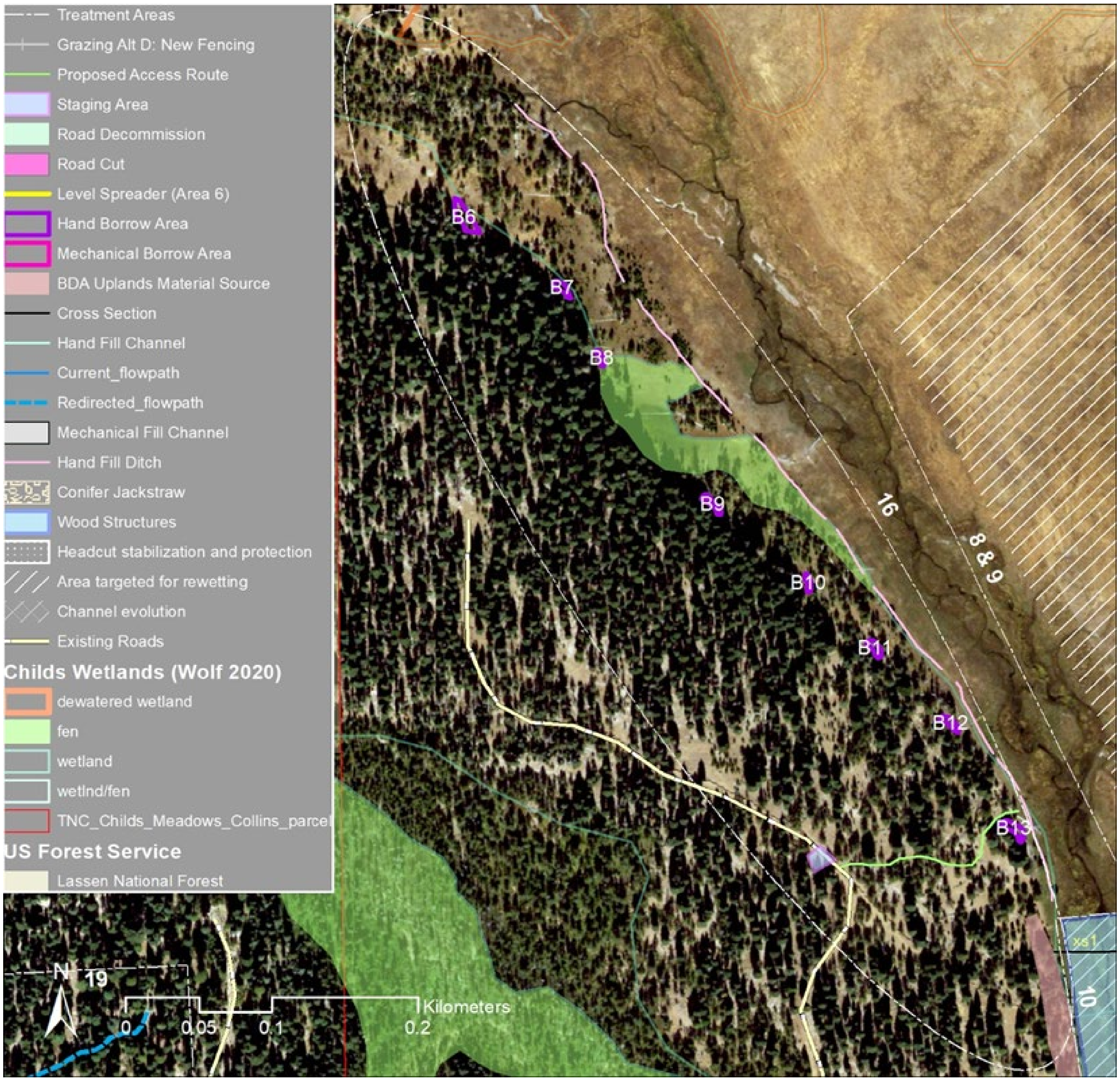


Figure 19: Plan View of Area 16

Area 16

Location: Ditch along western edge of the cattle enclosure fencing erected as part of the pilot restoration project.

Current Site Conditions: Shallowly sloping ditch (0.5%: 11 ft. drop over 2,050 ft. length) draining groundwater-dependent meadow ecotypes.

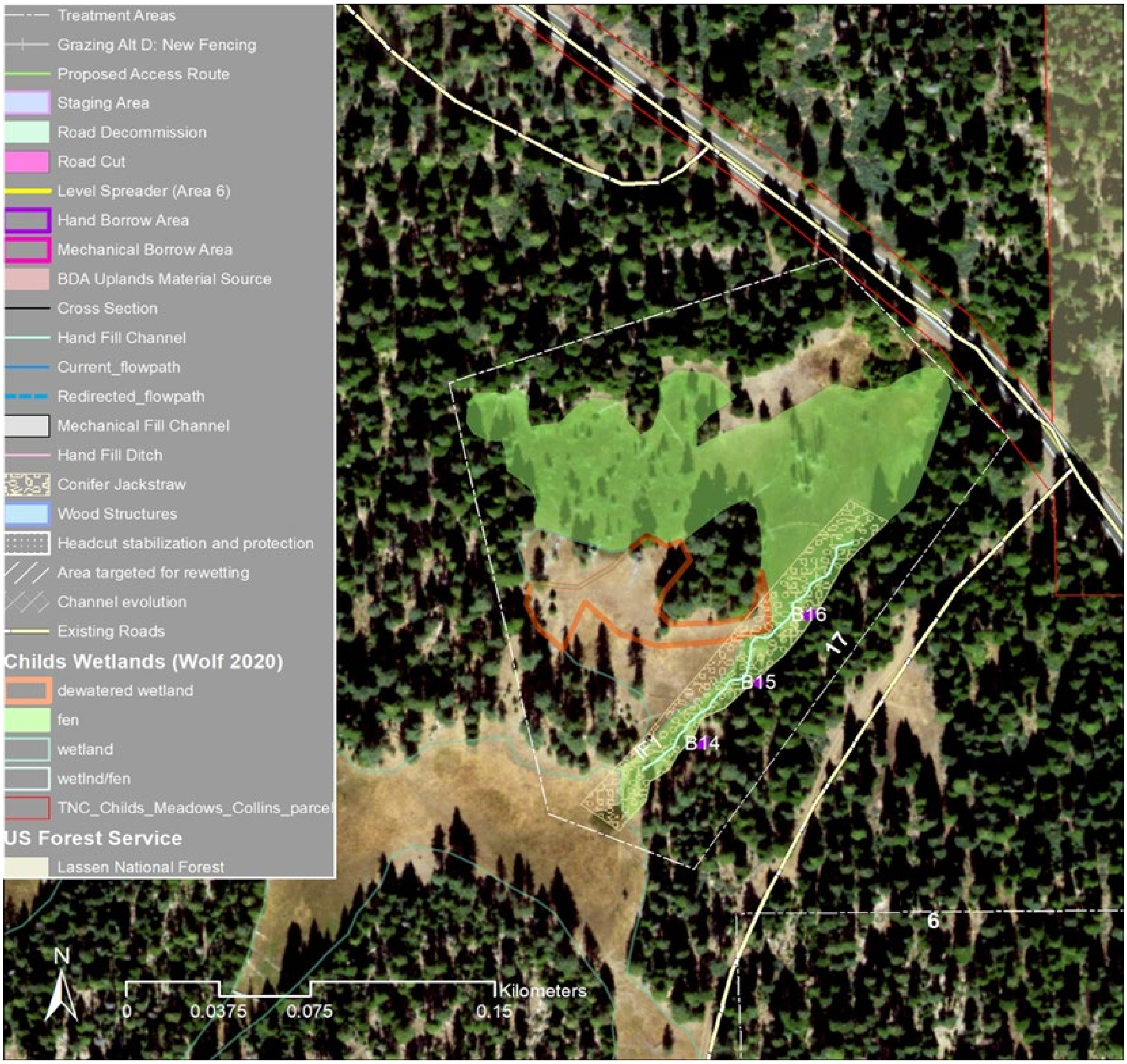


Figure 20: Plan View of Area 17, Island Fen

Area 17

Location: Referred as Island Fen, east of Area 3.

Current Site Conditions: Small headcut, small incised channel, and cattle trails.

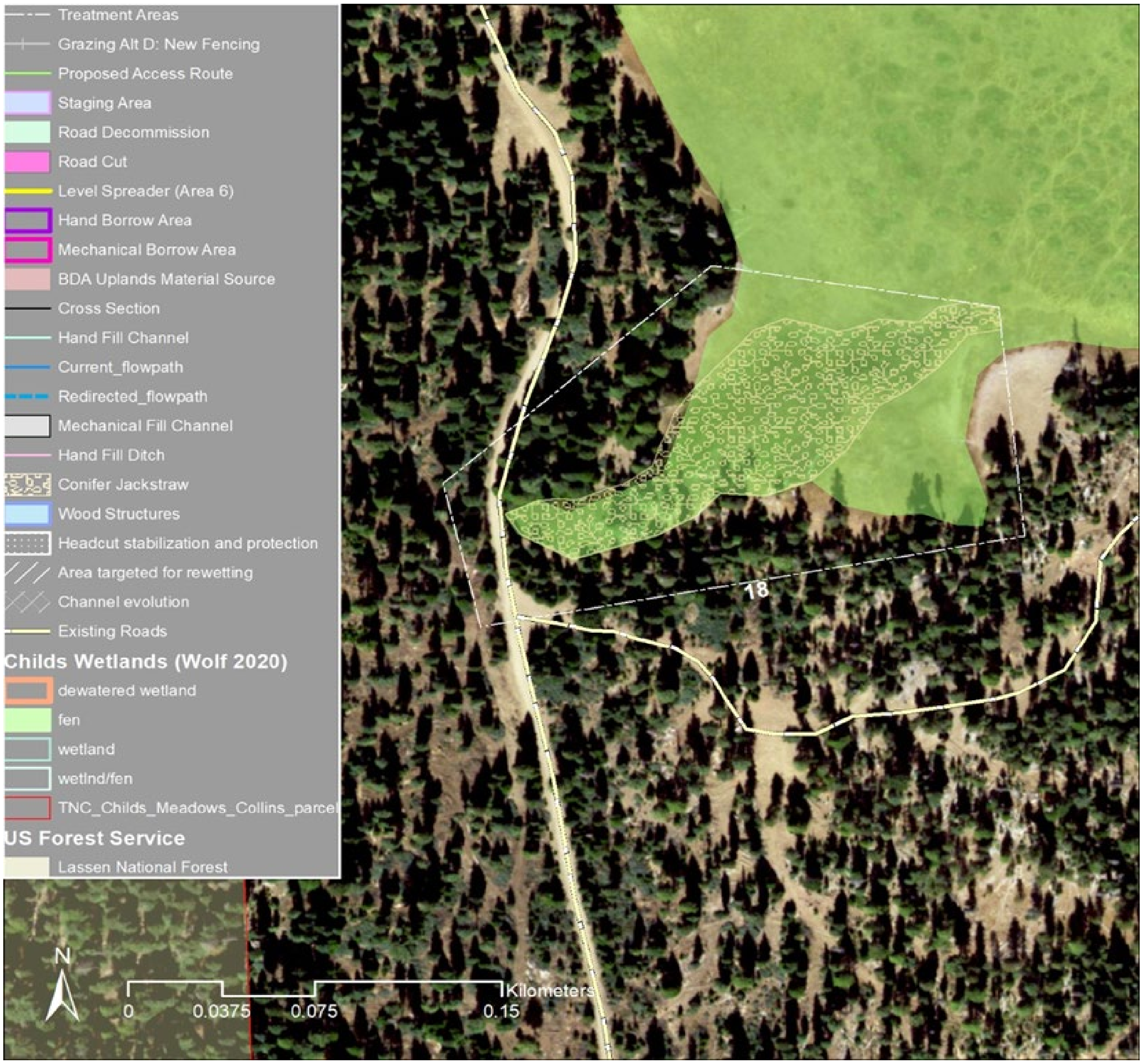


Figure 21: Plan View for Area 18, Upper Lobe

Area 18

Location: Fen within the uppermost lobe of Childs Meadows on CAF Property.

Current Site Conditions: A small highly saturated section of this larger fen system is degraded with small channels and hoof punctures from cattle overuse.

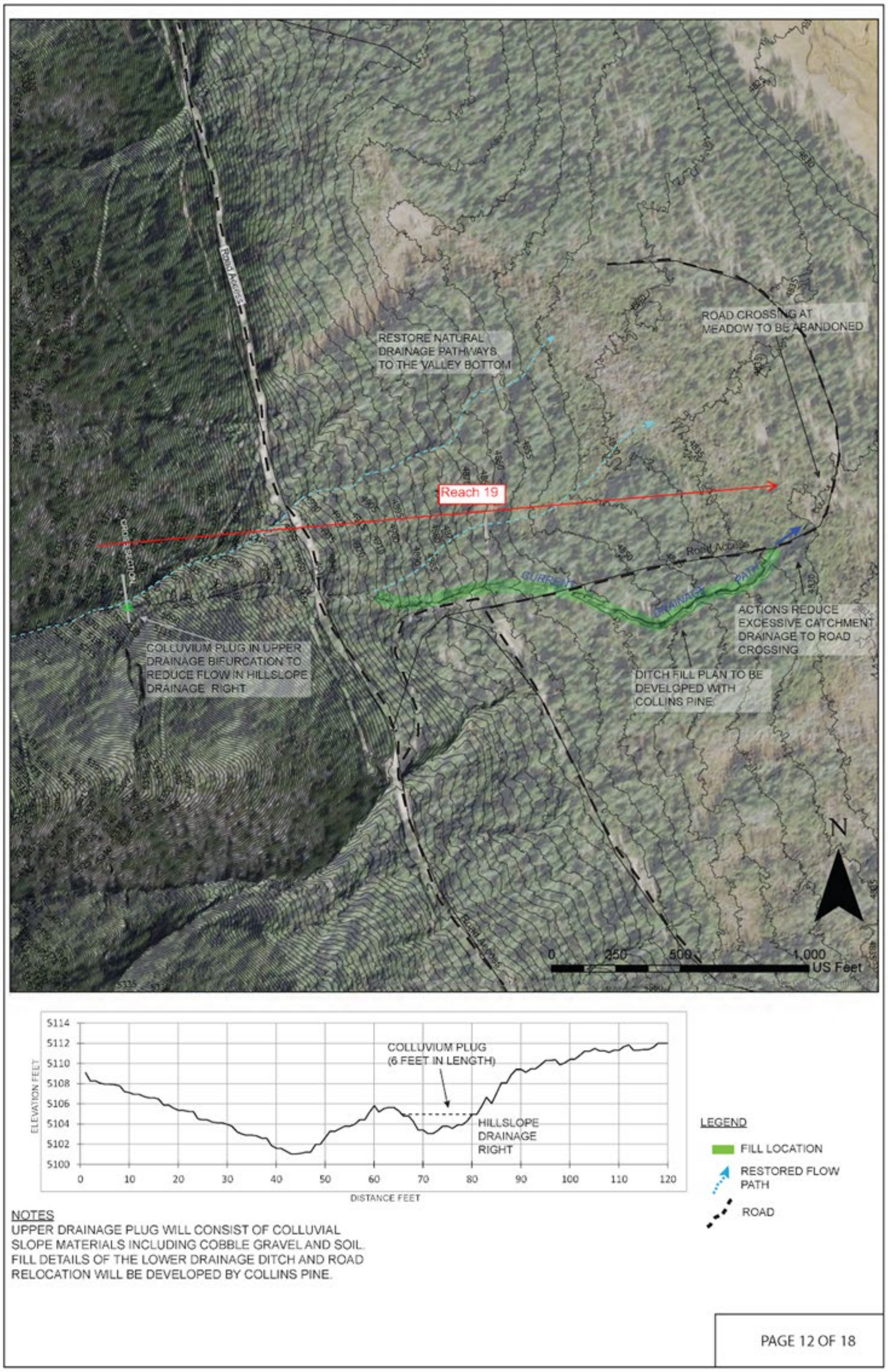


Figure 22: Design Plan View and Cross Section for Area 19
(A long section of ditch fill has been removed from proposed Project work)

Area 19

Current Site Conditions: The road-capture of a stream caused a 28-acre watershed to completely change its flow path and enter the meadow well downstream of where it likely historically entered. The stream now flows along a topographical high point adjacent or on the roadbed. Without surface water, any historical wetland area along the natural stream corridor would have likely dried over the decades and converted to upland vegetation.

Project Description/Restoration Practices

The following is an overview of each practice used in connection with the **Restoring the Deer Creek Headwaters at Childs Meadows Project** that will restore hydrologic, geomorphic and biological conditions within the Childs Meadows complex. In addition to the practices themselves, construction and maintenance requirements are described as well. Importantly, in addition to the maintenance and motioning requirements described in this Initial Study/Mitigated Negative Declaration and **Appendix L Post Project Maintenance and Monitoring Plan for the Restoring the Deer Creek Headwaters at Childs Meadows Project**, additional requirements may be established for project work in the future by regulatory and funding entities. **Figure 2: Overview of Childs Meadows Project Area with Specific Features Identified** shown above provides an overview of treatment locations. A visual description of proposed meadow treatments is shown in generalized schematic drawings found in **Appendix J.** General construction and implementation techniques for these meadow restoration practices follow those found in ***"Low-Tech Process-Based Restoration of Riverscapes: Design Manual. Version 1.0"*** shown among the references listed in the **References Cited** section of this Initial Study/Mitigated Negative Declaration. The Numbers adjacent to each practice below refer to the Project areas described immediately above.

Beaver Dam Analog (BDA) Areas 1,2 3, 4, 5, 8, 9, 10, 11, 12, 13, and 14

(See schematic drawings found Appendix J and feature cross sections shown in Appendix K) to this Initial Study/Mitigated Negative Declaration). BDA treatments will be used primarily in riparian meadow floodplain reaches. A summary of this treatment is found in **Table 2 Summary of Typical Hydraulic, Hydrologic and Geomorphic Effects of Beaver Dam Analogues (BDAs) and Post-Assisted Log Structures (PALS)** below. Backwater BDAs described below will also be used downstream of headcuts to reduce erosion. A total of between 48 and 91 BDAs will be developed throughout the overall **Restoring the Deer Creek Headwaters at Childs Meadows Project** area. BDA structures will be constructed using native materials and hand crews. As proposed, BDA structures will be a channel-spanning feature having a constant crest elevation. These structures will be constructed with a mixture of woody debris, rock, and soil to form a pond and mimic a natural beaver dam. The design and implementation of BDAs is non-destructive method to promote the depositional processes that are responsible for riparian floodplain habitat. BDAs will also be used to create immediate deep-water habitat to promote beaver colonization and to promote many of the same processes affected by natural beaver dams (e.g., increased channel-floodplain connectivity).

When incision is less than 1.21 meters, BDAs will serve to redirect flow from the channel over banks and onto the floodplain, at all flow rates including stream baseflows. These structures will be built greater than 100% and up to 300% of the bank-to-bank channel width. The crest elevations of BDAs will be up to .61 meters above the lowest bank height, but generally less than 1 foot. BDAs will be spaced such that the backwater from one dam reaches the next upstream dam so that the head differential from bank to pond is no greater than .46 meters at base flow. This will reduce the potential for scour below each dam, energy for end-run head cutting, and will allow beavers to travel safely throughout the complex with reduced risk of predation. When incision is greater than 1.21 meters, BDAs will serve as grade control to

Table 2: Summary of Typical Hydraulic, Hydrologic and Geomorphic Effects of Beaver Dam Analogues (BDAs) and Post-Assisted Log Structures (PALS)

Type	Hydraulic	Hydrologic	Geomorphic
BDA	Create deep slow water	Increase frequency and magnitude of overbank flow, increase hyporheic flows	Channel aggradation upstream, bar formation, bank erosion (if breached on ends), sediment sorting, dam pool formation
PALS, channel-spanning	Create upstream backwater or pond, and plunge hydraulics downstream	Increase frequency and magnitude of overbank flow, increase hyporheic flows	Channel aggradation, channel avulsion, bank erosion, dam and plunge pool formation, bar formation
PALS, bank-attached	Force convergent flow (deeper and faster), create eddy behind structure	Force overbank flows*	Bank erosion, scour pool formation, bar formation, sediment sorting, channel avulsion
PALS, mid-channel	Force flow separation, create eddy in lee of structure	Force overbank flows*	Bank erosion, scour pool formation, bar formation, sediment sorting, channel avulsion

Indicates that influence may be minor compared to other structure types.

create a backwater effect that arrests headcuts within the channel or adjacent floodplain. BDAs structures will be built to 100% of the bank-to-bank channel width and up to 1.21 meters in height.

All BDAs will have a uniform crest elevation across their length. The structures will be straight or convex downstream (middle of the dam furthest downstream) to not concentrate flow in the center of the channel. BDAs will be constructed using native material sourced within the Project area including conifers, willow, sod, soil, forest duff, and rocks. Materials sourced for BDAs will follow the criteria in the material sourcing practices described below under the heading **Material Sourcing**. BDAs typically include posts driven into the channel bed and banks, with extensive additions of interwoven trees, branches, and roots; BDAs may also be constructed without posts. Finer material will be packed into the structure to provide a water seal that will reduce flow through BDA structures, redirecting flow over the banks/floodplain and/or overtop the BDA. An extensive curtain of woody material will be interwoven on the downstream side of the BDA to reduce scour from overtopping streamflow. The approximate fill volume for a BDA of 16’ × 4’ × 4’ dimensions (L × W × H) is 10 cubic yards (c.y.), including 3-5 c.y. of wood and branches and 5-7 c.y. of sod, soil, and forest duff. For post-assisted BDAs, untreated pine posts up to 3” diameter will be driven into the ground at least ¼ of the final post length, spaced about 18-30” apart. BDAs posts will be installed with a portable hydraulic post pounder, or sledgehammer and manual post pounder. The remaining assembly will be by hand.

The construction of BDAs will require a light-duty truck or ATV to haul materials and equipment from the existing road network to BDA locations. All transportation equipment will be fitted with low pressure tires in order to prevent impacts to meadow vegetation and soil conditions. When transportation equipment is used, all cultural sites, areas with rare plants, fens and other sensitive areas of the Childs Meadows complex will be avoided.

BDA structures will be inspected and if necessary, maintained approximately every other month in the summers of years 1and 2 after installation. Maintenance will include adding material to seal leaks and pond water up to the bank full or as-built height. Depending on the condition of the structures, maintenance will also include adding additional posts, weaving woody vegetation and/or patching small gaps using cobbles and sediment. Maintenance needs in years 3 through 5 will be determined through continued environmental monitoring conducted on an annual basis. Maintenance will be based on progress towards objectives identified in the monitoring plan for this project. Restoration efforts will utilize a process-based restoration approach that uses the dynamic hydrologic system within the Childs Meadows complex to alter the BDA structures. Consequently, intervention by Project proponents in order to maintain the restorative effects of Project work will be determined based on perturbation within the meadow system to effect achievement of Project objectives or significantly effecting timing of attaining those objectives. Substantial redundancies will be incorporated into Project work so that if some individual structures fail maintenance may not be necessary to achieve Project objectives. Maintenance and monitoring requirements will be formalized in a maintenance agreement established between Collins Almanor Forest and the RCD of Tehama County and as described in **Appendix L.**

Post-Assisted Log Structure (PALS) Areas 1, 3, 4, 11, 14

This restoration practice will be utilized in riparian meadow transport reaches. A summary of this treatment is found in **Table 2**. Backwater BDAs described below will also be used downstream of headcuts to reduce erosion. Approximately 33-49 PALS will be constructed throughout the Project area utilizing native materials and hand crews. (**See schematic drawings found in Appendix J and cross sections in Appendix K to this Initial Study/Mitigated Negative Declaration**). PALS structures are constructed using woody material of various sizes pinned together with untreated wooden posts driven into the stream bottom substrate and channel banks to mimic natural wood accumulations. These features are designed to influence hydraulic and geomorphic processes within stream channels. While PALS influence hydraulics at all flows, they are most likely to force geomorphic change during high flows when sediment is mobilized and as such require posts to provide temporary stability. Each PAL constructed will utilize a range of shapes and sizes based upon their location within the channel and desired function. In general, these features consist of larger diameter and longer length material than used in the construction of BDAs. PALS will be placed in reaches where incision is greater than 1.21 meters to accelerate the channel evolution processes of erosion and deposition and, in some cases, force overbank inundation during high flow. PALS will be built up to bank full 100% of the bank-to-bank channel width and up to 1.21 meters in height.

PALS are built with woody material and are intended to be porous. Construction materials will include trees, branches, and roots anchored using untreated pine posts up to 2.5” in diameter driven at least 2’ into the channel bed and banks. Only those conifers meeting the criteria established for this material in the **Material Sourcing** section below will be felled and utilized in the construction of PALS. Posts will be installed with a sledgehammer, manual post-pounder, and portable hydraulic post pounder. The remaining PALS assembly is by hand. The approximate fill volume for a PALS of 12’ × 4’ × 3’ dimensions is 5.5 c.y. of wood and branches.

The construction of PALS will require a light-duty truck or ATV to haul materials and equipment from the existing road network to PALS locations. All transportation equipment will be fitted with low pressure tires in order to prevent impacts to meadow vegetation and soil conditions. When transportation equipment is used, all cultural sites, areas with rare plants, fens, and other sensitive areas of the Childs Meadows complex will be avoided.

PALS will be maintained annually during baseflow conditions in years 1 through 3 after restoration. Maintenance includes adding and anchoring woody material up to the as-built height and up to the full channel width. Maintenance in years 3 through 5 will be determined by monitoring and is expected to be light and semi-annual. Maintenance will be based on progress towards objectives identified in the monitoring plan for this Project. Using a processed based approach, it is anticipated that the dynamic hydrologic system within the meadow complex will alter the BDA and PALS structures and thus intervention will be determined based upon the potential for any perturbation to effect achievement of Project objectives or to significantly effect timing in the attainment of those objectives. Redundancies will be built into the implementation of Project work so that if a portion of the individual structures fail, maintenance may not be necessary to achieve Project objectives. Maintenance and monitoring requirements will be formalized in a maintenance agreement established between Collins Almanor Forest and the RCD of Tehama County and shown in **Appendix L.**

Mechanical Fill of Large Channels Areas 4 and 6

Mechanical Fill treatments will be utilized in fens. Within treatment areas 4 and 6 incised and degraded channels at least .61 meters wide and .61 meters deep are located within and adjacent to fens. Due to the large fill volume required, mechanical equipment will be used to generate, transport, and place a mix of locally sourced wood chips and mineral soil in large incised channels (up to 50% of fill will be wood chips). These locations are mapped as “Mechanical Channel Fill” and “Mechanical Borrow Area” in the plan view figures throughout this Initial Study/Mitigated Negative Declaration. The total eroded gully volume recommended for mechanical fill treatments is approximately 947 c.y. The estimated total fill volume is 1,420 cubic yards of compacted material: approximately 710 cubic yards each of wood chips and mineral soil. Heavy-duty and light-duty equipment will access each restoration site from the existing road network and will not be operated on any meadow soils or plants. The mineral soil component excavated from the borrow areas will fill the gaps between the wood chips and shreds in the fill, helping anchor the saturated soil and preventing rapid subsurface flow. On all steep slopes, periodic permeable fill retainers such as organic erosion fabric or coir logs with interlaced wooden stakes hammered into beds and banks will be installed to reduce the risk of the saturated fill flowing down the channel before plant roots have a chance to grow, anchoring this material.

Earthen material will be excavated from hillslopes adjacent to the meadow as shown in plan views throughout this IS/MND. Multiple borrow locations have been identified from which fill material will be obtained. Most borrow areas will be located adjacent to the meadows and slightly higher in elevation than flood prone sites. In several instances, a portion of the borrow area may be located within the floodplain. These sites however will be utilized so that the invert elevation (i.e., difference between upslope and downslope edge) remains flat or less than .15 meters in height. A total of 1,966 c.y. of potential fill has been identified in the mechanical borrow areas however, no more than 1,420 c.y. (if no wood chips are used in fill mix), and as little as 710 c.y. (if 50% woodchips are used in fill mix), of this material will be needed to fill the large meadow gullies.

Prior to filling the channel, all sod and topsoil from within the channel will be removed and placed adjacent to the channel. After fill material is transported and placed in the channel, sod and topsoil will be replaced, and covered with natural-fiber (e.g., coir or jute) erosion fabric anchored into the adjacent fen surface. Disturbed areas not covered by replaced sod will then be planted with seeds and plugs of native fen sedges, whose roots and rhizomes anchor fen soil. No maintenance is expected to be necessary for this practice, however annual monitoring will be in place for up to 5 years to determine any need. If substantial erosion occurs, additional material (erosion control fabric, and revegetation) will be required. Maintenance requirements will be formalized in a maintenance agreement between Collins Almanor Forest and the RCD of Tehama County (**See Appendix L)**. The finished grade elevation for channel fill will be set to a similar elevation as the adjacent banks/floodplain. All fill surfaces that receive overland flow will be covered with staked erosion fabric suitable for transplanting into and allowing plant growth and establishment (e.g., Rolanka BioD-Mat).

On sites having slopes >4%, coir logs will be placed and staked in a herringbone pattern over erosion-fabric-covered fill to prevent overland flow downslope. Permeable coir logs of about 1.82 to 2.44 meters in length will be used. The permeability and short length of the coir logs will better reduce the flow concentration along impermeable and long flow barriers. In addition, coir logs will decompose under wetland conditions after approximately 5 years, by which time dense wetland vegetation will be established and resistant to erosion. Sod plugs of the desired meadow type (e.g., fens and meadows) will be hand dug and transplanted into the fill areas. Locally collected seed of native wetland sedges will be grown at a nursery and the seedlings transplanted back into the fill. All identified rare plant occurrences will be avoided as borrow areas for plugs. Sparsely vegetated remnant meadow surfaces (not sites containing fill material) that will be receiving dispersed overland flow as part of a restoration treatment will be evaluated for erosion fabric protection. If sufficient surface stability, root cohesion and early spring plant growth exists, no additional fabric will be required. If not, erosion fabric and transplants will be added to these rewetted but not filled areas.

Hand Fill of Ditches and Small Channels 4, 6, 16, and 17

This restoration practice will be utilized within fen and discharge slope meadows. In select small channels and ditches less than approximately 2' deep and 2' wide, hand crews will backfill steep sloping locations or place plugs in shallow sloping locations. This practice is referred to as "Hand Fill Chanel," "Hand Fill Ditch," and "Hand Borrow Area" in the legends of plan view figures displayed throughout this IS/MND. Two types of fill material will be used as appropriate, either a 50:50 mix of native alluvium and wood chips, or densely woven coconut coir logs. In both instances, hand crews will place the material within the channel. Coir logs will be staked in place. The alluvium and wood chips mix will fill gaps between the bed, banks, and the coir logs, helping to prevent piping and rapid subsurface flow.

The total ditch and small channel fill volume recommended for hand fill treatments is approximately 740 c.y. Roughly 370 c.y. each of wood chips and mineral soil will be required if coir logs are not use. 693 c.y. of potential fill has been identified in hand fill borrow areas. Using hand tools, any remaining sod within small channels will be salvaged and stockpile adjacent to the channel. Alluvium will be excavated from borrow areas using a combination of mechanical and hand tools. This material along with wood chips will be transported using whenever feasible, non-mechanized equipment. Transport routes will be established in areas that will not result in damage to meadow soils and vegetation resources. The salvaged sod will then be replanted with fill material packed to the required elevation. Jute fabric will be placed and staked in a manner similar to the mechanical treatment criteria described above if the area is at high risk of flood flows and erosion. No maintenance is expected to be necessary for channels and ditches filled by hand crews and annual monitoring will be in place for 3 years to determine any need. If substantial erosion occurs, additional material, erosion control fabric, and revegetation will be required. Monitoring and Maintenance requirements will be formalized in a maintenance agreement between Collins Almanor Forest and RCD of Tehama County as described in **Appendix I**.

Revegetation Areas 3, 5, 10, 11, 12, 13, 14

Revegetation practices described in this section will be used in and adjacent to riparian meadow floodplain and transport reaches. Riparian deciduous shrubs and trees will be planted in and adjacent to stream channels. These plantings are intended to accelerate the creation and enhancement of habitat for terrestrial and aquatic vertebrates. All plants will be locally sourced (collected locally and grown at a nursery). Willow cuttings will be sourced from within the Childs Meadows complex according to the criteria in the willow material sourcing practices described under **Material Sourcing** below. Revegetation will occur by hand within two years of hydrologic restoration activities. The Sierra Meadow Planting Palette tool developed by Point Blue Conservation Sciences (PBC) will be utilized to identify appropriate plant species in order to actively revegetate meadow sites within the Project area. Temporary protection (e.g., fencing, tubes) of plantings may be required to reduce impacts from cattle, deer, and other plant predators. If substantial loss of desired plant species occurs, additional planting (and protection) to maintain the desired species composition will be required. No maintenance is expected to be necessary for this practice, but occasional post-project monitoring will occur for up to 20 years to determine success and need for supplemental planting. Monitoring during the duration of the grant will occur as outlined in the monitoring plan shown in **Appendix L**.

Material Sourcing

The following describes the requirements, procedures and standards for sourcing materials to be used in connection with the **Restoring the Deer Creek Headwaters at Childs Meadows Project**

Conifers

Approximately 3,890 non-merchantable live and recently fire-killed conifers will be required in order to implement proposed restoration practices: approximately 2,300 trees to generate 1,080 CY of woodchips for mechanical and hand fill treatments; up to 1,350 for wood structures (assuming 10 trees per BDA and PALS); and up to 235 for the conifer jackstraw treatments. These calculations assume an average tree size of 8” DBH. Live non-merchantable lodgepole pine, white fir, incense cedar, along with fire-killed non-merchantable conifers of any species, up to 12” DBH sourced from (1) within the boundaries of delineated wetlands outside of treed fens, and (2) within non-wetland habitat to 100 ft of the mapped wetland boundary of Childs Meadows will be utilized. The second sourcing area is within Collins Almanor Forest's Childs Meadows THP boundary. These sites are displayed in **Figure 1: Restoring the Deer Creek Headwaters at Childs Meadows Project Location Map**. All cultural resource and rare plant sites will be avoided when sourcing conifers. When woody material is needed, all suitable trees required for a particular activity will be felled and immediately transported to restoration areas using pick-up trucks and ATVs with trailers. Limbs and other unused material will be lopped and scattered or chipped and scattered back onto the sites from which this material was obtained. Exact areas where conifers are sourced will be determined during construction and thus are not shown in the plan view figures.

Beaver Dam Analogs

Beaver Dam analogs will be constructed using native material sourced onsite, including conifers, willow, sod, soil, forest duff, and rocks. Conifers and willows will be sourced as described in their respective material sourcing sections. Approximately five c.y. of non-woody material (sod, soil, forest duff, and rocks) will be needed for each BDA structure. Soil, forest duff, and rocks will be sourced with hand tools from upland sites within 30 m of mapped Childs Meadows wetland boundaries, outside of all cultural resource areas. These sites are identified as "BDA Uplands Material Source" in plan view figures throughout this IS/MND. A total of 19.6 acres of potential BDA material locations have been mapped however, only 2% of this area will be disturbed in order to yield no more than 550 c.y. of upland soil, duff, and rock. The disturbance footprint created in obtaining this material will occur in patches no larger than 4 m^2, digging 30 cm (12 inches) deep, and no more than 4 m^2 will be disturbed from any 20 m^2 area. Sod for BDAs will be obtained from existing wetland surfaces, excluding fens and dewatered wetlands. Patches of sourced sod will be no larger than 1 m^2 and 30 cm deep, and no more than 2 m^2 will be taken from any 20 m^2 area of non-fen existing wetland surface. Up to 500 m^2 of sod (up to 200 CY of sod material) will be used throughout the entire Project area. Sod source sites have not been mapped in plan view figures but will exclude rare plants and cultural sites.

Willows

Willow cuttings are required for the construction of BDAs and for revegetation plantings. Most of the willow cuttings will be sourced from individuals found within the Project area. When willows are not available within 100 yards of a planned BDA structure or revegetation area, cuttings will be sourced from the lower extent of the Project area, within Area 14, or further downstream on CAF land where willows are abundant. Only branches less than 2" in diameter at the cutpoint will be used. No more than 20% of stems from an individual willow plant will be removed. No willow cuttings will be removed within existing Willow Flycatcher territories as described in the Biological Resources section of this IS/MND.

Cattle Grazing

Current and historical grazing is a key problem related to the degradation of Childs Meadows. There are 395 acres of wetlands on CAF property managed under the conservation easement now held by CAF of which 243 acres is currently available for "full-season" grazing. Currently, where grazing within the Childs Meadows complex is conducted, the grazing strategy is incompatible with achieving long-term restoration objectives. For grazing to continue within the **Project Area** while at the same time ensuring its compatibility with desired Project outcomes, modifications will be made to the current grazing regime within the Project area. To continue this land use activity once Project work is completed will require improved grazing management by the landowner and lessee as well as an increased use of fencing and natural barriers (e.g., downed trees) to exclude grazing from sensitive areas of the meadow such as fens, stream channels, and large unfilled headcuts **(See Figure 23: Map Showing Approximate Locations of Proposed New Fencing and Extent of Childs Meadows Wetland Area on Collins Almanor Forest Land With Easement Held by TNC Available for "Full-Season" Grazing and Table 3: Length of Fencing to be Installed Within the Childs Meadows Project)**.

As proposed, approximately 5% (12 of 243 acres) of the area within that portion of the meadow complex managed under CAF's conservation easement will be removed from all grazing activity. 231 acres of these wetlands will remain available for "full-season" grazing which would once again be allowed in the year immediately following completion of restoration work. Continuation of grazing will require diligence by the grazer and/or landowner to ensure that cows stay out of sensitive restored sites and that fences are repaired in a timely manner. Improved cattle grazing operations will require installing approximately 1 mile of new fencing **(See Table 3)**. Additional grazing mitigation practices would be needed within the most sensitive areas to ensure minimal damage to soils and resources when fences are breached or circumvented by cattle. Achieving necessary levels of protection will require a substantial initial cost for fencing and other Mitigation Measures, a maintenance budget for fence upkeep and regular

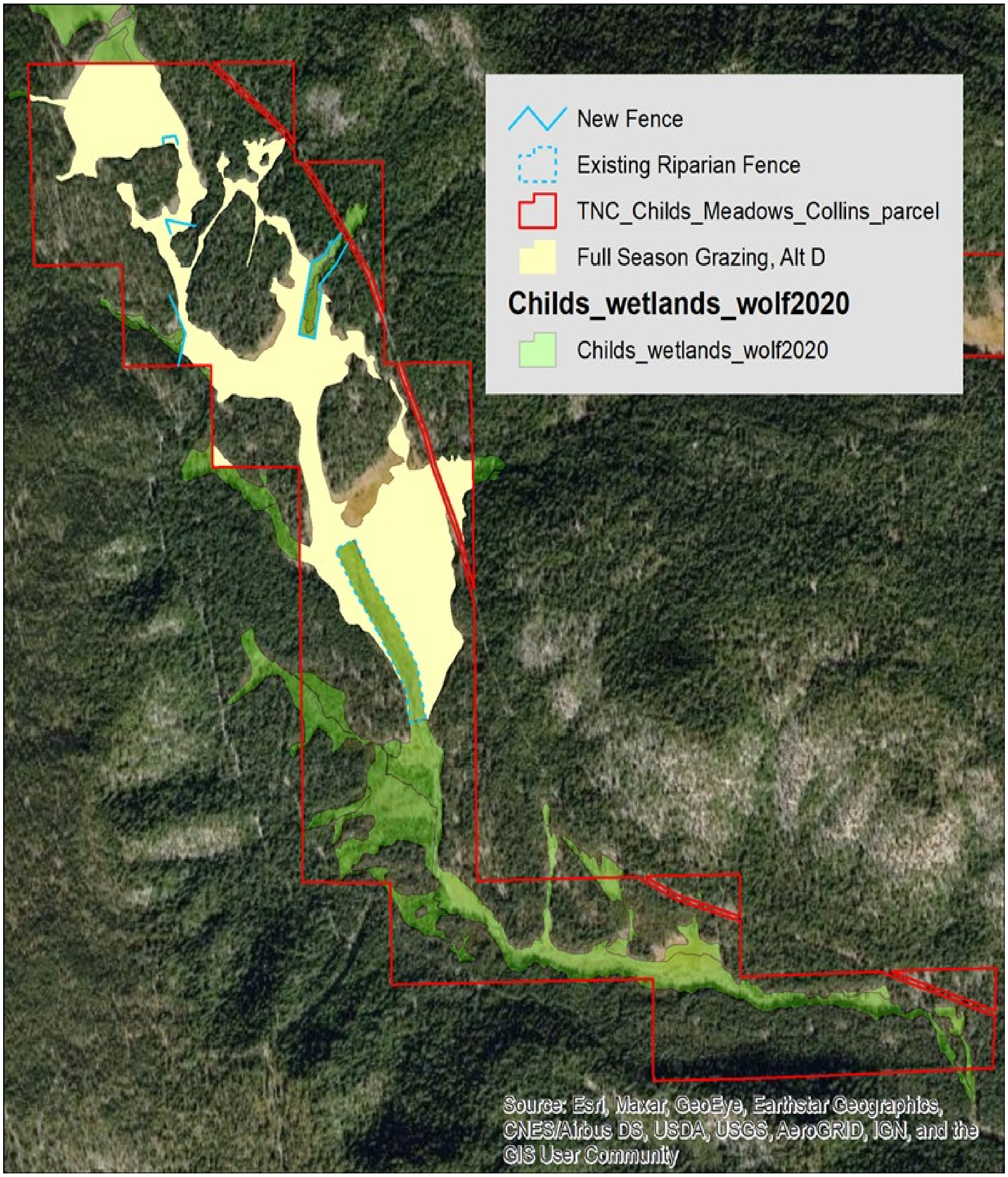


Figure 23: Map Showing Approximate Locations of Proposed New Fencing and Extent of Childs Meadows Wetland Area on Collins Almanor Forest Land with Easement Held by TNC Available for "Full-Season" Grazing

Table 3: Length of Fencing to be Installed Within the Childs Meadows Project

Description of Area	Length of New+ Fencing (ft.)	Length of New+ Fencing (mi)
Uppermost headcut at the top of Area 1	411	0.08
Largest headcut at the top of Area 2	671	0.13
Fen habitats in Area 4	1,005	0.19
Fen habitats in Area 6	3,253	0.62
Total	5,340	1.01

Measurements are rough approximations to guide decisions and will change based on final determined placement.

+ = *New fencing in some cases can be existing fencing that is no longer needed where it stands and re-purposed in new areas.*

* = *Seasonal exclusion of grazing.*

** = *1 acre of which is outside the easement boundary.*

diligence to ensure fence integrity especially in the late season when cows are inclined to enter wetter, more productive areas. These measures will be pared with a reduction in cattle number to attain AUMs approximately 20% lower than currently exists. A reduction in AUMs would be achieved through a combination of reducing the number of animals or the duration with which they are present. Exact AUMs will be adapted annually based on water year/available forage and results from monitoring the effects of previous year's grazing impacts on restoration goals. Development of a rigorous grazing management plan will occur as part of this Project's implementation funding to detail and codify these concepts.

Grazing Management - Exclusion Fencing

Exclusion fencing will be used in and adjacent to fens in Areas 4 and 6 to exclude or discourage cattle from entering these sensitive sites thus meeting restoration objectives. The fence type will be split rail utilizing cedar sourced within upland forest stands within the Project area on adjacent Collins Pine Company lands or wildlife friendly barbed wire. The fencing material to be used will vary depending on local conditions. No digging will be necessary, though posts will be driven into the ground. Mapped fence locations are approximate and may change based on field conditions **(See Figure 23: Map Showing Approximate Locations of Proposed New Fencing and Extent of Childs Meadows Wetland Area)**. Cattle exclusion fencing will be maintained for the first 3 years by RCD of Tehama County and CAF using grant funding. Following the initial 3-year maintenance period, fence maintenance will become the responsibility of the landowner, which at the present time is Collins Pine. Cost associated with fence maintenance will be offset from funds generated in connection with Project area grazing leases.

Grazing Management - Conifer Jackstraw

Jackstrawing of small conifers will be used in fens and discharge slope meadows in Areas 4, 6, 16, 17, and 18. In these areas, fens were identified that had significant hoof puncture impacts created by cattle and are at high risk of further degradation. Where these fens remain unfenced or have partial fencing, small diameter whole trees will be felled and placed across the meadow and meadow edge in a crisscross (jackstraw) patten in order to discourage overuse by cattle. This material will be placed at a density of 100 trees per hectare over an area of 2.34 acres. Approximately 234 trees will be used for this purpose. All trees will be sourced according to the conifer material sourcing practice described below. All areas containing rare plants whose development is incompatible with this action will be avoided. The conifer jackstraw treatment will be maintained for the first 3 years by RCD and CAF personnel through implementation grant funds. Following the 3-year implementation period, maintenance will be the responsibility of the landowner.

Grazing under new management requirements would be allowed in the year immediately following restoration. Monitoring of modified grazing areas would be required of the grazer and CAF to ensure livestock is excluded from sensitive areas. CAF has stated a commitment to regularly assess the compatibility of the selected grazing regime with restoration objectives through long-term monitoring, adaptively managing grazing in the interest of meadow health and re-evaluating the grazing lease annually with the possibility of complete cessation of grazing within the meadow in the future.

A variety of vehicles and equipment will be used during Project implementation as shown in **Table 4**.

Table 4: Anticipated Construction Equipment

# Of Units	Equipment Description	#Of Units	Equipment Description
1	RCDTC F-250	1	RCDTC Bobcat 770 Skid Steer Rental
1	RCDTC F-250 (Short Bed)	1	RCDTC Bobcat Root Grappler
1	RCDTC Dodge Ram	1	I5 Rentals 336 Excavator Rental
1	RCDTC Ford Ranger	1	I5 Rentals 950 Front End Loader
4	RCDTC Chainsaw Rental	1	I5 Rentals 950 Front End Loader
2	RCDTC Morbark Chipper Rental	1	Hydraulic Post Pounder

1	RCDTC Dump Trailer Rental	1	4 WD Quad Unit

Environmental Commitments

During proposed Project construction, all activities will comply with required permits **(See Table 1 Permits and Approvals Potentially Required for the Childs Meadows Project)**. Project work will also comply with the Mitigation Measures **(Appendix A)** and Best Management Practices **(Appendix B)** established for the **Restoring the Deer Creek Headwaters at Childs Meadows Project**.

Environmental Checklist

This chapter describes the affected environment within the Project area and discusses the anticipated environmental consequences associated with implementation of proposed Project work **(See "Description of the Proposed Project")**. **Appendix G** of the CEQA Guidelines was used as a basis for assessing the significance of potential environmental effects, considering the whole of the action as required by CEQA regulations. Agency standards, regulatory requirements and professional judgement were also used, where appropriate. Each of the resource areas was evaluated and one of the following four determinations was made:

No Impact: No impact to the environment will occur as a result of implementing the Project.
Less than Significant Impact: Implementation of the Project will not result in a substantial and adverse change to the environment and no mitigation is required.
Potentially Significant Impact: Implementation of the Project could result in an impact that has a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the Project" (CEQA Guidelines Section 15382).
Less than Significant with Mitigation Incorporated: Implementation of the Project could result in a "potentially significant impact," except that identified Project-specific Mitigation Measures will reduce the effect to a less-than-significant level.

Formally Established Mitigation Measures

If potentially significant impacts to Project area resources attributable to the implementation of Project work were identified during the environmental analysis established for this effort, formally established Mitigation Measures were developed to assure their protection. These protection measures are described in **Appendix A: Mitigation Monitoring and Reporting Plan**.

Recommended Best Management Practices

In order to further reduce impacts to Project area resources, an array of Best Management Practices will be utilized as appropriate during implementation of Project work. These practices are described in **Appendix B: Best Management Practices Developed for the Restoring the Deer Creek Headwaters at Childs Meadows Project** to this Initial Study/Mitigated Negative Declaration.

Aesthetics

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
I. Aesthetics. Would the Project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point.) If the Project is in an urbanized area, would the Project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

Environmental Setting/Affected Environment

The 404 acre Project planning area is located within the 1,272 acre Childs Meadows complex located in Eastern Tehama County approximately 10 miles southwest of the Lassen Volcanic National Park and 18 miles north of Chester California **(See Figure**

1: Restoring the Deer Creek Headwaters at Childs Meadows Project Location Map and Figure 2: Overview of Childs Meadows Project Area with Specific Features Identified). This high mountain meadow is at an elevation range of between 4,750' to 4,900'. The meadow complex is surrounded by private timberlands and public wildlands managed by the Lassen National Forest. The meadow complex consists of a series of broad, wet, planer surfaces dominated by wetland plant species, punctuated by isolated dry meadow areas and relatively higher elevation bedrock promontories dominated by coniferous forest **(see Photos AES 1 through AES 6)**. Several large, carbon-rich fens are also found within the Project area **(See Photos AES 7 and AES 8)**. Gurnsey Creek, flows approximately 4.7 miles through Childs Meadows from north to south inside an 8.8 square mile watershed**)**. Within the Childs Meadows complex, Gurnsey Creek and a number small tributaries are currently being impacted by head cutting and other erosion processes. The largest of these erosion features is shown in **Photos AES 9, 10, and 11.** Approximately 4 miles south of the Meadow's southernmost boundary, Gurnsey Creek meets mainstem Deer Creek an important tributary to the Upper Sacramento River that provides appropriate water quality for downstream habitat for listed aquatic species including Spring Run Chinook Salmon **(See Figure AES 1).** Land use in and around the Project area generally consists of grazing, timber production and low impact winter recreation. Adjacent commercial timberlands have undergone several cycles of timber harvest over the last several decades.


Photo AES 1: Inundated Portion of Childs Meadows Wet Meadow Area After High Spring Flow

Photo AES 2: Panoramic View of Wet and Dry Meadow Areas Within the Childs Meadows Complex


Photo AES 3: Panoramic View of Dry Meadow Component Within the Childs Meadows Complex

Photo AES 4: Example of Densely Stocked Conifer Forest Species Growing Within an Upland Island Surrounded by Meadow Complex Soils

Photo AES 5: Example of Upland Conifer Forest That Surround the Childs Meadows Complex
A portion of which is included in the Restoring the Deer Creek Headwaters at Childs Meadows Project Work Scope**.**

Photo AES 6: A Reference Reach Within Childs Meadow Where Beaver Activity Has Resulted in Hydrologic Connectivity and Wet Meadow Conditions

Photo AES 7: A Treed Fen with Naturally Occurring Lodgepole Pine
Vaccinium shrubs are abundant on small hummocks and at the base of trees.

Photo AES 8: Looking West Down a 12.5% Sloping Fen to the Valley Floor of Childs Meadows
Note mid-September flowing spring discharge and cattle hoof punches in the foreground.

Photo AES 9: Overview of a Head Cut and Surrounding Impacted Area
Note the significant amount of scour along both banks of the channel and the surface above. The channel shown in Photo 3 is upstream and to the left of the headcut just off this photograph's left border.

Photo AES 10: Close Up of a Head Cut


Photo AES 11: Close Up of Downstream Channel Immediately Adjacent to a Head Cut
Note the considerable amount of fine sediment within this portion of the stream channel.

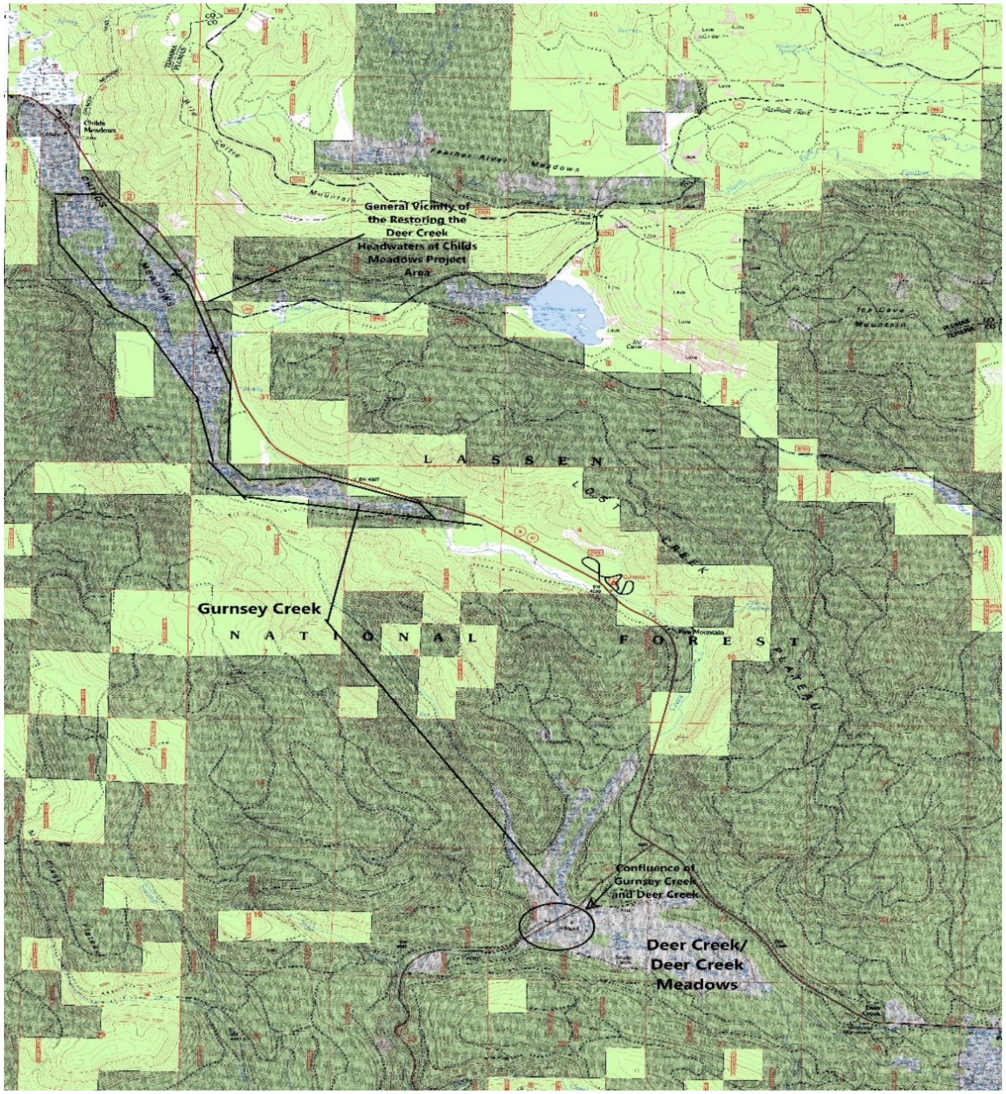


Figure AES 1: Proximity of Gurnsey Creek/Deer Creek Confluence at Deer Creek Meadows Within the Childs Meadows Project Area

A long history of human activities in the valley bottom in which Childs Meadows is located as well as adjacent uplands has resulted in the degradation of the Childs Meadows complex. Head cutting, conifer encroachment, grazing, and diversions are impacting hydrologic function, and habitat quality **(See photographs above)**. Cattle are currently grazed within most of the Project area under a 5-yr grazing permit held by Collins Almanor Forest. Subdivision, mining, and the introduction of non-native species are prohibited by easement provisions. As of 2021, the grazing permittee operate a total of 440 AUMs from mid-June to late July and then again from early September to early November. Since 2015, portions of the lower meadow have been fenced to prevent cattle grazing and a cross-valley fence was constructed in 2015 to exclude cattle from the downstream third of the meadow. A 15-acre parcel was fenced in fall 2015 to prevent grazing near a channelized reach of Gurnsey Creek as part of a controlled experimental demonstration project. The 404-acre Project area includes Collins Almanor Forest property inside and outside of the CAF held easement. The 175-acre Highlands Ranch and Resort property is located at north end of the Project area along State Route 36E **(See Photo AES 12)**. A portion of the ranchlands away from the developed area is within the proposed Project area. The small resort community of Childs Meadows is located opposite the meadow complex on the east side of State Route 36E. The Project area contains several wildland roads used to access adjacent timberlands along with an underground utility line **(Figure 3: Cable Route Location Within the Childs Meadows Complex)**. Current erosion features and other impacts within the Project area are described above under **Existing Conditions,** are shown in **Figure 2**, and currently impact visual conditions within the meadow itself. The largest of these erosion features are shown in **Photos AES 9, AES 10 and AES 11**. A number of these features, however, cannot be observed from areas of public view or public access due private control of access routes to the meadow floor as shown in **Figure 1:** and forested areas immediately adjacent to State Route 36E **(See Figure AES 2: Portions of Project Area Obscured by Forest Roadside Vegetation)**.

At the present time, forest restoration is in process that once completed will address conifer encroachment of the meadow, over-dense stands adjacent to the meadow complex, along with similarly dense stands throughout the watershed **(See Photos AES 13 and AES 14)**. The treatment plan related to this effort has been incorporated into the **Restoring the Deer Creek Headwaters at Childs Meadows Project** as large woody material generated in connection with forest restoration efforts along with that removed from the meadow area itself will be placed within stream channels and floodplains in a strategic manner as described in detail under the "**Project Description/Restoration Practices"** section above. Cattle enclosures, beaver dam analogs, and willow planting have been installed within the Childs Meadows system in connection with a pilot Project implemented by this Project's technical team. In 2016, a livestock fence was installed around 30 acres of degraded riparian meadow habitat along with 6 BDA structures in the lower half of an in-place grazing enclosure. In addition, hundreds of willow stakes were planted adjacent to stream channels. These actions resulted in increased water storage, flow complexity, vegetation growth, carbon storage, and number of growing willow plants in the fenced Project area.

Photo AES 12: Resort Complex Within a 175 Acre Operating Ranch Adjacent to the Project Area

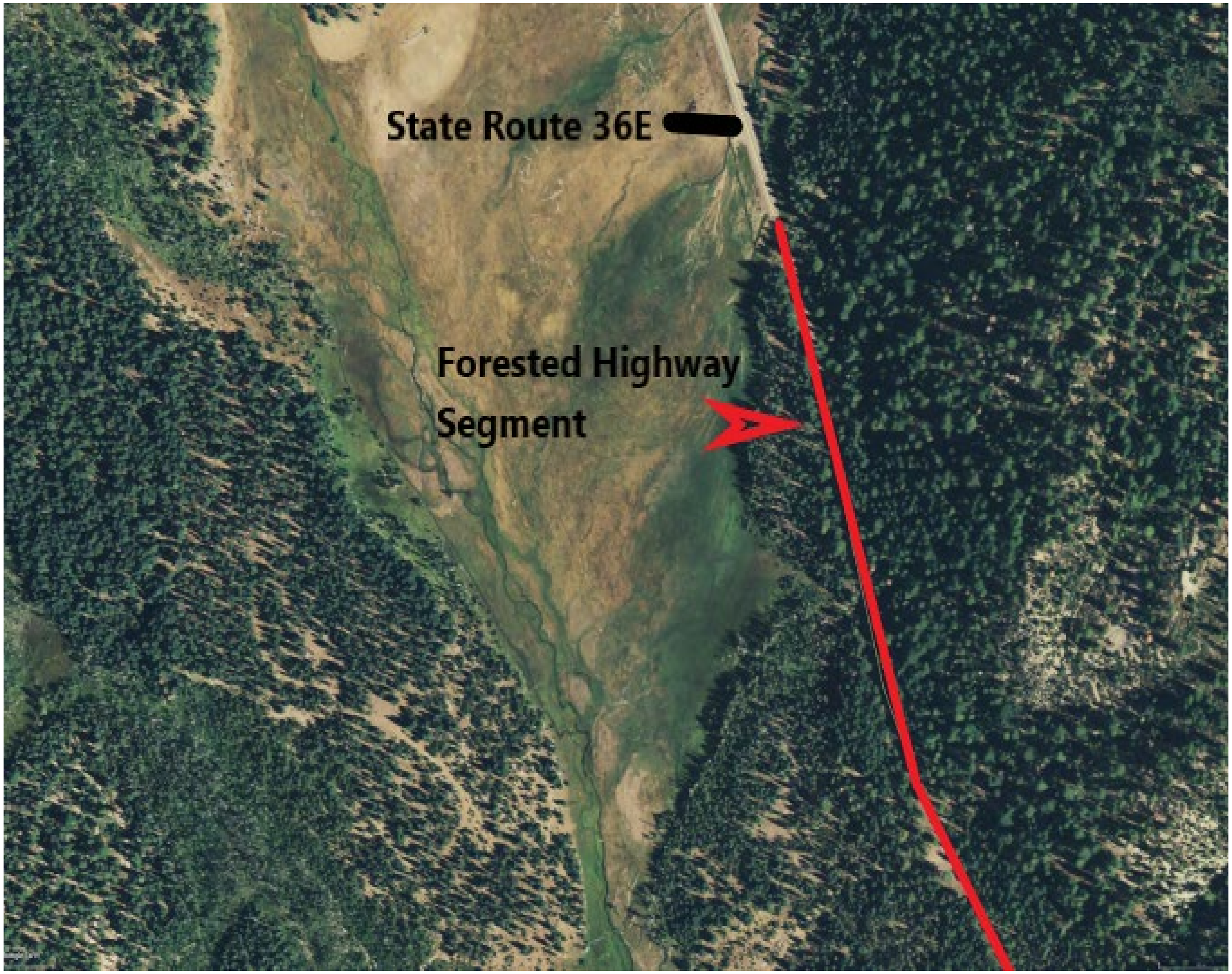


Figure AES 2: Portion of Project Area Obscured by Forest Roadside Vegetation

Photo AES 13: Example of Recently Established Conifer Species in Meadow Complex Soils

Photo AES 14: View of Mature Conifer Species That Have Become Established at the Edges and Interior of the Childs Meadows Complex

Note the incised stream channel where BDA’s will be used to raise the water base elevation.

Environmental Consequences

a) ***Would the Project have a substantial adverse effect on a scenic vista?***

Less Than Significant. The **Restoring the Deer Creek Headwaters at Childs Meadows Project** area is located within a remote portion of eastern Tehama County used primarily for timber production, ranching, hunting, wildlife management, water production and low impact winter snow sports activities such as cross-country skiing and snow shoeing. Project sites are located on private meadowlands zoned for ranching operations and forestlands zoned for timber production. Due to Project work being completed exclusively on private lands, access to impact sites is restricted. The overall Project area is parallel to State Route 36E and is partially screened from passing traffic by roadside forest stands **(See Figure AES 2)**. All work shall be completed at ground level in a low impact manner that will minimize the use of mechanical equipment **(refer to the project's scope of work described in detail above under Project Description/Restoration Practices)**. Once completed, proposed Project work will improve meadow aesthetics within treatment areas through the removal of head cut and erosion features along with several unused wildland road segments thus recreating natural aesthetic conditions. State Route 36E is not formally classified as a Scenic Route and all Project work will be completed during summer months when the meadow is used exclusively for cattle grazing and timber operations are conducted. As a result, implementation of Project work will not impact the area's visual resources to those using the meadow for approved winter recreation activities or passersby utilizing State Route 36W.

b) ***Would the Project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?***

No Impact. State Route 36E is not a formally recognized State Scenic Highway and no scenic resources will be damaged along any State Highway corridor. Project work will consist of short-term meadow restoration efforts which entail limited use of mechanical equipment along with power and hand tools in order to restore natural hydraulic and visual conditions within impacted meadowlands and stream channels as well as to remove several deteriorating road segments. Details of equipment use and restoration practices to be used in connection with Project work are described in **Project Description/Restoration Practices above**. A list of equipment expected to be used during Project implementation is shown in **Table 4: Anticipated Construction Equipment**.

c) ***In non-urbanized areas, would the Project substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point.) If the Project is in an urbanized area, would the Project conflict with applicable zoning and other regulations governing scenic quality?***

Less than Significant. During future Project implementation the visual character of this very rural Project area will change at various locations. Negative impacts to area aesthetics attributable to Project work will be temporary in nature. Improvements to area aesthetics will occur once Project work was completed and several growing seasons have passed. Overall Project implementation will not substantially degrade the existing visual character of public views found along State Route 36E as all Project related activities will be completed rapidly at the meadow surface through the limited use of mechanical equipment along with hand and power tools. In addition, a significant portion of the Project area is obscured from highway views by roadside forest stands **(See Figure AES 2)**. Those allowed access to meadow areas and adjacent timber lands during winter months will see some changes in meadow vegetation during the first three years after completion as vegetation is established and stream gradients shallowed, reducing head cutting and bank erosion. It is anticipated that temporary impacts to the visual character of the Project area will be obscured by snow during winter months. As described under **Project Description/Restoration Practices** above, vegetation that could be directly impacted by Project work will be protected through avoidance and disturbed areas will be restored through planting, reseeding, or natural recruitment. It is anticipated that any short-term impacts to aesthetic conditions within the Project area will be limited to the Childs Meadows surface and certain adjacent conifer stands east of the meadow complex

d) ***Would the Project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?***

No Impact. The proposed Project does not include the installation of lighting, nor will new sources of light or glare be created through the implementation of Project work. All Project implementation efforts will be completed during daylight hours.

Impacts to Aesthetics will be less than significant.

Agriculture and Forest Resources

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
II. Agricultural and Forest Resources.				
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997, as updated) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.				
Would the Project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒

d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Environmental Setting/Affected Environment

The Project area is located within a remote area of Tehama County zoned for timber production, ranching and natural resource management.

Environmental Consequences

a) ***Would the Project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?***

No Impact. None of the lands within the Project area are classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Therefore, there will be no impact.

b) ***Would the Project conflict with existing zoning for agricultural use or a Williamson Act contract?***

No Impact. Project implementation will not change land use within the Project area or on surrounding lands and thus will not conflict with existing zoning for agricultural activities or Williamson Act contracts. Therefore, there will be no impact.

c) ***Would the Project conflict with existing zoning for, or cause rezoning of forest land (as defined in Public Resources Code §12220(g)), timberland (as defined by Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code §51104(g))? -and-***

d) ***Would the Project result in the loss of forest land or conversion of forest land to non-forest use?***

No Impact Questions c) and d). The only impacts to adjacent forest stands will be the removal of conifer species invading Childs Meadows. Minor removal of timber may also occur during the establishment of Project staging and materials storage sites as well as, during road removal and related re-sloping of road prisms. Any forest materials such as small trees and dead downed material required for Project implementation will be gathered either from the Project area or within an adjacent timber harvest area owned by CAF. This Project will not conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production, nor will it cause zoning changes to forest, range, or other wildland area. As a result, the proposed Project will not conflict with existing zoning or cause rezoning of timberland currently classified as Timberland Production thus there will be no impact.

e) ***Would the Project involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?***

No Impact. No other changes in the exiting environment will result in the conversion of Farmland to non-agricultural use or conversion of forestland to non-forest use.

No impacts to Agricultural and Forest Resources are anticipated.

Air Quality

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
III. Air Quality.				
Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make the following determinations.				
Would the Project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☒	☐	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☒	☐	☐

Environmental Setting/Affected Environment, Criteria Air Pollutants and Precursor Emissions

Discussion

The Project area is located within eastern Tehama County and local jurisdiction for air quality is under the authority of the Tehama County Air Pollution Control District (TCAPCD). The TCAPCD is responsible for planning, maintenance, and attainment of air standards throughout Tehama County. Air Quality standards are based upon provisions of the federal and State Clean Air Acts. Air quality within Tehama County is regulated at the federal level by the U.S. Environmental Protection Agency (EPA) and at the State level by the California Air Resources Board (CARB).

In general, the air quality within Tehama County is good but does not currently fully meet State health standards for clean air, although no specific data is available for the Project area. Particulate matter and ozone are the air pollutants of greatest concern to Tehama County air officials. Particulate matter consists of fine mineral, metal, soot, smoke, and dust particles suspended in the air. For health reasons, the greatest concern is with inhalant particulate matter less than 10 microns in diameter, which can lodge in the most sensitive areas of the lungs and cause respiratory or other health problems. Tehama County is designated as a non-attainment area for PM10 by State standards and as unclassified[1] by federal standards. The climate and topography of the Northern Sacramento Valley traps man-made air pollution along with smoke from wildfires both of which, contribute to Tehama County's air quality problems, under an inversion layer that covers the valley floor. The Project area however is above the valley's inversion layer.

Construction equipment can release large amounts of particulate matter into the atmosphere in a relatively short period of time. Ozone is an invisible pollutant formed by chemical reactions involving nitrogen oxides and reactive hydrocarbons such as diesel, and gasoline emissions in the presence of sunlight. It is a powerful respiratory irritant that can cause coughing, shortness of breath, headaches, fatigue, and lung damage, especially among children, the elderly, and the sick. Tehama County is designated as non-attainment for ozone by State standards.

Sensitive Receptors

For the purposes of CEQA, a sensitive receptor is generically defined as any residence including private homes, condominiums, apartments, and living quarters; educational facilities such as preschools and kindergarten through grade twelve schools; daycare centers; and health care facilities such as hospitals or retirement and nursing homes. Sensitive receptors also include long-term care hospitals, hospices, prisons, and dormitories or similar housing. Based upon these definitions, sensitive receptors within, adjacent to or nearby the Project area include two resort facilities that make up the Childs Meadows community, the USFS Gurnsey Creek Campground, Fire Mountain Lodge, developed sites within the Deer Creek community and the adjacent Black Forest Lodge all located along the State Route 36E corridor. Other sites with the potential of being a sensitive receptor to this Project are the communities of Mill Creek located along State Route 172 and Mineral along State Route 36E. Both these developed areas are located approximately 11 miles southwest and northwest respectively from the Project area. In addition, the USFS Willows Springs Campground is located nearby to the southeast as well as several developed sites within the Feather River Meadows area due east of the Project area **(See Figure: AQ 1: Sensitive Receptors Within the Vicinity of the Restoring the Deer Creek Headwaters at Childs Meadows Project Area** below**)**.

Odors

Objectionable odors are unpleasant and may lead to public complaints. Odor impacts vary in frequency and severity, depending on the nature of the source, wind direction, and the location of sensitive receptors. Existing sources of odors within the Project area include car and truck emissions generated along State Route 36E along with occasional diesel fumes from heavy equipment working within harvest areas of surrounding public and private forest lands. It is anticipated that any increase in odors related to project work will be minor given the limited amount of mechanical equipment to be used in implementing Project work and the distance of the Project area to sensitive receptors.

Environmental Consequences

In compliance with the California Clean Air Act (CCAA), air districts submit air quality attainment plans (AQAP) primarily to address ozone non-attainment. The CCAA also requires a triennial assessment of the extent of air quality improvements and emission reductions achieved using control measures. As part of the assessment, attainment plans must be reviewed and if necessary, revised to correct for deficiencies in progress toward attainment and to incorporate new data or projections. AQAPs stress attainment of ozone standards and focus on strategies for reducing reactive organic gas and nitrogen oxide emissions. These plans also promote active public involvement, enforcement of compliance with district rules and regulations, education in the public and private sectors, development and promotion of transportation and land use programs designed to reduce vehicle miles traveled within the region, and implementation of stationary and mobile source control measures. AQAPs become part of the State Implementation Plan in accordance with the requirements of the CAAA. The TCAPCD has not established quantitative thresholds of significance for the purposes of CEQA with respect to short-term construction emissions of criteria air pollutant or precursor emissions. Rather, the agency emphasizes development and use of control measures.

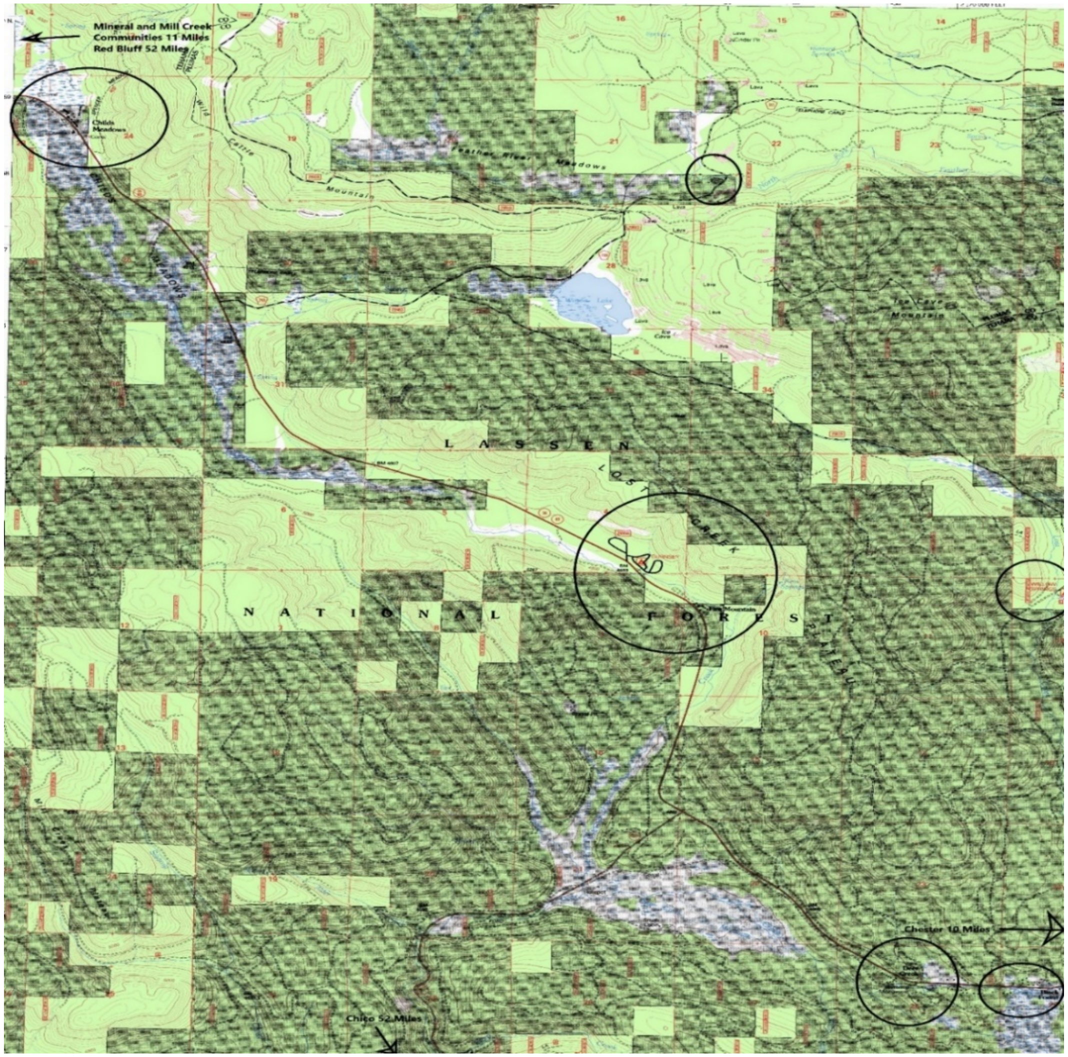


Figure AQ 1: Sensitive Receptors Within the Vicinity of the Childs Meadows Project Area

a) Would the Project conflict with or obstruct implementation of the applicable air quality plan?

No Impact. Project implementation will require the use of small construction equipment such as backhoes, excavators along with personnel and equipment transporters. In addition, power hand tools for digging and compacting will be used as well. Future maintenance of Project installed features described under **"Project Description/Restoration Practices"** above will be completed largely by hand **(See Table 4: Anticipated Construction Equipment)**. All fueled equipment will be operated under current California Air Regulations as enforced by the TCAPCD. The limited effects to air quality that would result either directly or indirectly from Project construction or maintenance related activities will be short term in nature and will occur intermittently. As a result, proposed construction and maintenance activities are not anticipated to conflict with or obstruct implementation of the Tehama County Air Quality Plan or any State Air Quality Plans and there will be no impact.

b) Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?

Less Than Significant with Mitigation Incorporated. Proposed Project construction and maintenance activities have the potential to affect ambient air quality by generating criteria pollutant emissions during operation of construction vehicles and equipment. Potential Project-related emissions include PM10 and ozone precursors. Fugitive dust emissions from ground-disturbing activities and driving on unpaved roads will also contribute to increases of PM10. Project-related increases of these pollutants will be insignificant due to the nature of Project work and size of equipment to be used. These emissions will however contribute to Tehama County's nonattainment for several pollutants by State standards. Construction and maintenance-related emissions will be temporary and short term in nature. The implementation of the emission and dust control measures included in **Mitigation Measures AQ-1 through AQ-5** shown in **Appendix A Mitigation Monitoring and Reporting Plan** will assure that the use of fueled equipment in connection with Project implementation and maintenance will not generate excessive amounts of particulate matter in the form of dust or equipment exhaust, effectively reducing potential impacts to less than significant.

c) Would the Project expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant with Mitigation Incorporated. No significant air quality impacts to any of the sensitive receptors located adjacent to the Project site and surrounding area are anticipated due to their distance from the Project area along with the temporary and intermittent nature of Project implementation and maintenance. **(See Figure AQ 1)**. It is anticipated that ambient air quality conditions will return to pre-project conditions once all Project related construction and maintenance work entailing the use of fueled equipment has been completed. Impacts to adjacent developed sites will be minimized as winds within the vicinity of the Project area will disburse pollutants away from inhabited locations. Current Project area conditions, this Project's design, along with the implementation of **Mitigation Measures AQ-1** through **AQ-5** and applicable Best Management Practices described in **Appendix B** will reduce any air quality impacts to a less than significant level.

d) ***Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?***

Less Than Significant with Mitigation Incorporated. Equipment used in the implementation of Project work will generate gasoline and diesel emissions. These emissions produce what many people consider to be objectionable odors. However, since Project-related emissions will be temporary, limited in nature and generated in a very remote portion of eastern Tehama County, any odors generated in connection with Project implementation will not significantly affect a substantial number of people for a long period of time. Additionally, no objectionable odors are anticipated to persist within the Project area or surrounding landscapes for more than one work period and will clear out of the area overnight. It is anticipated that air quality throughout the Project area will return to ambient conditions once all work utilizing motorized equipment and hand tools has been completed for the day. Impacts are therefore expected to be less than significant and will be further reduced with implementation of the emission and dust control measures included in **Mitigation Measures AQ-1** through **AQ-5** as well as applicable Best Management Practiced developed for this Project as described in **Appendix B**.

No significant adverse impacts to Air Quality are anticipated with the implementation of Mitigation Measures.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
IV. Biological Resources.				
Would the Project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game, the U.S. Fish and Wildlife Service, or the National Marine Fisheries Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service?	☐	☒	☐	☐

c) Have a substantial adverse effect on federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Environmental Setting/Current Conditions

In developing the **Restoring the Deer Creek Headwaters at Childs Meadows Project** work scope and analyzing its impact on the Project site and surrounding areas, University of California Davis (UCD), Point Blue Conservation Sciences, the RCD of Tehama County and consulting specialists addressed the specific environmental constrains and requirements of various federal and State regulatory entities having jurisdiction over the resources found within the Project area. To accomplish this, the Project's technical team utilized State and federally maintained resource and species information. In addition, UCD and PBC personnel conducted species surveys and a wetland delineation in order to describe the array of landscapes and identify species including those that are formally listed as State and federal Special Status found within the proposed Project area and specific Project impact sites. The information obtained from these efforts was analyzed and described in specialist reports that were used to inform this Initial Study/Mitigated Negative Declaration and in the developed Mitigation Measures and Best Management Practices that will render any impacts related to the implementation of Project work to a less than significant level. The **"Existing Conditions"** portion of this IS/MND above provides a detailed description of the Childs Meadows complex and surrounding upland areas.

Site History Related to Biological Resources

A long history of human activities within the Childs Meadows valley bottom and surrounding uplands has resulted in the degradation of the Childs Meadows complex. Stream channel incision, active head cutting, conifer encroachment, roadways, grazing, and diversions are all currently impacting hydrologic function, and habitat quality of the meadow complex. The primary impacts to wetland function within Childs Meadows are over 100 years of cattle grazing, as well as ditching, diversions, and other flow consolidation to accommodate grazing, roads, and timber harvest in adjacent uplands. Cattle directly consume aboveground vegetation, and damage soil and plant roots by hoof punching. These grazing impacts have left soil more vulnerable to erosion, as evidenced by several large erosion gullies in the meadow complex, some of which are actively headcutting. These gullies form topographic low trenches within an otherwise relatively uniform meadow floodplain that has been influenced by vegetation clearing, grazing, and removal of beaver. Surface and groundwater drain to these incised channels and flow rapidly downstream. Surface water flowing through incised stream channels and intentionally dug ditches can move up to three orders of magnitude faster than groundwater flowing through subsurface soils, resulting in rapidly dewatered meadow conditions. The loss of beaver and their dams further exacerbates these impaired conditions as there is little vegetative structure to impede and slow surface water flows. The combination of cattle grazing, beaver removal, channel incision, and ditching have impaired wetland functioning in Childs Meadows, resulting in a loss of key wetland habitat.

Cattle grazing continues within the Project area on meadow soils within 2/3 of the Project area north of a cross valley fence. Grazing operations are conducted under a 5-year grazing permit developed by The Nature Conservancy and currently held by the Collins Almanor Forest organization. A 15-acre parcel was fenced in the fall of 2015 to prevent grazing near a channelized reach of Gurnsey Creek as part of a controlled experimental demonstration Project. The 345 acres of unfenced wetland meadow in the upper portion of the complex are all grazed by the same cattle herd at a rate of approximately 440 animal unit months or 2.04 AUMs per acre. Cattle are present from approximately June 1 through October 31 with the majority of the herd moved to USFS grazing allotments from July through August. The 345-acre meadow area includes CAF property inside and outside of the CAF held easement, the Highlands Ranch Resort property, as well as a small amount of USFS owned meadow.

Restoration activities using cattle exclosures, BDAs, and willow planting have been piloted in the Childs Meadows system. In 2016, the pilot project team and volunteers installed a livestock fence around 30 acres of degraded riparian meadow habitat and 6 BDAs in the lower half of the exclosure and groundwater wells. Approximately 1,500 willow stakes were planted adjacent to the stream channels. These actions resulted in increased flow complexity, vegetation growth, carbon storage, and numerous growing willow plants in the fenced Project area. In addition, forest restoration has been funded and is being planned to address conifer encroachment of the meadow and overly dense upland forest stands in upland areas that are at significant risk of wildlife impacts. The South Lassen Watersheds Group, which includes members of this Project team, has secured funding for a large-scale forest restoration planning and implementation Project on adjacent upland forested parcels as well as meadowlands that are now encroached by confer tree species. The forest treatment plan for this Project will be integrated with other forest health efforts to capitalize on the availability of large wood for strategic in stream and floodplain placement.

Special Status Species

Resources within the Project area include special status mammals, fishes, reptiles, birds, and plants. "Special Status Species" include all species tracked by CNDDB that could potentially occur in the Project area and include all those which meet the CEQA definition of Endangered, Rare, or Threatened **(See CEQA Guidelines, § 15380)**.

Botanical Survey/Analysis and Reporting

The information summarized in this Biological Resources section is based upon a Botanical Survey **(Appendix C: Childs Meadows Restoration Project Botanical Survey Report)**, Wildlife Report **(Appendix D Evaluation of Impacts to Terrestrial and Aquatic Wildlife Resources for the Proposed Childs Meadows Restoration Project)**, and wetland delineation **(Appendix E Wetland Delineation and Assessment in Childs Meadow, Tehama County, CA)**, The CDFW's Natural Diversity Database (CNDDB) was also utilized in order to identify listed species which might be found within the Project area along with the Cal Fish and State of California Wildlife Habitat Relationship System databases. Importantly, these supporting reports analyzed a larger portion of the Childs Meadows complex and surrounding uplands than the proposed Project area. As a result, a larger survey/analysis area is portrayed in these documents than those included in this Initial Study.

Discussion of Potential Impacts

During the development of this Project's work scope and analyzing its impact on the Project site and surrounding area, the RCD of Tehama County and Project team have attempted to address the specific environmental constrains and requirements of various federal and State regulatory entities having jurisdiction over the resources found within the Project area. In preparing the Biological Resources component of this IS/MND, field surveys were completed along with preparation of the resource analysis reports described above.

Special Status Species

Among potential impacts that could occur within the proposed Project area are those related to biological resources within and adjacent to this portion of the Childs Meadows complex and surrounding uplands. These include species that were identified during field surveys as well as those Special Status mammal, fish, reptile, bird, and plant species tracked by the CNDDB, Cal Fish and Wildlife Habitat Relationship System databases and that meet the CEQA definition of Endangered, Rare, or Threatened **(See CEQA Guidelines, § 15380)**.

Mitigation Measure and Best Management Practices Developed in Order to Reduce Impacts to Biological Resources to a Less than Significant Level

The Mitigation Measures shown in **(Appendix A)** and Best Management Practices described in **(Appendix B)** were developed to reduce or prevent potential impacts to species that may inhabit the Project site or surrounding area. A number of these measures and practices were developed in order to protect aquatic and terrestrial species from related impacts such as soil erosion, the generation and introduction of sediment into streams and other sensitive areas, the introduction and spread of invasive species, along with spilling of fuel and other hazardous material.

Positive Impact of Project Work on Special Status Species

The primary goal of the **Restoring the Deer Creek Headwaters at Childs Meadows Project** is to recover hydrological, biological and geomorphic processes throughout the meadow complex in order to recreate and maintain meadow biodiversity that was present prior to human alteration. As a result, the Project area's resilience to climate change and other stressors will be increased and better maintained in the future. This goal will be achieved through:

- Increasing connectivity of valley hydrology and sediment delivery lost due to human alterations
- Capitalizing on energy within the natural system to restore hydrologic, soil and stream channel conditions, thus restoring habitat conditions for native plant and animal species
- Developing structures using local natural materials that do not over-stabilize Project elements
- Once Project work is completed, placing the meadow on a recovery trajectory to meet habitat objectives over time, rather than via a single intervention
- Increase floodplain connectivity, sediment deposition, and vegetation complexity within depositional reaches of Gurnsey Creek through Childs Meadow
- Increase channel migration within transport reaches of Gurnsey Creek
- Restore altered flow paths and increase lateral inundation of tributaries and springs

Results of Botanical Survey

INTRODUCTION

During 2020, botanical surveys were initiated for rare, threatened, endangered and other special status plants that have a potential of occurring within those portions of the Childs Meadows complex and adjacent upland sites included within the Project area as described under the "**Project Area**" and "**Existing Conditions**" sections of this Initial Study above. Survey sites within and adjacent to the Project areas are shown on maps included in **Appendix C: Childs Meadow Restoration Project Botanical Survey Report** and within portions of T29N R4E Section 25, 26 & 36, T29N R5E Section 30 & 31, T28N R5E Sections 5 & 6, and T28N R4E Section 1. Surveys were conducted in July and August of 2019; and July, August and September of 2020 with findings reported. The survey report also provides suggested actions that will protect and mitigate Project related impacts to the rare plants documented during survey work that could result in substantial reductions in plant numbers or range of occurrence.

METHODS

Methods used in the preparation of the botanical report included a review of existing resource databases and vegetation community information gathered during preparation of a biological resources assessment for the study. These reviews were followed by floristic field survey of peatlands, wet meadows, dry meadows, riparian, wetlands and upland transitional habitats within and adjacent to Project impact areas where habitat was targeted for special-status plant species in the study area. For the purpose of this evaluation, special status plant species include plants that are: 1) listed as threatened or endangered under the California Endangered Species Act or the federal Endangered Species Act; 2) proposed for listing as endangered or threatened by the U.S. Fish and Wildlife Service; 3) designated as rare by the California Department of Fish and Wildlife (CDFW); 4) a state or federal candidate species for listing as threatened or endangered; and/or 5) have a California Rare Plant Rank (CRPR) of 1, 2, 3, or 4.

PRE-FIELD SCOPING

Scoping for formal botanical surveys wase based upon initial pre-field scoping that was conducted in 2018. Updated searches of various databases were conducted on June 30, 2019 including the California Department of Fish and Wildlife's Natural Diversity Database (CNDDB), California Native Plant Society's Rare Plant Inventory (CNPS 2019), and the Lassen National Forest GIS datasets covering the 7.5 minute quadrangles shown in **Table BIO-1: USGS 7.5 Minute Quadrangles Covered in Botanical Resource Searches** below in order to develop a list of species with the potential to occur within and adjacent to the Project area.

Table BIO-1: USGS 7.5 Minute Quadrangles Covered in Botanical Resource Searches

Childs Meadows	**Reading Peak**
Mt. Harkness	**Mineral**
Lassen Peak	**Stover Mtn.**
Onion Butte	**Humboldt Peak**
Humbug Valley	
The entire Restoring the Deer Creek Headwaters at Childs Meadows Project area is Within the Childs Meadows 7.5 Minute Quadrangle	

Pre-field scoping was re-conducted in August of 2020 to confirm datasets.

The search of the CNDDB, CNPS, and Lassen NF datasets yielded 44 California Rare Plant Ranked (CRPR) 1 to 3 plant taxa and 25 CRPR 4 plant taxa. The combined results are shown below in **Table BIO-2: Scoping List of Plants.**

Table BIO-2: Scoping List of Plants

Scientific Name	Common Name	Status CRPR/State/Federal
Anemone multifida var. multifida	cut-leaf anemone	2B.2
Anthoxanthum nitens ssp. nitens	vanilla-grass	2B.3
Asplenium septentrionale	northern spleenwort	2B.3
Astragalus pulsiferae var. suksdorfii	Suksdorf's milk-vetch	1B.2
Betula glandulosa	dwarf resin birch	2B.2
Botrychium ascendens	upswept moonwort	2B.3
Botrychium crenulatum	scalloped moonwort	2B.2
Botrychium minganense	Mingan moonwort	2B.2
Botrychium montanum	western goblin	2B.1
Botrychium pinnatum	northwestern moonwort	2B.3
Brasenia schreberi	Watershield	2B.3
Carex lasiocarpa	woolly-fruited sedge	2B.3
Carex limosa	mud sedge	2B.2
Castilleja lassenensis	Lassen paintbrush	1B.3
Collomia larsenii	talus collomia	2B.2
Draba aureola	golden alpine draba	1B.3
Drosera anglica	English sundew	2B.3
Epilobium palustre	marsh willowherb	2B.3
Erigeron nivalis	snow fleabane daisy	2B.3
Eriogonum pyrolifolium var. pyrolifolium	pyrola-leaved buckwheat	2B.3
Haplodontium tehamense	Lassen Peak copper moss	1B.3
Hulsea nana	little hulsea	2B.3
Lysimachia thyrsiflora	tufted loosestrife	2B.3
Meesia longiseta	long seta hump moss	2B.3
Meesia uliginosa	broad-nerved hump moss	2B.2

Scientific Name	Common Name	Status CRPR/State/Federal
Oreostemma elatum	tall alpine-aster	1B.2
*Packera indecora**	rayless mountain ragwort	2B.2
Panicum acuminatum var. thermale	Geysers panicum	1B.2/ CE
Phlox muscoides	squarestem phlox	2B.3
Polemonium pulcherrimum var. shastense	Mt. Shasta sky pilot	1B.2
Potamogeton praelongus	white-stemmed pondweed	2B.3
Rhynchospora alba	white beaked-rush	2B.2
Rupertia hallii	Hall's rupertia	1B.2
Scheuchzeria palustris	American scheuchzeria	2B.1
Schoenoplectus heterochaetus	slender bulrush	2B.1
Schoenoplectus subterminalis	water bulrush	2B.3
Scutellaria galericulata	Marsh skullcap	2B.2
Silene occidentalis ssp. longistipitata	long-stiped campion	1B.2
Silene suksdorfii	Cascade alpine campion	2B.3
Smelowskia ovalis	alpine smelowskia	1B.2
Stuckenia filiformis var. alpina	Fineleaf pondweed	2B.2
Stellaria longifolia	long-leaved starwort	2B.2
Utricularia intermedia	flat-leaved bladderwort	2B.2
Utricularia ochroleuca	cream-flowered bladderwort	2B.2
CRPR List 4 plant taxa with the potential to occur		
Astragalus rattanii var. rattanii	Rattan's milk-vetch	4.3
Bruchia bolanderi	Bolander's bruchia	4.2
Bulbostylis capillaris	thread-leaved beakseed	4.2
Campanula scabrella	rough harebell	4.3
Cardamine bellidifolia var. pachyphylla	fleshy toothwort	4.3
Claytonia palustris	marsh claytonia	4.3

Scientific Name	Common Name	Status CRPR/State/Federal
Cypripedium montanum	mountain lady's-slipper	4.2
Erigeron elegantulus	volcanic daisy	4.3
Erigeron inornatus var. calidipetris	hot rock daisy	4.3
Eriophorum gracile	slender cottongrass	4.3
Erythranthe glaucescens	shield-bracted monkeyflower	4.3
Limnanthes floccosa ssp. floccosa	woolly meadowfoam	4.2
Lupinus dalesiae	Quincy lupine	4.2
Lycopus uniflorus	northern bugleweed	4.3
Meesia triquetra	three-ranked hump moss	4.2
Penstemon heterodoxus var. shastensis	Shasta beardtongue	4.3
Piperia colemanii	Coleman's rein orchid	4.3
Sanicula tracyi	Tracy's sanicle	4.2
Sidalcea gigantea	giant checkerbloom	4.3
Silene occidentalis ssp. occidentalis	Western campion	4.3
Stellaria obtusa	obtuse starwort	4.3
Streptanthus longisiliquus	long-fruit jewelflower	4.3
Subularia aquatica ssp. americana	water awlwort	4.3
Trillium ovatum ssp. oettingeri	Salmon Mountains wakerobin	4.2
Utricularia minor	lesser bladderwort	4.2

**** There was also additional information provided by Lassen N.F. assistant botanist Kirsten Bovee that called into question the original determination of the Packera indecora. It was noted that there were morphological characteristics that aligned it more with the closely related Packera pauciflora.***

CRPR Plant Rank

California Rare Plant Rank 1A: Plants presumed extirpated in California and either rare or extinct elsewhere
California Rare Plant Rank 1B: Plants rare, threatened, or endangered in California and elsewhere
California Rare Plant Rank 2A: Plants presumed extirpated in California but common elsewhere
California Rare Plant Rank 2B: Plants rare, threatened, or endangered in California but more common elsewhere

California Rare Plant Rank 3: Review List: Plants about which more information is needed
California Rare Plant Rank 4: Watch List: Plants of limited distribution

Threat Ranks

Ranks at each level also include a threat rank (e.g., CRPB 4.3) and are determined as follows:

0.1-Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2-Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3-Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

BOTANICAL SURVEYS

Botanical field surveys were conducted in general accordance with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018). These surveys were floristic in nature and consisted of identifying each species observed to the taxonomic level necessary to determine whether the plant is a federal or state listed special-status species. Plant taxonomy followed Baldwin et al. (2012), including applicable errata and supplements (Jepson Flora Project 2020). The field surveys were performed by walking meandering transects through microhabitats with the potential to support special-status plants. Survey intensity was heightened in areas corresponding to vegetation communities having the potential to support the special status plants identified in the pre-field resource review including peatlands, fens, springs, meadows, and riparian habitat.

RESULTS

The field survey was conducted at a time when all potentially occurring special-status plant species could be identified. Additional surveys were conducted in July 2020 to document the occurrence of invasive and special status plants. These surveys targeted areas that were most likely to have occurrences of invasive plant species, such as roads and heavily grazed areas among others. Additional rare plant surveys were conducted between August 18 and August 20, 2020. These surveys targeted areas of Childs Meadows complex with high probability for special-status plants in areas that might be impacted by restoration activities. Fens were prioritized for full coverage surveys and other wetlands were surveyed in the remaining allocated time. Some areas that will have restoration activities were not surveyed and have been identified for pre-implementation surveys as specific in **Appendix A: Mitigation Monitoring and Reporting Plan**.

Surveys were conducted exclusively on foot and are displayed on **Figure BIO-1: Childs Meadows Restoration Botanical Survey Routes** and **Figure BIO-2: Childs Meadows Restoration Botanical Survey Routes Grazing Areas**. Additional maps with surveys overlayed on restoration activities along with a complete list of observed plant species can be found in the full botanical report **(Appendix C)** attached to this Initial Study/Mitigated Negative Declaration.

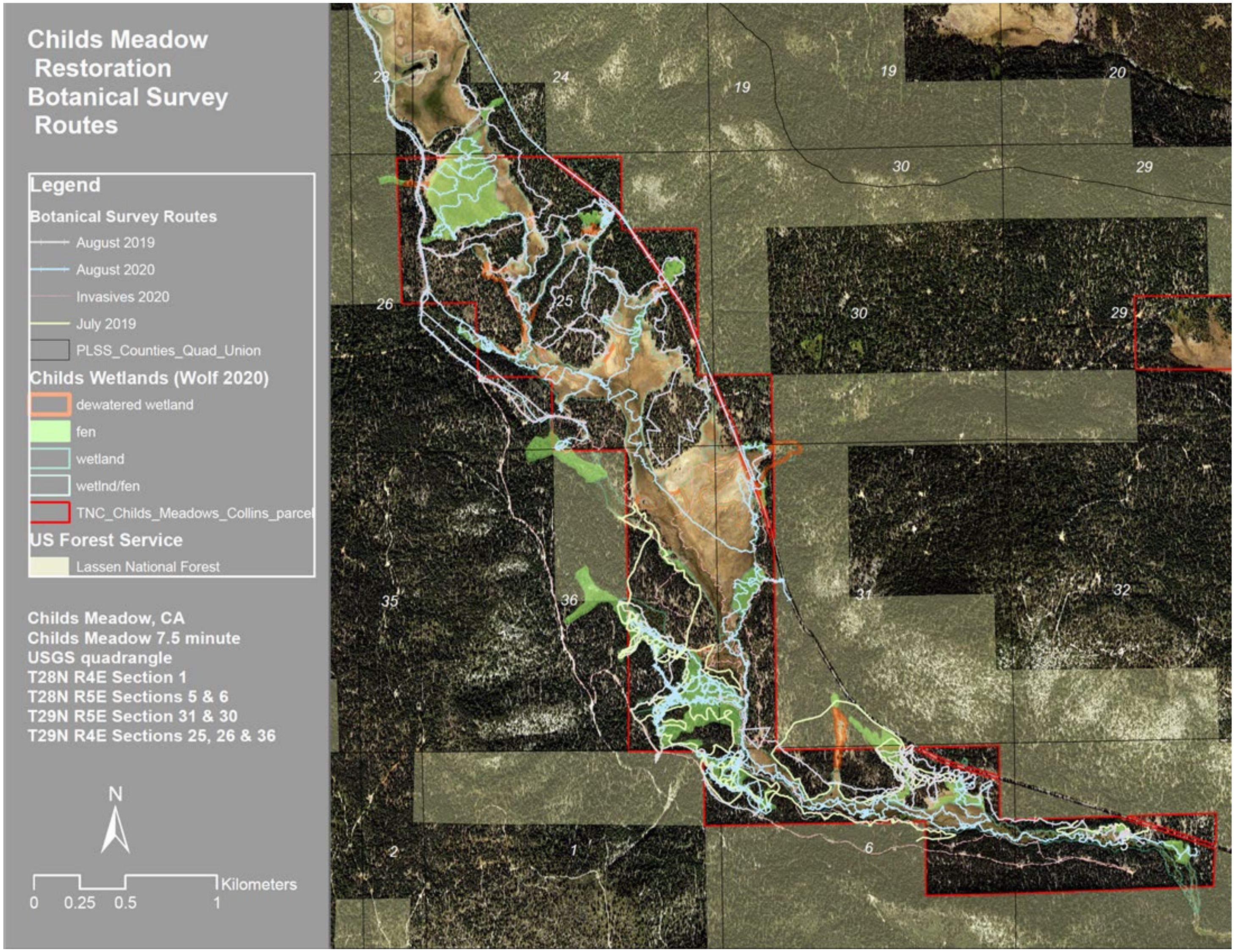


Figure BIO-1: Childs Meadows Restoration Botanical Survey Routes

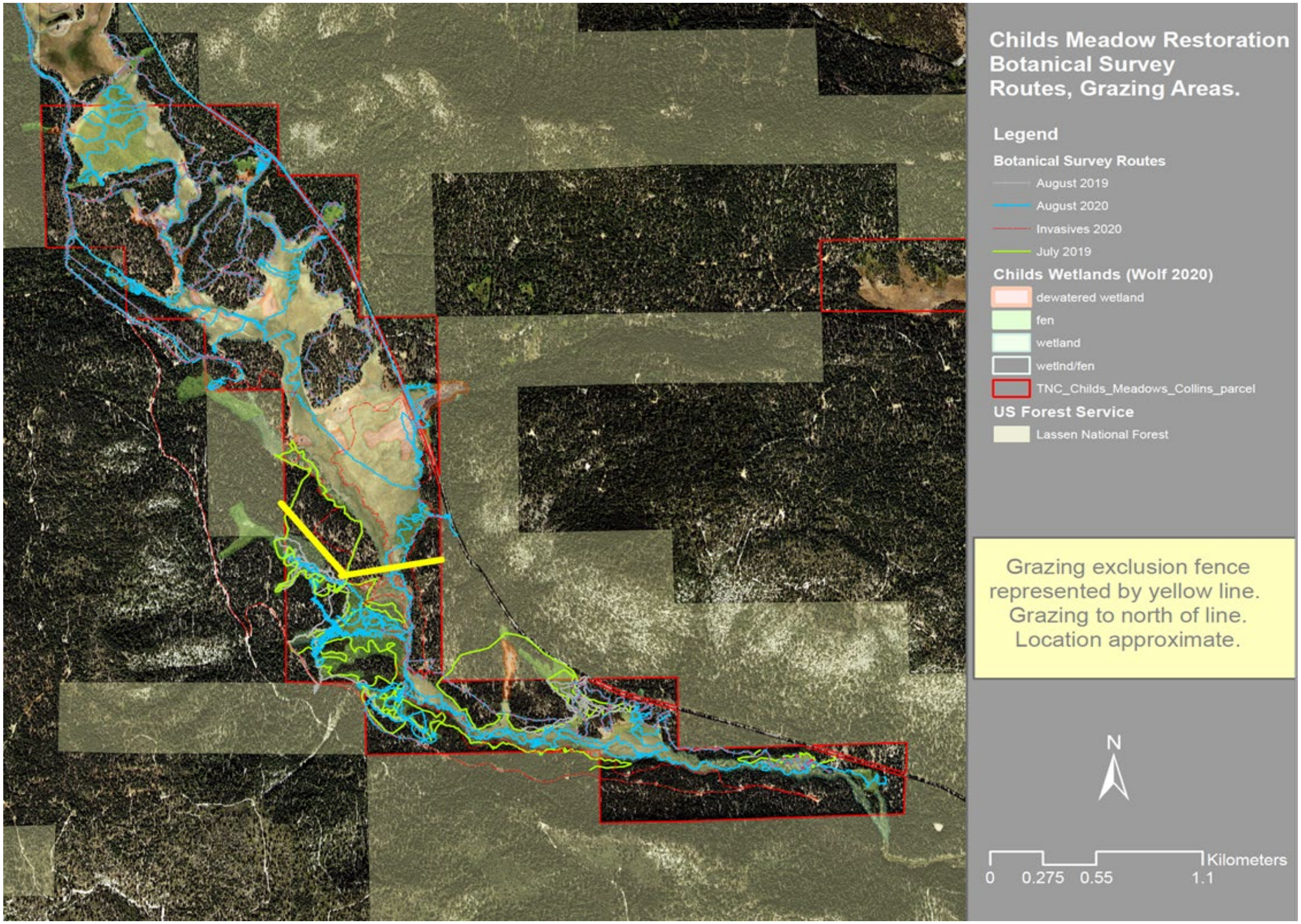


Figure BIO-2: Childs Meadows Restoration Botanical Survey Routes, Grazing Areas

Adverse Conditions and Related Limitations to Survey Results

Adverse conditions were encountered in the 2020 surveys, north of the cattle exclusion fence as cattle had been grazing Childs Meadows for at least a full month prior to initiation of survey efforts. This could have affected the identification of potential special-status plant species, as cattle had eaten the above ground portions of some plants, and some trampling of plants had occurred. Importantly, the suitability of the habitat for rare plants within the Childs Meadows complex has been degraded due to impacts such as trampling, altered hydrology, increased presence of nonnative plants, etc.

Special-Status Species

Special-status species include those species federally or State-listed as endangered, threatened, or candidate; State-listed as species of special concern or fully protected species; or ranked by the California Native Plant Society as a rare plant. A list of special-status species that have some likelihood of occurring within the Project area was generated. The likelihood of occurrence for each listed species was determined by proximity to known occurrences and by the availability of suitable habitat within the Project area. Species lists were generated in part by querying the California Natural Diversity Database (California Department of Fish and Wildlife 2018) for all species within the 9 USGS quadrangles shown in **Table BIO-1:** and by querying the 2018 USFWS Information for Planning and Consultation (IPaC) system (United States Fish and Wildlife Service 2018a).

A List of Special Status Plants are shown in **Table BIO-3:** and displayed on **Figure BIO-3 Childs Meadows Restoration Special Status Plants** below.

Table BIO-3: List of Special Status Plants and Their Habitat Preferences, and Results from Botanical Surveys of the Restoring the Deer Creek Headwaters at Childs Meadows Project

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Anemone multifida var. multifida	cut-leaf anemone	2B.2	Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. Microhabitat of rocky, gravelly,	No suitable habitat present. Not observed during surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
			carbonate or volcanic. 5,575 to 9,020 ft. elevation.	
Anthoxanthum nitens ssp. nitens	vanilla-grass	2B.3	Meadows and seeps (mesic). 1,500 to 1,894 meters in elevation.	Suitable habitat present. Not observed during surveys.
Asplenium septentrionale	northern spleenwort	2B.3	Chaparral, Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. Microhabitat of rocky, granitic areas. Elevational range 1613 to 3349 meters,	No suitable habitat present. Not observed during surveys.
Astragalus pulsiferae var. suksdorfii	Suksdorf's milk-vetch	1B.2	Great Basin scrub, Lower montane coniferous forest, Pinyon and juniper woodland. Microhabitat of volcanic, gravelly, rocky areas. Elevational range of 1,299 to 1,999 meters.	No suitable habitat present. Not observed during surveys.
Betula glandulosa	dwarf resin birch	2B.2	Bogs and fens, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps, Subalpine coniferous forest. Elevational range of 1299 to 2299 meters.	Suitable habitat present. Not observed during surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Botrychium ascendens	upswept moonwort	2B.3	Lower montane coniferous forest, Meadows and seeps. Elevational range of 1114 to 3017 meters.	Suitable habitat present. Not observed during surveys.
Botrychium crenulatum	scalloped moonwort	2B.2	Bogs and fens, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps (freshwater), Upper montane coniferous forest. Elevational range of 1267 to 3279 meters.	Suitable habitat present. Not observed during surveys.
Botrychium minganense	Mingan moonwort	2B.2	Bogs and fens, Lower montane coniferous forest, Meadows and seeps (edges), Upper montane coniferous forest. Elevational range of 1453 to 2179 meters.	Suitable habitat present. Not observed during surveys.
Botrychium montanum	western goblin	2B.1	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest. Elevational range of 1464 to 2179 meters.	Suitable habitat present. Not observed during surveys.
Botrychium pinnatum	northwestern moonwort	2B.3	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest. Elevational range of 1769 2040 meters.	Suitable habitat present. Not observed during surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Brasenia schreberi	watershield	2B.3	Marshes and swamps (freshwater). Elevational range of 29 to 2200 meters.	Suitable habitat present. Not observed during surveys.
Carex lasiocarpa	woolly-fruited sedge	2B.3	Bogs and fens, Marshes and swamps (freshwater, lake margins). Elevational range of 1699 to 2100 meters.	Suitable habitat present. Not observed during surveys.
Carex limosa	mud sedge	2B.2	Bogs and fens, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps, Upper montane coniferous forest. Elevational range of 1199 to 2700 meters.	Suitable habitat present. Not observed during surveys.
Castilleja lassenensis	Lassen paintbrush	1B.3	Meadows and seeps, Subalpine coniferous forest. Volcanic soils. Elevational range of 1008 to 3119 meters.	Suitable habitat present. One population from three sub populations documented during field surveys.
Collomia larsenii	talus collomia	2B.2	Alpine boulder and rock field, Closed-cone coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. Volcanic talus. Elevational range of 2209 to 3500 meters.	No suitable habitat present. Not observed during surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Draba aureola	golden alpine draba	1B.3	Alpine boulder and rock field, Subalpine coniferous forest. Elevational range of 1999 to 3354 meters.	No suitable habitat present. Not observed during surveys.
Drosera anglica	English sundew	2B.3	Bogs and fens, Meadows and seeps (mesic). Elevational range of 1299 to 2255 meters.	Suitable habitat present. Not observed during surveys.
Epilobium palustre	marsh willowherb	2B.3	Bogs and fens, Meadows and seeps (mesic). Elevational range of 2199 to 2200 meters.	Suitable habitat present. Not observed during surveys.
Erigeron nivalis	snow fleabane daisy	2B.3	Alpine boulder and rock field, Meadows and seeps, Subalpine coniferous forest. Elevational range of 1734 to 2900.	No suitable habitat present. Not observed during surveys.
Eriogonum pyrolifolium var. pyrolifolium	pyrola-leaved buckwheat	2B.3	Alpine boulder and rock field (sandy or gravelly, pumice). Elevational range of 1674 to 3200 meters.	No suitable habitat present. Not observed during surveys.
Haplodontium tehamense	Lassen Peak copper moss	1B.3	Alpine boulder and rock field (volcanic, mesic, rock and soil). Elevational range of 2499 to 2799 meters.	No suitable habitat present. Not observed during surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Hulsea nana	little hulsea	2B.3	Alpine boulder and rock field, Subalpine coniferous forest. Elevational range of 1719 to 3354 meters.	No suitable habitat present. Not observed during surveys.
Lysimachia thyrsiflora	tufted loosestrife	2B.3	Meadows and seeps mesic, Marshes and swamps, Upper montane coniferous forest. Elevational range of 973 to 1674 meters.	Suitable habitat present. One population documented during field surveys.
Meesia longiseta	long seta hump moss	2B.3	Bogs and fens, Meadows and seeps, Upper montane coniferous forest. Elevational range of 1749 to 3044 meters.	Suitable habitat present. Not observed during surveys.
Meesia uliginosa	broad-nerved hump moss	2B.2	Bogs and fens, Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest. Elevational range of 1208 to 2804 meters.	Suitable habitat present. One population documented during field surveys.
Oreostemma elatum	tall alpine-aster	1B.2	Bogs and fens, Meadows and seeps, Upper montane coniferous forest. Elevational range of 1004 to 2100 meters.	Suitable habitat present. Not observed during surveys.
Packera indecora	rayless mountain ragwort	2B.2	Meadows and seeps (mesic). Elevational range of 1598 to 1999.	Suitable habitat present. Incorrectly documented during 2019 surveys. Determined in 2020 to be *Packera pauciflora.*

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
				This species not present in Childs Meadow.
Panicum acuminatum var. thermale	Geysers panicum	1B.2/ CE	Closed-cone coniferous forest, Riparian Forest, Valley and Foothill grassland. Microhabitat of geothermally-altered soil, sometimes streamsides. Elevational range of 304 to 2470 meters	No suitable habitat present. Not observed during surveys.
Phlox muscoides	squarestem phlox	2B.3	Alpine boulder and rock field, Great Basin scrub, Subalpine coniferous forest. Elevational range of 1278 to 2700 meters.	No suitable habitat present. Not observed during surveys.
Polemonium pulcherrimum var. shastense	Mt. Shasta sky pilot	1B.2	Alpine boulder and rock field, Subalpine coniferous forest, Upper montane coniferous forest. Elevational range of 2,174 to 3,899 meters	No suitable habitat present. Not observed during surveys.
Potamogeton praelongus	white-stemmed pondweed	2B.3	Marshes and swamps (deep water, lakes). Elevational range of 1799 to 3000 meters	No suitable habitat present. Not observed during surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Rhynchospora alba	white beaked-rush	2B.2	Bogs and fens, Meadows and seeps, Marshes and swamps (freshwater). Elevational range of 59 to 2040 meters.	Suitable habitat present. Eight (sub)populations observed during field surveys.
Rupertia hallii	Hall's rupertia	1B.2	Cismontane woodland, Lower montane coniferous forest. Elevational range of 544 to 2249 meters.	No suitable habitat present. Not observed during surveys.
Scheuchzeria palustris	American scheuchzeria	2B.1	Bogs and fens, Marshes and swamps (lake margins). Elevational range of 1368 to 1999 meters.	Suitable habitat present. Not observed during surveys.
Schoenoplectus heterochaetus	slender bulrush	2B.1	Lower montane coniferous forest, Marshes and swamps (lake margins). Elevational range of 1598 to 1600 meters.	Suitable habitat present. Not observed during surveys.
Schoenoplectus subterminalis	water bulrush	2B.3	Bogs and fens, Marshes and swamps (montane lake margins). Elevational range of 749 to 2249 meters.	Suitable habitat present. Not observed during surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Scutellaria galericulata	Marsh skullcap	2B.2	Meadows, freshwater-marsh	Suitable habitat present. Not observed during surveys.
Silene occidentalis ssp. longistipitata	long-stiped campion	1B.2	Chaparral, Lower montane coniferous forest, Upper montane coniferous forest. Elevational range of 999 to 1999 meters.	No suitable habitat present. Not observed during surveys.
Silene suksdorfii	Cascade alpine campion	2B.3	Alpine boulder and rock field, Subalpine coniferous forest, Upper montane coniferous forest. Elevational range of 2354 to 3110 meters	No suitable habitat present. Not observed during surveys.
Smelowskia ovalis	alpine smelowskia	1B.2	Alpine boulder and rock field. Elevational range of 2439 to 3099 meters	No suitable habitat present. Not observed during surveys.
Stuckenia filiformis var. alpina	Fineleaf pondweed	2B.2	Freshwater-marsh	Suitable habitat present. Not observed during surveys.
Stellaria longifolia	long-leaved starwort	2B.2	Bogs and fens, Meadows and seeps (mesic), Riparian woodland, Upper montane coniferous forest. Elevational range of 899 to 1830 meters.	Suitable habitat present. One population documented in Project area during field surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Utricularia intermedia	flat-leaved bladderwort	2B.2	Bogs and fens, Meadows and seeps (mesic), Marshes and swamps (lake margins), Vernal pools. Elevational range of 1199 to 2700 meters	Suitable habitat present. Two populations from eight sub-populations were documented in Project area during field surveys
Utricularia ochroleuca	cream-flowered bladderwort	2B.2	Meadows and seeps (mesic), Marshes and swamps (lake margins). Elevational range of 1,434 to 1,440 meters.	Suitable habitat present. Two populations documented during field surveys.

Special Status Plants Occurring within the Restoring the Deer Creek Headwaters at Childs Meadows Project Area

Ten special status plant species were documented from multiple populations within the **Restoring the Deer Creek Headwaters at Childs Meadows Project** Area as listed below.

A single CRPR 2B.3 species:
- Tufted loosestrife (Lysimachia thyrsiflora)

Five CRPR 2B.2 species:
- Broad-nerved hump moss (Meesia uliginosa)
- Cream-flowered bladderwort (Utricularia ochroleuca)
- Flatleaved bladderwort (Utricularia intermedia)
- White beaked rush (Rhynchospora alba)
- Long leaved starwort (Stellaria longifolia)

A single CRPR 1B.3 species:
- Lassen paintbrush (Castilleja lassenensis)

Three CRPR 4 species:
- Marsh claytonia (Claytonia palustris)
- Three-ranked humpmoss (Meesia triquetra)
- Shasta beardtongue (Penstemon heterodoxus var. shastensis)

Populations of listed species are displayed individually within **Appendix C: Childs Meadows Restoration Project Botanical Survey Report**.

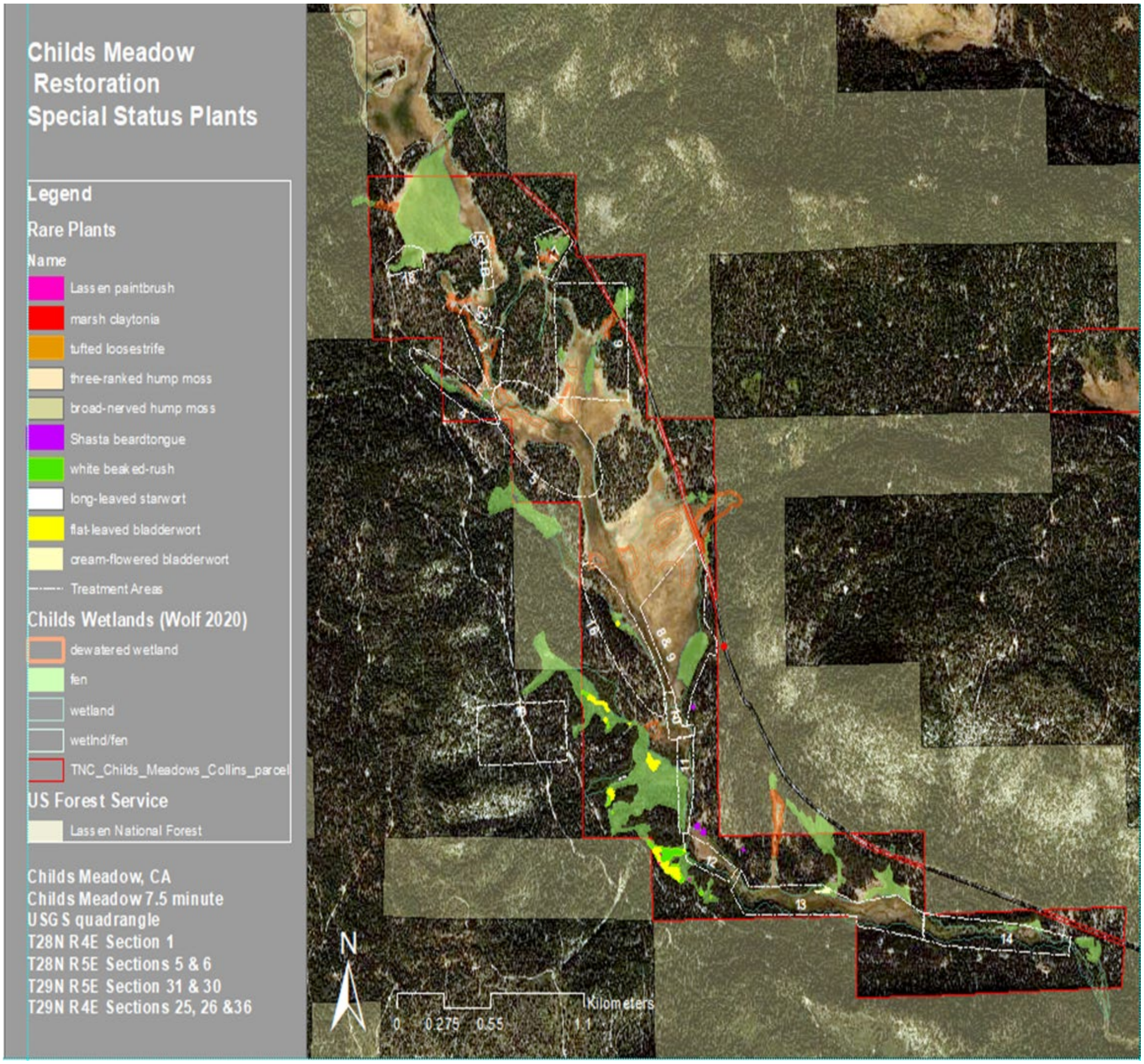


Figure BIO-3: Childs Meadows Restoration Special Status Plants

Invasive Plant Species

A variety of California Invasive Plant Council (CAL-IPC) rated non-native and invasive plants were identified within the Project area as shown in the table below.

Table BIO-4: California Invasive Plant Council Rated Non-Native and Invasive Plants Within the Project Area

Site	Nonnative Invasive plant	Mitigating action
Borrow site B3	Bull thistle	Move borrow site, or flag area with bull thistle, monitor fill locations 3 years
Borrow site B17	Woolly mullein	Move borrow site, or flag area with woolly mullein, monitor fill locations 3 years

There is the potential for some indirect impacts from disturbance and material movement resulting in the spread of invasive nonnative plant species. Any impacts related to such plants are anticipated to be short term and limited in nature through the implementation of Project specific Mitigation Measures and Best Management Practices related to invasive plant species rendering these to a less than significant level.

Terrestrial and Aquatic Spices Surveys/Analysis and Reporting

INTRODUCTION

In order to identify potential Project related environmental impacts to terrestrial and aquatic wildlife resources within the Project area. A survey and evaluation related to special-status animal species was conducted. Included were those that are (1) listed as threatened or endangered under the CESA or the ESA; (2) proposed for federal listing as threatened or endangered; (3) identified as state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as Species of Special Concern or California Fully Protected Species. Field Surveys for Special Status species were completed during July. Results of those field and analysis efforts are documented in (**Appendix D**: **Evaluation of Impacts to Terrestrial and Aquatic Wildlife Resources for the Proposed Childs Meadows Restoration Project.** In addition, the CDFW's Natural Diversity Database (CNDDB) was utilized in order to identify listed species which might be found within the Project area along with the Cal Fish and State of California Wildlife Habitat Relationship System databases. Importantly, these supporting reports analyzed a larger portion of the Childs Meadows complex and surrounding uplands than the proposed Project area. Consequently, a larger survey/analysis area is described in **Appendix D** than included in this Initial Study.

METHODS

To assess potential special status wildlife species occurring in or adjacent to the Childs Meadow Restoration Project area, a 9-quad search using CNDDB RareFind **(See Table BIO-1: USGS 7.5 Minute Quadrangles Covered in Botanical Resource Searches)**. In addition, staff from Point Blue Conservation Science, Collins Almanor Forest, Lassen National Forest, the USFS Pacific Southwest Research Station, and Washington State University have conducted biological resource surveys for special-status aquatic species, birds, and carnivores within the Project area and adjacent environments from 2010 to 2020. Surveys included the use of focused searches, visual encounter surveys, call backs, camera traps, and point count methods for birds. CAF staff conducted visual encounter surveys for special status amphibians in the summer of 2018, 2019, and 2020 across nearly all aquatic habitats holding standing water within Childs Meadows. These sources of aquatic habitat included class I and II watercourses, spring and fen areas, waterholes, and ephemeral pools. Surveys in 2019 were conducted across the spring, summer, and fall months to assess seasonal movement of amphibians. Call back surveys for northern goshawks occurred in forested sites within the Project area that were determined to be suitable goshawk breeding habitat in 2018 and 2019 by CAF staff biologists and technicians. Call back surveys for great gray owls occurred in 2019 and 2020, per survey requirements outlined in CAF's pending great gray owl Safe Harbor Agreement. California spotted owl call back and nesting status surveys are performed annually around the Project area in connection with the Lassen National Forest's California Spotted Owl Demographic Study. To date, there have been no nesting spotted owls identified within or adjacent to Childs Meadow. Point Blue Conservation performed willow flycatcher and sandhill crane surveys in June of 2017, 2018, and 2020. PBC also surveyed birds using point count surveys along Gurnsey Creek in June of 2010-2020, except for 2018. Camera surveys for mammals were completed by CAF staff in winter 2017-2018 and 2018-2019 (baited) and summer of 2018 and 2019 (unbaited) within and adjacent to the Project area.

RESULTS

Twenty-six special status terrestrial, riparian, aquatic and avian species were considered in this analysis and are listed below in the table below.

Table BIO-5: Scoping List of Terrestrial, Riparian, Aquatic and Avian Species [1 2]

Species	Listing Status* (Fed / State)	Habitat	Species or potential suitable habitat present	Determination
Invertebrates				
Western bumble bee (*Bombus occidentalis)*	FSS / Candidate E	Access to flowering plants and abandoned rodent burrows	Not known to occur in the Project area, but suitable habitat may be present.	No impact
Fish				
Chinook salmon – Central Valley spring-run ESU (*Oncorhynchus tshawytscha*)	T / T	Anadromous waters of the Central Valley <27℃.	Cannot occur in the Project area because of natural stream passage barrier downstream.	No impact
Steelhead - Central Valley DPS (Oncorhynchus mykiss irideus)	T / --	Anadromous waters of the Central Valley.	Cannot occur in the Project area because of natural stream passage barrier downstream.	No impact
Amphibians				

Cascades frog (*Rana cascadae*)	-- / Candidate E, SSC	Mountain lakes, small streams, and ponds in meadows < 8,200 ft. Typically no fish present.	Known to occur in the Project area based on resource surveys.	Less than significant impact with mitigation
Foothill yellow-legged frog (*Rana boylii*)	BLMSS, FSS / E, SSC	Partly shaded rocky streams and riffles with a rocky substrate in a variety of habitats	Not known to occur in the Project area, but suitable habitat may be present.	No impact
Sierra Nevada yellow-legged frog (*Rana sierrae*)	E / T	Mountain lakes, small streams, and ponds in meadows. Typically, no fish present.	Not known to occur in the Project area, but suitable habitat may be present.	No impact
Southern long-toed salamander (*Ambystoma macrodactylum sigillatum)*	-- / SSC	High elevation meadows and lakes.	Known to occur in the Project area based on resource surveys.	Less than significant impact with mitigation
Birds				
Bald eagle (*Halieaeetus leucocephalus)*	BLMSS, FSS / E, FP	In western North America, nests and roosts in coniferous forests within 1 mile of a lake, a reservoir, a stream, or the ocean	No bald eagle nests are located within the Project area, but suitable habitat is present.	No impact
California spotted owl (*Strix occidentalis occidentalis)*	FSS, MIS / SSC	Late seral closed canopy coniferous forest	Not known to occur in the Project area.	No impact
Great gray owl (*Strix nebulosa)*	FSS / E	Late seral closed canopy coniferous forest adjacent to wet meadows	Not known to occur in the Project area, but suitable habitat present	No impact
Greater sandhill crane (*Antigone canadensis tabida)*	BLMSS, FSS / T, FP	Summers in open terrain near shallow lakes or freshwater marshes; winters in plains and valleys near bodies of fresh water	Known to occur within the Project area.	Less than significant impact with mitigation
Northern goshawk (*Accipiter gentilis)*	BLMSS, FSS / SSC	Coniferous forest. Red fir, lodgepole pine, Jeffrey pine, and aspen are typical nest trees.	Known to occur within the Project area.	Less than significant impact with mitigation
Olive-sided flycatcher (*Contopus cooperi)*	-- / SSC	Conifer forests, burns, clearings. Breeds mostly in coniferous forest of the north and the higher mountains, especially around the edges of open areas	Known to occur in the Project area.	No impact

		including bogs, ponds, clearings.		
Osprey (*Pandion haliaetus)*	-- / SSC	Nests in snags or cliffs or other high, protected sites near the ocean, large lakes, or rivers with abundant fish populations	Known to occur in the Project area.	Less than significant impact
Vaux's Swift (*Chaetura vauxi)*	-- / SSC	Nests in hollow, burned-out tree trunks in large conifers; most other activities are conducted in the air	Known to occur in the Project area.	No impact
Willow flycatcher (*Empidonax traillii)*	FSS / E	Riparian areas and large, wet meadows with abundant willows for breeding; usually found in riparian habitats during migration	Known to occur in the Project area.	Less than significant impact with mitigation
Yellow rail (*Coturnicops noveboracensis)*	FSS / SSC	Grassy marshes and wet meadows	Not known to occur in the Project area, but suitable habitat present.	No impact
Yellow warbler (*Dendroica petechial*)	MIS / SSC	Primarily nests in riparian habitats adjacent to creeks and rivers in thickets.	Known to occur in the Project area.	Less than significant impact with mitigation
Mammals				
American badger (*Taxidea taxus)*	-- / SSC	Drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	Not known to occur in the Project area, but suitable habitat present.	Less than significant impact
California wolverine (*Gulo gulo luteus)*	Proposed T, FSS / T, FP	Remote, high elevation, tree-line habitat and areas of deep snowpack	Not known to occur in the Project area and suitable habitat not present.	No impact
Gray wolf (*Canis lupus)*	E / E	Habitat generalist, including coniferous forests and wet meadows	Not known to occur in the Project area, but suitable habitat present.	No impact
Pacific fisher – (*Pekania pennanti)*	BLMSS, FSS / T, SSC	Intermediate to large tree stages of coniferous forests and deciduous-riparian areas with high percent canopy closure. Uses cavities, snags, logs, rocky areas for cover and denning. Large areas	Not known to occur in the Project area and suitable habitat not present.	No impact

		of mature, dense forest.		
Sierra Nevada mountain beaver (*Aplodontia rufa californica)*	-- / SSC	Dense growth of small deciduous trees and shrubs in riparian areas, wet soil, abundance of forbs.	Not known to occur in the Project area, but suitable habitat present	No impact
Sierra Nevada red fox (*Vulpes vulpes necator)*	Proposed E, FSS / T	Mainly mountain meadows and woodlands near treeline. Some winter use of high elevation coniferous forest	Not known to occur in the Project area, but suitable habitat present	Less than significant impact
Sierra Nevada snowshoe hare	-- / SSC	Thickets of deciduous trees, shrubs, and young conifers in high-elevation riparian areas.	Not known to occur in the Project area, but suitable habitat present	Less than significant impact
Spotted bat (*Euderma maculatum)*	BSSC / SSC	Habitat generalist needing needing rock crevices in cliffs or caves for roosting.	Not known to occur in the Project area and suitable roosting habitat not present	No impact

[1] Status definitions:
E=Listed as Endangered under the federal or state Endangered Species Act
T=Listed as Threatened under the federal or state Endangered Species Act
SSC=California species of special concern
FP=California fully protected species
FSS=United States Forest Service Sensitive Species
BLMSS=Bureau of Land Management Sensitive Species
MIS=United States Forest Service Management Indicator Species

[2] Special status species evaluated for this analysis. Species were classified as special status if they are (1) listed as threatened or endangered under the CESA or the ESA; (2) proposed for federal listing as threatened or endangered; (3) identified as state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as Species of Special Concern or California Fully Protected Species.

Special Status Species Detected in the Project Area

Nine special-status wildlife species are known to occur in the Project area. All of these (Cascades frog, southern long-toed salamander, greater sandhill crane, northern goshawk, olive-sided flycatcher, osprey, Vaux's swift, willow flycatcher, yellow warbler) were detected in the Project area during biological resource surveys. Below is a discussion of the habitat requirements and distribution for each of these species relative to the Project area. No other special-status wildlife species were detected in biological resource surveys or have recorded detections within the Project area in CNDDB.

Cascades frog (Rana cascadae): Cascades frogs can be found in a range of aquatic habitats, including large lakes, ponds, wet meadows, and flowing streams, with occurrence in these habitats varying by life stage and season (Pope et al. 2014). Reproduction occurs in shallow still-water habitats that are the first to become exposed by snowmelt early in the spring and retain water long enough for egg and tadpole development: about 3 to 4 months (Pope et al. 2014). These habitats include shallow alcoves of lakes, ponds, potholes, flooded areas in meadows, and occasionally slow-moving streams or stream backwaters

(Pope et al. 2014). Nonbreeding active-season habitat is more variable than breeding habitat (Pope et al. 2014). Adults and subadults use a wide array of aquatic habitats during the nonbreeding season; these include ponds, meadows, lakes, and streams (Pope et al. 2014). Adults often use sites with open, sunny areas, often along the shorelines, which may be favorable because they provide basking and foraging opportunities (Pope et al. 2014). They also use floating logs or emerged rocks that provide basking and foraging opportunities while also providing an aquatic escape from predators (Pope et al. 2014). Juveniles are often found in similar habitats as adults (Pope et al. 2014). The frogs are suspected of overwintering in aquatic sites that do not freeze solid (e.g., springs and deep lakes), similar to the mountain yellow-legged frog (*Rana muscosa* and *R. sierrae*) in the Sierra Nevada (Pope et al. 2014).

A population of Cascades frog is known to occur in many locations throughout Childs Meadows Project area. A portion of this population has been monitored for multiple years using mark-recapture techniques by the US Forest Service Pacific Southwest Research Station and researchers from Washington State University. In 2019 under the CAF California Scientific Collecting Permit, the CAF staff biologist also began marking Cascades frogs at all areas across Childs Meadows where frogs were detected in order to better understand the population status. Mark-recapture techniques will continue to be used to monitor this population during meadow restoration efforts. Cascades frogs are also swabbed to assess disease loading, and this aspect of the research will also continue in order to understand how restoration activities may alter disease loading.

Southern long-toed salamander (Ambystoma macrodactylum sigillatum): Southern long-toed salamander use high elevation meadows and lakes in the Sierra Nevada, Cascade, and Klamath mountains. Aquatic larvae occur in ponds and lakes. Outside of the breeding season, adults are terrestrial and associated with underground burrows of mammals and moist areas under logs and rocks in close proximity to water. A population of long-toed salamander is known to occur in Childs Meadows within a small ephemeral pool. The distribution and extent of their hibernation habitat is unknown.

Greater sandhill crane (Antigone canadensis tabida): Pairs of greater sandhill crane in California generally nest in wet meadow, shallow lacustrine, and fresh emergent wetland habitat, with nests constructed of large mounds of water plants emerging from shallow water. Sandhill cranes are known to occur and breed in Childs Meadow, however exact breeding locations may change year to year. Point Blue detected greater sandhill crane every year in the Project area during the breeding season in 2012, 2013, 2016-2018, and 2020.

Northern goshawk (Accipiter gentilis): Northern goshawks are found in forested communities, including mixed conifer, true fir, montane riparian, Jeffrey pine, ponderosa pine, and lodgepole pine forests. In 2018, CAF staff biologists had multiple detections of both adult and juvenile goshawks in the Project area during call back surveys. Follow-up surveys in 2018 were inconclusive and were performed again in 2019. No nests or goshawks were observed in 2019, nor in 2020 during limited time spent searching. Though northern goshawks have not been detected in the Project area, suitable nesting and foraging habitat exists in the Project area.

Olive-sided flycatcher (Contopus cooperi): Olive-sided flycatcher habitat includes conifer forests, and the edges of burns and clearings in conifer forest. The bird breeds mostly in coniferous forests (both early seral and old-growth), especially around the edges of open areas including meadows, bogs, ponds, and clearings, and nest in early successional post-fire forests and forage in forest openings, along edges, and over forest canopies (Kotliar 2007). They require suitable foraging and singing perches, which include dead branches of live trees or snags. The nest high in large, tall trees. PBC has detected olive-sided flycatcher within the Project area every year from 2010-2020 during the breeding season.

Osprey (Pandion haliaetus): Osprey nesting habitat varies greatly, but common characteristics include : (1) adequate supply of accessible fish within energetically adequate commuting distance (10–20 km) of nest; shallow waters (0.5–2 m deep) generally provide most accessible fish; (2) open, elevated nest sites free from predators such as trees, large rocks over water, bluffs, predator-free islands, or artificial structures such as nest platforms, towers supporting electrical lines or cellphone relays, and channel markers. Osprey have been recorded actively flying over the Project area during the breeding season in 2012, 2013, 2017 and 2020. In 2020 CAF staff found an inactive raptor nest in the Project area, determined to be an osprey nest.

Vaux's swift (Chaetura vauxi): Vaux's swift nests in hollow, burned-out tree trunks in large conifers and snags, while most other activities are conducted in the air. Vaux's swift is known to occur in the Project area based on surveys completed by PBC. Vaux's swift has occasionally been detected foraging above Childs Meadows complex once in 2011 during the breeding season, but there is no evidence that they are breeding in the Project area.

Willow flycatcher (Empidonax traillii): Willow flycatcher require large, wet meadows with riparian areas characterized by dense willows and shrub cover. Breeding willow flycatchers are known to occur in some but not all years at Childs Meadows within the Project area. They have been detected along Gurnsey Creek within the Project area during the breeding season in 2010-2015, 2018, and 2020. In 2020 they only occurred outside of areas planned for restoration.

Yellow warbler (Dendroica petechial): Yellow warbler habitat requirements are similar to willow flycatcher and include riparian areas with riparian vegetation (especially shrubs, trees) in close proximity to water along streams and in wet meadows. Yellow warbler has been detected in the Project area along Gurnsey Creek every year from 2010-2020.

Special Status Species Not Detected within the Project Area

Thirteen special-status species may have suitable habitat present within the **Restoring the Deer Creek Headwaters at Childs Meadows Project area**. These species however were not detected by resource surveys conducted within the Childs Meadows complex or the immediately surrounding area or a search of the CNDDG Database. Details regarding all seventeen species life histories and environmental needs are shown below.

Western bumble bee (Bombus occidentalis): Western bumble bee habitat includes meadows and other areas with a diverse and productive understory plant community. No dedicated surveys have been undertaken for western bumble bee at Childs Meadow, although suitable habitat does exist within the Project area. The closest record of western bumble bee in the 9-quad search was documented in the general vicinity of the town of Mineral 5.5 miles away.

Chinook salmon (Oncorhynchus tshawytscha) and steelhead (Oncorhynchus mykiss irideus): Habitat in the Deer Creek watershed for the chinook salmon Central Valley spring-run evolutionarily significant unit and the steelhead Central Valley distinct population segment includes the anadromous waters of Deer Creek and its tributaries. There is a natural barrier to anadromy, Deer Creek falls, located >13 stream miles downstream of the Childs Meadows restoration Project area boundary, thus, these species cannot reach Childs Meadow. We anticipate no negative impacts related to Project activities on the waters below Deer Creek falls. The potential exists however for Project work to contribute cooler water to the Deer Creek system that will reduce water temperatures for downstream anadromous fishes.

Foothill yellow-legged frog (Rana boylii): In the Sierra Nevada, habitat includes mid-elevation rocky streams and rivers with rocky substrate and open, sunny banks, in forests, chaparral, and woodlands. Sometimes found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools. Suitable habitat may exist in the downstream quarter of the Project area where the substrate of Gurnsey Creek is coarse. Despite extensive amphibian surveys throughout Childs Meadows complex since 2011, this species has not been detected within the meadow complex. Even though suitable habitat may exist, surveys indicate that this species does not exist in the Project area. There were several detections of Rana boylii in the 9-quad CNDDB search as close as 7 miles away as of 1999, downstream from the Project area along several tributaries to Deer Creek.

Sierra yellow-legged frog (Rana sierrae): Inhabits lakes, ponds, meadow streams, isolated pools, and sunny riverbanks in the Sierra Nevada Mountains. Usually found in or very close to water, typically within a couple of meters. This species is highly adaptable regarding what perching conditions (i.e., slope, canopy, cover, and substrate) are available. Waters that do not freeze to the bottom or dry up completely are required. Despite extensive amphibian surveys throughout Childs Meadows since 2011, this species has not been detected. Even though suitable habitat may exist, it is assumed the species does not exist in the Project area. The only detection of this species in the 9-quad CNDDB search was in the area of Jonesville, about 14 miles south of the Project area in the Butte Creek watershed.

Bald eagle (Halieaeetus leucocephalus): Bald eagles typically breed in forested areas adjacent to large bodies of water. They nest in trees, and rarely on cliff faces and ground nests in treeless areas. Nests occur in mature and old-growth forest with some habitat edge, relatively close (usually <2 km) to water with suitable foraging opportunities. Actual distance to water varies within and among populations. In some cases, distance to water is not as critical as the quality of the foraging area that is present. The forest around Childs Meadows represents potentially suitable nesting habitat, though prey populations within the Childs Meadows complex may not be sufficient to support nesting eagles.

California spotted owl (Strix occidentalis occidentalis): California spotted owl habitat consists of late seral closed canopy coniferous forest. The Lassen National Forest has been a part of a long-term California Spotted Owl demography study that covers the majority of suitable habitat on the Almanor Ranger District along with the suitable forested habitat around Childs Meadow including CAF lands. To date, no nesting spotted owls have been located within the Childs Meadows complex.

Great gray owl (Strix nebulosa): Great gray owl use late seral closed canopy coniferous forest adjacent to wet meadows. The owl has never been confirmed as a breeding species in the Lassen area, although very infrequent sightings of this species has been confirmed. In 2019 and 2020 the CAF biologist completed call station surveys for great gray owls in suitable habitat in and around the Childs Meadows area without any detections.

Yellow rail (Coturnicops noveboracensis): Yellow rails that breed in the Sierra Nevada require sedge marshes/meadows with moist soil or shallow standing water. Within the Project area, there is suitable habitat for the species in Childs Meadow. The lack of tall herbaceous vegetation and meadow wetness within most of the Project area however likely limits suitability for the species. No yellow rails have been detected within Childs Meadows during extensive passive survey efforts for all birds. While it is possible the species occurs within Childs Meadow, this evidence suggests that probability is low. The closest detections of yellow rail are approximately 7.6 miles northwest of the Project area at Willow Lake.

American badger (Taxidea taxus): American badger habitat includes drier open stages of most shrub, forest, and herbaceous habitats having friable soils. This badger is also known to occur in the vicinity of Lake Almanor. CAF has conducted forest carnivore surveys via baited camera stations in the Project area since 2017 with no badger detections.

California wolverine (Gulo gulo luteus): Habitat for this species consists of remote, high elevation, tree-line landscapes as well as areas of deep snowpack. This habitat does exist in the Project area. CAF has conducted forest carnivore surveys via baited camera stations in the Project area since 2017 with no wolverine detections.

Gray wolf (Canis lupus): Gray wolves are habitat generalists, using many different habitat types ranging from mountain meadows to closed canopy forests. Though the entire Project area can be considered suitable habitat, it is located outside the Known Wolf Area Activity mapped by CDFW. CAF has conducted forest carnivore surveys via baited camera stations in the Project area since 2017 without wolf detections.

Pacific fisher (Pekania pennanti): Pacific fisher habitat includes intermediate to large tree stages of coniferous forests and deciduous-riparian areas having a high percent of canopy closure. Species preference is for mature, dense forest stands. Fisher use cavities, snags, logs, and rocky areas for cover and denning. CAF has conducted forest carnivore surveys via baited camera stations in the Project area since 2017 without fisher detections. Although fishers are not known to breed in the vicinity of the Project area, it is possible they pass through or forage within the Project area.

Sierra Nevada mountain beaver (Aplodontia rufa californica): Sierra Nevada mountain beaver habitat includes dense tree stands consisting of small deciduous species and shrubs in riparian areas. Also included are areas of wet soils, those containing an abundance of forbs and water supplies along with a dense understory for food and cover. There have been no formal surveys for mountain beaver in the Project area and no detections recorded in the CNDDB for this portion of eastern Tehama County although suitable riparian habitat is available. Mountain beaver populations are uncommon throughout the Sierra, which may explain why this species may not be present within the Project area.

Sierra Nevada red fox (Vulpes vulpes necator): Sierra Nevada red fox (SNRF) use multiple habitat types including meadows, rocky areas and high-elevation conifer habitat. CAF has conducted forest carnivore surveys via baited camera stations in the Project area since 2017 with no red fox detections. The entire Project area however is potentially suitable habitat for denning and foraging.

Sierra Nevada snowshoe hare (Lepus americanus tahoensis): The Sierra Nevada snowshoe hare occurs in riparian communities characterized by thickets of deciduous trees and shrubs such as willows and alders, as well as dense stands of young conifers, and chaparral from about 1,463 to 2,438 meters. They are primarily crepuscular and nocturnal, with daylight hours spent in shallow depressions called forms, scraped out under cover, such as brushy thickets or log piles. The nearest detection of SNSH in the CNDDB database was in 1925 near Mineral, approximately 5.5 miles to the West of the Project area.

Spotted bat (Euderma maculatum): Spotted bats occupy a wide variety of habitats including montane conifer forests, but are most common in rough and dry habitats, including deserts. They roost in rock crevices of cliffs and caves. It is thought that the distribution of spotted bats may be limited by the availability of suitable roosting habitat. The Project area lacks large rock outcrops, caves, and cave-like manmade structures. Wet montane meadows are known to provide foraging habitat for spotted bats in the

Sierra Nevada. The nearest detection of spotted bat in the CNDDB database is from Diamond Lake near Turner Mountain, in July of 2000, 8 miles to the WSW of the Project area.

Discussion and Impact Assessment

The following assessment of known occurrences of special-status species, or likelihood of occurrence of those species, was made related to potential impacts for species with suitable habitat or known occurrence within the Project area. The analysis and conclusions described in **Appendix D: Evaluation of Impacts to Terrestrial and Aquatic Wildlife Resources for the Proposed Childs Meadows Restoration Project** are based upon an understanding that all construction activities, including material gathering, will occur no earlier than August 1 of each calendar year.

Species Unlikely to be Impacted by Project Activities

The Project is unlikely to result in direct or indirect impacts to 16 of the 26 species reviewed and described below:

Western bumble bee: Western bumble bees have not been detected within the Project area. Project activities will likely improve habitat quality for the species by planting an array of important pollinator plant species. As a result, the Project is unlikely to negatively impact western bumble bee.

Chinook salmon and steelhead: Chinook salmon and steelhead cannot reach Childs Meadows because of a natural barrier to anadromy over thirteen stream miles downstream of the Project area (Deer Creek Falls). As a result, no impacts related to Project activities on the waters below Deer Creek falls is anticipated. The Project may contribute to lower water temperatures for downstream anadromous fishes because of increased exchange rates between groundwater and surface water.

Foothill yellow-legged frog: No impacts to foothill yellow-legged frogs are anticipated as no know occurrences have been found within or around the Project area despite a decade of thorough amphibian surveys. Habitat suitability for frogs is expected to be improved by Project activities, should this species colonize Childs Meadows in the future.

Sierra yellow-legged frog: No impacts to Sierra yellow-legged frogs are anticipated as this species is not known to occur in or around the Project area despite a decade of thorough amphibian surveys. Habitat suitability for frogs is expected to be improved by Project activities, should this species colonize Childs Meadows in the future.

Bald eagle: No impacts to the bald eagle in connection with proposed Project work is anticipated as this species is not known to nest in the Project area and the suitability of potential nesting and foraging habitat will not be altered. Tree harvest associated with proposed Project work will focus on very small diameter trees and snags which will not affect California Wildlife Habitat Relationship stand classifications nor potential nest trees.

California spotted owl: No direct or indirect effects from proposed Project activities to California spotted owl are anticipated, as they are not known to occur in or around the Project area. Treatments will also not affect suitable California spotted owl habitat adjacent to the Project area. Tree harvest associated with the Project will focus on small diameter timber and snags which will not affect California Wildlife Habitat Relationship stand classifications.

Great gray owl: Great gray owls are not known to occur in the Project area though suitable habitat is present. Proposed Project work will increase and improve suitable habitat for this species by restoring meadow hydrology, providing structural diversity, and improving habitat for prey species. Large snags and important wildlife trees that could provide potential nest sites will not be affected by Project activities. Consequently, the great gray owl is unlikely to be impacted by this Project.

Olive-sided flycatcher: Meadow treatments and related timber falling are expected to have no impact on olive-sided flycatcher. Hand-felling of small diameter timber and snags on the meadow ecotone will likely not affect nest locations as this species nests in tall, large diameter trees.

Vaux's swift: Though Vaux's swift has been detected occasionally foraging above Childs Meadows, there is no evidence that this species nests in the Project area. Therefore, they will likely not be impacted by Project activities.

Yellow rail: Yellow rail is not known to occur in the Project area despite extensive surveys conducted by species specialists on sites where other rail species have been detected. Suitable habitat for the Yellow rail in Childs Meadows occurs in areas that support tall dense herbaceous understory with saturated conditions. Such habitat is very limited within proposed Project impact areas. Yellow rail is therefore unlikely to be impacted by Project activities.

California wolverine: The Project area does not support suitable habitat for the California wolverine and no individuals were detected during wildlife survey efforts. Consequently, proposed Project work will have no impact of this species.

Gray wolf: The Project area is outside of the CDFW-mapped area of Known Wolf Activity. It is possible however that wolves outside of the Known Wolf Activity Area could be foraging or traveling through the Project area and impacted by activities and noise from the proposed Project activities. Given the limited extent of noise producing Project work, relative to the size of potential wolf habitat in and around the Project area, Project work will likely be avoidable by gray wolf passing through the area. Therefore, the Project is not likely to impact this species.

Pacific fisher: The Project area does not support suitable habitat for pacific fisher and no fishers have been detected on recent surveys. Project activities will not alter potential fisher habitat. Therefore, pacific fisher will not be impacted by Project activities.

Sierra Nevada mountain beaver: Mountain beaver have not been detected in the Project area, but suitable habitat may exist in the riparian areas of Gurnsey Creek. It is unlikely that proposed Project activities will impact mountain beavers due to the very limited extent of mechanical ground-disturbing activities to be implemented adjacent to suitable beaver habitat in the vicinity of Gurnsey Creek. As a result, Sierra Nevada Mountain beaver are unlikely to be impacted by Project activities. Expected increases in forbs and riparian shrubs and trees resulting from Project activities will improve foraging opportunities for this species.

Spotted bat: Spotted bats have not been detected in the Project area nor does it contain suitable roosting habitat. Consequently, no anticipated impacts to roosting spotted bats is anticipated. The meadow may be suitable as spotted bat foraging habitat. It is highly unlikely that proposed Project activities will impact spotted bat foraging given construction activities are to occur during the day and spotted bats feed exclusively at night. Therefore, the spotted bat will likely not be impacted by Project activities. Expected improvements to the health of the Childs Meadows complex from Project activities will likely improve foraging opportunities for this species.

Species Potentially Impacted by Project Activities

Of the 26 species reviewed, 10 have the potential to be impacted by Project activities. Details on potential direct and indirect impacts of the Project on each of these species and how these impacts are less than significant or could be mitigated to less than significant levels are described below. Specific protective Measures have been developed for a number of these species as described in **Appendix A: Mitigation Monitoring and Reporting Plan**.

Cascades frog: Several of the proposed meadow treatments overlap areas and habitats occupied by the Cascades frog. Direct effects of the Project on this species include disturbance during their reproductive period or direct incidental mortality of individuals during construction activities. There are no anticipated indirect effects of the Project on Cascades frog, as the suitability of their breeding and post-breeding habitat is expected to be improved by Project activities. Direct effects will be avoided through the implementation of **Mitigation Measure #BIO 1: Survey and Protection Requirements for the Cascade Frog**.

Southern long-toed salamander: No Project related activities will occur in areas where the southern long-toed salamander (SLTS) is associated with wet meadow pools. As a result, no impacts to breeding sites are anticipated. SLTS migrate to breeding sites in spring, outside of this Projects fall implementation window. Direct effects of meadow restoration efforts on salamanders may include disruption of fall migration to overwintering habitats and impacts to hibernation sites. These effects however are unlikely to be significant, as SLTS migration occurs at night, while construction activities will occur during daytime hours. There are little data available on hibernation sites for SLTS, but may include aquatic sites for larvae under logs, bottom debris, and subsurface springs and terrestrial locations such as logs for adults. Effects to possible hibernation sites will be mitigated to less than significant effect through the implementation of **Mitigation Measure #BIO 2: Prohibition Against the Removal of Downed trees and Logs**.

Greater sandhill crane: There are no direct effects anticipated from Project activities. Indirect effects to sandhill crane include potential disturbance to meadow understory vegetation during hydrologic restoration implementation, increased human activity during implementation, and noise from mechanical equipment. Disturbances associated with meadow restoration implementation are considered temporary impacts. Restoration actions in the long-term will have a net benefit to this species by increasing suitable nesting habitat (standing water and tall herbaceous vegetation). Impacts to greater sandhill crane will be achieved through the implementation **Mitigation Measure BIO 3: Preconstruction Surveys and Protection of Sandhill Crane Nest Sites and Flightless Young**.

Northern goshawk: Direct effects of the Project on northern goshawk include disturbance during their reproductive period. There are no anticipated indirect effects of the Project on this species as the suitability of their nesting habitat will not be altered and there will be no negative impact to the abundance or availability of prey species. Tree harvest associated with the Project will focus on very small diameter trees which will not affect California Wildlife Habitat Relationship stand classifications. Direct effects on Northern Goshawk related to Project implementation will be mitigated to a less than significant level through implementation of **Mitigation Measure BIO 4: Use of Mechanical Equipment During Northern Goshawk Nesting Season**.

Osprey: Direct effects of the Project on osprey include disturbance during their reproductive period. There are no anticipated indirect effects of this Project on osprey as the suitability of their nesting habitat will not be altered and there will be no negative impact to the abundance or availability of prey species. Tree harvest associated with Proposed Project work will focus on very small diameter trees which will not affect California Wildlife Habitat Relationship stand classifications. Direct effects to this species will be mitigated to a less than a significant level through implementation of **Mitigation Measure BIO 5: Protection of Osprey Nests**.

Willow flycatcher: Impacts of Project activities to the willow flycatcher include potential reduction in nesting substrate and disturbance from Project activities during the nesting season. Willows are critical nesting substrate for this species. Up to 20% of an individual willow's stems <2 inches at the widest point are proposed to be harvested for building structures used in hydrologic restoration. A map of known willow flycatcher territories within the Childs Meadows complex is shown in **Figure BIO-4: Map of known Willow Flycatcher Territories Within the Childs Meadows Complex** below. Impacts to willow flycatcher nesting substrate will be prevented through the implementation of **Mitigation Measure BIO 6: Willow Cutting Near Willow Flycatcher Territories** and **BIO 7: Work Restrictions During Willow Fly Catcher Nesting Season**.

Yellow warbler: Impacts of Project activities to yellow warbler includes disturbance during implementation. Willow harvest to generate Project material will be limited to no more than 20% of an individual willow's stems <2 inches at their widest point. This level of cutting is not expected to be enough to impact the nesting habitat of yellow warblers. Impacts to yellow warblers from disturbance will be reduced to a less than significant level through implementation of **Mitigation Measure BIO-8: Yellow Warbler Work Period Restrictions**.

American badger: Potential direct effects to badger from Project activities include disturbance or mortality associated with mechanical material sourcing in upland habitats for channel fill. These effects are less than significant because of their very small extent and very low likelihood of impacting individuals. Even if an individual was impacted, there will be insignificant impacts to the local population. Indirect effects include alterations to habitat such as soil compaction and soil disturbance from heavy equipment. These effects are also less than significant because of the small footprint of mechanical equipment activities off roads in upland habitats. Impacts are also less than significant as this species has not been detected in the Project area.

Sierra Nevada red fox: Direct effects of the Project to Sierra Nevada Red Fox are likely to be less than significant as the Project area is below the elevation range this species occupies during warm seasons. If a Sierra Nevada Red Fox were to be present within the overall Project area it will likely be a dispersing individual passing through the area. Disturbance to individuals could include noise from the use of mechanized equipment. These effects, however, are considered less than significant due to the difference between the peak activity hours of the Red Fox and that of proposed Project work. Peak activity for the fox occurs during nighttime hours while all Project activities will occur during daylight hours. The minimal extent of proposed mechanical treatments are such that active implementation areas would be avoidable by Sierra Nevada red fox passing through the area. The Project is expected to increase meadow habitat suitable for foraging.

Sierra Nevada snowshoe hare: Direct effects of the Project to Sierra Nevada snowshoe hare are anticipated to be less than significant primarily because the species is not known to occur in the Project area. The Project area is also at the very low end of the elevation range this species is known to occupy. Potential effects include noise disturbance from the use of mechanized equipment and the mechanical removal of conifers within the meadow-upland ecotone. The effects from mechanized equipment are considered less than significant due to differences in peak activity hours of snowshoe and proposed Project work. The Snowshoe hare is most active during crepuscular and nighttime hours while all Project activities will occur during daylight hours. The effects of conifer material harvest are considered less than significant as all harvest activity will be completed by hand over a limited extent of available habitat, and after the hare breeding season (May – July). The Project is expected to increase the cover of suitable riparian shrub and deciduous tree habitat for this species.

Wetland Delineation and Assessment in Childs Meadows and Waters of the US

As interpreted by U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency, Section 404 wetlands are defined as:

"…areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

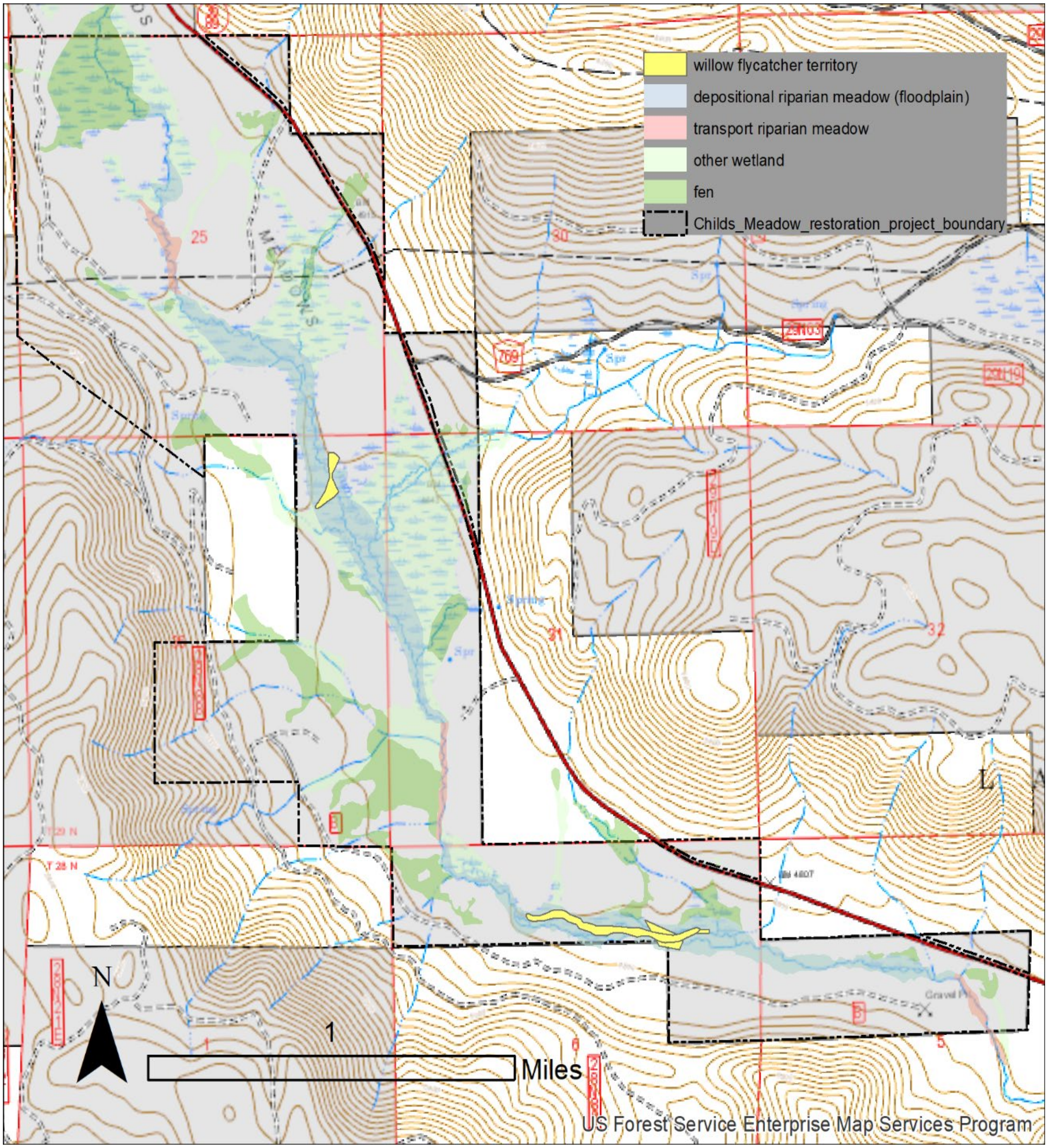


Figure BIO-4: Map of known Willow Flycatcher Territories Within the Childs Meadows Complex

More specifically, wetlands are areas where the frequent and prolonged presence of water at or near the soil surface drives the natural system. Related to biological resources Wetland areas also contain the type of soils that support plant and wildlife communities that utilize moist sites along with those that are inundated during a large part of the year.

In order to delineate and assess the function of the wetlands in Childs Meadows, soils, hydrology, and vegetation were described at 65 plots throughout the meadow as displayed in **Figure BIO-4: Map of Known Willow Flycatcher Territories Within the Childs Meadows Complex**, **Figure BIO-5: Shaded Relief Topographic Map Showing Study Plot Locations and Delineated Wetlands Within the Childs Meadow Complex**, **Figure BIO-6: Aerial Photograph of Childs Meadow Showing Study Plots and Delineated Wetlands,** along with the detailed maps shown in **Appendix E: Wetland Delineation and Assessment in Childs Meadow Tehama County, CA.** of this IS/MND. An ocular estimate of plant cover was made for 63 plant species identified at the plots. The percent cover and wetland indicator status of each plant species was used to determine if wetland vegetation was present in each plot. A soil pit was dug at each plot and soils were investigated for indications of wetland conditions. The presence of wetland hydrology was determined in each soil pit as well. A network of existing wells within sub-basin three were used to determine the duration of wetland hydrologic conditions at nearby study plots. Using the data from the 65 study plots, multi-spectral aerial imagery, and detailed topography, the wetlands, fens, and dewatered wetlands were delineated throughout the meadow. Fens are a subclass of wetland that require 16-inches of peat soil, perennial groundwater saturation, and dominance of wetland plants. Details pertaining to wetland delineation efforts are found in **Appendix E**.

The valley floor and hillslope wetland complex cover 520.4 acres, approximately 9% of the Childs Meadows watershed. The wetland complex contains 138.7 acres of fen, 259.3 acres of non-fen wetland, 42.1 acres of dewatered former wetland, and 80.3 acres of mixed wetland/fen on un-surveyed private land at the north end of the Childs Meadows watershed. Several of the hillslope fens contain communities of plants that are not common within fen localities. Study plot 20 and a large fen on the western side of furthest downstream sub-basin, contain a significant cover of lodgepole pine. Although establishment of conifers within wetlands can occur following dewatering, lodgepole pine is extremely tolerant of completely saturated soil and can occur naturally to form treed fens. The hydrology of the treed fens on the western side of Childs Meadows appears largely intact, and the presence of lodgepole in these areas is natural. These fens, along with study plot 12, support populations of other wetland-obligate plants such as *Triantha occidentalis, Caltha leptosepala,* and the carnivorous *Drosera rotundifolia.*

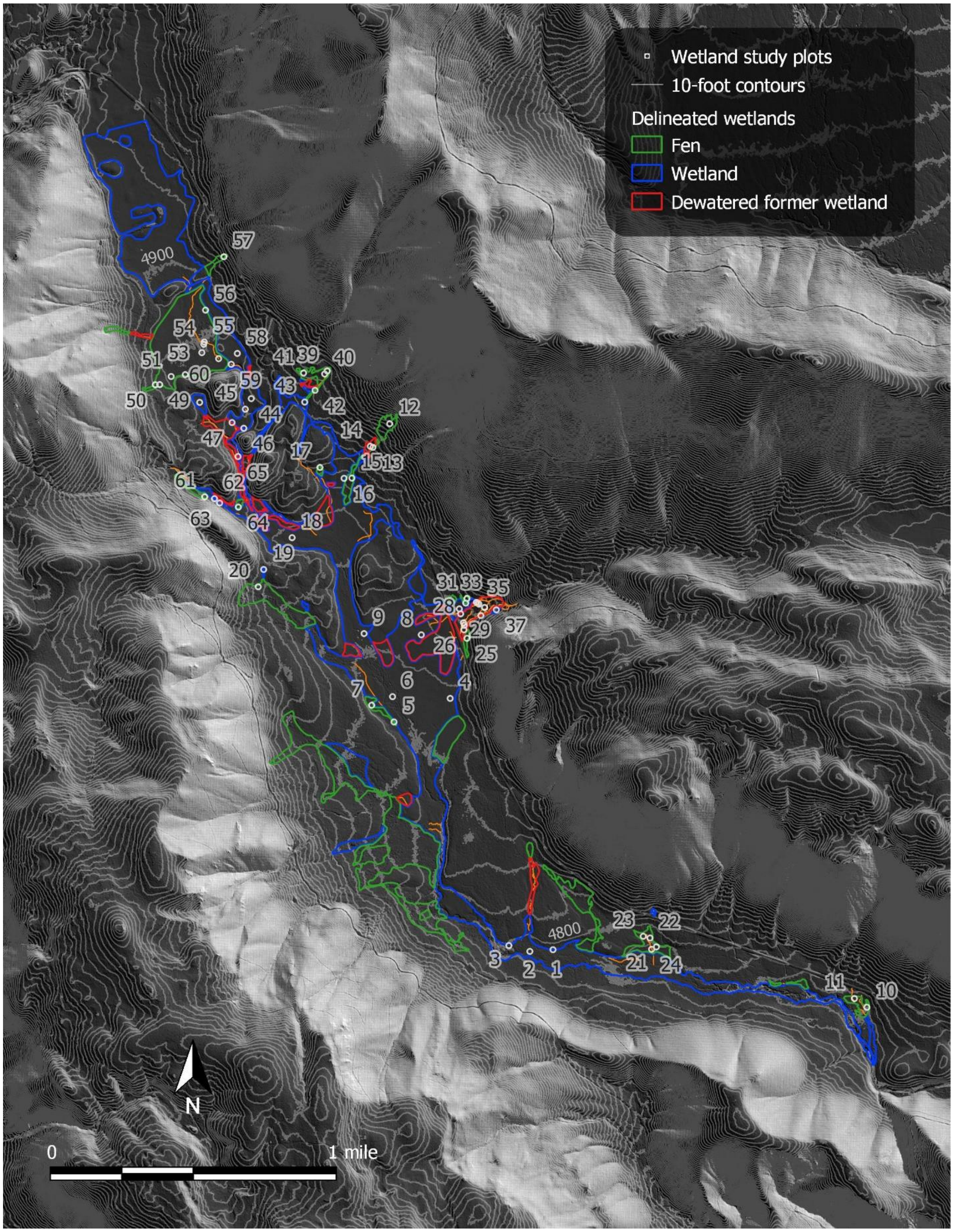


Figure BIO-5: Shaded Relief Topographic Map Showing Study Plot Locations and Delineated Wetlands Within the Childs Meadow Complex

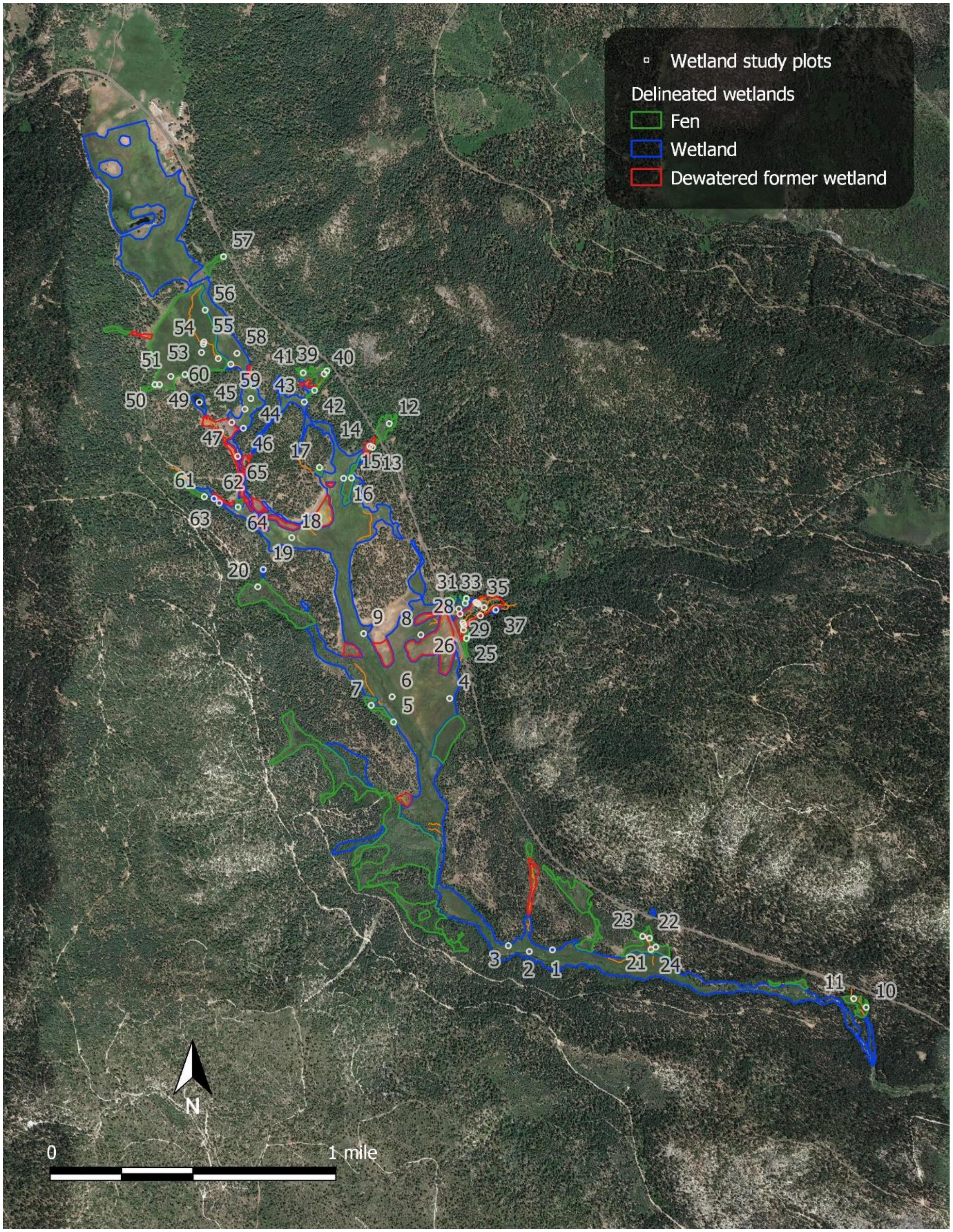


Figure BIO-6: Aerial Photograph of Childs Meadow Showing Study Plots and Delineated Wetlands

In addition to the 63 plant species found during this survey, 112 other plants have been described from the meadow or immediate vicinity (CalFlora 2020). Several of these plants are listed as rare or have other special or protected status. In addition, the endangered willow flycatcher and Cascades frog use portions of Childs Meadows for habitat. Beaver have occupied and dammed the main flow channel within the fourth, most downstream, sub-basin. The occurrences of willow flycatcher and Cascades frog is closely tied to the presence of willow stands and ponds, which correspond to beaver dam sites. **Table BIO-6: Summary of the Wetland Soils, Hydrology, and Vegetation at 65 Study Plots** below provides a summary of the wetland soils, hydrology, and vegetation at 65 study plots.

The primary impact to wetland function within Childs Meadows is cattle grazing. Both aboveground vegetation removal through direct consumption, and physical damage to soil and belowground plant parts by hoof punching was evident throughout the site. These grazing impacts leave soil more vulnerable to erosion, and several large erosion gullies are present, some of which are actively headcutting. These gullies form topographic low trenches within an otherwise level in cross-section meadow. Surface and groundwater drain to these low areas and flow downstream. The drainage of groundwater into surface flow features like gullies is a particularly significant impact because water moves about 100 to 1000 times faster down gradient as surface water over land than it does as groundwater in soil. Deep gullies drain groundwater away from adjacent meadow areas. Within several portions of Childs Meadow, these drained meadow areas are evident as level terraces that retain wetland soils, even though they currently have deep water tables that no longer support wetland plant and soil processes.

Some wetland obligate species can persist despite the loss of wetland hydrology by drainage. Although these species require wetland conditions to establish and grow as small individuals, once they have a large belowground root network, they can track a declining water table and obtain sufficient moisture to stay alive in non-wetland conditions. *Carex nebrascensis* is one such species, as it is persisting in study plot 14 despite the lack of wetland hydrology. The dry peat soils and presence of *Carex nebrascensis* indicates that this area was a former fen. A drainage ditch that runs through plot 13 has apparently dewatered this area, but the high-organic wetland soils, and a few obligate wetland plants persist.

Several groundwater-saturated sections of the Childs Meadows have been dewatered by the installation of drainage ditches. The longest of these drainage features extends for approximately 609 meters, from above study plot 7 to below study plot 5. This ditch was partially blocked in 2015 as part of the restoration experiment, and even the partial and haphazard blockage redistributed water across a large area of meadow. Other ditches are having a similar dewatering effect near plots 13 and 14 along with sites that are adjacent to and downstream of plot 25-37 and between plots 4 and 8.

Table BIO-6: Summary of the Wetland Soils, Hydrology, and Vegetation at 65 Study Plots

(This table is divided into four groups of study plots. Each section of the table contains a complete list of the plant species identified across all wetland plots.)

Plot type		well	well	well	well	well	well	well	well	well	delin	delin	delin	delin	delin
Plot #		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Wetland soil?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Matrix color 0-12in		10YR 2/2	10YR 2/2	10YR 2/2	10YR 5/1	10YR 2/2	10YR 2/2	--	10YR 3/1	10YR 2/2	--	--	--	--	--
Texture 0-12in		silt	histosol	sandy silt	silt	histosol	peat	peat	silty sand	silt	peat	peat	peat	peat	peat
Redox features 0-12in		15%	10%	10%	25%	10%	10%	--	10%	15%	--	--	--	--	--
Hydric soil indicators		F6	A1	F6	F3	A1	A1	A1	F6	F6	A1	A1	A1	A1	A1
Wetland hydrology?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--
2019Sep water table relative to ground surface (in)		-24	-24	-32	-10	-26	-23	1	-70	-18	1	-2	0	-4	<-16
Wetnad hydrology indicators		A2	A2	A2	A2	A2	A2	A1	A2	A2	A1	A2	A1	A2	--
2019 consecutive days >-30cm water table		30	56	31	150	17	24	107	31	31	--	--	--	--	--
Wetland vegetation?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bare ground areal cover (%)		0	0	0	0	0	0	10	0	0	0	0	0	9	40
Total areal veg cover (%)		100	100	100	100	100	100	90	100	100	100	100	100	91	60
Prevalence index		1.6	1.6	2.1	1.6	1.3	2.8	1.4	2.0	1.5	2.2	2.0	2.1	1.4	2.2
Taxon	Wetland status														
Achillea millefolium	FACU	--	--	--	--	--	--	--	--	--	--	--	--	--	5
Bistorta bistortoides	FACW	10	20	10	--	--	5	--	15	5	--	--	2	--	--
Bromus diandrus	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calocedrus decurrens	UPL	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Camassia quamash	FACW	5	--	--	--	--	15	--	25	5	--	--	--	--	--
Caltha leptosepala	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calyptridium monospermum	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex aurea	FACW	--	--	--	--	--	10	--	--	--	--	--	--	--	--
Carex feta	FACW	--	--	30	--	--	--	--	--	--	--	--	--	--	--
Carex jonesii	OBL	--	--	--	--	--	--	5	--	--	--	--	2	--	--
Carex lenticularis	OBL	--	30	--	--	--	--	--	--	--	--	--	--	--	--
Carex nebrascensis	OBL	40	20	10	40	25	5	25	10	40	--	--	2	5	15
Carex simulata	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex utriculata	OBL	--	--	--	--	--	--	--	--	5	--	--	--	10	--
Collinsia parviflora	UPL	--	--	--	--	--	15	--	--	--	--	--	--	--	--
Deschampsia cespitosa	FACW	--	--	--	--	--	--	--	--	5	10	10	--	--	--
Drosera rotundifolia	OBL	--	--	--	--	2	--	5	--	--	1	1	2	--	--
Eleocharis macrostachya	OBL	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Eleocharis quinqueflora	OBL	--	--	--	--	10	--	--	10	--	--	--	--	--	--
Equisetum arvense	FAC	--	--	--	--	--	--	--	--	--	--	--	29	1	--
Erythranthe guttata	OBL	--	--	--	--	--	--	--	--	--	5	5	2	20	--
Erythranthe primuloides	OBL	--	--	--	--	--	--	10	--	--	--	--	--	10	--
Gayophytum diffusum ssp. *parviflorum*	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gentiana newberryi	FACW	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Hastingsia alba	OBL	--	--	--	--	--	--	--	--	--	--	--	10	--	--
Hypericum anagalloides	OBL	--	--	--	--	5	--	--	--	--	--	--	--	--	--
Hypericum scouleri	FACW	--	--	--	--	1	--	--	--	--	--	--	--	--	--
Juncus ensifolius	FACW	--	--	--	--	--	--	--	--	--	5	5	--	--	--
Juncus mexicanus	FACW	20	15	15	20	13	--	15	25	15	--	25	--	30	20
Juncus nevadensis	FACW	--	--	--	--	--	--	--	--	--	20	20	2	--	--
Kyhosia bolanderi	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lewisia nevadensis	UPL	--	--	--	--	--	--	--	5	--	--	--	--	--	--
Lilium pardalinum ssp. *shastense*	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moss	--	--	--	--	--	29	--	20	--	--	--	--	--	15	10
Muhlenbergia filiformis	FACW	--	--	--	--	--	--	--	--	--	10	10	--	--	--
Oreostemma alpigenum	FAC	--	--	--	--	--	--	--	--	--	25	--	--	--	5
Oxypolis occidentalis	OBL	--	--	--	--	--	--	--	--	--	--	--	25	--	--
Pedicularis attollens	OBL	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Perideridia parishii ssp. *latifolia*	FAC	--	--	--	--	--	10	--	--	--	1	1	--	--	--
Pinus contorta var. *murrayana*	FAC	--	--	--	--	--	--	--	--	--	5	5	--	--	--
Plantago major	FAC	--	--	10	--	--	--	--	--	--	--	--	--	--	--
Platanthera dilatata var. *leucostachys*	FACW	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Poa pratensis	FAC	--	10	15	--	--	--	--	--	--	--	--	--	--	--
Potamogeton natans	OBL	--	--	--	--	--	--	--	--	5	--	--	--	--	--
Primula tetrandra	FACW	--	--	--	--	10	--	5	--	--	--	--	--	--	--
Ranunculus alismifolius var. *alismifolius*	FACW	20	--	--	40	--	20	--	10	10	--	--	--	--	--
Ranunculus aquatilis	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ranunculus orthorhynchus	FACW	--	--	--	--	--	--	--	--	--	--	1	--	--	--
Salix lemmonii	FACW	5	--	--	--	--	--	--	--	5	--	--	--	--	--
Scirpus microcarpus	OBL	--	5	1	--	--	--	--	--	5	1	1	--	--	--
Sisyrinchium elmeri	OBL	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Sorbus scopulina	FACU	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sparganium angustifolium	OBL	--	--	9	--	--	--	--	--	--	--	--	--	--	--
Spiraea douglasii	FACW	--	--	--	--	--	--	--	--	--	1	1	--	--	--
Spiranthes romanzoffiana	FACW	--	--	--	--	--	--	--	--	--	5	5	2	--	--
Stellaria longipes	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Symphyotrichum foliaceum	FACU	--	--	--	--	--	--	--	--	--	--	--	10	--	--
Taraxacum officinale	FACU	--	--	--	--	--	15	--	--	--	--	--	--	--	5

Triantha occidentalis	FACW	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Trifolium wormskioldii	FACW	--	--	--	--	--	5	--	--	--	--	--	--	--	--
Vaccinium uliginosum	FACW	--	--	--	--	--	--	5	--	--	10	10	--	--	--
Veronica americana	OBL	--	--	--	--	5	--	--	--	--	--	--	--	--	--
Veratrum californicum	FAC	--	--	--	--	--	--	--	--	--	--	--	--	--	--

	Plot type Plot #	delin 15	delin 16	delin 17	delin 18	delin 19	delin 20	delin 21, 23	delin 22	delin 24	delin 25	delin 26	delin 27	delin 28
	Wetland soil?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--	Yes	--
	Matrix color 0-12in	--	10YR 2/2	--	10YR 2/2	10YR 3/1	--	10YR 3/1	--	--	--	--	10YR 3/1	--
	Texture 0-12in	peat	histosol	peat	silt	silt w/ OM	peat	10cm peat; silty gravel	peat	peat	peat	silty sand	silty sand	silty sand
	Redox features 0-12in	--	5%	--	15%	15%	--	10%	--	--	--	--	10%	--
	Hydric soil indicators	A1	A1	A1	F6	F6	A1	F6	A1	A1	A1	--	F6	--
	Wetland hydrology?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--	Yes	--
	2019Sep water table relative to ground surface (in)	1	-12	1	<-16	-10	-2	<-16	-2	-2	0	<-16	0	<-16
	Wetnad hydrology indicators	A1	C3	A1	C3	A2	A2	C3	A2	A2	A1	--	A1	--
	2019 consecutive days >-30cm water table	--	--	--	--	--	--	--	--	--	--	--	--	--
	Wetland vegetation?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--	Yes	--
	Bare ground areal cover (%)	8	0	10	10	0	0	9	10	0	10	60	15	60
	Total areal veg cover (%)	92	100	90	90	100	100	91	90	100	90	40	85	40
	Prevalence index	1.1	1.4	1.5	1.6	1.4	1.5	2.0	2.1	1.3	1.3	3.1	2.1	3.1
Taxon	Wetland status													
Achillea millefolium	FACU	--	--	5	--	--	--	--	--	--	--	--	--	--
Bistorta bistortoides	FACW	--	--	--	--	5	5	--	--	--	--	--	--	--
Bromus diandrus	UPL	--	--	--	--	--	--	--	--	--	--	10	--	10
Calocedrus decurrens	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Camassia quamash	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Caltha leptosepala	OBL	--	--	--	--	--	1	--	--	--	--	--	--	--
Calyptridium monospermum	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex aurea	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex feta	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex jonesii	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex lenticularis	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex nebrascensis	OBL	5	65	10	20	80	30	1	5	10	--	--	--	--
Carex simulata	OBL	--	--	30	--	--	--	--	--	40	--	--	--	--
Carex utriculata	OBL	--	--	10	15	--	--	--	--	--	--	--	--	--
Collinsia parviflora	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Deschampsia cespitosa	FACW	--	30	--	25	--	--	45	5	--	--	--	--	--
Drosera rotundifolia	OBL	--	--	--	--	--	1	--	5	--	--	--	--	--
Eleocharis macrostachya	OBL	40	--	--	--	--	20	--	5	--	--	--	--	--
Eleocharis quinqueflora	OBL	--	--	10	--	--	--	--	--	--	--	--	--	--
Equisetum arvense	FAC	--	--	--	--	--	--	--	--	--	10	--	25	--
Erythranthe guttata	OBL	--	--	--	--	--	--	--	--	10	--	--	--	--
Erythranthe primuloides	OBL	1	--	5	--	--	--	--	--	--	--	--	--	--
Gayophytum diffusum ssp. parviflorum	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Gentiana newberryi	FACW	--	--	--	--	--	--	--	5	--	--	--	--	--
Hastingsia alba	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Hypericum anagalloides	OBL	--	--	5	--	--	--	--	--	--	--	--	--	--
Hypericum scouleri	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Juncus ensifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Juncus mexicanus	FACW	--	5	--	30	5	--	45	40	20	10	--	25	--
Juncus nevadensis	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Kyhosia bolanderi	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Lewisia nevadensis	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Lilium pardalinum ssp. shastense	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Moss	--	40	--	--	--	--	--	--	--	--	--	--	--	--
Muhlenbergia filiformis	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Oreostemma alpigenum	FAC	--	--	--	--	--	--	--	--	--	--	--	--	--
Oxypolis occidentalis	OBL	--	--	--	--	--	10	--	--	--	40	--	15	--
Pedicularis attollens	OBL	--	--	--	--	--	1	--	--	--	--	--	--	--
Perideridia parishii ssp. latifolia	FAC	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinus contorta var. murrayana	FAC	--	--	--	--	--	10	--	10	--	--	--	--	--
Plantago major	FAC	--	--	--	--	--	--	--	--	--	--	--	--	--
Platanthera dilatata var. leucostachys	FACW	--	--	--	--	--	--	--	--	5	--	--	--	--
Poa pratensis	FAC	--	--	5	--	--	--	--	--	--	--	--	--	--
Potamogeton natans	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Primula tetrandra	FACW	--	--	--	--	--	5	--	5	--	--	--	--	--
Ranunculus alismifolius var. alismifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Ranunculus aquatilis	OBL	--	--	--	--	--	--	--	--	10	--	--	--	--
Ranunculus orthorhynchus	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Salix lemmonii	FACW	--	--	--	--	--	--	--	--	--	--	--	20	--
Scirpus microcarpus	OBL	--	--	--	--	--	--	--	--	--	30	--	--	--
Sisyrinchium elmeri	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Sorbus scopulina	FACU	--	--	--	--	--	1	--	--	--	--	--	--	--
Sparganium angustifolium	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Spiraea douglasii	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Spiranthes romanzoffiana	FACW	1	--	--	--	--	--	--	--	--	--	--	--	--
Stellaria longipes	FACW	--	--	--	--	--	--	--	--	--	--	15	--	15

Symphyotrichum foliaceum	FACU	--	--	--	--	10	--	--	5	--	--	--	--	--
Taraxacum officinale	FACU	--	--	5	--	--	--	--	--	--	--	--	--	--
Triantha occidentalis	FACW	--	--	--	--	--	1	--	--	--	--	--	--	--
Trifolium wormskioldii	FACW	5	--	5	--	--	--	--	--	5	--	--	--	--
Vaccinium uliginosum	FACW	--	--	--	--	--	15	--	5	--	--	--	--	--
Veronica americana	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Veratrum californicum	FAC	--	--	--	--	--	--	--	--	--	--	15	--	15

	Plot type	delin	delin	delin	delin	delin	delin	delin	delin	delin	delin	delin	delin
	Plot #	29	30	31, 32	33, 35, 36, 38	34	37	39	40,42	41	43	44	45, 46
	Wetland soil?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Matrix color 0-12in	10YR 3/1	10YR 3/1	--	10YR 3/1	10YR 3/1	10YR 3/1	--	--	--	10YR 2/2	10YR 2/2	10YR 3/1
	Texture 0-12in	silty sand	silty sand	peat	silty sand	sandy loam	sandy silt	peat	peat	peat	sandy silt	sandy silt	sandy silt
	Redox features 0-12in	10%	5%	--	10%	15%	15%	--	--	--	15%	10%	15%
	Hydric soil indicators	F6	F6	A1	F6	F6	F6	A1	A1	A1	F6	F6	F6
	Wetland hydrology?	--	Yes	Yes	--	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2019Sep water table relative to ground surface (in)	<-16	<-16	0	<-16	2	-10	0	0	1	-12	-12	-2
	Wetnad hydrology indicators	--	C3	A1	--	A1	A2	A1	A1	A1	C3	C3	A2
	2019 consecutive days >-30cm water table	--	--	--	--	--	--	--	--	--	--	--	--
	Wetland vegetation?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Bare ground areal cover (%)	35	0	0	35	0	0	0	5	5	10	5	10
	Total areal veg cover (%)	65	100	100	65	100	100	100	95	95	90	95	90
	Prevalence index	2.8	2.0	2.0	2.8	2.0	1.0	1.4	1.5	1.4	1.9	2.0	1.0
Taxon	Wetland status												
Achillea millefolium	FACU	--	--	--	--	--	--	--	--	--	--	--	--
Bistorta bistortoides	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Bromus diandrus	UPL	10	--	--	10	--	--	--	--	--	--	--	--
Calocedrus decurrens	UPL	--	--	--	--	--	--	--	--	--	--	--	--
Camassia quamash	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Caltha leptosepala	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Calyptridium monospermum	UPL	--	--	--	--	--	--	--	--	--	--	--	--
Carex aurea	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Carex feta	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Carex jonesii	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Carex lenticularis	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Carex nebrascensis	OBL	5	35	--	5	--	--	--	5	--	30	25	30
Carex simulata	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Carex utriculata	OBL	--	--	--	--	--	--	--	--	--	--	--	30
Collinsia parviflora	UPL	--	--	--	--	--	--	--	--	--	--	--	--
Deschampsia cespitosa	FACW	5	35	--	5	--	--	--	--	--	45	50	--
Drosera rotundifolia	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Eleocharis macrostachya	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Eleocharis quinqueflora	OBL	--	--	25	--	--	--	--	30	20	--	--	--
Equisetum arvense	FAC	--	--	15	--	25	--	--	--	--	--	--	--
Erythranthe guttata	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Erythranthe primuloides	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Gayophytum diffusum ssp. parviflorum	UPL	--	--	--	--	--	--	--	--	--	--	--	--
Gentiana newberryi	FACW	--	--	--	--	--	--	--	--	5	--	--	--
Hastingsia alba	OBL	--	--	30	--	--	--	--	--	--	--	--	--
Hypericum anagalloides	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Hypericum scouleri	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Juncus ensifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Juncus mexicanus	FACW	10	15	--	10	25	--	--	--	--	5	5	--
Juncus nevadensis	FACW	--	--	--	--	--	--	10	30	20	--	--	--
Kyhosia bolanderi	UPL	--	--	--	--	--	--	5	--	--	--	--	--
Lewisia nevadensis	UPL	--	--	--	--	--	--	--	--	--	--	--	--
Lilium pardalinum ssp. shastense	FACW	--	--	--	--	--	--	5	--	--	--	--	--
Moss	--	--	--	--	--	--	--	--	20	30	--	--	--
Muhlenbergia filiformis	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Oreostemma alpigenum	FAC	--	--	--	--	--	--	--	--	--	--	--	--
Oxypolis occidentalis	OBL	--	--	--	--	30	40	70	--	10	--	--	--
Pedicularis attollens	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Perideridia parishii ssp. latifolia	FAC	--	--	--	--	--	--	--	--	--	--	--	--
Pinus contorta var. murrayana	FAC	--	--	5	--	--	--	--	--	--	--	--	--
Plantago major	FAC	--	--	--	--	--	--	--	--	--	--	--	--
Platanthera dilatata var. leucostachys	FACW	--	--	--	--	--	--	5	--	--	--	--	--
Poa pratensis	FAC	--	--	--	--	--	--	--	--	--	--	--	--
Potamogeton natans	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Primula tetrandra	FACW	--	--	10	--	--	--	--	--	--	--	--	--
Ranunculus alismifolius var. alismifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Ranunculus aquatilis	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Ranunculus orthorhynchus	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Salix lemmonii	FACW	--	--	--	--	20	--	--	--	--	--	--	--
Scirpus microcarpus	OBL	--	--	--	--	--	60	5	5	10	--	--	30
Sisyrinchium elmeri	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Sorbus scopulina	FACU	--	--	--	--	--	--	--	--	--	--	--	--
Sparganium angustifolium	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Spiraea douglasii	FACW	--	--	--	--	--	--	--	--	--	--	--	--

Spiranthes romanzoffiana	FACW	--	--	--	--	--	--	--	5	--	--	--	--
Stellaria longipes	FACW	15	--	--	15	--	--	--	--	--	--	--	--
Symphyotrichum foliaceum	FACU	5	15	15	5	--	--	--	--	--	10	10	--
Taraxacum officinale	FACU	--	--	--	--	--	--	--	--	--	--	--	--
Triantha occidentalis	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Trifolium wormskioldii	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Vaccinium uliginosum	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Veronica americana	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Veratrum californicum	FAC	15	--	--	15	--	--	--	--	--	--	5	--

	Plot type	delin	delin	delin	delin	delin	delin	delin	delin	delin	delin	delin		
	Plot #	47	48	49-51	52	53-56	57	58	59	60	61-64	65		
	Wetland soil?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
	Matrix color 0-12in	10YR 4/2	10YR 2/2	--	--	--	--	10YR 3/1	10YR 2/2	--	10YR 2/2	10YR 3/1		
	Texture 0-12in	silty sand	sandy silt	peat	peat	peat	peat	silty gravel	histosol	peat	histosol	silty gravel		
	Redox features 0-12in	15%	10%	--	--	--	--	10%	10%	--	10%	10%		
	Hydric soil indicators	F3	F6	A1	A1	A1	A1	F6	A1	A1	A1	F6		
	Wetland hydrology?	--	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--		
	2019Sep water table relative to ground surface (in)	<-16	2	0	2	1	0	<-16	-8	0	-8	<-60		
	Wetnad hydrology indicators	--	A1	A1	A1	A1	A1	C3	A2	A1	A2	--		
	2019 consecutive days >-30cm water table	--	--	--	--	--	--	--	--	--	--	--		
	Wetland vegetation?	--	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--		
	Bare ground areal cover (%)	60	0	0	0	0	0	9	0	0	5	80		
	Total areal veg cover (%)	40	100	100	100	100	100	91	100	100	95	20		
	Prevalence index	5.0	1.5	1.3	1.5	1.3	1.5	2.0	1.4	1.4	1.1	5.0		
Taxon	Wetland status												Ave of all plots	Ave when present
Achillea millefolium	FACU	--	--	--	--	--	--	--	--	--	--	--	0	5
Bistorta bistortoides	FACW	--	--	--	--	--	--	--	--	--	--	--	2	9
Bromus diandrus	UPL	15	--	--	--	--	--	--	--	--	--	--	1	11
Calocedrus decurrens	UPL	--	--	--	--	--	--	--	--	--	--	--	0	2
Camassia quamash	FACW	--	--	--	--	--	--	--	--	--	--	--	1	13
Caltha leptosepala	OBL	--	--	--	--	--	--	--	--	--	--	--	0	1
Calyptridium monospermum	UPL	5	--	--	--	--	--	--	--	--	--	10	0	8
Carex aurea	FACW	--	--	--	--	--	--	--	--	--	--	--	0	10
Carex feta	FACW	--	--	--	--	--	--	--	--	--	--	--	1	30
Carex jonesii	OBL	--	--	--	--	--	--	--	--	--	--	--	0	4
Carex lenticularis	OBL	--	--	--	--	--	--	--	--	--	--	--	1	30
Carex nebrascensis	OBL	--	--	15	--	40	5	1	65	50	65	--	20	24
Carex simulata	OBL	--	--	--	--	--	--	--	--	--	--	--	2	35
Carex utriculata	OBL	--	50	--	50	30	--	--	--	15	5	--	5	22
Collinsia parviflora	UPL	--	--	--	--	--	--	--	--	--	--	--	0	15
Deschampsia cespitosa	FACW	--	--	--	--	--	--	45	30	15	--	--	9	24
Drosera rotundifolia	OBL	--	--	--	--	--	--	--	--	--	--	--	0	2
Eleocharis macrostachya	OBL	--	--	--	--	--	--	--	--	--	--	--	2	17
Eleocharis quinqueflora	OBL	--	--	10	--	--	--	--	--	--	--	--	3	16
Equisetum arvense	FAC	--	--	--	--	--	--	--	--	--	--	--	3	18
Erythranthe guttata	OBL	--	--	10	--	--	--	--	--	--	--	--	1	9
Erythranthe primuloides	OBL	--	--	10	--	--	--	--	--	--	15	--	1	9
Gayophytum diffusum ssp. parviflorum	UPL	20	--	--	--	--	--	--	--	--	--	10	1	15
Gentiana newberryi	FACW	--	--	--	--	--	--	--	--	--	--	--	0	4
Hastingsia alba	OBL	--	--	--	--	--	--	--	--	--	--	--	1	20
Hypericum anagalloides	OBL	--	--	--	--	--	--	--	--	--	--	--	0	5
Hypericum scouleri	FACW	--	--	--	--	--	--	--	--	--	--	--	0	1
Juncus ensifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	0	5
Juncus mexicanus	FACW	--	50	20	50	30	--	45	5	20	10	--	17	21
Juncus nevadensis	FACW	--	--	--	--	--	20	--	--	--	--	--	3	17
Kyhosia bolanderi	UPL	--	--	--	--	--	--	--	--	--	--	--	0	5
Lewisia nevadensis	UPL	--	--	--	--	--	--	--	--	--	--	--	0	5
Lilium pardalinum ssp. shastense	FACW	--	--	--	--	--	--	--	--	--	--	--	0	5
Moss	--	--	--	10	--	--	20	--	--	--	--	--	5	22
Muhlenbergia filiformis	FACW	--	--	--	--	--	--	--	--	--	--	--	0	10
Oreostemma alpigenum	FAC	--	--	--	--	--	--	--	--	--	--	--	1	15
Oxypolis occidentalis	OBL	--	--	--	--	--	20	--	--	--	--	--	6	29
Pedicularis attollens	OBL	--	--	--	--	--	--	--	--	--	--	--	0	2
Perideridia parishii ssp. latifolia	FAC	--	--	--	--	--	--	--	--	--	--	--	0	4
Pinus contorta var. murrayana	FAC	--	--	--	--	--	5	--	--	--	--	--	1	7
Plantago major	FAC	--	--	--	--	--	--	--	--	--	--	--	0	10
Platanthera dilatata var. leucostachys	FACW	--	--	5	--	--	--	--	--	--	--	--	0	4
Poa pratensis	FAC	--	--	--	--	--	--	--	--	--	--	--	1	10
Potamogeton natans	OBL	--	--	--	--	--	--	--	--	--	--	--	0	5
Primula tetrandra	FACW	--	--	--	--	--	--	--	--	--	--	--	1	7
Ranunculus alismifolius var. alismifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	2	20
Ranunculus aquatilis	OBL	--	--	--	--	--	--	--	--	--	--	--	0	10
Ranunculus orthorhynchus	FACW	--	--	--	--	--	--	--	--	--	--	--	0	1
Salix lemmonii	FACW	--	--	--	--	--	--	--	--	--	--	--	1	13
Scirpus microcarpus	OBL	--	--	20	--	--	20	--	--	--	--	--	5	15
Sisyrinchium elmeri	OBL	--	--	--	--	--	--	--	--	--	--	--	0	1

Sorbus scopulina	FACU	--	--	--	--	--	--	--	--	--	--	--	0	1
Sparganium angustifolium	OBL	--	--	--	--	--	--	--	--	--	--	--	0	9
Spiraea douglasii	FACW	--	--	--	--	--	--	--	--	--	--	--	0	1
Spiranthes romanzoffiana	FACW	--	--	--	--	--	5	--	--	--	--	--	1	4
Stellaria longipes	FACW	--	--	--	--	--	--	--	--	--	--	--	1	15
Symphyotrichum foliaceum	FACU	--	--	--	--	--	--	--	--	--	--	--	2	9
Taraxacum officinale	FACU	--	--	--	--	--	--	--	--	--	--	--	1	8
Triantha occidentalis	FACW	--	--	--	--	--	--	--	--	--	--	--	0	2
Trifolium wormskioldii	FACW	--	--	--	--	--	5	--	--	--	--	--	1	5
Vaccinium uliginosum	FACW	--	--	--	--	--	--	--	--	--	--	--	1	9
Veronica americana	OBL	--	--	--	--	--	--	--	--	--	--	--	0	5
Veratrum californicum	FAC	--	--	--	--	--	--	--	--	--	--	--	2	13

Environmental Consequences

a) ***Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service?***

Less Than Significant with Mitigation Incorporated. Meadow complex restoration efforts to be completed in connection with this Project are expected to return natural hydrologic, stream flow and ecological functions within the Childs Meadows complex both within and outside Project impact sites. Project work is expected to have a direct positive impact on listed and unlisted plant, mammal, bird, fish and amphibian species that utilize the meadow complex, stream channel and now denuded and highly eroded stream banks. The anticipated reduction in erosion and related sediment rates into Gurnsey Creek will improve water conditions for the currently listed Spring Run Chinook Salmon and other listed and unlisted anadromous species that inhabit Deer Creek below Deer Creek Falls. The Deer Creek watershed is a major component of the overall Sacramento River system and thus water quality improvements within this major tributary will be reflected in improved water quality within the river's mainstem. Given the short timeframe of Project work, any negative impacts such as noise or the minor disturbance of bank and creek bottom sediments will be short term in nature and will be reduced to a less than significant level through the implementation of the Mitigation Measures described above and shown in **Appendix A: Mitigation Monitoring and Reporting Plan** of this Initial Study/Mitigated Negative Declaration document. Potential impacts will also be reduced through the implementation of those **Best Management Practices** described in **Appendix A**. Necessary maintenance to assure continued proper functioning of Project work is described in **Appendix I Post Project Maintenance and Monitoring Plan for the Restoring the Deer Creek Headwaters at Childs Meadows Project**.

b) ***Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service?***

Less Than Significant with Mitigation Incorporated. No formally designated riparian habitats or sensitive natural communities have been established within the Project area. **Mitigation Measure #BIO 15: Protection of Riparian Vegetation** was developed and incorporated into this Project's work scope in order to directly reduce potential impacts on riparian areas and wet sites to a less than significant level. **Mitigation Measures #BIO 17 through #BIO 19** were developed in order to indirectly protect riparian and aquatic habitats thought the prevention of invasive plant infestations attributable to construction activities and equipment use. In addition, various **Best Management Practices (See Appendix B)** were established to reduce impacts related to invasive plant species.

c) Would the Project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less Than Significant with Mitigation Incorporated. Prior to Project implementation, the RCD of Tehama County will obtain a **Department of Fish and Wildlife Streamside Alteration Agreement (1600 Permit)** and **State Water Board 401 Certification and Army Core of Engineers 404 Permit**. The provisions of these permits along with the implementation of various **Mitigation Measures** and **Best Management Practices** will prevent impacts to meadow resources or reduce them to a less than significant level. Once completed, it is anticipated that Project work will improve conditions for aquatic and meadow species found within and around the Project area.

d) Would the Project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less Than Significant with Mitigation Incorporated. No negative impacts to migratory terrestrial, aquatic or avian species are anticipated in connection with implementation or completion of this Project. In addition to Project work being completed within a short time frame, the Best Management Practices along with formally established Mitigation Measures will reduce potential direct impacts to biological resources within the Project area's meadow, stream channel, riparian and upland habitats to a less than significant level. Those Mitigation Measures related to the spread of invasive species will protect Project area resources by preventing the spread of noxious plants through the use of mechanized equipment or materials obtained outside the Project area through the implementation of **Mitigation Measures #BIO 17 through #BIO 19**. In addition, **Mitigation Measure # BIO12: Protection of Migratory Bird Treaty Act Species** was developed specifically to address potential impacts to those species covered under the MBTA that may utilize the Childs Meadows complex during migration periods.

e) Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. Other than the requirements and standards found within conservation easement documents for the Childs Meadows area, there are no local policies, ordinances or other formalized restrictions protecting biological resources that apply to the Project area.

f) Would the Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. The only habitat or conservation plan that is applicable to the Project area relates to is a conservation easement that has been established for that portion of Childs Meadows in which Project work will be completed.

No significant adverse impacts to Biological Resources are anticipated with the implementation Mitigation Measures.

Cultural Resources

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
V. Cultural Resources. Would the Project:				
a. Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	☐	☒	☐	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☒	☐	☐
c. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Environmental and Regulatory Setting/Affected Environment

Regulatory Setting

The proposed Project requires compliance with CEQA as well as the National Historic Preservation Act (NHPA) of 1966, as amended. Both CEQA and (NHPA) mandate that government agencies take into consideration the effects of their actions on cultural resources listed on, or eligible for inclusion in, the California Register of Historical Resources (CRHR) (defined as historical resources at 14 CCR § 15064.5[a]) and the National Register of Historic Places (NRHP) (defined as historic properties at 36 CFR § 800.16[l]). A cultural resource is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. While the NRHP and CRHR significance criteria are similar, the former is given precedence in this analysis because cultural resources eligible for the NRHP are also eligible for inclusion in the CRHR, but the reverse is not necessarily true (PRC 5024.1[c]). Therefore, employing the federal standards will be applicable in both federal and state regulatory contexts.

The NRHP criteria for evaluation, which is outlined at 36 CFR Part 60.4, states the following:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in a districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feelings, and association and that:

- are associated with events that have made a significant contribution to the broad patterns of our history; or
- are associated with the lives of persons significant in our past; or
- embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or

- have yielded, or may be likely to yield, information important in prehistory or history.

For a resource to be considered eligible for listing on the NRHP, it must not only be shown to have significance under one or more of these four criteria but must also retain sufficient integrity to convey that significance.

Introduction

A cultural/historical resource investigation of the proposed 404-acre **Restoring the Deer Creek Headwaters at Childs Meadows Project** impact site and immediately adjacent lands (totaling 707 acres) was completed during 2020 and 2021. Information, data and analysis developed during these efforts and incorporated into the Cultural Resources section of this Initial Study/Mitigated Negative Declaration is contained in the cultural resources report **(Heritage Resource Investigation of the 707-Acre Childs Meadows Restoration Plan, Northeast Tehama County, California dated April 2021** and its **Attachment A: DPR 523 Site Records** document. **Due to the sensitive nature of some information contained in these documents, both were excluded from the Appendices to this IS/MND**. The goal of this effort was to complete a thorough archeological/cultural resource inventory of the Project area and surrounding lands. Specific tasks included the following that were completed in a manner that adhere to both federal and State environmental analysis requirements. (1) an archival document review of records housed at the Northeast Information Center of the California Historical Resources Information System, California State University, Chico (NEIC); (2) coordination with the California Native American Heritage Commission (NAHC) and tribes with potential heritage interests in the Project area; (3) an historical records investigation of the Project area; (4) identification, definition, and intensive archaeological inventory of the proposed Project's Area of Potential Effects (APE) described below, (5) documentation of potentially affected cultural resources greater than 50 years old; (6) evaluation of the integrity and National Register eligibility evaluation and determination of Findings of Effects for all potentially affected heritage resources, and; (7) heritage resource management recommendations.

Area of Potential Effects

Pursuant to 36 CFR § 800.16(d), under Section 106 the proposed Area of Potential Effects (APE) constitutes "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties if any such properties exist." Based on the planning team's goal of a broad assessment, the APE surveyed for cultural, historic and tribal resources included the entire 707-acre planning area which includes the 404-acre Project area shown in **Figure 1 and Figure 2** along with **Figure CUL 1: Childs Meadows Restoration Plan Area of Potential Effects,** which for the purpose of inventory was segregated into two zones Meadow and Meadow Margins and Forested Slopes.

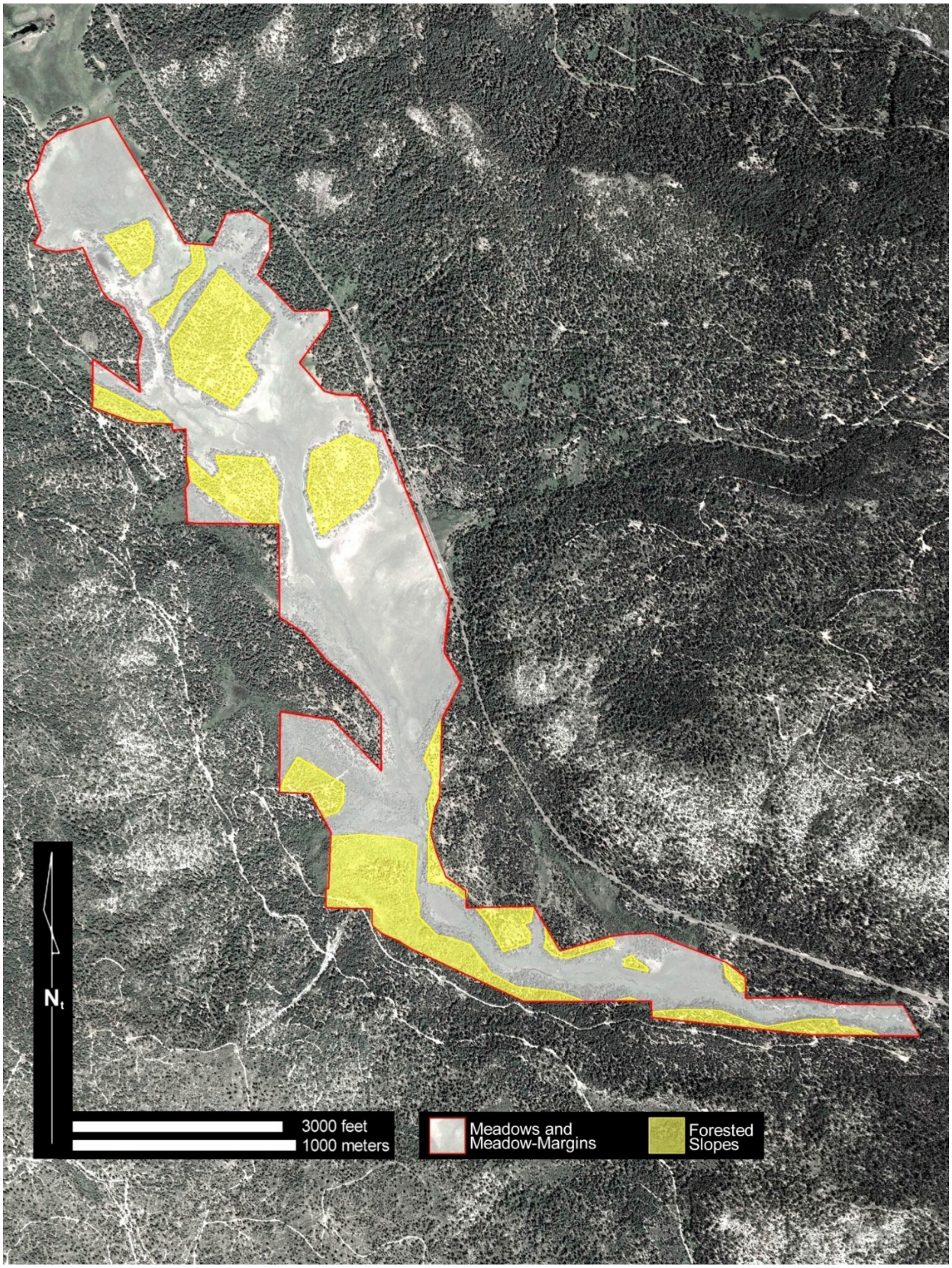


Figure CUL 1: Childs Meadows Restoration Plan Area of Potential Effects

Meadows and Meadow-Margins

A total of 404 acres of meadow and meadow-margins constitutes the area most likely to be affected by Project related restoration activities including five current shovel-ready floodplain restoration projects focusing on streamside and wetland areas as well as all potential meadow floodplain connectivity restoration zones and actively planned conifer encroachment curtailment projects, the latter focused on meadow-margins.

Forested Slopes

A total of 185.4 acres of forested slopes at a distance greater than 15.24 meters from meadow margins and occupied by mature conifer stands constitute the areas most likely to be affected by Project related conifer encroachment suppression activities, vehicle and construction equipment access, native materials (woody vegetation) acquisition as well as materials staging on existing, unimproved dirt access roads.

Cultural Survey Efforts Within the Childs Meadows Project Area

Methods/Processes

In-House Document Review

On November 13, 2020, an in-house document review (NEIC File #D20-224) covering records of previous investigations and previously recorded sites on-file within a 1.5-mile (2.4 kilometer) radius of the Project area was completed. Fifteen previous cultural resource investigations and 30 archaeological sites were on-file.

Previous Investigations and Excavations in the Vicinity of the Restoring the Deer Creek Headwaters at Childs Meadows Project

Previous pedestrian archaeological surveys have occurred within the Project area **(See Table CUL-1 and Figure CUL 2: Previous Archaeological Surveys Within a 1.5-mile Radius of the Project Area)** below. In 2,000, a Confidential Archaeological Addendum was completed for the proposed 687-acre CAF's Doe Mountain Timber Harvest Plan (THP), which covered most of the timbered tracts contained in the current Project Area. Five sites previously recorded by Lassen National Forest archaeologists resided on federal lands immediately adjoining Collins Almanor Forest property. None of the five extended into CAF lands (Ca-Teh-819/H, -830, -978, -1493, and -1600) and thus will not be affected by the Doe Mountain THP. Two new sites were recorded on CAF lands, one contained in the current

Table CUL-1: Previous Archaeological Investigations Within A 1.5-Mile Radius of the Project Area

Previous Investigations Partially Contained Within the Project APE

Report	Year	Author(s)	Title	Prepared for	Sites Recorded
NEIC-3628	2000A	Ford, B. K.	Confidential Archaeological Addendum for the Doe Mountain Timber Harvest Plan, Tehama County, California.	Collins Pine Company	52-000819, 52-000830, 52-000978, 52-001493, 52-001600, 52-001954, 52-001955
NEIC- 014432	2014	Peak, M.	Cultural Resources Assessment of the Childs Meadow Head Cut Stabilization and Repair Project Area, Tehama County, California.	Tehama County Resource Conservation District	52-001954

Previous Investigations Within a 1.5-mile Radius of the Project APE

Report	Year	Author(s)	Title	Prepared for	Sites Recorded
NEIC-0331	1976	Cook, R. A.	Archaeological Survey Report for the Proposed Improvement of 02-Teh-36 P.M.91.4/92.2	California Department of Transportation	52-000819, 52-000820, 52-000821
NEIC-2089	1992	Ford, B. K.	Archaeological and Historical Resources Survey and Impact Assessment for the Elam Creek Timber Harvest Plan.	Collins Pine Company	52-000213, 52-001586
NEIC-2749	1999	Possehn, D.	Confidential Archaeological Addendum for the Lee Ranch Non-Industrial Timber Management Plan, Plumas County, California.	Possehn Consulting	32-000619, 32-001009, 32-001010, 32-001098, 32-001285, 32-001415, 32-001482, 52-001433
NEIC-4756	2001	Oilar, S.	Archaeological Reconnaissance Report for the Gurnsey Creek Proposed Restoration Project.	Lassen National Forest	-
NEIC-4923	2002A	Kent, K.	Archaeological Reconnaissance Report: Plantation TSI.	Lassen National Forest	04-001211, 32-000254, 32-003484
NEIC-4930	2002	McLaughlin, R.	Archaeological Reconnaissance Report for the Roads Maintenance Projects, Tehama County, California.	Lassen National Forest	52-002046
NEIC-5299	2002	Juska, A.	Confidential Archaeological Addendum for the Cold Creek Timber Harvest Plan, Tehama County, California.	Collins Pine Company	52-002040
NEIC-5339	1999	Ford, B. K.	Confidential Archaeological Addendum for the Lost Timber Harvest Plan, Tehama County, California.	Collins Pine Company	32-000619, 32-001211, 52-000824, 52-000831, 52-001360, 52-001433
NEIC-5340	2002	Tappero, J. J.	Confidential Archaeological Addendum for the Hole In The Ground Timber Harvest Plan, Tehama County, California.	Collins Pine Company	-
NEIC-5991	2002B	Kent, C. L.	Archaeological Reconnaissance Report: Treatment Unit 11, Lassen National Forest, California.	Lassen National Forest	32-000258, 32-000259, 32-000285, 32-000287, 32-000288, 32-000290, 32-001762, 32-001937, 32-001939, 32-002275, 32-002276, 32-002277, 32-002278, 32-002481
NEIC-9013	2004	Kent, C. L.	Archaeological Reconnaissance Report: Battle Creek DFPZ, Almanor Ranger District, Lassen National Forest, Tehama County, California.	Lassen National Forest	52-000551, 52-000554, 52-000613, 52-000825, 52-000966, 52-000999, 52-001578, 52-001594, 52-001765, 52-001815, 52-001976, 52-002003, 52-002321, 52-002420
NEIC-10101	1985	Greenway, G., E. Nilsson, and M. Dugas	Evaluation of Archaeological Sites CA-TEH-966 and CA-TEH-1434, Wild Timber Sale.	Lassen National Forest	52-000966, 52-001434
NEIC-11574	2009	Oilar, S.	Archaeological Survey Report for the proposed Mill Creek Bridge Rehabilitation, Tehama County, California.	California Department of Transportation	-

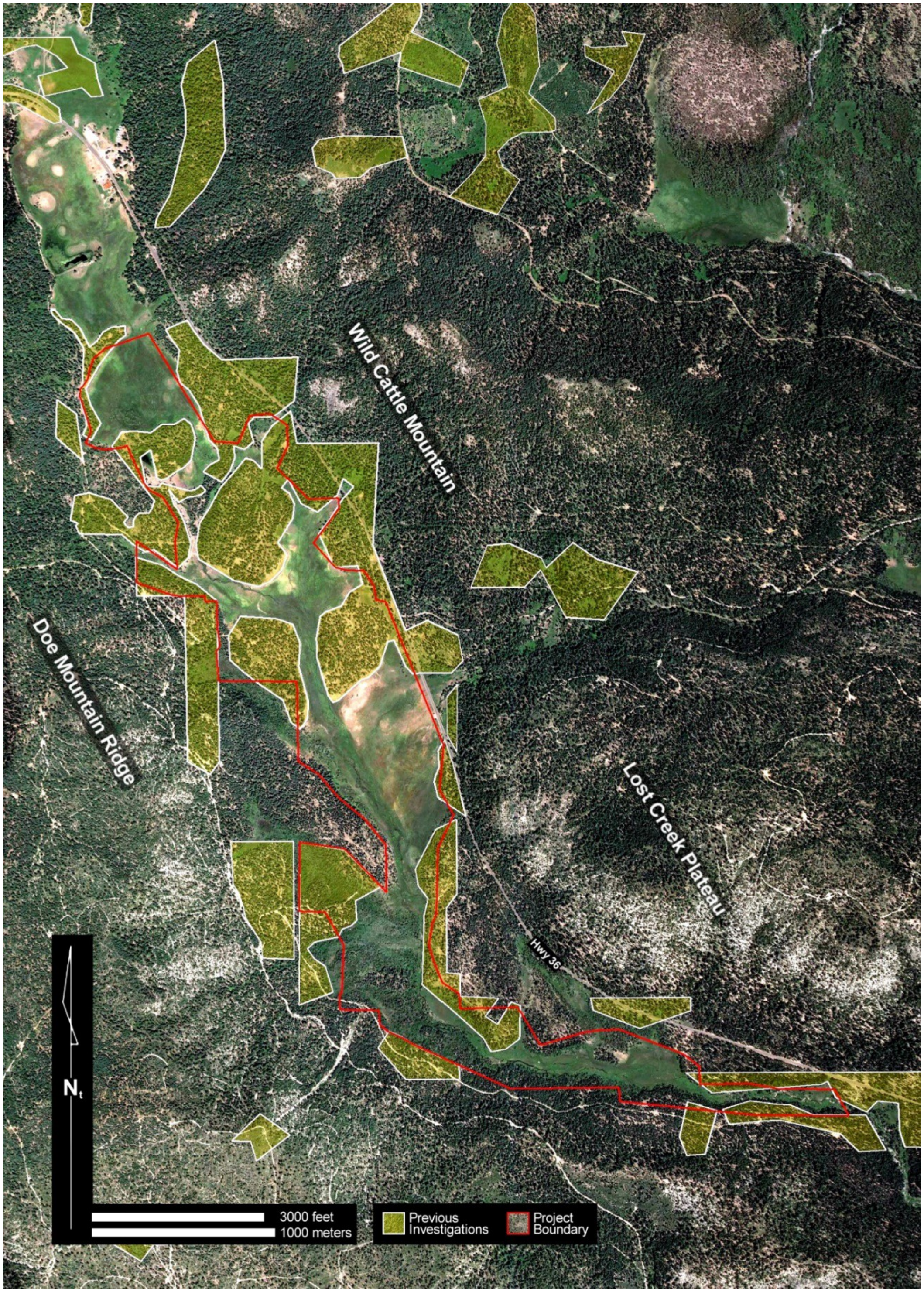


Figure CUL 2: Previous Archaeological Surveys Within a 1.5-Mile Radius of the Project Area

A 2014 survey and assessment of cultural/archeological resources was conducted in connection with the Resource Conservation District of Tehama County's **Childs Meadows Head Cut Stabilization and Repair Project** that was not implemented. This survey effort encountered no cultural resources within that effort's proposed treatment site which is located within the boundaries of the **Restoring the Deer Creek Headwaters at Childs Meadows Project** area. Surveys completed in connection with that proposed project confirmed the location and content of Ca-Teh-1954, a prehistoric lithic scatter site located at the junction of CAF roads 1500 and 1572 west of the current Project Area.

In 1962, the National Park Service produced an initial assessment of Lassen Volcanic National Park archaeological resources. This survey focused on habitable streamside, lake shore, and meadow margin landforms where large, central occupation sites likely to produce stratigraphy and artifacts useful for building local chronology were anticipated. 11 small sites were identified within the survey area, all lacking the characteristics sought. Lands outside Park boundaries were also surveyed, recording 21 sites in meadows to the west and south. Three sites in the Childs Meadows area were selected for test excavations, Ca-Teh-597 and 598 located on the north end of Childs Meadows 0.6-miles north of the Project Area, and Ca-Teh-607 located in the Wilson Lake pass 0.6 miles east of the Project Area. Test excavations found that all three sites were marked by shallow midden soils with poor preservation of organic remains. Features indicative of vegetal food processing were observed, including handstones, millingstones, bedrock mortars, and dense accumulations of fire-affected rock. With respect to local chronology, the sites were not stratified as assemblages were difficult to read. Dart-sized notched points indicated some Archaic use, however small, late prehistoric notched and barbed points dominated, indicating the most intensive use of the region came in the recent prehistoric past.

Ca-Teh-966 is located on Lassen National Forest lands, within a spring-fed drainage 0.5-miles east of the 1962 excavated sites Ca-Teh-597 and -598. All three are part of a closely spaced cluster of prehistoric residential sites located in well-watered meadow complex at the point where Mill Creek Meadows and Childs Meadows merge 1.0-miles north of the north end of the Project Area. Ca-Teh-966 was originally identified and recorded in 1979 and revisited in 1984 by LNF personnel. A report prepared in connection with 1985 survey efforts detailed the results of a test excavation of Ca-Teh-966, completed in advance of a proposed road rehabilitation project related to a new timber sale. Eight excavation units including four 1-x-2 meter and four 1-x-1 meter control units totaling 3.9 cubic meters (c.m.) were identified. Seven of the units were situated in or adjacent to the subject road and produced mixed and compacted roadbed material. One unit located in an undisturbed area produced evidence of stratigraphic integrity related to an extensive artifact inventory including obsidian, basalt, and chert flakes, arrow points, dart points, and flake tools. The site also produced ground stone tools including hopper mortars, handstones, and millingstones. These efforts concluded that undisturbed portions of the site qualified for the National Register and recommended project avoidance.

Previous Pedestrian Survey in the Vicinity of the Project Area

Fourteen previous investigations are on-file for lands within a 1.5-mile (2.4 kilometer) radius around the Project area. All 14 of the investigations featured pedestrian archaeological surveys. Two of these located at the northern end of the Childs Meadows complex led to test excavations. California Department of Transportation (Caltrans) Investigations. Caltrans sponsored two surveys confined to the State Route 36E right-of-way along the immediately east border of the Project Area. In 1976 a 0.8-mile segment of right-of-way crossing from Mill Creek Meadows to Childs Meadows 0.9 miles north of the north end of the Project Area was surveyed. Three prehistoric lithic scatter sites, one of which had a historic-era corral

(Ca-Teh-819/H, -820, and -821). In 2009 cultural resource surveys were conducted in connection with a proposed rehabilitation project at the Mill Creek bridge which partially overlapped the 1976 study area. No historical resources were identified.

Lassen National Forest Investigations

The Lassen National Forest sponsored five investigations covering 4,009 acres which at least in part extended into the 1.5-mile radius. The survey efforts most pertinent to the Project area included the proposed 47-acre Gurnsey Creek Restoration Project located on the Gurnsey Creek floodplain 0.6-miles southeast of the south end of the Project area. The restoration project, located adjacent to the LNF's Gurnsey Creek Campground, resulted in the installation of wood and hardscaping along a portion of Gurnsey Creek to stabilize bank erosion and restore floodplain connectivity. Other reported Lassen National Forest projects located near the **Restoring the Deer Creek Headwaters at Childs Meadows Project** area include a survey of the 1,288- acre Plantation Timber Sale consisting of 63 dispersed parcels one of which was located 0.9 miles northeast of the Project Area on the slopes of Wild Cattle Mountain. In addition, 12 road rehabilitation projects comprising 235 acres in the Deer and Mill Creek watersheds including one project 0.9 miles south of the Project area in Gurnsey Creek basin; survey of 2,079 acres consisting of dispersed parcels in the Wilson Lake basin and on the slopes of Wild Cattle Mountain east of the Project area. 360 acres of hazardous fuel treatment sites were surveyed including parcels in the northern Gurnsey Creek watershed 1.4-miles north of the Project area. The Lassen National Forest investigations resulted in the documentation of five sites within the 1.5- mile radius including two prehistoric lithic scatters with bedrock mortar outcrops (Ca-Teh-966 and - 1815), two prehistoric lithic scatters with historic trash (Ca-Teh-825/H and -2003/H), and a segment of the historic Red Bluff-Susanville Road (Ca-Teh-176H). **Table Cul 2: Previously Recorded Archaeological Sites Within a 1.5-Mile Radius of the Childs Meadow Project Area** provides a list of previously recorded cultural sites.

Table CUL-2: Previously Recorded Archaeological Sites Within a 1.5-Mile Radius of the Childs Meadows Project Area

P# 52-	Trinomial	Other Name	**Prehistoric**	Lithic Scatter	Midden/Habitation Debris	Points	Bifaces	Milling Equipment	Bedrock Milling Feature	**Historic**	Dump/Trash	Stacked Fieldstone	Poleline (Telegraph/Powere)	Road/Trail	Corral/Fence	NEIC Report(s)
597	Ca-Teh-597	SFSC-Teh-3	X	X	X	-	-	-	-	-	-	-	-	-	-	#1318
598	Ca-Teh-598	SFSC-TEH-4	X	X	X	X	-	-	-	-	-	-	-	-	-	#1318
607	Ca-Teh-607	SFSC-Teh-12	X	X	X	-	-	-	-	-	-	-	-	-	-	#1318
819	Ca-Teh-819/H	USFS 05-06-51-166; DOT-02-15 / TEH-804	X	X	X	-	X	-	-	X	-	-	-	-	X	#0331, #3628
820	Ca-Teh-820	DOT-2-16	X	X	-	-	-	-	-	-	-	-	-	-	-	#0331

821	Ca-Teh-821	DOT-2-17	X	X	-	X	-	-	-	-	-	-	-	-	-	#0331
824	Ca-Teh-824	USFS 05-06-51-345	X	X	-	-	-	-	-	-	-	-	-	-	-	#5339
825	Ca-Teh-825/H	USFS 05-06-51-346	X	X	-	X	-	-	-	X	X	-	-	-	-	#9013
826	Ca-Teh-826	USFS 05-06-51-347	X	X	-	-	-	-	X	-	-	-	-	-	-	-
830	Ca-Teh-830	USFS 05-06-51-352	X	X	X	X	-	X	-	-	-	-	-	-	-	#3628
966	Ca-Teh-966	USFS 05-06-51-443	X	X	X	X	X	X	-	-	-	-	-	-	-	#9013, #10101
968	Ca-Teh-968	USFS 05-06-51-442, -987, and -581	X	X	-	X	-	-	X	-	-	-	-	-	-	-
978	Ca-Teh-978	USFS 05-06-51-448	X	X	-	X	-	X	-	-	-	-	-	-	-	#3628
1493	Ca-Teh-1493	Childs Sawmill BRM	X	-	-	-	-	-	X	-	-	-	-	-	-	#3628
1598	Ca-Teh-1598	USFS 05-06-51-162	X	X	-	X	X	-	-	-	-	-	-	-	-	-
1599	Ca-Teh-1599	USFS 05-06-51-157	X	X	-	X	X	-	-	-	-	-	-	-	-	-
1600	Ca-Teh-1600	USFS 05-06-51-160	X	X	-	X	X	-	-	-	-	-	-	-	-	#3628
1765	Ca-Teh-1765H	USFS 05-06-51-553; Red Bluff-Susanville Road	-	-	-	-	-	-	-	X	-	-	X	X	-	#2298, #9013
1815	Ca-Teh-1815	USFS 05-06-51-899	X	X	-	X	X	X	-	-	-	-	-	-	-	#9013
1954	Ca-Teh-1954	1572 Road Site; THP #2-00-181-TEH(5)	X	X	-	X	X	X	-	-	-	-	-	-	-	#3628, #14432
1955	Ca-Teh-1955	USFS 05-06-51-1142; 1566 Road Site	X	X	-	X	X	X	-	-	-	-	-	-	-	#3628
2003	Ca-Teh-2003/H	USFS 05-06-51-573	X	X	-	-	-	-	-	X	X	-	-	-	-	#9013
2050	Ca-Teh-2050	USFS 05-06-51-166	X	X	-	-	X	-	-	-	-	-	-	-	-	-
2100	Ca-Teh-2100	USFS 05-06-51-576	X	X	-	-	X	-	-	-	-	-	-	-	-	-
2101	Ca-Teh-2101	USFS 05-06-51-575	X	X	-	X	X	X	-	-	-	-	-	-	-	-
2310	Ca-Teh-2310H	USFS 05-06-51-29; Doe Mountain	-	-	-	-	-	-	-	X	-	X	-	-	-	-
2414	Ca-Teh-2414H	USFS 05-06-51-164	-	-	-	-	-	-	-	X	-	-	X	-	-	-
2429	Ca-Teh-2429	PL-36-068	X	-	-	-	-	-	X	-	-	-	-	-	-	-
2554	Ca-Teh-2554	USFS 05-06-51-1144	X	X	-	X	X	X	X	-	-	-	-	-	-	-
2589	Ca-Teh-2589H	USFS 05-06-51-1057	-	-	-	-	-	-	-	X	-	-	X	-	-	-

26 24 6 15 12 8 5 7 2 1 3 1 1

Collins Almanor Forest THP Investigations

Cultural/archeological resource analysis has been completed within 17,099 acres of CAF timberlands in connection with five additional THPs. Included was a survey of the 4,540-acre Elam Creek THP located in the lower Gurnsey Creek and Deer Creek headwaters 1.0-mile south of the south boundary of the **Restoring the Deer Creek Headwaters at Childs Meadows Project** area. Additional nearby CAF projects include the 1,118-acre Lee Ranch THP located in the Feather River Meadows area 1.3-miles northeast of the Project area; the 2,240-acre Cold Creek THP including parcels located just 0.4-miles west of the southwest boundary of the Project area; the 7,065-acre Lost THP, located on the slopes of Wild Cattle Mountain in the Wilson Lake pass, 0.5-miles east of the Project area's east boundary and the 2,136-acre Hole-In-The-Ground THP, including large parcels on Doe Mountain Ridge immediately adjoining the west edge of the Project area. The combined THP investigations resulted in the identification and documentation of one site within the 1.5-mile radius, a small prehistoric lithic scatter (Ca-Teh-824).

Previously Recorded Sites

Previous investigations within a 1.5-mile (2.4-kilometer radius) of the **Restoring the Deer Creek Headwaters at Childs Meadows Project** area resulted in the documentation of 30 archaeological sites including 23 prehistoric Native American sites, four historic-era sites, and three with both prehistoric and historic-era components:

Historic-Era Components

Four recorded sites are individually-recorded segments and features associated with one historic transportation route, the late 19th–early 20th century Red Bluff-Susanville toll road. Site Ca-Teh-1765H is the roadbed, sites Ca-Teh-2414H and -2589H track and associated telegraph line; sites Ca- Teh-825/H and -2003/H are early-19th to mid-20th century sheet refuse scatters with glass, ceramics, food cans, and milled lumber, probably representing the remains of a demolished roadside commercial buildings. The road and related features lie immediately east of the Project area:

- 1 Stacked Rock Feature. Ca-Teh-2310H is a stacked fieldstone feature located at the crest of Doe Mountain, probably a tent platform associated with an early-20th century fire lookout. The feature is located west of the Project area;

- 1 Corral. Ca-Teh-819/H contained the remains of a late-19th or early-20th century post-and-plank corral with machine-cut nail fasteners. The feature is located north of the Project area.

Prehistoric Native American Components

- Prehistoric Residential Sites. Sites Ca-Teh-597, -598, -607, -819/H, -830, and -966 are prehistoric settlements marked by high-density, dark anthrosol midden deposits containing flaked stone projectile points, bifaces, flakes, and flake tools, groundstone including hopper mortars, handstones, and millingstones. Five of the six midden sites are located in the well-watered meadow complex at the point where Mill Creek Meadows and Childs Meadows merge 1.0-miles north of the north end of the Project area. One of the midden sites is located in the Wilson Lake pass area immediately east of the Project area.

- 18 Prehistoric Lithic Scatter Sites. Sites Ca-Teh-820, -821, -824, -825/H, -826, -968, - 978, -1598, -1599, -1600, -1815, -1954, -1955, -2003/H, -2050, -2100, -2101, and -2554 are prehistoric camps marked by low- to moderate-density non-midden deposits projectile points, bifaces, flakes, and handstones and millingstones. Three of the lithic scatter sites also had associated bedrock mortar outcrops.

- 2 Prehistoric Bedrock Mortar Sites. Sites Ca-Teh-1493 and -2429 are isolated prehistoric bedrock mortar outcrops consisting of single mortar holes absent any other trace evidence.

Archeological Research/ Historical Research Methods

Field Methods Related to Archeological and Cultural Resources

Field surveys took place on 14 separate field days between October 30 and December 20, 2020, with field work scheduled in response to early snow and to information developed from ongoing document review and historic records research. The Project area was divided into two zones as shown in **Figure CUL-2**. Meadows and margins were covered following a high-intensity survey strategy consisting of pedestrian transects spaced between 3 and 6 meters apart. Forested slopes were covered using a moderate- intensity strategy consisting of transects spaced between 12 and 20 meters. Because the survey took place in the winter season after a season of cattle grazing, the meadows and margins were generally open resulting in high surface visibility. The forested slopes were characterized by dense needle/leaf debris and deadfall, and where overburden prevented ready visibility survey was augmented with surface scrapes using a trowel and hoe. Ongoing research findings indicated the likely occurrence of historic-era road and trail features, and in response a Garrett Ace 250 © metal detector was used to complete targeted sweeps of likely road routes. GPS data-logging was accomplished using a high- resolution SX Blue II GNSS© series GPS receiver linked via Bluetooth© to a Samsung S3 Tablet© running the Mapit© app for Android©. Photo-documentation was accomplished using the S3 digital camera, and georeferenced using the Mapit© app. Resources were recorded using California Department of Parks and Recreation site record forms (Cal DPR-523a-l) according to standards described in *Instructions for Recording Historical Resources* (California Office of Historic Preservation 1993).

Supplementary Field Investigations

In order to establish an interpretive context for Project area resources, conventional survey methods were augmented as follows:

- Coverage was expanded where necessary to define resource boundaries extending outside the APE onto adjoining CAF and Lassen National Forest lands;
- Coverage was expanded outside the APE to confirm the presence and boundaries of previously recorded sites nearby;
- Coverage was expanded outside the APE in order to search for connecting traces of historic-era roads and trails.

Site Descriptions

Field investigations resulted in the identification of eleven archaeological sites including two historic-era sites and nine prehistoric Native American sites. The survey also documented 16 isolated finds. All 11 of the sites and all 16 isolated finds are contained in or located on the immediately border of the Project APE. The following provides summary descriptions of the seven archaeological sites contained in the Project area; Attachment A: DPR 523 Site Records contains detailed site records which may be consulted for additional site, feature, and artifact data, photo-documentation, and high- resolution UTM and Latitude/Longitude coordinates. **(Due to the confidential nature of some information contained within that document, it was not included as an attachment to the Initial Study/Mitigated Negative Declaration document.)**

CM-20-01–Historic Belle Mill Sheep Trail

Site CMR-20-01 is composed of five discontinuous traces of an historic-era trail, probably the Belle Mill Sheep Trail which passed through the Childs Meadows area and led to other montane meadows farther south and east including Lower Deer Creek Meadows, Tule (Wilson) Lake Meadows, Stump Ranch

Meadows, Big Meadows, Rock Creek Meadows, and Lassen County. The Bell Mill Trail was developed in the mid-1860s and maintained through the early 1900s as a trail distinct from the nearby Red Bluff-Susanville Road built in 1863 as sheep and cattle interests first sought to avoid toll charges and later sought to minimize wagon and vehicle traffic conflicts on the road. The traces recorded here span a total of 1682 meters north-south and are marked by depressions measuring 3.6 and 4.5 meters wide from berm crown-to-berm crown. The traces are 'U'-shaped in cross-section, and the depressions vary in depth between 0.06 to 0.60 meter berm crown-to-bottom. The five segments (north to south) measure 57, 148, 66.44, 39, and 204 meters in length with significant gaps between produced by cattle trampling, creek meander, meadow peat-swell and fen-mound formation, and logging impacts. One period artifact, an aqua glass square bottle base fragment was found near Segment 5. One feature was identified, a rock alignment and berm possibly representing a short road cut or tent platform retaining wall located alongside Segment 5. The feature has two elements: (a) a short, linear field stone rock alignment consisting of sub-rounded basalt cobbles aligned end-to-end to form a possible road cut or tent platform retaining wall. The exposed rock alignment is approximately 1.524 meters long and is aligned with (b) a low berm totaling 27 meters long and 3.04 meters wide. The low berm contains additional rock and possible rock stacks.

CM-20-01–Prehistoric Lithic Scatter Site

Site CMR-20-02 is a low-density, low-diversity prehistoric Native American lithic scatter deposit located on a fan slope adjacent to a perennial spring mound on the east margin of Childs Meadows. The site occupies an oval-shaped area measuring 58 meters N-S by 26 meters E-W (1,162 square meters/1,390 square yards). Five chipped stone artifacts were identified including two Tuscan obsidian split nodule flakes, two basalt flakes, and one basalt dart-sized corner-notched point. No surface features were observed. The artifact inventory indicates that the site served as an episodic camp where chipped stone tools were made and repaired for use in local hunting and collecting activities.

CM-20-03–Prehistoric Lithic Scatter Site

Site CMR-20-03 is a low-density, low-diversity prehistoric Native American lithic scatter deposit located on a fan slope adjacent to a perennial spring mound on the east margin of Childs Meadows. The site occupies an oval-shaped area measuring 83 meters N-S by 40 meters E-W (2,453 square meters/2,934 square yards). Six chipped stone artifacts were identified including four Kelly Mountain obsidian flakes and four basalt flakes. No surface features were observed. The artifact inventory indicates that the site served as an episodic camp where chipped stone tools were made and repaired for use in local hunting and collecting activities.

CM-20-04–Prehistoric Lithic Scatter, Bedrock Mortar, and Rock Art Site

Site CMR-20-04 is a moderate density, moderate-diversity prehistoric Native American lithic scatter deposit located on a fan slope adjacent to upper Gurney Creek on the east margin of Childs Meadows. The site occupies an oval-shaped area measuring 282 meters SW-NE by 67 meters SE-NW (12,063 square meters/14,274 square yards). Twenty-six chipped stone artifacts were identified including: 10 basalt flakes; 9 Kelly Mountain obsidian flakes, one with red mottles; 1 red-black-clear mottled obsidian flake, probably Davis Creek; 1 ignimbrite flake; 1 Tuscan obsidian flake; one water- worn chert cobble spall; and three formed tools including 1 basalt flake tool; and 2 reworked Tuscan obsidian dart-sized corner-notched points. One feature was observed, a bedrock mortar and cupule boulder. The boulder is composed of grey, grainy, phaneritic dacite. It is subangular and roughly oval in plan view with the portion visible at the surface measuring 2.2 meters N-S by 1.5 meters E-W. The top of the boulder is flush to grade and just 5−12 centimeters above the surrounding ground surface. There are five elements including three mortar cups and two possible cupules or nut anvil pits. All five elements have clear characteristics of human agency with smooth, ground inner surfaces but they are also heavily weathered, modified by lamellar exfoliation caused by freeze-thaw of moisture caught on the boulder surface and in the mortar cups. The pounded and compressed cup walls appear to have resisted exfoliation so that the cup rims are now lipped. There is no evident difference in the degree of wear or weathering of the cupules versus the mortars, that is, no evidence that one set may be older than the other. All five elements are weathered to the same degree and appear to be the same age. The preponderance of oval mortar forms suggests a rocking or "lever" motion was used during pounding and grinding. The site location, morphology, and assemblage indicate that it was a seasonal camp used as a stage for local animal and plant harvest. The large-thick corner-notched points are typical of local Middle Archaic assemblages dating approximately 3500−7500 calBP.

CM-20-05–Prehistoric Lithic Scatter
Site CMR-20-05 is a low-density, low-diversity prehistoric Native American lithic scatter deposit located on a low-lying, natural mound landform on the west margin of Childs Meadows. The site occupies an oval-shaped area measuring 85 meters SE-NW by 35 meters SW-NE (2,135 square meters/2,553 square yards). Seven artifacts were identified including three Kelly Mountain obsidian flakes, two basalt flakes, one basalt dart-sized corner-notched point, and one basalt cobble unifacial handstone. No surface features were observed. The artifact inventory indicates that the site served as an episodic camp where chipped stone tools were made and repaired for use in local hunting and collecting activities.

CM-20-06–Prehistoric Lithic Scatter
Site CMR-20-06 is a low-density, low-diversity prehistoric Native American lithic scatter deposit located on a fan slope landform on the west margin of Childs Meadows. The site occupies an oval-shaped area measuring 85 meters SE-NW by 35 meters SW-NE (1,576 square meters/1,885 square yards). Four chipped stone artifacts were identified including two Tuscan obsidian split nodule flakes, two basalt flakes, and one basalt dart-sized corner-notched point. No surface features were observed. The artifact inventory indicates that the site served as an episodic camp where chipped stone tools were made and repaired for use in local hunting and collecting activities.

CM-20-07–Prehistoric Lithic Scatter
Site CMR-20-07 is a low-density, low-diversity prehistoric Native American lithic scatter deposit located on a fan slope landform on the west margin of Childs Meadows. The site occupies an oval-shaped area measuring 38 meters SE-NW by 27 meters SW-NE (694 square meters/830 square yards). Three chipped stone artifacts were identified including two Kelly Mountain obsidian flakes and one Tuscan obsidian flake. No surface features were observed. The artifact inventory indicates that the site served as an episodic camp where chipped stone tools were made and repaired for use in local hunting and collecting activities.

CM-20-08 (Ca-Teh-1955/2554)–Prehistoric Lithic Scatter and Bedrock Milling Station Site
Site CMR-20-08 is a moderate density, moderate-diversity prehistoric Native American lithic scatter located on a fan toe adjacent to the confluence of upper Gurney Creek and an unnamed perennial spring feeder on the west margin of Childs Meadows. The site occupies an irregular-shaped area measuring 378 meters N-S by 158 meters E-W (32,936 square meters/39,931 square yards). Three previous investigations were confined to adjoining Lassen National Forest lands resulted in the documentation of sites Ca-Teh-1955 and Ca-Teh-2554. The investigation documented here involved: (1) a status check on Lassen National Forest lands which confirmed the location and content of Ca-Teh-1955 and -2554 and identified an artifact scatter connecting both previously recorded loci; and (2) a focused inventory on CAF lands which encountered a more extensive scatter connecting all loci and extending the site east, north, and south. The three investigations combined recorded a variety of chipped stone artifacts and at least four possible handstones or fragments, enumerated in the site record. The record for locus Ca-Teh-2554 also lists two "bedrock milling stations"; however, the record provides no photo, illustration, or

specific description so composition cannot be determined. The artifact inventory indicates that the site served as a seasonal camp used as a stage for local hunting and collecting activities.

CM-20-09–Prehistoric Lithic Scatter, Bedrock Milling Slick, and Rock Art Site
CMR-20-09 is a moderate density, moderate-diversity prehistoric Native American lithic scatter deposit located on a fan toe adjacent to upper Gurney Creek on the east margin of Childs Meadows. The site occupies and irregular area measuring 198 meters N-S by 230 meters E-W (24,391 square meters/29,172 square yards). Sixty-one chipped stone artifacts were identified including: 1 basalt dart-sized corner-notched point; 1 basalt shouldered point; 1 Kelly Mountain obsidian biface roughout fragment; 1 chert core-tool; 1 basalt core-tool; 34 Kelly Mountain obsidian flakes; 16 basalt flakes; 3 black dacite flakes; 2 Tuscan obsidian flakes; and 1 dark chert flake. Two features were observed: Feature 1 consists of two separate boulders in close proximity, each with one bedrock millingslick. The boulders are composed of grey, grainy, phaneritic dacite. Both boulders are flush to grade and elevated 25 centimeters above the surrounding ground surface. They are both subangular and roughly rectangular in plan view with the portion visible at the surface measuring roughly 70 centimeters N-S by 50 centimeters E-W. Feature 1A is a boulder with a single, shallow basin millingslick measuring 35 centimeters long, 25 centimeters wide, and 5 centimeters deep, placed parallel to the long axis of the boulder. Feature 1B is a boulder with a single, shallow basin millingslick measuring 32 centimeters long, 18 centimeters wide, and 3 centimeters deep, placed diagonally across the boulder surface. Both boulders exhibit some evidence of general surface pecking and grinding but these attributes are also obscured by weathering and exfoliation. Feature 2 is a rock art boulder of grey, grainy, phaneritic to porphyritic dacite. It is subangular and roughly rectangular in plan view with the portion visible above surface measuring 180 centimeters SE- NW by 150 centimeters SW-NE. The top of the boulder is flush to grade and just 15−25 centimeters above the surrounding ground surface. There are two definitive side-by-side, cupules measuring 4.5 centimeters in diameter and 1.5 centimeters deep. These have clear characteristics of human agency with smooth profiles and ground inner surfaces but they are heavily weathered. There are also four possible cupules in the same cluster, but all four are heavily impacted by lamellar exfoliation caused by freeze- thaw of moisture caught in the hollows and cups.

CM-20-10–Prehistoric Lithic Scatter
Site CMR-20-10 is a low-density, low-diversity prehistoric Native American lithic scatter deposit located on a fan slope on the east margin of Childs Meadows. The site occupies an oval-shaped area measuring 42 meters N-S by 15 meters E-W (546 square meters/653 square yards). Three chipped stone artifacts were identified including two Kelly Mountain obsidian flakes and one dacite cobble test core. No surface features were observed. The site location and artifact inventory indicate that it served as a seasonal camp used as a stage for local hunting and collecting activities.

CM-20-11–Historic-Era Trash Scatter
Site CMR-20-11 is a low-density trash scatter composed of mid-20th century food and beverage container fragments, a fuel tin fragment, and a ceramic plate fragment. The site occupies an oval-shaped area measuring 32 meters NW-SE by 22 meters SW-NE (643 square yards/537 square meters). Ten artifacts were identified three thin-walled colorless glass beverage bottle fragments, one thick-walled colorless glass beverage bottle fragment, three amber glass beverage bottle fragments, one crushed sanitary can fragment, one crushed kerosene tin fragment, and one white glazed earthenware ceramic flatware fragment, probably a plate. The site location and artifact inventory indicate that it served as a small, seasonal camp probably used as a stage for local hunting and or ranching activities. The site is a possible late-1940s/late-1950s cowboy camp.

Isolated Finds

The field investigation encountered 16 individual, isolated artifacts in the Project APE; 13 are prehistoric Native American artifacts probably discarded at various times in the prehistoric past during dispersed resource collection activities and three are historic-era items.

Historic Resource Integrity

Evaluation of Integrity
Under Section 106 of the National Historic Preservation Act, an historic resource may be determined eligible for the National Register of Historic Places if it possesses "integrity of location, design, setting, materials, workmanship, feeling, and association" (National Park Service 1995). For the two historic-era sites CM-21-01 and -11, integrity is addressed in relation to the potential of each site to provide information on location, design, setting, materials, and workmanship. For the nine prehistoric sites CM-20-02 through -10, integrity is addressed in relation to the status and preservation of the deposits.

Historic-Era Site Integrity
Historic-era trail site CMR-20-01 has a poor overall degree of integrity. The five preserved trail segments are separated by significant gaps produced by cattle trampling, logging activity, creek meander, and meadow peat-swell and fen-mound formation. Despite this, the preserved segments retain substantial integrity of location. Mid-20th century trash site CMR-20-11 has a moderate degree of integrity of location, with minor historic impacts related to grazing and nearby timber harvest activity.

Prehistoric Site Integrity
All nine prehistoric sites possess a moderate-to-high degree of integrity, with minor historic impacts related to historic-era grazing and nearby timber harvest activity. Prior impacts include sheet erosion, scuffing, and abrasion of site constituents. Generally, the sites have been spared large-scale earth-moving, with specific earth-moving impacts confined to specific locations and corridors at two sites: (1) site CMR-20-07 has been impacted by operation of the historic-era Belle Mill Stock Trail, which has resulted in the destruction of soil integrity by trampling and deflation along the south and east margins of the sites; and, (2) CM-20-08/Ca-Teh-1955/Ca-Teh-2554 has been impacted by prior timber harvest activity including tree felling and removal, log deck construction, and skid trail and haul road construction.

Despite the prior impacts, owing to the relatively large size of the sites and localized impacts, approximately 80-percent of the surface area of both sites appears consist of substantially intact archaeological deposits. The intact portions of both previously impacted sites and the remaining seven prehistoric sites exhibit moderate-to-high levels of integrity, with minor historic impacts related to historic-era grazing and nearby timber harvest activity. Prior impacts at all nine include sheet erosion, scuffing, and abrasion of site constituents.

NATIONAL REGISTER ELIGIBILITY

Evaluation of Eligibility
Under Section 106 of the National Historic Preservation Act, an historic resource may be determined eligible for the National Register of Historic Places if it possesses "the quality of significance in American history, architecture, archeology, engineering, and culture" and if it meets one or more of the following criteria:

- is associated with events that have made a significant contribution to the broad patterns of our history; or

- is associated with the lives of persons significant in our past; or
- embodies distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- has yielded, or may be likely to yield, information important in prehistory or history.

Ineligible Sites
Two sites, historic-era trail site CMR-20-01 and historic-era trash scatter site CM-20-11, are not eligible for the National Register. They are not associated with significant events or persons, do not represent the work of a master, and nor do they embody the distinctive characteristics of a type, period, or method of construction. Investigation has identified limited research potential linked to the history of local settlement and the regional rise in montane meadow stock grazing in the late 19th to early 20th century; however, this research theme is adequately addressed via documentary research coupled with direct inspection and professional documentation of artifacts and features reported here.

Potentially Eligible Sites
For purposes of Project planning, all nine prehistoric Native American sites, CM-20-02 through CM-20-10, shall be considered significant and eligible for the National Register of Historic Places under criterion (d). The factors in favor of eligibility are fivefold:

- All nine sites exhibit substantial integrity of soils indicating the likely presence of undisturbed subsurface deposits;
- All nine produced evidence of prehistoric tool and tool production indicating that the subsurface deposits can be expected to potentially contain a formal tool inventory and technological assemblage, faunal and floral remains, and domestic features such as living surfaces, hearths, and caches;
- All nine sites produced evidence of the presence of datable materials in the form of obsidian artifacts such that the sites can be considered likely to contain analytically meaningful and chronologically ranked data sets;
- Five of the nine sites produced temporally-diagnostic projectile points and other potential time-marker artifact and features types, and the artifacts indicate the sites represent a multi-millennial time span. Three of the sites (CM-20-02, -04, and -09) produced stemmed, foliate, and side-notched atlatl dart points indicative of the mid-Holocene Deadman Complex, and two of the sites produced small darts points and corner-notched arrow points indicative of the Late Holocene Dye Creek and Mill Creek Complexes. Investigation of the sites individually and as a unit could be expected to yield evidence of change through time in prehistoric economy and lifeways. These findings could be cast against models of prehistoric regional population change or the landmark study of the nearby Little Willow Lake 14,000-year pollen profile which has provided solid evidence of extensive upland Holocene climate and vegetation change;
- Two of the sites produced bedrock features including bedrock mortars, bedrock millingslicks, and bedrock cupules, the latter potentially representing rock art expressions. Closer analysis of these features and investigation of their temporal and cultural contexts could yield new information on past economic change, for example, re- examination of the evidence relating to a hypothesized Cascade montane Wyethia-based vegetal food economy, or new contributions to the growing body of regional petroglyph analysis.

Based on these dimensions of research potential, the sites shall be considered potentially eligible for the National Register of Historic Places under criterion (d) "may be likely to yield information important in prehistory or history."

RECOMMENDATIONS

Eligibility and Effects

Project partners solicited this study during formal planning efforts with the intent of developing information on the location, extent, content, integrity, and National Register eligibility of the cultural resources and to provide protection for newly delineated eligible cultural resources. These efforts were informed by an array of planning documents that were utilized in the development of this Initial Study/Mitigated Negative Declaration. Based upon the archeological/cultural resource surveys and analysis conducted in connection with this Project, no specific potential impacts to these resources were identified that were attributable to the implementation of proposed Project. In the event significant changes to the scope of work **(described in Project Description/Restoration Practices)** above are made, follow up survey efforts will be completed in order to assure that the Mitigation Measures and Best Management Practices currently developed for this Project will protect all identified and unidentified archeological, cultural and historic resources. Findings and recommendations of the archeological/cultural resource investigation are as follows:

Two historic-era sites, CM-20-01 and CM-20-11, are determined not eligible for the National Register. Therefore, these resources are not *Historic Properties* and Project related activity in the vicinity of these sites may proceed as planned.
Nine prehistoric Native American sites, CM-20-02 through CM-20-10, are determined potentially eligible for the National Register. Project related activity must be designed to avoid all potential direct and indirect effects within a buffer zone of 30 meters on all sides of the mapped boundaries. If avoidance in this buffer is maintained, the proposed Project will have "*No Historic Properties Affected*" pursuant to 36 CFR Part 800.4(d.1).

Unanticipated Resources

Based on the Project description and geomorphic setting no buried, unanticipated finds are expected to be uncovered during implementation of this Project. Consequently, no Memorandum of Agreement for unanticipated finds is recommended at this time, and no provisions for Project cultural resource monitoring are judged necessary. In keeping with 36*cfr*800.14 *Post-Review Discoveries*, if archaeological resources are discovered during Project related activities all work will cease in the vicinity of the finds and provisions shall be made for evaluation by a professional archaeologist. The archaeologist may determine the unanticipated finds merit reasonable efforts to avoid, minimize, or mitigate adverse effects and may merit resolution of adverse effects pursuant to 36*cfr*800.6. **(See Mitigation Measure #CUL 2: Protection of Newly Discovered Archeological, Prehistoric, Historic or Paleontological Resources.**

Cattle Supplement Stations

If the Project managing partners continue to issue grazing leaseholder permits, stipulations shall be put into effect regarding the placement of supplement stations. Salt blocks and feed or supplement stations attract cattle to the extent that trails radiate out from each station like the spokes on a wheel, and supplement stations typically produce high levels of cattle milling resulting in soil mixing, erosion, and deflation damage to archaeological deposits. Supplement stations shall not be placed within the boundaries or buffer zones of archaeological sites **(See Mitigation Measure #CUL 4: Cattle Supplement Stations)**.

Environmental Consequences

See **Mitigation Measures #CUL-1** through #**CUL 4** in **Appendix A Mitigation Monitoring Plan** and **Appendix B Best Management Practices** for details related to cultural resource protection measures related to Project implementation.

a) ***Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5? -and-***

b) ***Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?***

Less Than Significant with Mitigation Incorporated. Based upon the archeological/cultural resource surveys and analysis conducted in connection with the development of this Initial Study/Mitigated Negative Declaration, no specific potential impacts to these resources attributable to the implementation of proposed Project work were identified. Various prehistoric sites were identified that are potentially eligible for the National Register protection measures including avoidance of all potential direct and indirect effects through the development buffer zones around all sides of these resources' mapped boundaries. If avoidance of a suitable buffer area is maintained and all Mitigation Measures as well as Best Management Practices established for Cultural Resources are adhered to, proposed Project work will result in "*No Historic Properties Affected*" pursuant to 36 CFR Part 800.4(d.1) and a determination that any impacts to these resources will be "**Less Than Significant with Mitigation Incorporated"**. In the event significant changes to the scope of work described under **Project Description/Restoration Practices** above are made, follow up surveys will be completed in order to assure that the Mitigation Measures and Best Management Practices currently developed for this Project will protect all identified and unidentified archeological, cultural and historic resources.

c) ***Disturb any human remains, including those interred outside of formal cemeteries?***

Less Than Significant with Mitigation Incorporated. See **Mitigation Measure #CUL 3: Discovery of Human Remains** described in **Appendix A:** related to the protection of human remains interred outside of formal cemeteries that render impacts to these, **Less Than Significant with Mitigation Incorporated.**

Mitigation Measures Related to Cultural Resources
See **Appendix A:** for a complete list of protection measures to be implemented in connection with this effort that will prevent impacts to cultural resources that have been identified or may be found within the Project area during implementation of the **Restoring the Deer Creek Headwaters at Childs Meadows Project**.

No significant adverse impacts to Cultural Resources are anticipated with the implementation of Mitigation Measures.

Energy

	ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
	VI. Energy. Would the Project:				
a.	Result in potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation?	☐	☐	☒	☐
b.	Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

Environmental Setting/Affected Environment

The only facility within or surrounding the Project area that utilizes energy is a small resort adjacent to the Project site and another resort facility within the Childs Meadows community on the opposite side (east) of State Route 36E. Developed sites at Fire Mountain Lodge, the Deer Creek community and facilities at the Black Forest Lodge also consume energy **(See Figure 1)**. Proposed Project work will have no effect on energy use at these facilities. During Project implementation, gasoline and diesel will be used to fuel small construction and transportation equipment along with the limited number of power tools to be utilized in the implementation of Project work. Bio hydraulic fluid will be used in all equipment other than that used to transport equipment, supplies and personnel.

Environmental Consequences

a) Would the Project result in potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation?

Less than Significant. Temporary energy use in connection with Project implementation will entail consumption of diesel and gasoline by Project implementation equipment as well as that used to transport equipment, supplies, and personnel. Per the air quality protection measures established for Project implementation, several of which also apply to energy use efficiency, all construction equipment will be maintained in proper tune according to manufacturer's specifications. Maintenance, repair, and tuning reports for equipment will be prepared by equipment contractors and provided when requested to the RCD of Tehama County Project Manager. In addition, the use of diesel construction equipment meeting current CARB certification standards for off-road diesel engines will be maximized and unnecessary vehicle idling restricted to five minutes or less. With these measures in place, wasteful, inefficient, or unnecessary use of energy resources is not anticipated, and impacts will be less than significant.

b) ***Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?***

No Impact. The implementation of proposed Project work will not conflict with or obstruct any State or local plans for renewable energy or energy efficiency; therefore, there will be no impact.

Impacts to Energy Resources will be Less Than Significant.

Geology and Soils

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
VII. Geology and Soils. Would the Project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to California Geological Survey Special Publication 42.)	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994, as updated), creating substantial direct or indirect risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste	☐	☐	☐	☒

water disposal systems where sewers are not available for the disposal of waste water?

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒

Environmental Setting/Affected Environment

The Childs Meadows complex is located at an elevational range between 4,750' and 4,900'. The valley in which the meadow is located was carved by Tahoe-aged (70,000 years ago) and pre-Tahoe glaciations. Glacial till, outwash deposits and more recent fluvial deposits fill the valley floor. The full glacially scoured valley width ranges from 6,000' to 1,500' within the Childs Meadows reach. The valley floor meadow occupies about 2,000' of the full-valley width about 2 miles from the head of the meadow, decreasing to less than 200' wide at it furthest downstream extent **(See Figure 1)**. The meadow surface of the valley floor is nearly level in cross-section, with the exception of several gully incisions and slightly elevated glacial deposits including moraines and kames. Colluvium, talus, and glacial deposits form forested slopes that fill the remaining valley width at the base of the bedrock valley walls. The cliffs that form the valley walls are composed of extrusive volcanic deposits of rhyolite, andesite, and basalt 1 to 2 million years old. Over its 5-mile length, Childs Meadows drops 150' in elevation, resulting in an average slope of 0.57%, with locally steeper or shallower grades.

The Childs Meadows valley is bounded by several different bedrock formations ranging in age from Late Pliocene to Holocene. The following descriptions are brief summaries of the geologic units bounding the valley proximal to the Project area:

Andesite of Wild Cattle Mountain (taw)
Bounding the northeast side of the valley is the Late Pliocene Andesite of Wild Cattle Mountain. This unit comprises a south-dipping series of andesite lava flows of poorly defined origin. Flow contacts and interflow breccias are rarely exposed. The unit contains relatively steep slopes and locally is covered with a coniferous forest.

Rhyolite of Mill Creek Plateau (rmp)
Exposed in relatively small patches along the southwestern side of the valley is the early Pleistocene Rhyolite of Mill Creek Plateau. This formation consists of a 150 m lava flow that erupted from a buried vent near the flow's west margin. The surface morphology of the flow and pumiceous carapace have been completely removed by erosion. The flow is now covered by a thick very light-colored soil.

Andesite of Doe Mountain (adm)
The most extensive geologic unit exposed on the western side of the valley is the early Pleistocene Andesite of Doe Mountain. The unit is characterized as a small dome-shaped mass of porphyritic aug-hyp andesite correlated with the Dittmar Volcanic Center. Glaciation and erosion have modified the original morphology of the dome. The unit currently has a thin soil mantle and is poorly exposed.

Tholeiitic Basalts of Mill Creek Plateau (bmc)

Exposed in relatively small patches on the western side of the valley is the middle to late Pleistocene Tholeiitic Basalts of Mill Creek Plateau. Lava flows of this unit entered the Gurnsey Creek drainage and flowed linearly for 8 km downstream. Most of the flow is buried beneath alluvium and colluvium.

Holocene and Pleistocene Colluvium and Talus (Qc)
Exposed on the margins of the valley is a unit mapped as Holocene and Pleistocene Colluvium and Talus. The unit consists of nonsorted to laterally sorted, unconsolidated, nonbedded, course to fine rubble. It consists mainly talus at the base of slopes but locally occurs as slopewash or thin, local debris flows. This is the unit that makes up the bedrock promontories that bound and confine the wet portions of Childs Meadows.

Units within the Valley

Outwash gravel from older glaciations (Qoo)
Within the confinement of the Gurnsey Creek watershed, in the northern Childs Meadows area, lay a series of late Pleistocene glacial outwash gravels. Field observations indicate there is little gravel exposed in this area and that the surface exposures are predominantly fine grained non-cohesive silts with minor clay content. These deposits are consistent with glacial outwash, but gravel appears to be a very minor component of the unit within the Project area.

Quaternary Alluvium (Qf)
Mapped throughout the valley floor in the Childs Meadows area are Holocene and Pleistocene Alluvium deposits. They are characterized as moderately well sorted, unconsolidated, lenticular-bedded sand and gravel in modern stream channels. The unit includes terraces and reworked glacial outwash in some locations, and extensive marsh deposits in other areas. Soils found within the Project area consist of those which are moderately deep, rocky, gently sloping to steep and underlain by volcanic rock.

Soils

Soil types found within the Project area are described below:

Chummy soils, 0 to 3% Slope
This soil type represents the largest portion of the Project area which includes meadows both wet and dry. The Chummy series is a gray strongly acid, silty clay loam developed from fine textured alluvium. It is a Fine-loamy, soil containing a mat of roots and decaying organic matter with little mineral soil material. This soil then becomes a silty clay loam strongly acid (pH 5.5); at 10 to 23". The texture of Chummy soils in the Project area ranges from silty clay loam, clay loam, and loam. In reaction they are slightly acid to strongly acid as these sediments are from a wide range of volcanic rocks, including basalt, andesite, and rhyolite. This is a poorly and very poorly drained soil resulting in slow runoff rates while permeability is moderate. The depth of the water table varies but is usually within 10 inches of the surface in the early summer and may drop below 5' in the fall. During the winter months the soil is saturated and partly frozen. Chummy soils within Childs Meadows support dense vegetative complex forbs including sedges rushes, Spanish clover and other water loving plants. Grasse species within the meadow include blue joint, slender muhly, and alpine timothy and provide excellent summer range for cattle and sheep.

Nanny stony loam, 0 to 8 percent slopes
Within those portions of the Project area out of the meadow complex are found Nanny stony loom 0 to 8% slope soils. This very deep, well drained soil is formed in alluvium from basic igneous rock. Within

the Project area Nanny gravelly loam is under a cover of Douglas fir, ponderosa pine, sugar pine, and white fir. Reaction is slightly to strongly acid. This soil is well drained has slow runoff and moderately rapid permeability. Project work will be conducted on several small sites with slopes from 0 to 8%.

In order to prevent erosion related to construction activity, only small mechanical equipment and powered hand tools along with non-mechanical hand tools will be utilized to complete the **Restoring the Deer Creek Headwaters at Childs Meadows Project** scope of work. In addition, various Best Management Practices as shown in **Appendix B** have been developed and will be implemented during Project implementation in order to reduce impacts to soil resources within the Project's impact area.

Environmental Consequences

a) Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

No Impact. A review of the current Alquist-Priolo Earthquake Fault Zone Maps indicates that there are no faults within that portion of eastern Tehama County where Project work will occur. No indication of rupturing is indicated within this Project's impact area.

ii. Strong seismic ground shaking?

Less Than Significant. See comments under a) i) above

iii. Seismic-related ground failure, including liquefaction?

Less Than Significant. See comments under a) i) above

iv. Landslides?

No Impact. Soils within the Project area are either poorly drained in meadow sites, (Chummy Soils) or well drained soils on those portions of the Project area outside of the meadow complex (Nanny Soils). The majority of Project work will occur within stream channels and other sites within the Childs Meadows complex. Project work will entail the installation of natural materials into a stream channels or minor alteration of channels on flat slopes in order to reestablish the natural stream bed slope within incised channels and at head cut knick point resulting in increased water peculation into the meadow soils and a reduction in erosion generated sediments into Gurnsey Creek and thus the overall Deer Creek watershed system.

b) Would the Project result in substantial soil erosion or the loss of topsoil?

Less Than Significant. As mentioned in the discussion above, soil types within the Project area have a moderate to high potential for erosion. Project work will be conducted on flat slopes or nearly so and will entail the installation of bio-engineered water retention devices such as bever dam analogs and post assisted log structures. Several erosion treatments including head cut fills within fins, ditch and small channel fills along and reestablishment of vegetation will be completed as well. An array of Mitigation Measures found in **Appendix A:** and Best Management practices **Appendix B:** have been established for the development and maintenance of these features and treatments that will prevent impacts to soil stability and reduce the potential for generation of stream bed and bank related erosion and related sediment generation. In addition, the requirements and standards found in **Appendix I: Post Project Maintenance and Monitoring Plan for the Restoring the Deer Creek Headwaters at Childs Meadows Project** will provide additional protection to Project area resources and assure that treatment actions completed in connection with this effort continue to function properly**.**

c) Would the Project be located on a geologic unit or soil that is unstable or that would become unstable as a result of the Project and potentially result in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

No Impact. All Project work will be conducted on flat areas of a meadow complex as well as the bank and stream bed of Gurnsey Creek along with several small tributaries. Project work will impact about 920 linear feet (280 meters) of stream bank. Once flow retention devices and other treatments have been completed, not only will head cutting cease, but stream beds will also decrease in depth resulting in the shallowing of currently in place steep sided cut banks. In addition, various Mitigation Measures and Best Management Practices have been developed and will be implemented that will protect meadow soils and related plant communities.

d) Would the Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

No Impact. There are no expansive soils as defined in Table 18-1-B of the Uniform Building Code within the Project area. Project work does not entail the construction of buildings or other structures that could be at risk from expansive soils.

e) Would the Project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No Impact. The Project area is not zoned for urban development uses. No septic tanks or alternative wastewater disposal systems are located within the Project's immediate impact area, and none will be developed in connection with the completion of proposed Project work.

f) Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No Impact. Proposed Project implementation activities will occur exclusively in an area containing fluvial sediments, which are generally devoid of significant paleontological resources. Impactive Project activities will not encroach below the meadow complex alluvium layer. Therefore, significant or unique paleontological resources will not be present within in any Project impact area and there will be no impact.

Impacts related to Geology and Soils will be Less Than Significant.

Greenhouse Gas Emissions

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
VIII. Greenhouse Gas Emissions. Would the Project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Environmental Setting/Affected Environment

Climate change is caused, in part, by accumulation in the atmosphere of greenhouse gases (GHGs), which are produced primarily by the burning of fossil fuels for energy. State Law (Health and Safety Code §38505g) defines GHGs to include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and hexafluoride. Because GHGs persist and mix in the atmosphere, emissions anywhere in the world can affect the climate everywhere. GHG emissions are typically reported in terms of carbon dioxide equivalents (CO_2e), which is a conversion of all GHGs to an equivalent basis considering their global warming potential compared to CO_2. In 2013, total California GHG emissions were 459.3 million metric tons of CO_2e (California Air Pollution Control Officers Association 2008). This represents a reduction in total GHG emissions from 2012, which had the first emissions increase since 2007. Baseline conditions within the Project area include GHG emissions from the heavily travelled State Route 36E/89 and to a lesser degree State Route 172 along with County and USFS maintained roads adjacent to the Project area.

Regulatory Setting

This section describes the federal, State, and local regulations related to greenhouse gas emissions and climate change.

Federal Regulations Pertaining to GHG Emissions
At the federal level, the United States Environmental Protection Agency (EPA) administers the Clean Air Act (CAA). In 2007, the United States Supreme Court ruled that GHGs are "pollutants" under the CAA. In 2009, the EPA found that six GHGs constitute a threat to public health and welfare, and that the

combined emissions from motor vehicles cause and contribute to climate change. These findings serve as a prerequisite to regulations of GHG emissions from motor vehicles, construction equipment, and large stationary emitters of GHGs. On April 1, 2010, the EPA and the National Highway Traffic Safety Administration established a program to reduce GHG emissions and improve fuel economy standards for new model year 2012-2016 cars and light trucks. On August 9, 2011, the EPA and the NHTSA announced standards to reduce GHG emissions and improve fuel efficiency for heavy-duty trucks and buses.

State Regulations Pertaining to GHG Emissions

The State of California has enacted several policies and plans to address GHG emissions and climate change. In 2006, AB 32, the Global Warming Solutions Act was passed, which set the overall goals for reducing California's GHG emissions to 1990 levels by 2020. Executive Orders S-3-05 and B-16-2012 further extend this goal to 80 percent below 1990 levels by 2050. In April 2015 Governor Brown issued EO B-30-15, which established a GHG reduction target of 40 percent below 1990 levels by 2030. CARB has completed rulemakings to implement several GHG emission reduction regulations and continues to investigate the feasibility of implementing additional GHG emission reduction regulations. CARB approved the First Update to the AB 32 Scoping Plan on May 22, 2014 (California Air Pollution Control Officers Association 2008). This update defined climate change priorities for the following five years and sets the groundwork to reach long-term goals set forth in EOs S-3-05 and B-16-2012. The update also highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals and evaluates how to align the State's longer-term GHG reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use.

Senate Bill (SB) 97, which was signed in 2007 and went into effect in 2010, requires that project proponents estimate the GHG emissions that will result from a project as part of the environmental review process under CEQA. Jurisdictions that have adopted a Qualified GHG Reduction Strategy can streamline the GHG review if the project is shown to be compliant with the strategy by meeting the requirements in CEQA Guidelines Section 15183.5(b). While this Inventory does not constitute a complete Qualified GHG Reduction Strategy, it can be used to support the creation and adoption of such a document. SB 97 also requires the Office of Planning and Research to develop amendments to the CEQA Guidelines that address the analysis and mitigation of GHG emissions. The California Natural Resources Agency adopted the amendments to the CEQA Guidelines in 2010. Key points of these amendments include:

Lead agencies must analyze the GHG emissions of proposed projects and reach a conclusion regarding the significance of those emissions **(See CEQA Guidelines Section 15064.4)**. When a project's GHG emissions may be significant, lead agencies must consider a range of potential Mitigation Measures to reduce those emissions **(See CEQA Guidelines Section 15126.4[c])**. Lead agencies may significantly streamline the analysis of GHGs at the project level by using a programmatic GHG emissions-reduction plan that meets certain criteria **(See CEQA Guidelines Section 15183.5[b])**.

Local Efforts and Regulations Pertaining to GHG Emissions

Tehama County lies within the jurisdiction of the Tehama County Air Pollution Control District. Air Districts have direct and indirect regulatory authority over sources of air pollution and GHGs within their territory and can inform and guide how laws on air pollution and GHGs are applied. They play a critical role in providing support and guidance to jurisdictions, although they do not officially certify Qualified GHG Reduction Strategies. The Tehama County General Plan states that Tehama County will work with the TCAPCD to prepare a Climate Action Plan for the county (Tehama County 2009). The TCAPCD has not yet adopted plan-level guidelines for GHG reduction within Tehama County.

Environmental Consequences

2021 Analysis Evaluation of Greenhouse Gas Emissions from the Proposed Childs Meadows Restoration Project

The following narrative is based upon calculations shown in **Appendix F: Evaluation of Greenhouse Gas Emissions from the Proposed Childs Meadow Restoration Project** and **Appendix G: Greenhouse Gas Emissions Calculations Worksheet**. The net greenhouse gas sequestration from this Project is expected to be 28,718 mt CO2e. Montane meadows have the potential to sequester large amounts of carbon when in proper functioning condition. A previously implemented demonstration project at Childs Meadows tested the impacts of two treatments (cattle exclusion and cattle exclusion plus BDAs) on carbon sequestration. They found that BDAs resulted in a net storage effect of about 70 gCO2-Ceq m-2 per growing season, while the combined effect of the two treatments was a net storage of about 500 gCO2-Ceq m-2 per growing season. The proposed Project will increase the scale of BDA treatments and cattle exclusion fencing across the larger meadow complex, thus resulting in net benefits to carbon sequestration. It is anticipated that restoration of the 404-acre Project area will result in a carbon sequestration benefit of 28,736 mt CO2e based on the California Air Resources Board, Quantification Methodology for the California Department of Fish and Wildlife. Project implementation activities are expected to emit 18 mt CO2e over three years of implementation based on Department of Water Resources GHG Calculator.

a) ***Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?***

Less Than Significant. Based upon the calculations shown in **Appendix G**, 17.8 metric tons of CO_2e associated with the use of transportation and construction equipment will be generated during the 3-year Project implementation period of this meadow restoration effort. During this Project's 25-year useful life, the average annual Total GHG Emissions has been determined to be .7139331 MT CO2 equivalents with Maximum Yearly Construction GHG Emissions calculated to be 12.650251 MT CO2 equivalents. For the purposes of this CEQA analysis, the TCAPCD established a threshold of significance of 900 metric tons of CO_2 or CO_2e per year during the life of an approved project. It is estimated that the proposed Project will remain operational for a minimum of 10 years with channel maintenance, if required. Based upon the estimated total of 5,517 metric tons of CO_2e expected to be released during Project implementation and a minimum 10-year life span for the overall Project, the average GHG emissions will be 551.7 metric tons of CO_2e per year. Channel maintenance, if required, will cause a negligible increase in this annual average. Therefore, emissions will be well below the established threshold and will be less than significant.

b) ***Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?***

Less Than Significant. Refer to discussion above along with that shown in **Appendix F: Evaluation of Greenhouse Gas Emissions from the Proposed Childs Meadow Restoration Project** and **Appendix G: Greenhouse Gas Emissions Calculations Worksheet**. Proposed Project work will restore the hydrological and biological functioning of the Project area as well as the riparian and stream channel conditions within Childs Meadows. Although the proposed Project will generate short-term GHG emissions during construction and, maintenance of beaver dam analogs and other developed features, the emissions will be below the threshold established for Tehama County and therefore will not obstruct efforts to reduce GHG emissions. As a result, proposed Project work will not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Impacts related to Greenhouse Gas Emissions will be Less Than Significant.

Hazards and Hazardous Materials

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
IX. Hazards and Hazardous Materials. Would the Project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and/or accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a	☐	☐	☐	☒

	public airport or public use airport, would the Project result in a safety hazard for people residing or working in the Project area?				
f)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g)	Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	☐	☒	☐	☐

Environmental Setting/Affected Environment

The Project's impact areas are within a remote portion of Tehama County used largely for timber production, ranching, natural resource management and low impact winter recreation.

Discussion

Diesel and gasoline will be used in mechanical equipment implementing Project work along with that used to transport equipment, supplies and personnel. Bio hydraulic fluid will be used in equipment utilized within the Childs Meadows complex, stream zones/aquatic sites and other sensitive areas. **(See Mitigation Measure #HA/HAZ-7: Use of Bio-Hydraulic Fluid: described in Appendix A below)**. **(See Table 4: Anticipated Construction Equipment** under **Project Description/Restoration Practices above.)** There is a chance that a spill of these bio or petroleum based products could occur if equipment overturned or during fueling and maintenance operations. This is unlikely however and the risk will not be significant with the implementation various Mitigation Measures related to hazardous materials as described in **Appendix A** along with applicable Best Management Practices related to the use of Hazardous Materials shown in **Appendix B**.

The California Department of Forestry and Fire Protection (Cal Fire) has developed a ratings scale for determining the potential for wildland fires. This scale considers the type and amount of vegetation (fuel); climate conditions such as temperature, wind, and humidity; and degree of slope and geographic conditions (topography). Based upon Cal Fire criteria, the Project area is located within a high fire hazard severity zone. A majority of proposed Project work will be completed within a flat meadow complex with generally moist soils or mildly sloping conifer forest stands located immediately adjacent to Childs Meadows. Importantly, Project work includes thinning of these adjacent forest stands as well as the removal of conifers invading meadow soils which will reduce the volume of dead and downed conifer forest vegetation within the Project area. In addition, woody material required for meadow structures will be sourced from adjacent forest stands further reducing fuel loads within the Project area.

Pursuant to Government Code Section 65962.5, the SWRCB GeoTracker (State Water Resources Control Board 2020) and the California Department of Toxic Substances Control EnviroStor (California

Department of Toxic Substances Control 2020) online databases were consulted on November 18, 2020, to determine if there are any recorded sites of concern within or near the Project area. No sites of potential concern were identified in the vicinity of the Project area.

Environmental Consequences

a) ***Would the Project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? -and-***

b) ***Would the Project create a significant hazard to the public or the environment through reasonably foreseeable upset and/or accident conditions involving the release of hazardous materials into the area?***

Less Than Significant with Mitigation Incorporated. The Project area contains habitat that is used at various times of the year by listed and unlisted aquatic, avian and terrestrial species requiring the protection of meadow soils, water quality, riparian habitat and confer forests conditions. Equipment used in connection with Project implementation and maintenance work will be fueled with diesel or gasoline. Bio hydraulic fluid will be used in equipment working within the Childs Meadows complex along with stream channels and other aquatic sites per the provisions of Mitigation Measure **#HA/HAZ-7: Use of Bio Hydraulic Fluid:** Transportation equipment used to transport equipment utilized in the implementation of Project work will be fueled and maintained using petroleum-based fuels and lubricants. It is possible that a spill could occur while transporting fuels, lubricants and hydraulic fluid to job sites, during fueling and maintenance operations or related to leaks in equipment fuel and lubricant lines. If leaks occurred, the risk of environmental damage to riparian areas, water quality, stream zone and other resources within the Project area would be minimal. Implementation of the **Mitigation Measures** found in **Appendix A: Mitigation Monitoring and Reporting Plan** along with the Best Management Practices described in **Appendix B: Best Management Practices Developed for the Restoring the Deer Creek Headwaters at Childs Meadows Project** will reduce impacts related to the use of fuel and lubricants to an even lower level of insignificance.

c) ***Would the Project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?***

No Impact. There are no existing or proposed schools within one-quarter mile of the Project area. Therefore, there will be no impact.

d) ***Would the Project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would it create a significant hazard to the public or the environment?***

No Impact. The Project area is not located on or near a site that is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5. or the California Department of Toxic Substances Control EnviroStor Therefore, there will be no impact.

e) ***For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard for people residing or working in the Project area?***

No Impact. The Project area does not lie within an airport land use plan area or within two miles of a public airport or public use airport. Project work will not change the land use designation or construct tall structures within the Project area and will not result in an airport-related safety hazard. Therefore, there will be no impact.

f) Would the Project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact. None of the proposed Project activities will impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. The only Project related impacts to traffic along public or private roads in the area that could be used as an evacuation route would be the transport of equipment and personnel to the Project site over State Route 36E, along the CAF road system or Forest Service Roads 28N88 traversing north to south and 28N90 to the southeast **(see Figure 1)**. The occurrence of equipment transport will be rare however daily trips to the Project site by Project personnel are anticipated. Due to the limited amount of road use expected in connection with this Project, impacts to or interference with an adopted emergency response plan or emergency evacuation plan are not anticipated. Post-project stream flows will not prevent emergency access to any developed sites surrounding the Project area. Therefore, there will be no impact.

g) Would the Project expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

Less Than Significant with Mitigation Measures Incorporated. The Project area is located within a remote area of eastern Tehama County on lands classified as having High Fire Rating by Cal Fire. A spark from construction, transportation or maintenance equipment during dry conditions could ignite a vegetation fire, resulting in potentially significant impacts. The potential for fire ignition risk and related impact attributable to Project work is minimized due to:

- Low standing meadow vegetation and generally damp soils within and around Project impact sites
- The availability of water from Gurnsey Creek and small tributaries flowing throughout the Childs Meadows complex
- The Project area's remote location and distance from transportation routes and other sources of human ignition

In addition, firefighting equipment and portable fire water will be made available at work sites as per the Mitigation Measures and Best Management Practices established for this Project related to Hazards and Hazardous Materials. Post-project, flows within Gurnsey Creek and other water features will provide a year-round source of water, further reducing the risk of wildland fire within the Project area.

No significant adverse impacts related to Hazards and Hazardous Materials are anticipated with the implementation of Mitigation Measures.

Hydrology and Water Quality

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
X. Hydrology and Water Quality. Would the Project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	☐	☒	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management for the basin?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces in a manner which would:	☐	☐	☒	☐
(i) result in substantial erosion or siltation on- or off-site:	☐	☐	☒	☐
(ii) Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off site;	☐	☐	☒	☐
(iii) create or contributes runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☐	☒
(iv) impede or redirect floodflows?	☐	☐	☒	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?	☐	☐	☐	☒
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☒

Environmental Setting/Affected Environment

The **Restoring the Deer Creek Headwaters at Childs Meadows Project** area is located at an elevation of roughly 4,900’ and is within the upper portion of the Gurnsey Creek/Deer Creek watershed south of Mt. Lassen. The drainage area that flows into Gurnsey Creek above the Project area is approximately 2.7 square miles or roughly 1,735 acres. The subbasin is shaped radially, with two main catchments upstream of State Route 36E/89 that confluence downstream from there into the meadow. The headwaters of Gurnsey Creek are located at an elevation of 6,235’ and drain steep snowcapped mountains dominated by a coniferous forest while the meadow is gently sloping, wet, and dominated by wetland plants. There is little development and limited impervious surfaces in the basin excluding several resort facilities on either side of State Route 36E/89 at the north end of the Project area, the State Highway along its east side along with various gravel and native surface wildland roads within surrounding forestlands.

Activities and features around the Project area that could impact water quality within the watershed of Gurnsey Creek and its small tributaries include selective timber harvests within surrounding forest lands over the past 20 years as well as several small fires. In addition, past levels of cattle and sheep grazing prior to the development of a conservation easement originally established by The Nature Conservancy have impacted levels of vegetation and related water quality. According to data recorded at the rainfall gage in the nearby community of Mineral (DWR #A40), the mean annual average precipitation in the vicinity of Childs Meadows is 54”. Rainfall occurs during the winter and spring and snow levels frequently exceed 10’ ft. between December and February. The average 24-hr. rainfall intensity is 2.1”/hr. for the 100 yr. storm event. Peak storm runoff for Q100 (100-year return interval runoff) within the Gurnsey Creek watershed was calculated at 514 cfs.

(Note: the numbers referenced below are found in Appendix E: Wetland Delineation and Assessment in Childs Meadows Tehama County, CA)

Over its 5-mile length, Childs Meadows drops 150’ in elevation, resulting in an average slope of 0.57%, with locally steeper or shallower grades. Groundwater discharge emerges at hillslope springs up to 120’ above the elevation of the valley floor. These discharges flow down colluvium and talus hillslopes with grades of 1.24% to 12.5%. On both the west and east sides of the valley, these elevated springs are located near where older volcanic units are exposed above lower and younger concealing deposits of Holocene and Pleistocene colluvium and talus. This hillslope groundwater saturates sloping fens that connect to wetlands on the valley floor, forming upslope arms of Childs Meadows wetlands. Groundwater also emerges at the valley floor elevation, as diffuse discharge, or at several discrete spring mounds. These mounds form where dense mats of vegetation form a confining layer over a spring discharge point, trapping and pressurizing the underlying water, and forming a raised floating mound of saturated fen vegetation and peat soil. The electrical conductivity of the water within the wetlands ranges from about 50 to 200 µS/cm seasonally, which is similar to the findings from a broad sample of fens that occur on volcanic bedrock.

The watershed for Childs Meadows is 8.791 square miles. The uppermost significant surface flow feature in the meadow is a discontinuous erosion gully with a headcut located at study **plot 59**. An upper sub-basin of 1.07 square miles drains into this headcut. The largest headcut in the meadow occurs 1,400’ downstream of the uppermost headcut, at **study plot 46**. The uppermost gully dissipates about 400’ upstream of the headcut at **plot 46**. A second sub-basin includes all areas of Childs Meadows upstream of the only significant side valley connecting Childs Meadows complex. This side valley leads up to Wilson Lake, east of Childs Meadow, although the lake and associated wetland are located across the watershed divide and drain into Lost Creek. The second sub-basin adds an additional 1.67 sq. miles of drainage, for a total of 2.74 sq. miles of watershed for Childs Meadows above the Wilson Lake valley.

The third sub-basin adds 2.42 sq. miles for a total of 5.16 sq. miles that includes drainage from the eastern "Wilson Lake" side valley and terminates below the main 2000' wide valley meadow. The head of Gurnsey Creek begins at the bottom of this third sub-basin. However, a network of connected erosion gullies extends upstream to the outlet of sub-basin two, and since this form continuous and connected surface flow, the head of Gurnsey Creek could be considered the outlet of the second sub-basin. Above the outlet of the second sub-basin, surface flow channels are discontinuous and unstable. The last downstream (3.62 sq. mile) sub-basin drains into the relatively narrow (200'-500') valley floor meadow that makes up the downstream 2.3 miles of Childs Meadow.

In order to delineate and assess the function of the wetlands in Childs Meadows, a formal wetland delineation and assessment **(Appendix E)** was completed with soils, hydrology, and vegetation described at **65 plots** throughout the meadow. A soil pit was dug at each plot and soils were investigated for indications of wetland conditions. The presence of wetland hydrology was determined in each soil pit as well. A network of existing wells within sub-basin 3 were used to determine the duration of wetland hydrologic conditions at nearby study plots. Using the data from the **65 study plots**, multi-spectral aerial imagery, and detailed topography, the wetlands, fens, and dewatered wetlands were delineated throughout the meadow.

The valley floor and hillslope wetland complex cover 520.4 acres, approximately 9% of the Childs Meadows watershed. The wetland complex contains 138.7 acres of fen (a subclass of wetland that require 16-inches of peat soil, perennial groundwater saturation, and dominance of wetland plants), 259.3 acres of non-fen wetland, 42.1 acres of dewatered former wetland, and 80.3 acres of mixed wetland/fen on un-surveyed private land at the north end of the Childs Meadows watershed. The hydrology of the fens on the western side of Childs Meadows appears largely intact, and the presence of lodgepole in these areas is natural. Beaver have occupied and dammed the main flow channel within the fourth, most downstream, sub-basin.

The entire delineated area of Childs Meadows has been grazed by cattle for at least a century. Portions of the meadow have been fenced off to prevent cattle grazing since about 2015. A partial cross-valley fence was constructed in 2015 to exclude cattle from the meadow reach in the downstream forth sub-basin. A 15-acre parcel at the downstream end of the third sub-basin was fenced to prevent grazing near the channelized western side of this valley reach. Both fences experienced periodic breaches and required annual maintenance, but generally functioned to prevent most cattle grazing. The 15-acre parcel was part of a controlled wetland restoration experiment, and the exclusion of grazing in this reach resulted in significantly greater plant productivity as compared to a grazed section of the meadow. The 360 acres of unfenced wetland meadow receive approximately 500 animal unit months (AUMs) of grazing pressure per year.

The primary impact to wetland function within the Childs Meadows complex is cattle grazing. Both aboveground vegetation removal through direct consumption, and physical damage to soil and belowground plant parts by hoof punching was evident throughout the site. These grazing impacts leave soil more vulnerable to erosion, and several large erosion gullies are present, some of which are actively headcutting. These gullies form topographic low trenches within an otherwise level in cross-section meadow. Surface and groundwater drain to these low areas and flow downstream. The drainage of groundwater into surface flow features like gullies is a particularly significant impact because water moves about 100 to 1000 times faster down gradient as surface water over land than it does as groundwater in soil.

Deep gullies drain the groundwater away from adjacent meadow areas. In several areas of Childs Meadow, these drained meadow areas are evident as level terraces that retain wetland soils, even though they currently have deep water tables that no longer support wetland plant and soil processes.

A drainage ditch that runs through **plot 13** has evidently dewatered this area, but the high-organic wetland soils, and a few obligate wetland plants persist. In addition, several groundwater-saturated sections of Childs Meadows have been dewatered by the installation of drainage ditches. The longest of these ditches extends for about 2,000', from above study **plot 7** to below **study plot 5**. This ditch was partially blocked in 2015 as part of the restoration experiment, and even the partial and haphazard blockage redistributed water across a large area of meadow. Other ditches are having a similar dewatering effect near **plots 13** and **14** and adjacent to and downstream of **plot 25-37** and between **plots 4** and **8.**

Environmental Consequences

a) ***Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?***

Less Than Significant with Mitigation Incorporated. Project work poses a potential for impacts to water quality standards related to the short-term generation of sediments as well as the release of diesel fuel and equipment lubricants into the Gurnsey Creek/Deer Creek watershed system through the accidental spill of lubricants or fuel. This potential will be reduced to a less than significant level thought implementation of the various Mitigation Measures described in **Appendix A:** along with Best Management Practices shown in **Appendix B:** related to hydrology and water quality as well hazards and hazardous materials. Introduction of construction related sediments into Gurnsey Creek and ultimately Deer Creek will be minimized or reduced thought the implementation of BMPS related to sediment catchment and control as well as equipment operations in around riparian areas and stream courses. Per the requirements established in **Mitigation Measure #HYDRO 2: Protection of Existing Drainage Features**, all existing drainage structures within Project impact sites or the surrounding Project area will be protected from Project related impacts and remain free of obstructions. Impacts will be further reduced through RCDTC compliance with the requirements of those water related permits listed in **Table 1 Permits and Approvals Potentially Required for the Childs Meadows Project.**

b) ***Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management for the basin?***

No Impact. The proposed Project does not include groundwater pumping, only surface water will be used and only the minimal amount required to compact excavated areas, provide dust control along access roads and excavation sites and to stabilize excavated and fill material during storage. Water will also be stored in a portable tank for fire protection and some water may be used to initially irrigate newly installed vegetation. It is anticipated that within several years after Project completion, the natural topographic and hydrologic profile of Childs Meadows and that portion of the Gurnsey Creek stream channel within the Project area will be reestablished. Completion of Project work will also result in decreased down cutting and stream flow velocity along with a resultant increase in percolation of water into the aquifer beneath the Childs Meadows complex. As a result, no negative impacts to groundwater supplies or groundwater recharge will occur.

c) Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces in a manner which would:

i. result in substantial erosion or siltation on- or off-site:

Less than Significant. As proposed, the installation of in channel and meadow flow control features and bank stabilization infrastructure will use natural materials and in general, the current stream channel alignment along with bio-engineered sediment control structures. Some minor bank contouring will occur in order to remove cut banks which currently erode into stream flows during high flow events and this may slightly change stream course direction. Such contouring will only occur along very small segments of stream channels. Once completed, Project work will result in a significant reduction of stream generated erosion and siltation related to current stream cutting.

ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off site;

Less than Significant. One of the primary goals of this meadow restoration project is to reestablish natural hydraulic and habitat functioning within the Childs Meadows complex and surrounding confer forests as well as well to rehydrate meadow soils. As a result of Project work, it is anticipated that high flows within Gurnsey Creek and its tributaries within Childs Meadows will be slowed and spread over flat meadow sites allowing water to saturate soils and percolate into the local aquifer. As result, downstream flood flows will be reduced and summer/early fall flows will increase as water stored in soils and the aquifer are released.

iii. create or contributes runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff; or

No Impact. See comments under c) ii) above. In addition, the Project area is within a wildland area where there are no residential developments and related storm water drainage systems. Therefore, there will be no impact.

iv. impede or redirect floodflows?

Less than Significant. The goal of this Project is to slow (impede) high stream flows (including snow melt within Gurnsey Creek's mainstem and small tributaries flowing through the Childs Meadows complex. In addition to rehydrating meadow soils and improving conditions for meadow associated plant and animal species, anticipated reduction in stream flow velocities will allow stream sediment to percolate out of the water column raising stream bed heights. Slower stream velocities, increased sediment removal and increase channel heights are also expected to reduce the chance of high flows exacerbating head cutting or creating new headcuts within meadow channels. Consequently, any negative impacts to stream channel morphology if any will be less than significant.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?

No impact. The Project area is not located within a tsunami or seiche zone. Proposed Project work is expected to reduce stream flows within the Childs Meadows complex thus reducing the opportunity for head and channel cutting or other fomes of stream related erosion. In addition, there are no sources of soil bound pollutants within the Project area and thus no potential for an inadvertent release of pollutants due to the anticipated periodic inundation of meadow areas. In addition, it is anticipated that there will be a reduction in stream generated sediments flowing into the Deer Creek watershed. Therefore, there will be no impact.

e) Would the Project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

No Impact. The proposed Project has the potential to temporarily increase turbidity into the Gurnsey Creek/Deer Creek watershed system during implementation and post construction maintenance efforts. Due to the nature of proposed Project work, no adverse impacts to the quality of surface waters are anticipated. Improvement to groundwater levels within the Childs Meadows complex are however expected. As a result, no conflict with or obstruction of a water quality control plan or sustainable groundwater management plan will occur.

No significant adverse impacts related to Hydrology and Water Quality are anticipated with the implementation of Mitigation Measures.

Land Use and Planning

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XI. Land Use and Planning. Would the Project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

Environmental Setting/Affected Environment

Proposed Project implementation will occur within a remote area of Tehama County zoned for timber production, ranching and natural resource management. Two develop sites are located adjacent to the Childs Meadows complex and across (east side) State Route 36E immediately adjacent to the meadow area. **Figure 1** and **Figure AQ 1** display several additional developed sites within the Project Area's vicinity.

Environmental Consequences

a) Would the Project physically divide an established community?

No Impact. Proposed Project implementation will occur immediately adjacent to two developed sites within an unincorporated area of Tehama County and approximately 8 miles from the nearest developed community, Mill Creek, located along State Route 172 **(See Figure AQ 1)**, Therefor there will be no impact.

b) Would the Project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. Three land use plans have been developed for the area in which this Project will be implemented along with surrounding public and private lands. These include the conservation easement originally established by The Nature Conservancy, the Tehama County General Plan and the Lassen National Forest Plan. Once Project work is completed, land use within the Childs Meadows complex will remain in full compliance with all terms of the TNC easement. Related to the Tehama County General Plan, the Project area will remain in compliance with established zoning and land uses. All work will be completed on private lands outside Lassen National Forest jurisdiction. Project work and post project maintenance activities will be compatible with LNF management goals. All landowners within the Project area have approved the incorporation of lands under their ownership/jurisdiction into the proposed Project area and have agreed to execute a formal access agreement prior to the initiation of Project work. In addition to allowing Project work to occur on privately owned land, these agreements also apply to in place public and private roads that will be used to access sites within the Project area or as staging areas for equipment and supplies. All permanent spoil areas will be established within open areas where no housing occurs or is anticipated to be developed. Other than the daily transport of personnel, equipment, and supplies to the Project area, implementation of Project work will not impact land use. Therefore, there will be no impact.

No impacts to Land Use and Planning are anticipated.

Mineral Resources

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XII. Mineral Resources. Would the Project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☒	☐
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☒	☐

Environmental Setting/Affected Environment

A portion of proposed Project work will entail filling headcuts and channels in fens as well as in ditches and small channels within the Childs Meadows. Aggregate fill material will be excavated from hillslopes adjacent to the meadow and a road prism that is being decommissioned as described in **Project Description/Restoration Practices** above. These borrow sites are all within the Project area as shown in plan-view **(See Plan View Figure 1 and Figure 2 along with Figures 7, 9, 18, and 19)**. The sourcing and extraction of fill material will follow the standards and practice described in the **Material Sourcing Standards and Requirements** section of this is/MND. As shown, most borrow areas will be located adjacent to the meadows and slightly higher in elevation than flood prone water surface heights. In several instances, a portion of the borrow area may be located within a floodplain. Such excavation sites will be utilized in a manner so that the invert elevation (i.e., difference between upslope and downslope edge) remains flat or less than .5' in height. A total of 2,659 c.y. of potential earthen fill has been identified as available within the borrow areas, and it is anticipated that 1,080 c.y. of earthen fill will be utilized to fill the headcuts and gullies if a 50:50 earthen fill to wood chips mixture is used, and as much as 2,160 c.y. of earthen fill will be utilized if wood chips are not used.

Environmental Consequences

a) Would the Project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

Less Than Significant. As described in **Project Description/Restoration Practices,** proposed Project work entails the excavation of aggregate fill material from hillslopes adjacent to Childs Meadows and the prism of a road adjacent to the meadow that is being decommissioned. All the limited amount of fill to be used will be gathered within the Project area. This material will be used to fill head cuts and gullies within fens and other sites located within the Project area. Proposed excavation sites are not permitted for large scale commercial or municipal aggregated production. No long-term impact to local aggregate, sand or other mineral resources is anticipated as there are no extraction operations within the Project area nor are any anticipated to be developed in the foreseeable future. There are significant sources of aggregate material similar to what will be removed from the **Deer Creek Headwaters at Childs Meadows Project** area that serve the needs of Tehama County. Consequently, no significant impacts to known mineral resources are anticipated.

b) Would the Project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

Less Than Significant. Project work will entail the minimal excavation of aggregate within the Project area. No other mineral resources will be used or disturbed in connection with Project implementation. As a result, no significant loss of any locally important mineral resource recovery site will occur. Therefore, there will be no impact.

Impacts to Mineral Resources will be Less Than Significant.

Noise

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XIII. Noise. Would the Project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☒	☐	☐
c) For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?	☐	☐	☐	☒

Environmental Setting/Affected Environment

As described in the 2008 Tehama County General Plan, primary sources of noise within the County include highway and local traffic, commercial and industrial uses, airports, and railroad operation. A majority of the proposed Project's impact area consists of undeveloped areas such meadow lands, riparian areas and surrounding forested upland areas. Two commercial developments (The Village at Childs Meadows and the Highlands Ranch) are located within and adjacent to the northern boundary of the **Deer Creek Headwaters at Childs Meadows Project** area. The Gurnsey Creek Campground is located immediately east of the Project area approximately 1 mile from noise producing activities. Other developed sites are located to the north, south and west of the Project area. These occupied sites however are at distance that will not be impacted by noise producing Project related activities **(See Figure AQ 1: Sensitive Receptors Within the Vicinity of the Childs Meadows Project Area**). Ambient noise conditions within and around the Project area include traffic volumes along the State Route 36E/89 corridor located immediately east of the Project area. Relatively low traffic volumes (1,445 average north/south trips per day) are generated along that portion of the State Highway adjacent to the Project area.

During the implementation of Project work, a temporary increase in ambient noise levels will be created by transportation and small mechanical equipment along with small power hand tools used in the implementation of Project work. All work will be completed during daylight hours. It is anticipated that work will progress at a rapid rate with noise generating equipment on site for a very limited period of time. As a result, only short-term impacts to noise levels within the surrounding area are anticipated. No long-term impacts to ambient noise levels or to noise standards established in the Tehama County General Plan are anticipated.

Environmental Consequences

The Noise Element of the Tehama County General Plan recommends the adoption of a County-wide noise control ordinance that will restrict construction activities to certain hours. At this time, however, Tehama County does not have an adopted noise ordinance.

a) Would the Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant. During the implementation of Project work, a temporary increase in ambient noise levels will be created by small construction, transportation and other types of equipment as well as small power hand tools used in the development of erosion and sediment control infrastructure. This will be minimal and created only during daylight hours. Work is anticipated to progress at a rapid rate and therefore noise generating equipment will be on site for a very limited period resulting in short term impacts to the surrounding area. No long-term impacts to wildlife or to noise standards established in the Tehama County General Plan are anticipated.

b) Would the Project result in generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant with Mitigation Incorporated. The majority of Project work will be completed using small excavation, transportation and other types of equipment along with small power hand tools. Two commercial developments (The Village at Childs Meadows and the Highlands Ranch) are located within and adjacent to the northern boundary of the **Deer Creek Headwaters at Childs Meadows Project** area. The Gurnsey Creek Campground is located immediately east of the Project area approximately 1 mile from noise producing activities. Other developed sites are located to the north, south and west of the Project area however, these occupied sites are at distance such that no noise related impacts will occur. **(See Figure AQ 1: Sensitive Receptors Within the Vicinity of the Childs Meadows Project Area.)** Any equipment creating ground borne vibration or noise will operate for a short period of time. Consequently, impacts related to vibration or noise levels will be less than significant. Implementation of **Mitigation Measures NOISE-1: Implement General Noise Protection and Reduction Measures** and **NOISE-2: Limited Period of Operation** will ensure that Project-related noise will not exceed acceptable levels and be limited to daylight hours. These measures will also ensure that any nearby sensitive receptors will be notified prior to the start of Project implementation. Those Mitigation Measures established for biological resources pertaining to the timing of proposed Project work in relation to species specific nesting and breeding periods will assure that such species will not be impacted by Project noise, effectively reducing potential impacts to less than significant.

c) ***For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?***

No Impact. There are no private airstrips within or near the Project area. The closest public airport is the Chester Municipal Airport, located approximately 22 miles southeast of the Project area. Proposed Project work will not expose construction workers in the Project area to excessive airport-related noise levels. Therefore, there will be no impact.

No significant adverse impacts related to Noise are anticipated with the implementation of Mitigation Measures.

Population and Housing

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV. Population and Housing. Would the Project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Environmental Setting/Affected Environment

The proposed Project is located within an undeveloped area of eastern Tehama County where developed sites are widely scattered **(See Figure AQ 1: Sensitive Receptors Within the Vicinity of the Childs Meadows Project Area.)** As described above there are two developed sites immediately adjacent to the northern boundary of the **Deer Creek Headwaters at Childs Meadows Project** area along with the Gurnsey Creek Campground located approximately one mile from sites where Project related noise will be produced.

Environmental Consequences

a) ***Would the Project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?***

No Impact. The proposed Project entails habitat restoration and enhancement efforts and will not induce substantial unplanned population growth or related housing nor will any housing related infrastructure be developed within or around the Project area. Therefore, no impacts will occur.

b) Would the Project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No Impact. Proposed Project work will not result in the removal of any structures within or surrounding the Childs Meadows area thus residents will not be displaced requiring the construction of replacement housing. Therefor there will be no impact.

No impacts to Population and Housing are anticipated.

Public Services

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XV. Public Services. Would the Project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

Environmental Setting/Affected Environment

The Project area is located on privately owned meadow lands and surrounding uplands in eastern Tehama County **(See Figure 1)**. These private parcels are surrounded by U.S. Forest Service lands managed by Lassen National Forest personnel. As a result, services to the area are provided collaboratively between County, State, and federal agencies. Fire protection is provided under a mutual aid agreement between the Tehama County Fire Department, Cal Fire and U.S. Forest Service. Policing within the area is provided by the Tehama County Sheriff's Department. There are no schools within or adjacent to the Project area. The closest educational facilities are in Mineral, Chester and Red Bluff. The USFS managed Gurnsey Creek Campground is located east of the Project area along State Route 32E/89. Low impact outdoor recreation is allowed on portions of those surrounding lands managed by the Lassen National Forest and CAF.

Environmental Consequences

a) ***Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:***

Fire protection? Police protection? Schools? Parks? Other Public Facilities?

No Impact. The overall Project area is located in a very rural portion of eastern Tehama County where there are few public services. No negative impacts to the provision of Fire Protection Police Protection, Schools, Parks or other public facilities will occur.

No impacts to Public Services are anticipated.

Recreation

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI. Recreation. Would the Project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

Environmental Setting/Affected Environment

The **Deer Creek Headwaters at Childs Meadows Project** area is located within a high mountain meadow surrounded by forested uplands located exclusively on private land. The most extensive use of the Project area is for cattle grazing. A small portion at the Project area's north end is used for summer and winter low impact recreation activities such as hiking, cross country skiing and snowshoeing. It is anticipated that proposed Project work will improve natural aesthetic within the meadow and immediately adjacent upland areas thus improving conditions for current levels of recreation.

Environmental Consequences

a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Impact. No increase in the use of parks or other recreational facilities is anticipated in connection with the implementation of this meadow restoration Project. Proposed meadow and upland treatments will however improve the aesthetics of the area for current levels of outdoor recreationists.

b) Would the Project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

No Impact. No recreational facilities will be construction or expanded as a result of Project work.

No impacts to Recreation resources are anticipated.

Transportation

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII. Transportation. Would the Project:				
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	☐	☐	☐	☒
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☐	☒

Environmental Setting/Affected Environment

The Project Area is accessed by State Route 36E/89 located on its eastside as well as several Collins Almanor Forest and Lassen National Forest maintained wildland roads located to the north, south and west. Except for minor road removal and related re-sloping of road prisms on CAF maintained wildland routes within **Areas 3** and **4**, as well as trucks transporting construction equipment and crews using State Route 36E or Forest Service Roads 28N88 and 28N90 **(See Figure 1)**, Project work will be conducted off roadways.

Environmental Consequences

a) Would the Project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

No Impact (See comments under Environmental Setting/Affected Environment above).
No conflict with a program, plan, ordinance or policy addressing the circulation system within Tehama County or on LNF managed lands are anticipated.

b) Would the Project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision(b)?

Less Than Significant. The road systems surrounding the Project area will be subject to a minor short-term increase in traffic particularly along State Route 36E/89 during Project implementation. These minor increases will not conflict with any circulation system plans. Lightly used CAF and USFS roads will also be used to access the interior of the Project area and upland sites to the west. Small sections of CAF roads within **Areas 3** and **4** will be removal and re-sloping. Due to its nature, proposed Project work will not be inconsistent with CEQA Guidelines section 15064.3, subdivision (b).

c) ***Would the Project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?***

No Impact. No changes in road geometry will be completed during implementation of Project work nor will roads be used in a manner that is incompatible with their design.

d) ***Would the Project result in inadequate emergency access?***

No Impact (See comments under Environmental Setting/Affected Environment above).
No negative impacts to emergency access are anticipated.

Impacts to Transportation will be less than significant.

Tribal Cultural Resources

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XVIII. Tribal Cultural Resources.				
a) Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☒	☐	☐
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

Environmental Setting/Affected Environment

Pursuant to PRC 21080.3.1(d), prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report for a Project, the Lead Agency shall begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed Project if the California Native American tribe requested to the Lead Agency, in writing, to be informed by the Lead Agency through formal notification of proposed Projects in the geographic area that is traditionally and culturally affiliated with the tribe.

Previous Native American Consultation

In 2014 the Resource Conservation District of Tehama County prepared an Initial Study/Mitigated Negative Declaration for the **Childs Meadows Head Cut Stabilization and Repair Project** which was not implemented. In connection with those efforts, a letter was sent to the NAHC requesting a check of the Sacred Lands files. Their reply dated August 22, 2014, indicated that no properties listed as Sacred Lands were present in the Project area. The NAHC provided a list of individuals and groups to contact regarding the Project. Letters requesting comment and/or information concerning the Project area along with a topographic map and aerial photograph delineating the Project were sent on August 30, 2014 to: Kyle Self, Chairperson, Greenville Rancheria of Maidu Indians; Andrew Freeman, Chairperson, Paskenta Band of Nomlaki Indians; Jason Hart, Chairperson, Redding Rancheria; Tracy Edwards, Chief Executive Officer, Redding Rancheria; James Hayward, Sr. Cultural Resources Program, Redding Rancheria; Glenda Nelson, Chairperson, Enterprise Rancheria of Maidu Indians; Art Angle, Vice Chairperson, Enterprise Rancheria of Maidu Indians; Kelli Hayward, Wintu Tribe of Northern California; and, Beverly Ogle.

On September 8, 2014, an email message from Enterprise Rancheria of Maidu Indians was received saying the Project area was outside their territory and suggested the Susanville and Greenville groups be contacted. The second reply was a phone call September 11, 2014, from Beverly Ogle. Ms. Ogle expressed concerned about the Project because of the "highly sensitive" nature of the Childs Meadows area for cultural resources and recommended that a monitor be present during excavation.

A second round of letters was sent October 2, 2014, with details concerning the results of the Northeast Information Center's record search and field inspection and with a second request for comment and/or information. Ms. Ogle called again on October 7, 2014, and once again requested that a monitor be present during ground disturbing activities. No other replies have been received as of October 13, 2014.

Tribal Consultation Efforts Completed in Connection with the Restoring the Deer Creek Headwaters at Childs Meadows Project

Concurrent with cultural and archeological investigations completed in connection with this Project, Collins Almanor Forest is preparing the Child Meadows Timber Harvest Plan (Plan No. 2-19-00153-TEH) inclusive to the Project Area footprint. Based on an agreement reached by the managing partners, the current Native American coordination effort completed by Collins Pine for the Childs Meadows THP was adopted and no new Native American coordination was pursued for this investigation. The Childs Meadows THP Native American coordination log was completed by Registered Professional Forester Glen Gerbatz. Due to the sensitive and confidential nature of information contained with that portion of the THP document, it was not included with the attachments to this Initial Study/Mitigated Negative Declaration.

In addition to those completed for cultural/archeological resources, survey and analysis efforts were conducted related to the possible occurrence of tribal resources located within the Project area. The intent of these efforts was to obtain information related to the location, extent, content, integrity, and National Register eligibility of the resources and to provide protection for newly delineated eligible cultural/archeological and tribal resources. Findings and recommendations of the historical and tribal resource investigation are as follows:

- Two historic-era sites, CM-20-01 and CM-20-11, are determined not eligible for the National Register. Therefore, these resources are not *Historic Properties* and Project related activity in the vicinity of these sites may proceed as planned.

- Nine prehistoric Native American sites, CM-20-02 through CM-20-10, are determined potentially eligible for the National Register. Project related activity must be designed to avoid all potential direct and indirect effects within a buffer zone of 100 feet (30 meters) on all sides of the mapped boundaries. If avoidance in this buffer is maintained, the proposed Projects will have "*No Historic Properties Affected*" pursuant to 36 CFR Part 800.4(d.1).

In order to protect these significant cultural/tribal resources, recommendations and specific provisions in the form of formally established Mitigation Measures and Best Management Practices have been established to prevent Project related activities from impacting such resources. These include:

Unanticipated Resources

Based upon the Project description, geomorphic setting as well as survey work and analysis completed in connection with archeological, cultural and tribal resources, no buried, unanticipated finds are expected to be uncovered during implementation of **Restoring the Deer Creek Headwaters at Childs Meadows Project** work. Consequently, no Memorandum of Agreement for unanticipated finds was recommended or prepared for this IS/MND and no provisions for Project related cultural resource monitoring was judged to be necessary. In keeping with 36*cfr*800.14 *Post-Review Discoveries*, if archaeological resources are discovered during Project related activities, all work will cease in the vicinity of the finds and will be evaluation by a professional archaeologist or in the case of Tribal Resources, an appropriate tribal representative. The archaeologist or tribal representative may determine that newly discovered finds uncovered during Project work merit reasonable efforts to avoid, minimize, or mitigate adverse effects and resolution of adverse effects pursuant to 36*cfr*800.6. Several Mitigation Measures shown in **Appendix A: Mitigation Monitoring and Reporting Plan** were established to protect archeological, cultural and tribal resources that may be inadvertently discovered during implementation of proposed Project work.

Confidentiality

California Government Code, Sections 6253 and 6254.10 authorizes state and local governmental agencies to exempt certain public records from inspection. Disclosure of archaeological, cultural and tribal site information is covered under this code. As result information and data related to these resources has not been incorporated into the text of this Initial Study/Mitigated Negative Declaration nor have reports related to these resources been attached to this document.

Environmental Consequences

a) ***Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:***

   i. ***Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?*** **-and-**

   ii. ***A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.***

Less Than Significant with Mitigation Incorporated. (See discussion above)

No significant adverse impacts related to Tribal Cultural Resources are anticipated with the implementation of Mitigation Measures CUL 1 through CUL 5. If the protective measures stated above are adhered to, proposed Project work will result in "No Historic Properties Affected" pursuant to 36 CFR Part 800.4(d.1)."

Utilities and Service Systems

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XIX. Utilities and Service Systems. Would the Project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
b) Have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years?	☐	☐	☐	☒
c) Result in a determination by the wastewater treatment provider that serves or may serve the Project that it has adequate capacity to serve the Project's Projected demand, in addition to the provider's existing commitments?	☐	☐	☐	☒
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☒
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

Environmental Setting/Affected Environment

Underground utilities known to exist within the Project area include a telephone cable that passes through its central portion **(See Figure 3: Cable Route Location Within the Childs Meadows Complex)**. Other underground utilities may exist beneath Project impact sites. In order to prevent impacts to these utility features, a utility locating service will be procured to identify and mark the location of both know and potentially unknown subsurface utility features. One these locations have identified and marked all subsurface Project work occurring in areas where impact could occur including borrow sites or those areas where digging or post installation will occur by establishing no treatment buffers. Above ground utilities include electrical lines on the west side of State Route 36E/89 that connect with developed sites on both sides of the high right-of-way at the north end of the Project area. These lines are outside the Project area. Waste disposal needs within the vicinity of the Project area are provided exclusive by individual landowner wells and septic systems.

Environmental Consequences

a) ***Would the Project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects?***

No Impact. The proposed Project will not require or result in the construction of new or expanded water, wastewater treatment, or storm water drainage facilities. Proposed restoration activities will not require the relocation of existing aboveground utility lines that cross the Childs Meadows complex as all Project work will be away from the line or will not impact soils to a depth that will impact this underground infrastructure.

b) ***Would the Project have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years?***

No Impact. The limited amount of water required to implement Project work will be obtained from streams running through the Project area. Once all Project work has been completed, no water will be used. Therefore, impacts to available water supplies will be temporary and less than significant.

c) ***Would the Project result in a determination by the wastewater treatment provider that serves or may serve the Project that it has adequate capacity to serve the Project's Projected demand, in addition to the provider's existing commitments?***

No Impact. The proposed Project will not require wastewater treatment services. Therefore, there will be no impact.

d) ***Would the Project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals? -and- Would the Project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?***

No Impact. The proposed Project will not require the disposal of any material other than a possible minor amount of woody debris used to construct in-stream structures along with excavated soil as Described in **Project Description/Restoration Practices**. Woody material will be piled burned in upland areas adjacent to Childs Meadows and soils spoiled by scattering it over the same upland area. The amount and disposal of solid material will comply with federal, State, and local statutes related to solid waste. Therefore, there will be no impact.

No impacts to Utilities and Service Systems are anticipated.

Wildfire

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XX. WILDFIRE. Would the Project:				
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose Project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☒	☐	☐
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☒	☐	☐
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☒	☐	☐

Environmental Setting/Affected Environment

The **Restoring the Deer Creek Headwaters at Childs Meadows Project** area is located within a meadow complex containing low growing grass, riparian vegetation and other plants associated with wet or damp soils. As a result, risk of wildfire within that portion of the Project area on meadow soils is low. Upland areas containing mixed conifer forests surround Childs Meadows, a small portion of which, is within Project boundaries. Approximately half of the surrounding forest lands including those within the Project area are rated as being within a Very High Fire Hazard Severity Zone as rated by Cal Fire. The other half of these surrounding forested areas are rated as having either a High or Moderate Fire Hazard Severity Zone rating.

Environmental Consequences

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:

a) Substantially impair an adopted emergency response plan or emergency evacuation plan? and-

No Impact. The Project area is located within a meadow complex surrounded by public and privately managed forestlands. Both public and private lands within and surrounding the Project area are included in CAF and Lassen National Forest fire management plans. These planning documents address current fire conditions, infrastructure and resources available to protect natural resources and developed sites, as well as procedures to address wildfire events. The nature of Project work including its size, impacts to vegetation and the limited use of roads are such that no impact to any public or private emergency response or evacuation plan is anticipated.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose Project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire? -and-

Less than Signiant with Mitigation Measures: The Project area is located on flat meadowland areas with a very small portion of Project work to be completed at the edge of mildly sloping forested upland areas away from the State Route 36E/89 road prism. Completion of Project work will result in the rehydration of meadows soils and a raise in the area's water table improving conditions and long-term health of both meadow and upland species. As a result, fire ignition and spread risk under normal fire weather conditions will be improved both during and after Project work has been completed. In addition, there are no homes and very few developed sites near the Project area. **Mitigation Measure HAZ-6: Fire Protection Equipment** will reduce the risk of wildfire and potential exposure of Project area occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. **(See Figure AQ 1: Sensitive Receptors Within the Vicinity of the Childs Meadows Project Area.)**

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment? -and-

Less Than Significant with Mitigation Measures. No changes to local road, fire management or infrastructure will occur in order to implement or complete Project work. Ongoing forest, fire and fuels management activities on surrounding CAF and the Lassen National Forest parcels will continue further improving forest conditions surrounding the Project area. In addition, **Mitigation Measure HAZ-6** along with Project specific best management practices will reduce fire ignition and spread to a less than significant level.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Less Than Significant with Mitigation Measures. The Project area is located on flat meadowlands and immediately adjacent, mildly sloping forested upland areas. The nature of Project work will improve meadow and forest conditions within the Project area. It is anticipated that increased retention of water within Childs Meadows soils and its aquafer will reduce fire risk related to desiccated soil and vegetation during dry periods. Increased water retention is also expected to increase moisture available to vegetation within surrounding forested upland areas. Ongoing fire/fuels and forest management activities of CAF and the Lassen National Forest within surrounding foreland areas will increase overall forest health and further reduce the risk of wildlife ignition and spread. In addition, **Mitigation Measure HAZ-6** along with Project specific Best Management Practices will reduce fire ignition and spread to a less than significant level.

No significant adverse impacts related to Wildfire are anticipated with the implementation of Mitigation Measures.

Mandatory Findings of Significance

XXI. Mandatory Findings of Significance		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a.	Does the Project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b.	Does the Project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" meant that the incremental effects of a Project are considerable when viewed in connection with the effects of past Projects, the effects of the other current Projects and the effects of probable future Projects)?	☐	☒	☐	☐
c.	Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Regulatory Setting

CEQA Guidelines Section 15065 states that the Lead Agency shall find that a project may have a significant effect on the environment, and thus require that an environmental impact report be prepared, where there is substantial evidence that checklist items a) through c) may occur. When Mitigation Measures or project modifications are adopted that will avoid or mitigate a significant effect on the environment, the Lead Agency need not prepare an environmental impact report.

Environmental Consequences

a) ***Does the Project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? -and-***

b) ***Does the Project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" meant that the incremental effects of a Project are considerable when viewed in connection with the effects of past Projects, the effects of the other current Projects and the effects of probable future Projects)? -and –***

c) ***Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?***

Less than Significant with Mitigation Incorporated. The **Restoring the Deer Creek Headwaters at Childs Meadows Project** will not substantially degrade the quality of the environment, substantially reduce habitat for fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels or threaten to eliminate a plant or animal community. As designed, proposed project work will not substantially reduce the number or restrict the range of a rare or endangered plant or animals, eliminate important examples of the major periods of California history/prehistory, negatively impact Tribal Cultural Resources, result in cumulatively considerable impacts, or substantially adversely affect human beings. Such a potential does not exist because of the restorative nature of proposed Project work, the cumulative positive impact this Project and similar efforts underway within the Childs Meadows complex will have on water quality, the hydrologic functioning of the Childs Meadows complex as well as on aquatic, meadow and upland species. In addition, all Project work will be implemented in such a manner as to avoid or reduce short-term impacts on sensitive resources through implementation of environmental commitments, specific Mitigation Measures and Best Management Practices that will protect natural, cultural, and tribal resources. Specific, Mitigation Measures will be implemented to reduce or avoid potential impacts to the following resources: Air Quality, Biological Resources, Cultural Resources, Hazards/Hazardous Materials, Hydrology/Water Quality, Noise, Tribal Cultural Resources and Wildfire **(See Mitigation Measures related to Hazards and Hazardous Materials)**.

APPENDICES

Appendix A: Mitigation Monitoring and Reporting Plan Air Quality

Mitigation Measure #AQ-1: Fugitive Dust

- All ground-disturbing operations shall be suspended when winds exceed 20 miles per hour or when winds carry dust beyond the Project area despite implementation of all feasible dust control measures.
- Traffic speeds on all unpaved surfaces shall be reduced to 15 miles per hour or less.
- Unnecessary vehicle traffic shall be reduced by restricting access.
- The time and location of fugitive dust generating activities shall be staggered in order to prevent impacts related to airborne particles.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #AQ-2: Construction Equipment Exhaust (*also applies to Greenhouse Gas Emissions*)

- All construction equipment shall be maintained in proper tune according to manufacturer's specifications. Maintenance, repair and tuning reports for equipment shall be maintained by the RCDTC Project Manager and incorporated into the RCDTC Project file.
- To the extent practicable, the use of diesel construction equipment meeting the CARB's 1996 or newer certification standard for off-road heavy-duty diesel engines shall be maximized.
- Unnecessary vehicle idling shall be restricted to 5 minutes or less.
- Visibility emissions from stationary diesel-powered equipment shall not exceed 40% opacity for more than three minutes in any one hour.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #AQ-3: Registration of Heavy Equipment: (*also applies to Greenhouse Gas Emissions*)

All heavy equipment shall be registered with the State Portable Engine Registration Program. Equipment operators shall adhere to **Tehama County Air Pollution Control District** regulations pertaining to fugitive dust.

Schedule:
Responsible Party:
<u>**Verification of Compliance**</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #AQ-4: Burn Permits (*also applies to Greenhouse Gas Emissions*)

Any burning of Project related debris shall be conducted during the regular burn season when fire danger is low and wildland fuels are sufficiently cured to assure a clean burn. The **Tehama County Air Pollution Control District (TCAPCD)** shall determine the burn day status prior to initiating any burning activity. Burning operations shall only be initiated on permissive burn days while following all federal, state, and local requirements in order to assure that burning activities are conducted in a manner and at a time that will have a less than significant level of impact to air resources. A violation of TCACP related provision is a violation of section 41852 of the California Health and Safety Code. A copy of the burn permit shall be submitted to the **TCACP** prior to any burning activity with a copy provided to the **RCDTC Project Manager** for retention in the RCDTC Project file. The RCDTC Project Manager's copy of all burn permit documents shall be submitted to:

Resource Conservation District of Tehama County
2 Sutter Street, Suite D
Red Bluff, CA 96080

The **TCAPCD** shall assure adherence to the provisions of this Mitigation Measure.

Schedule:
Responsible Party: **TCACP**
<u>**Verification of Compliance**</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #AQ-5: Materials Prohibited from Burning in Connection with a Project Work (*also applies to Greenhouse Gas Emissions*)

Areas where Project related burning shall occur shall be free of vegetative material that has not been generated within the **Restoring the Deer Creek Headwaters at Childs Meadows Project**. The following materials are prohibited from burning within Project area: tires, rubbish, plastic, treated wood, construction/demolition debris, or material containing asbestos.

Schedule:
Responsible Party:
<u>**Verification of Compliance**</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Biological Resources

Mitigation Measure BIO 1: Survey and Protection Requirements for the Cascade Frog
Suitable Cascades frog habitat in areas identified for restoration activities shall be surveyed immediately prior to commencement of impactful Project work. Suitable Cascades frog habitat as related to protection measures include saturated soils or wetter. If the restoration area is not suitable Cascades frog habitat, Project work may commence. If frogs are observed during these surveys, all operations within 23 meters of the observation shall halt, and CDFW shall be contacted for site-specific protection measures. If Cascades frogs are not observed, but the area where suitable habitat exists within or immediately adjacent to Project impact areas, a qualified and permitted biologist shall survey such habitat for frogs in the morning prior to each day's restoration/implementation activities. If frog(s) are present, observed individuals shall be captured and held in an appropriate manner until potently impactful activities occurring with 23 meters of the capture site have been ceased for the day. Appropriate containment of frogs shall include placing individuals in clear plastic bins that have been tilted on angle and partway filled with cold stream water so the frog can choose to be in or out of the water. Bins shall also be placed in a shaded location. Exact protection measures shall be refined in consultation with CDFW personnel. The timing of restoration activities shall occur after tadpoles have metamorphosed. In the southern Cascades, larvae usually hatch in June and metamorphose in late August.

Schedule:
Responsible Party:
<u>**Verification of Compliance**</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure BIO 2: Prohibition Against the Removal of Downed Trees and Logs
No previously downed trees or logs shall be removed when harvesting material for BDA construction.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure BIO 3: Preconstruction Surveys and Protection of Sandhill Crane Nest Sites and Flightless Young
Preconstruction nesting surveys shall be completed within 0.5 mile of the proposed work area no more than 30 days prior to the start of any impactful activity conducted during the breeding season (April 1 through July 31). If no occupied nests are found, no further mitigation shall be required. If active nests or flightless young are identified within the survey area, no-disturbance buffers shall be established at a distance sufficient to minimize disturbance based on the nest location, topography, and cover. Due to greater sandhill cranes classified as a California Fully Protected species with no take authorization and that they are sensitive to disturbance, the no-disturbance buffer shall be no less than 152 meters. If active nests or flightless young are found within the survey area but outside of the 152 meter no-disturbance buffer, a qualified biologist shall be on site to monitor the nest/flightless young for signs of disturbance (e.g., agitated behavior or modified foraging or feeding behavior). If it is determined by the biologist that construction activities are resulting in disturbance, work shall cease immediately and CDFW shall be contacted to determine adequate protective measures.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure BIO 4: Use of Mechanical Equipment During Northern Goshawk Nesting Season
The use of mechanical equipment shall be avoided during the Northern Goshawk nesting season (February 15 to September 15), to a distance of ¼ mile of suitable nesting habitat or if a nest is confirmed. This restriction may be lifted if it is determined through intensive stand searches or other surveys that the suitable habitat is not occupied. If a northern goshawk nest is found in the Project area or within a ¼ mile of proposed treatment areas, the nest tree shall be protected from removal of other impacts. Improved meadow habitat will likely provide long-term benefits to this species.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure BIO 5: Protection of Osprey Nests

If active nests are found within 1/8 mile of any Project impact site, such areas shall be protected from impacts including discontinuance of Project work.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure BIO 6: Willow Cutting Near Willow Flycatcher Territories

No willows shall be cut within 164' (50 m) of all currently known willow flycatcher territories shown in **Figure Bio-4: Map of known willow flycatcher territories within the Childs Meadows complex** and any new willow flycatcher territories that may be established during future pre-restoration surveys.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure BIO 7: Work Restrictions During Willow Flycatcher Nesting Season

Impacts to willow flycatchers from disturbance shall be avoided by prohibiting within-meadow restoration activities within its nesting period of June 1 through August 15. This restriction may be lifted if it is determined through intensive searches or other appropriate surveys that the suitable habitat is not occupied. Meadow restoration is expected to improve habitat for willow flycatcher by rewetting the meadow, increasing frequency of floodplain inundation, and increased riparian shrub cover, factors known to improve habitat for these species.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure BIO-8: Yellow Warbler Work Period Restrictions
Meadow restoration activities shall be restricted to those time periods outside the Yellow Warbler nesting period of May 15 through July 31.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure BIO-9: Avoidance and Protection of Sensitive Plant Species.

The following protective measures shall be implemented in order to avoid or prevent impacts to sensitive plants as identified and described in **Appendix G Childs Meadows Restoration Project Botanical Survey Report**.

- Flag populations with highly visible flagging and establish a 30' buffer from the population's edge.
- Educate persons performing restoration activities as to locations of sensitive plants and provide a picture guide so they can familiarize themselves with sensitive species.
- The following are recommended to avoid or minimize any direct or indirect impacts from project activities and are recommended on an individual species basis:
    - Flag and avoid population of flat leaved bladderwort with a 30' buffer.
    - Flag with a 30' buffer, populations of Shasta beardtongue near where staging area shall be established.
    - Flag a pathway from the staging area into the restoration activity area avoiding Shasta beardtongue individuals.
    - Flag and avoid populations of tufted loosestrife with a 30' buffer.
    - The following measures apply to the Cream Flowered Bladderwort
    - Flag and avoid populations of cream-flowered bladderwort in Treatment Area 13 with a 30' buffer.
    - Develop a transplanting and monitoring plan for the cream-flowered bladderwort.
    - Transplant the individuals of cream-flowered bladderwort that fall within the disturbance footprint, or deep (>8"- 1 ft.) inundation zones, of Treatment Area 10.
    - Individuals shall be moved upstream, ensuring the site has similar soil (peat), hydrologic, vegetation type and aspect. Selected transplanting sites shall extend the known population spatially, by planting beyond the known perimeters of the existing population as feasible in order to maintain population coverage. Transplanting shall occur in the season determined to have the greatest potential for success, (generally the fall), after the turions have formed on the bladderwort. Transplanting shall occur in a 25 to 1 ratio for each individual that may be destroyed, and some propagules may be used from the population to the south (T28N R5E NW 1/4 of Section 6). Transplants shall be monitored every month for the first year during the growing season, then subsequently, for the first two years. After two summer seasons of monitoring finding successful establishment and flowering for the second season, transplanting shall have been deemed successful.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure BIO# 10: Pre-Implementation Surveys

Conduct surveys for sensitive plants in the appropriate phenological time period, at least 30 days prior to Project implementation activities.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #BIO 11: Protection of Previously Unidentified Listed Plants:

If during the implementation of Project work, any previously unidentified plants shown in **Table BIO-2: Scoping List of Plants** or **Table BIO-3: List of Special Status Plants, Their Habitat Preferences and Results from Botanical Surveys of the Restoring the Deer Creek Headwaters Project at Childs Meadows Project Area** are detected by the **RCDTC Project Manager**, other RCDTC representative or any Project personnel, all Project related activities shall immediately stop and a 25' "No Treatment Area" shall be established and flagged around the perimeter of any occurrence by these species individuals.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #BIO 12: (Protection of Migratory Bird Treaty Act Species)
In order to protect any species covered by the Migratory Bird Treaty Act (MBTA), no Project work of any kind shall occur between March and August 10, unless the following is implemented: 1). A survey is conducted by a biologist or other persons with knowledge of and ability to recognize species protected by the MBTA within 0.5 miles of the Project area during the nesting season of listed species and it is determined that there are no occupied nests within the proposed Project area. 2). If an occupied nest is found, then a biologist or other person with knowledge of, and ability to recognize, species protected by the MBTA shall determine if the birds present are those protected by the MBTA. If an MBTA species is located then a 100' "No Treatment Area" shall be established around the nest during the breeding season. If raptor species are found, the provisions of **Mitigation Measure #BIO 13 (Raptor Protection)** related to raptor protection shall also apply. Modifications and possible reduction in "No Treatment Area" size may be made after consultation with the California Department of Fish and Wildlife personnel. If Project work is delayed or suspended for more than 15 days after surveys have been completed, the Project area shall be resurveyed for MBTA or raptor species prior to reinitiating of Project work.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #BIO 13: (Raptor Protection):
A wildlife biologist with appropriate training in the identification of raptors shall perform a walk-through survey of treatment areas shortly before any Project work is implemented. This walk-through survey shall include examination of nests for raptor activity, visual searches for whitewash, listening for calls, and any other evidence of nesting raptors in the harvest unit. If field personnel detect raptor presence, appropriate protection measures as described below for that particular species shall be established. Upon discovery of an occupied raptor nest or any unknown large bird, the **RCDTC Project Manager** or a wildlife biologist (after conferring with the RCDTC's Project Manager) shall inform all personnel involved with Project work of such sightings. Upon notification, vegetation disturbing activities shall be suspended within one mile of the nest. Activities may resume after the species using the nest is identified and the appropriate measures described below to protect the nest are implemented on the ground.

Raptor Protection Measures
Listed Raptors
If an occupied nest of an Endangered Species Act or California Endangered Species Act listed raptor is discovered during Project work, the Contractor shall protect the nest tree, screening trees, perch trees, and replacement trees from any Project work including, (1) suspension of Project work within one mile of the nest, (2) suspension of all Project work within a 375-foot radius buffer of the occupied nest, and (3) immediate notification and consultation by the of the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service as appropriate. Modifications and possible reduction in "No Treatment Area" size may be made after such consultation has been completed.

Non-Listed Raptors
If an occupied nest of a non-listed raptor is discovered during Project work, all vegetation disturbing activities within one mile of the occupied nest shall be suspended. Upon such suspension, the **RCDTC**

Project Manager or a professional biologist shall designate the nest trees, perch trees(s), screening tree(s), and replacement trees(s), for which a "No Treatment Area" shall be established.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #BIO 14: (Fisher Protection):
Prior to Project implementation, the **RCDTC Project Manager** or biologist shall look for freshly excavated cavities suitable for fisher dens on green trees or snags proposed for use as woody material having a diameter between 10" and 12" and that are located 6' to 12' above ground level. In addition, within the Project area, a potential den structure is defined as any hardwood with visible indicators of cavity formation (dead or alive) ≥15 inches DBH, a conifer snag ≥22 inches DBH, or a live green cull or green wildlife conifer ≥22 inches DBH. A live green cull is a conifer tree with less than 25% merchantable wood by volume. A green wildlife conifer is considered a potential den structure when it has mistletoe brooms, large rest ranches, and visible signs of fungus or other indications of cavity formation or visible cavity openings. The **RCDTC Project Manager** or biologist shall contact CDFW for consultation if site-specific avoidance measures are needed that differs from those described above. Any additional site-specific avoidance measures developed through consultation with CDFW shall provide greater or equal protection to those stated here.

Den snags shall be protected by flagging the snag itself and establishing a flagged 375' radius "No Treatment Area". If a fisher is sighted in treatment areas by equipment operators or other Project personnel during any Project work, all vegetation disturbing activities shall be suspended within that area and the **RCDTC Project Manager** or biologist shall be notified. If a den or habitation of a fisher is discovered, all operations shall be suspended and a survey for a fisher den shall be completed. If a den is found a, flagged 375' radius "No Treatment Area" shall be established around the identified den or habitation. The Department of Fish and Wildlife shall then be immediately notified.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure# BIO 15: (Protection of Riparian Vegetation):
Prior to Project implementation, the **RCDTC Project Manager** shall determine and identify the exact location of equipment access points along with stream course crossings using those sites that are stable and that will minimize riparian disturbance. During implementation of Project work as much understory vegetation shall be retained as possible in order to maximize shade producing and bank stabilizing vegetation during Project implementation. Soil compaction shall be minimized using equipment with a greater reach or that exerts less pressure per square inch on the ground, resulting in less overall area disturbed or less compaction of disturbed areas. Disturbed soils shall be decompacted at the Project's completion as mobile equipment exits Project impact areas. Disturbed and decompacted areas shall be revegetated, with native species specific to the Project location that comprise a diverse community of woody and herbaceous species.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure BIO 16: Minimizing of Impacts to Aquatic Habitat and Species during Dewatering of the Project Site

When Project implementation work occurs within a year-round flowing channel, the Project site must be dewatered. In order to prevent or minimize impacts including the temporary loss of aquatic habitat; stranding, displacement, or crushing of fish and amphibian species along with increased turbidity from disturbance of the channel bed, the following measures shall be implemented during dewatering operations:

- Determination by the RCDTC Project Manager and CDFW personnel as to the most appropriate specific means of bypassing flow around the work area in order to minimize channel disturbance and avoid direct mortality of fish and other aquatic vertebrates.
- Coordinate project site dewatering with a fisheries biologist qualified to perform fish and amphibian relocation activities.
- Minimize the length of the dewatered stream channel and duration of dewatering.
- Bypass stream flow around work area but maintain stream flow to channel below project impact sites.
- Periodically pump the dewatered stream segment dry of seepage.
- Place pumps in flat areas, well away from the stream channel.
- Secure pump units by tying off to a tree or staking in place to prevent movement by vibration.
- Refuel pump units in an area well away from stream channels and place fuel absorbent mats under pumps while refueling.
- Cover pump intakes with 1/8" mesh to prevent entrainment of fish or amphibians that fail to be removed prior to dewatering operations.
- Check pump intakes periodically for impingement of fish or amphibians that fail to be removed prior to dewatering operations.
- Discharge wastewater from Project impact areas to an upland location where it will not drain sediment-laden water back to stream channel.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Biological Resources (Invasive Plants)

Mitigation Measure #BIO-17: Pre-Implementation Surveys for Invasive Plants

Surveys for invasive plants in the appropriate phenological time period will be conducted at least 30 days prior to Project implementation activities.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #BIO-18: Identification and Isolation of Invasive Plants

Prior to the implementation of any Project work, the **RCDTC Project Manager** or other suitably qualified individual (having knowledge in the identification and control of noxious plants) as selected by the **RCDTC Project Manager** shall survey the Project area in order to identify and if necessary, recommend treatment of CDFA listed noxious plants (including those listed in **Table BIO-4 California Invasive Plant Council Rated Non-Native and Invasive Plants Within the Project Area**). If such plant infestations are found, they shall be either 1.) flagged and avoided during Project implementation, or 2.) treated prior to Project implementation. **Appendix F Best Management Practices Developed for the Restoring the Deer Creek Headwaters at Childs Meadows Project** provides information on approved best management practices related to the control of invasive plant species. Populations of invasive plants listed by Cal-IPC shall be evaluated by the **RCDTC Project Manager** or other suitably trained individual as selected by the **RCDTC Project Manager** for risk of further infestation due to Project related activities, with treatments or other mitigations applied as needed. If discrete patches of Cal-IPC listed invasive plants are identified, (e.g., species that are not already common in the Project area) all equipment staging sites shall be located outside of such infestations.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #BIO 19: 1. Soil Borne Invasive Plant and seed Material
In order to prevent the spread of soil born nonnative plant material and seed, the following protection measures shall be adhered to in connection with all Project work:

- Prior to moving soil from one location to another, the site in which soils will be obtained shall be inspected for nonnative invasive species. In the event nonnative plant material of seed is found, soil shall be obtained from another location.
- Sites where borrow soil is imported shall be monitored and treated for 3 years for invasive nonnative plants.
- Staging areas shall be located away from areas containing invasive nonnative plants.
- Pathways from staging areas to restoration locations shall be routed and buffered away from areas containing nonnative invasive plants.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #BIO-20: Post Project Monitoring for Invasive Plants

Monitoring for invasive plants infestations shall be conducted by the **RCDTC Project Manager** or other qualified individual as selected by the **RCDTC Project Manager** for three years after all Project work has been completed. The **RCDTC Project Manager** shall establish the timing and frequency of monitoring activities. If an individual other than the RCDTC Project Manager (as selected by the RCDTC Project Manager is to complete monitoring activities, that person shall have training in the identification and control of noxious plants. If necessary, to assure control of noxious plants, the **RCDTC Project Manager** may require follow up abatement once all Project work has been completed. Inspection for noxious plants, monitoring photographs shall be taken and incorporated into the RCDTC Files with follow-up abatement completed as necessary.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #BIO-21: Invasive Plants and Equipment Cleaning

In order to prevent the spread of invasive plant species, all mechanical and hand equipment to be used in the implementation of Project work shall be cleaned prior to use within the Project area. The **RCDTC Project Manager** shall assure and document equipment cleaning and adherence to **Mitigation Measure #BIO-21:** requirements in the form date-stamped representative photographs (with location labels added) of all equipment to be used in the execution of Project work. Photographs shall be taken by the **RCDTC Project Manager** or another individual as selected by the **RCDTC Project Manager** before any Project work is implemented. Photographs shall indicate that such equipment has been cleaned off site prior to use within the Project area. A copy of these photographs shall be incorporated into the RCDTC Project files within 7 days of being taken.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #BIO-22: Prevention of Invasive Plant Infestations Related to Soils Borrow Sites

In order to prevent the spread of invasive plant species found at borrow sites, if such plants are identified within these areas, they shall be flagged and material not utilized in connection with any Project work. All sites in which fill material is utilized shall be monitored for a period of 3 years to assure that such species are not developing.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Cultural Resources

Mitigation Measure #CUL 1: Protection of Identified Cultural Resources

All new and previously recorded archeological sites identified during field surveys completed in connection with the preparation of this Initial Study/Mitigated Negative Declaration and documented in a previous archeological report entitled **"Cultural Resources Assessment of the Childs Meadows Head Cut Stabilization and Repair Project Area, Tehama County, California** (Peak and Associates) dated October 2014 shall be protected through complete avoidance. A flagged 50' "No Treatment Area" shall be established around each of these sites by the **RCDTC Project Manager** or prior to implementation of any Project work.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #CUL 2: Protection of Newly Discovered Archeological, Prehistoric, Historic or Paleontological Resource

Within areas of ground or vegetation disturbing activities, if Project work appears to expose any previously unknown archeological, prehistoric, historic or paleontological resource sites within the impact area of any Project work or within 15.4 meters beyond the Project work impact boundaries, the site shall be avoided. Work may continue elsewhere within the overall Project area. Exposed cultural or paleontological resources shall be appropriately flagged in order to immediately establish a "No treatment Area" of at least 30.48 meters. A professional archeologist shall examine the site, evaluate found objects and make a finding of their significance. The archeologist shall also develop recommendations for the permanent protection of objects and site treatments as necessary. Identified sites shall be permanently protected through avoidance. These sites shall be made off limits to personnel, equipment, and Project related impacts of any kind. A professional archeologist shall determine an appropriate permanent flagged exclusion zone once the site has been adequately assessed for significance. Findings of significance shall be prepared and submitted to appropriate agencies and Native American groups at the discretion of the professional archeologist. As appropriate, findings shall be recorded in the RCDTC Project files.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #CUL 3: Discovery of Human Remains

If during the execution of Project work, human remains are found, the **RCDTC Project Manager** or other RCDTC personnel with supervisory responsibility shall, after having informed the RCDTC Project Manager of such findings, halt work at that location until a professional archaeologist visits the site in order to assess their significance, process the remains and immediately notify the County Coroner. If the remains are determined by the County coroner to be Native American, the Native American Heritage Commission (NAHC) and Native American groups at the discretion of the professional archeologist shall be notified within 24 hours and the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains. Findings of significance shall be prepared and submitted to appropriate agencies at the discretion of the professional archeologist. Findings shall also be recorded in the Project files by the **RCDTC Project Manager**. Project work may continue on other non-impacted portions of the Project area.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #CUL 4: Cattle Supplement Stations

If the Collins Almanor Forest continue to issue grazing permits, a requirement shall be incorporated into these stating that salt blocks, feed and supplement stations shall not be placed within the boundaries or buffer zones of archaeological sites.

Schedule:
Responsible Party:
<u>**Verification of Compliance**</u>:
Monitoring Party: CAF
Initials: ____________
Date: ____________

Hydrology and Water Quality

Mitigation Measure HYDRO-1: Stormwater Pollution Prevention Plan

A Stormwater Pollution Prevention Plan shall be implemented prior to initiation of Project work. The RCDTC shall implement BMPs identified in the SWPPP and those Shown in **Appendix F Best Management Practices Developed for the Restoring the Deer Creek Headwaters at Childs Meadows Project** for controlling soil erosion and discharges of other Project related contaminants. Such BMP's shall be in addition to the specific Mitigation Measure listed in this Initial Study/Mitigated Negative Declaration. Routine monitoring and inspection of BMPs shall be conducted by the **RCDTC Project Manager** to ensure that the quality of storm water discharges is in compliance with the permit. BMPs required to be incorporated into the SWPPP include:

- Soil stabilization measures, such as preservation of existing vegetation and use of mulch or temporary plantings to minimize soil disturbance;
- Sediment control measures to prevent disturbed soils from entering waterways;
- Tracking control measures to reduce sediments that leave the Project site on vehicle or equipment tires;
- Non-stormwater discharge control measures, such as monitoring water quality of dewatering operations and hazardous material delivery along with storage, and emergency spill response requirements.

The **RCDTC Project Manager** shall ensure that BMPs are implemented as appropriate throughout the duration of Project work and shall be responsible for contractor and subcontractor compliance with the SWPPP requirements. In addition, the SWPPP shall include information on:

- The project's Implementation schedule
- Pollutant source identification
- Storm water BMPs
- Erosion control
- Sedimentation control
- Maintenance and Inspections
- Post Project implementation storm water management

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #HYDRO 2: (Protection of Existing Drainage Features

Any existing drainage features shall be protected from Project related impacts and shall remain free of obstruction.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Hazards and Hazardous Materials

Mitigation Measure #HA/HAZ-1: Protection Against Hazardous Material Spills in Streams and Riparian Zones (*also applies to Biological Resources and Hydrology and Water Quality*)

To reduce potential impacts associated with fuel spills in streams and riparian areas, the **RCDTC Project Manager** or other qualified individual as determined by the RCDTC shall ensure that fuels and lubricants are at no time transported across a live stream other than in the tank of equipment being moved or already applied to such equipment. Only existing roads and stream crossings or new formally developed crossings shall be used to move personnel, equipment and materials across stream courses as well as into and out of the Project site unless previously approved by the **RCD Program Manager**. **Appendix E Best Management Practices Developed for the Restoring the Deer Creek Headwaters at Childs Meadows Project** provides information on approved protective practices related to the protection of resources from the impact of hazardous spills in stream and riparian areas

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure # HA/HAZ-2: Equipment Refueling and Maintenance Precautions (*also applies to Biological Resources and Hydrology and Water Quality*)

The **RCDTC Project Manager** or other qualified individual as determined by the RCDTC, shall select refueling and maintenance sites for all equipment including power hand tools within flat sites that are away from TEBs and other buffers related to dry or wet waterways along with areas that could potentially flow into a stream or other waterway in the event of an accidental spill. Such sites shall also be established outside of TEBs and other exclusion zones established in order to protect wildlife and plant resources along with Cultural Resource Exclusion Buffers established to protect cultural and tribal resources. Fuel containment equipment including absorbent sheets and waddles shall be made available by the **RCDTC Project Manager** at all refueling and maintenance areas. The **RCDTC Project Manager,** other responsible RCDTC personnel and equipment operators shall be responsible for the immediate containment and removal of any spilled material and shall immediately inform the **RCDTC Project Manager** of such spills. The **RCDTC Project Manager** shall then immediately contact appropriate authorities including the CDFW informing them of such spills. The **RCDTC Project Manager** shall inform all workers of the importance of preventing spills and of the appropriate measures to take should a spill occur. Equipment shall be stored and maintained within properly cleared areas. The **RCDTC Project Manager** or other responsible RCDTC personnel shall inspect refueling areas to assure compliance with **Mitigation Measure #HA/HAZ 2**. **Appendix E Best Management Practices Developed for the Restoring the Deer Creek Headwaters at Childs Meadows Project** provides information on approved best management practices related to equipment refueling and maintenance that will protect resources from the impacts of such operations.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure # HA/HAZ-3: Limitations on Equipment Use (*also applies to Biological Resources and Hydrology and Water Quality*)

The following conditions apply to the use of equipment in connection with proposed Project work:

- A contained area shall be designated for equipment storage, short-term maintenance, and refueling and shall be located at least 50’ from waterbodies.
- Major vehicle maintenance and washing shall be conducted off site.
- All spent fluids including motor oil, radiator coolant, or other fluids either vegetable or petroleum based, along with used vehicle batteries shall be collected, stored, and recycled as hazardous waste off site.
- Dry cleanup methods (i.e., absorbent materials, cat litter, and/or rags) shall be used whenever possible.
- Spilled dry materials shall be swept up immediately.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure # HA/HAZ-4: Equipment Inspections Related to Oil and Fuel (*also applies to Biological Resources and Hydrology and Water Quality*)

The **RCDTC Project Manager** or other qualified individual as determined by the RCDTC shall make periodic inspections of equipment for leaking oil or fuel correcting or repairing any such leaks prior to resuming their use or crossing any stream channels. The **RCDTC Project Manager** or other qualified individual as determined by the RCDTC shall be responsible for all repairs made in order to assure adherence to **Mitigation Measure #HA/HAZ-4:** Inspection reports shall be submitted to:

Resource Conservation District of Tehama County
2 Sutter Street Suite D
Red Bluff, CA 96080

The results of these inspections reports shall be incorporated into the RCDTC Project files along with evidence of any repairs required and completed before returning equipment to Project work sites.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure # HA/HAZ-5: Communications Equipment

The **RCDTC Project Manager** shall assure that dependable radios or phone communication is available at all Project area work sites in order to report emergencies that may occur.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #HA/HAZ-6: Fire Protection Equipment (*also applies to Air Quality, Biological Resources, Greenhouse Gas Emissions, and Hydrology and Water Quality*)

To reduce impacts associated with exposure of people or structures to wildland fires, the **RCDTC Project Manager** shall ensure that adequate fire protection equipment is available at work sites. This shall include fire extinguishers attached to all mechanized equipment. In addition, firefighting hand tools shall be made available at all areas where equipment is operated. The **RCDTC Project Manager** and all workers shall comply with all applicable fire safe standards as found in Public Resources Code Division 4, Chapter 6, (PRC's 4427, 4428, 4429, 4431, 4442, list not all inclusive). Vehicles shall not be parked in tall grass or any other location where heat from the exhaust system could ignite a fire. All motorized equipment shall have approved spark arrestors. A Project work log shall be maintained which documents that contractors and/or landowners have provided equipment for adequate fire protection prior to the start of any Project work by the contractor and/or landowners, and that firefighting hand tools have been made available at all areas where equipment is operated. A copy of the Project work log shall be sent on a weekly basis during the execution of Project work to:

Resource Conservation District of Tehama County
2 Sutter Street, Suite D
Red Bluff, CA 96080

with a copy retained in the RCDTC Project files, in order to document compliance with **Mitigation Measure #HA/HAZ-6.**

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #HA/HAZ-7: Use of Bio-Hydraulic Fluid: All fueled equipment to be operated within meadow, aquatic and other sensitive areas shall use vegetable based hydraulic fluid. Documentation certifying the use of bio hydraulic fluid shall be provided to:

Resource Conservation District of Tehama County
2 Sutter Street, Suite D
Red Bluff, CA 96080

with a copy retained in the RCDTC Project files, in order to document compliance with **Mitigation Measure #HA/HAZ-7.**

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Noise

Mitigation Measure NOISE-1: Implement General Noise Protection and Reduction Measures

- Equipment not in use shall not be left idling for more than 5 minutes.
- All noise producing equipment shall be equipped with noise control devices such as mufflers, in accordance with manufacturers' specifications and shall be maintained in proper operating condition.
- Transportation routes shall be coordinated, and equipment arranged to minimize disturbance to noise-sensitive uses.
- The **RCDTC Project Manager** or an appointed disturbance coordinator shall respond to all public complaints.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure NOISE-2: Limited Period of Operation
All Project activities entailing the use of mechanical equipment or engines, including mechanical hand tools, shall be conducted between the hours of 7 AM to 7 PM.

Schedule:
Responsible Party:
<u>Verification of Compliance</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Transportation and Traffic

TRANS/TRAFFIC-1: Authorization for Access onto County Maintained Roads, State Highways or Road Rights-of-Way.

If Project work described in this Initial Study/Mitigated Negative Declaration will enter into the right-of-way along any State, County, National Forest or privately maintained road, access authorization shall be obtained from Cal Trans District 2, the Tehama County Public Works Departments, the Lassen National Forest or the owner of any private road. A separate authorization shall be obtained for each occurrence of entry into a State, County, U.S. Forest Service Road. Only a single access authorization will be required for all Project related entries onto private roads. All State, County and federal regulations related to right-of-way access and road use shall be adhered to during the implementation of all Project work. Adherence shall also be given to all provisions established in access agreements executed between the RCD of Tehama County and private landowners.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Tribal Cultural Resources

Mitigation Measure #TCR-1: Tribal Consultation (*also applies to Cultural Resources*)

If Native American archaeological or other cultural materials are discovered during implementation of any Project work, consultation shall be conducted between the **RCDTC Project Manager** and appropriate tribal representatives. Consultation shall entail the development of in place resource avoidance and preservation measures or revisions to the Project's implementation that result in avoidance of the resource and protection of its cultural and natural context. Tribal and other cultural resources shall be treated in a culturally appropriate manner taking into account tribal cultural values and meaning of the resource, including:

- Protecting the cultural character and integrity of the resource
- Protecting the traditional use of the resource

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #TCR-2: Formally Established Buffer Zones Around Mapped and Unmapped Tribal Resource Sites (*also applies to Cultural Resources*)

Project related activity shall avoid all potential direct and indirect effects within a 100' (30 meters) buffer zone established around all sides of mapped tribal resource site boundaries. If Project personnel discover previously unidentified tribal resources during implementation of Project work, the **RCDTC Project Manager** shall be notified, and all work halted until the inadvertently discovered tribal resources can be analyzed by an appropriate tribal representative or profession archeologist. Upon completion of analysis, a 100' buffer shall be established around such sites.

Schedule:
Responsible Party:
<u>**Verification of Compliance**</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #TCR-3: Formal Establishment of Prohibition Against Looting Within the Project Area and Surrounding Lands (*also applies to Cultural Resources*)

The **RCDTC Project Manager** shall establish and covey to all Project participants and personnel a prohibition against looting and that such activity is disqualifying action and subject to law enforcement.

Schedule:
Responsible Party:
<u>**Verification of Compliance**</u>:
Monitoring Party:
Initials: ____________
Date: ____________

Mitigation Measure #TCR-4: Tribal Consultation (*also applies to Cultural Resources*)

If Native American archaeological or other cultural materials are discovered during implementation of any Project work, consultation shall be conducted between the **RCDTC Project Manager** and appropriate tribal representatives. Consultation shall entail the development of in place resource avoidance and preservation measures or revisions to the Project's implementation that result in avoidance of the resource and protection of its cultural and natural context. Tribal and other cultural resources shall be treated in a culturally appropriate manner taking into account tribal cultural values and meaning of the resource, including:

- Protecting the cultural character and integrity of the resource
- Protecting the traditional use of the resource

Schedule:
Responsible Party:
<u>**Verification of Compliance**</u>**:**
Monitoring Party:
Initials: ____________
Date: ____________

Appendix B: Best Management Practices

The following Best Management Practices (BMP) shall be utilized during implementation of the **Restoring the Deer Creek Headwaters at Childs Meadows Project**. These BMPs have been developed and incorporated into this Project's work scope in order to reduce or eliminate impacts to the aquatic, riparian, wetland and upland areas found within the Project area. Proposed BMPs include temporary measures that are only applied and effective during implementation activities and/or permanent measures that work to control erosion and sedimentation as well as improve storm water quality during and implementation efforts. The erosion and sediment control techniques to be utilized during Project implementation will conform *to CDFW California Salmonid Stream Habitat Restoration, Manual Parts IX and X,* or to other acceptable BMP programs that are employed for restoration of mountain meadows and protecting water quality. In addition, implementation of Project work will strictly follow all of the requirements stated in the CDFW Streambed Alteration Agreement and other water quality protection permits and agreements.

It is anticipated that all Project work will be completed within one to two years during the dry summer and fall months (approximately August 1 through October 31) or as late as feasible. When operations are completed, any excess materials or debris will be removed from the Project area. Structures and associated materials not designed to withstand high seasonal flows (i.e., temporary access structures) will be removed as well. Between work seasons, all materials, debris, structures and associated materials will be removed from the Project site or stored in areas above the ordinary high water mark before wet period flows occur.

BMP Selection Criteria

The selection of Best Management Practices for the **Restoring the Deer Creek Headwaters at Childs Meadows Project** was based the following criteria:

- Formally delineated limits of clearing and grading activities.
- A determination that buffer strips or natural vegetation can be utilized as a control measure.
- The arrangement of all Project components within and around the Childs Meadows complex that impact their physical surroundings.
- Identified opportunities for staging or sequencing Project implementation activities to minimize the amount and period of exposure of disturbed soils.
- A determination that most existing vegetation can be preserved.
- The incorporation of scheduling and/or phased implementation into the Project.

Scheduling

Purpose: To encourage the sequencing of Project implementation activities and minimize the exposure of un-stabilized soils to erosion by wind, rain, and runoff.

Applications: All locations that include grading, earthwork or any other impactful activities.

Standards and Specifications:

- The **RCDTC Project Manager** shall develop and maintain a project site check list and schedule for completion of work. The checklist and schedule will provide the date that each Project implementation task will begin and be completed. All erosion and sediment control measures will be incorporated into the Project schedule.
- No earthwork will be completed during the local wet season (October 31st to May 1st).
- Work will be scheduled in order to minimize the extent of site disturbance at any one time.

Inspection and Maintenance:

- On a bi-weekly basis, the **RCDTC Project Manager** shall verify that Project work is on schedule according to the Project plan.
- If required once Project work is underway, the **RCDTC Project Manager** shall revise the originally established Project schedule well in advance of the events requiring such changes in order to prevent problems and to maintain control when changes to the schedule are unavoidable. Significant changes to the original Project schedule will be communicated to appropriate government agencies as determined necessary by the **RCDTC Project Manager**.

Phased Project Implementation

Purpose: To reduce on-site erosion and sediment transport off-site by sequencing land disturbance and erosion and sediment control measures.

Applications: Locations where water quality might be impacted by erosion from earthwork.

Limitations: Weather and other unforeseen conditions that may affect Project phasing.

Standards and Specifications: Project phasing schedules will include at a minimum the following:

- A schedule for the installation of erosion and sediment controls.
- A schedule that is compatible with the general Project schedule.

The following table lists the **Restoring the Deer Creek Headwaters at Childs Meadows Project**'s anticipated major site sequencing events:

1. Project area Access	Install stabilized Project area entrances/exits before earth disturbing activities begin.
2. Sediment traps and basins	Design and construct sediment traps and basins prior to stripping and grading.
3. Runoff control	Install diversion channels and dikes before the onset of grading activities.
4. Sediment Control	Install sediment control BMPs along downhill border of site.
5. Erosion control	Stabilize disturbed soils as soon as possible.
6. Land clearing and grading	Clear and grade the site after sediment and runoff control measures have been installed.

7. Maintenance	Conduct frequent inspections and remove accumulated sediments from the BMPs.
8. Surface stabilization	Apply immediately to any disturbed areas to control dust and erosion.
9. Building construction	Properly store and contain materials.
10. Maintenance	Conduct frequent inspections and remove accumulated sediments from the BMPs.
11. Landscaping and final stabilization	Stabilize the area and remove all temporary sediment control and Project related wastes.

Inspection and Maintenance:

- Verify frequently that work is on schedule according to the Project plan.
- Revise the plan before implementation of Project activities or when changes to the Project schedule are unavoidable.
- Communicate significant schedule changes to appropriated federal, State and County staff personnel to assist with inspection efforts.

Topsoil Reuse (Fill Material)

Purpose: To encourage the salvaging, stockpiling and reapplication of native topsoil and other selected materials for reuse during revegetation activities. Reuse of native topsoil can be a critical factor to the success of revegetation efforts, particularly when attempting to reestablish native vegetation.

Applications: Sites where revegetation with native plant species is desirable. Particularly applicable on cut slopes, floodplains, wetlands, stream banks, and sensitive habitat areas. Proper topsoil management can result in successful revegetation, enhanced productivity, reduced erosion, and permanent stabilization.

Limitations: Requires advanced planning prior to grading and earthwork activities. Stockpiles may constrict the area available for Project implementation activities. Stockpile runoff can negatively impact water quality.

Standards and Specifications:

- Soils information obtained in the site assessment related to the preparation of the CEQA Initial Study/Mitigated Negative Declaration will be utilized in order to identify the location, depth and amount of soils suitable for salvaging. Topsoil will be excavated carefully, avoiding large rocks and will be stockpile where it will not become contaminated.
- Topsoil will be screened to remove large rocks, roots and vegetation when necessary to establish a representative native growth medium.
- Shrubs will be carefully removed and stored with their roots covered with mulch or loose soil.
- Soil stockpiles will be covered or protected with temporary stabilization measures such as mulch or temporary vegetation.
- Temporary stabilization will be established no later than 21 days after stockpiles are created.
- Perimeters controls such as sandbag barriers will be installed as soon as practicable and will be in place prior to the onset of precipitation. The following elements will be considered when developing this Project's topsoil management plan:

- The amount and quality of existing topsoil.
- The area that topsoil will be reused, the required depth of application and methodology for salvaging topsoil.
- Stockpile location, duration of storage and protection against erosion and sediment transport. Availability of additional amendments to supplement topsoil reclamation

Inspection and Maintenance:

- Covers and perimeter controls will be inspected weekly.
- Covers and temporary stabilization measures will be repaired, replaced or augmented as necessary.
- Perimeter controls will be repaired or replaced as needed.

Coffer Dams

Purpose: Coffer dams are watertight temporary structures enclosing a water body segment in order for it to be pumped dry for construction purposes. Coffer dams are typically comprised of sandbags, concrete barriers, sheet piles, or manufactured devices. Isolation and dewatering provide a dry working area and is often necessary to prevent adverse environmental impacts from the construction activities. Silt fences, straw bales or other flow-filtering measures will be installed in the channel downstream of each coffer dam to reduce turbidity and suspended sediment.

Applications:

- In all water bodies to isolate the work area from the water resource.
- Where a dry construction work area is required.
- Is often use with other in-water work BMPs.

Limitations: In stream and river systems, high flows can cause overtopping or failure of cofferdams. Those that will be in place for an extended duration are designed to accommodate the likelihood of flooding. Coffer damming a stream channel requires that provisions be made to maintain stream flow around work site; **(See Temporary Stream Diversion below)**. The permeability of the water body substrate needs to be considered when selecting the type of cofferdam to be used. Cofferdams are rarely completely watertight and will require continued maintenance dewatering **(See Dewatering)**.

Standards and Specifications: There are three primary design criteria for cofferdams:

- Minimal seepage through, under, and around the cofferdam to the extent practical.
- Structural stability and integrity of the cofferdam.
- Sufficient freeboard to accommodate reasonably expected fluctuations in water levels.

Sandbag Cofferdams: Given the short term of Project implementation activities and anticipated low stream flows within Gurnsey Creek during Project work, a sandbag coffer dam or similar structure will be installed prior to implementation of the proposed project work.

Sandbag Material: Sandbag material will be polypropylene, polyethylene, or polyamide woven fabric, minimum unit weight of four ounces per square yard, mullen burst strength exceeding 300 psi in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70 percent in conformance with the requirements in ASTM designation D4355. Use of burlap is not acceptable.

Sandbag Size: Each sand-filled bag will have a length of 18 inches, width of 12 inches, thickness of 3 inches, and weight of approximately 33 lbs. Bag dimensions are nominal and may vary based on locally available materials.

Grade of Sand: All sandbag material will be coarse sand, free from deleterious materials and seed.

Plastic Sheeting: Plastic sheeting will be utilized to minimize seepage through the cofferdam. Sheeting will be anchored under the base of the cofferdam and wrapped up and over the top of the cofferdam. Where there is an unacceptable level of seepage through the substrate, plastic sheeting will be extended upstream along the bottom of the water body perpendicular to the cofferdam.

Height of Dam: Up to 3 feet (.9144 meters), measured from the existing streambed to the top of berm. Sandbags will be placed to create a low spot within the top of the berm to direct possible overtopping flood flow.

Temporary Stream Diversions

Purpose: A temporary stream diversion diverts the base flow of a perennial stream around a construction site by use of a conduit (pipe) or small diversion ditch. Its purpose is:

- To maintain stream flow continuity, quality and habitat and provide a dry working environment for the construction activities.
- To allow the installation of a structure in a perennial stream with minimal impacts on stream turbidity. Through the temporary diversion of the stream's base flow away from Project sites and into a stable pipe or channel system, clean water is kept out of active Project sites.

Application: This practice applies where flows are low enough and/or the watershed is small enough to allow normal base flows to be handled practically in a conduit (pipe) or small diversion ditch. It is intended for those situations where the temporary stream diversion will only be needed during the summer-fall months of low stream flow, where the time of construction can be minimized, and the site can be stabilized before winter. Temporary Stream Diversions are required for any work within a stream that is subject to the rules and regulations of the U.S. Army Corps of Engineers for in-stream modifications (404 permits).

Timing: Timing the installation of this measure is critical to minimize impacts on fisheries.

Phasing: To minimize the impact to the stream, phasing the operations must be considered before the stream is diverted. This measure needs to be quickly and carefully installed, well maintained and removed as soon as possible when the Project site is stable.

Constriction of the channel: These practices will increase the velocity of flow due to constriction of the channel and will create a higher potential for erosion and movement of sediments in the stream channel.

Flooding: Any flood flows during Project implementation can be expected to damage or destroy this practice. It may contribute to the flooding effects.

Standards and Specifications: The construction of any specific temporary stream diversion related to this Project's work scope will not cause a significant water level difference between the upstream and downstream water surface elevations (not to exceed 1%) and the velocity will be maintained at a rate similar to existing flow conditions.

Water Fluctuation: The base flows of all streams will be maintained at all times.

Time of Operation: All temporary stream diversions will be (within 2 calendar days after the structure is no longer needed. Unless prior written approval is obtained from the RCDTC Project Manager, all structures will be removed, and the area stabilized before winter.

Aggregate: There will be no earth, sands, silts, clays or organic material used for Project work within the waterway channel. Washed coarse aggregate (3/4 inch to 4 inches) referenced, as AASHTO designation No. 1 will be the minimum acceptable aggregate size for temporary stream diversions. Larger clean aggregates will be allowed.

Sandbags: Sandbags will consist of materials, which are resistant to ultra-violet radiation, tearing and puncture, and woven tightly enough to prevent leakage of fill material (i.e., sand, fine gravel, etc.). The following criterion has been considered when selecting the temporary stream diversion method:

Time of year: The time of year may preclude the selection of one or more of the standard methods due to fish spawning or migration restrictions.

Site Location: Locate the temporary stream diversion where there will be the least disturbance to the soils of the existing waterway banks.

Removal of the structure: Ease of removal and subsequent damage to the waterway will be primary factors in considering the choice of a design of the stream diversion.

Maintenance: This is a high maintenance item. Weather reports need to be monitored and the structure prepared for anticipated storm events.

Design Criteria: Provisions for temporary stabilization of the inlet, outlet, and return channel will be included in the design. The materials used in construction will be sound, and capable of withstanding the loads applied. The materials must also be durable and maintain their integrity for the life of the Project. Other design criteria include:

- Excavation of the channel will begin at the downstream end and proceed upstream. All excavated materials will be stockpiled outside of the floodplain and temporarily stabilized to prevent re-entry into the stream channel.
- The height of the diversion structure will be one half the distance from the streambed to stream bank plus one foot.
- Clean water from the diversion will be returned to the channel downstream of Project sites, dirty water will be pumped onto meadow soils or onto a vegetated hillside where the water can disperse and infiltrate the ground prior to reentering the channel through the groundwater.
- All excavation materials will be disposed of in an approved disposal area outside the 100-year floodplain unless otherwise approved.

- The downstream and upstream connection to the natural channel will be constructed under dry conditions. Sandbags will contain the stream.
- The process of excavation and stabilization will be a continuous (uninterrupted) operation.
- All materials will be on-site prior to Project implementation.

Sandbag-Conduit Diversion: This practice will be used only for very short time duration. Because the potential for wash out is high, it must be carefully monitored and not be left unattended for any 24-hour period. If a major storm event is expected, the site must be stabilized in preparation for it. The conduit will have the hydraulic capacity to handle the flow rate of 0.85 cubic meters per second per square mile of drainage area above the site.

Sandbag-Stone Diversion: The temporary channel will be able to convey the 2-year storm event. The diversion structure will be installed from upstream to downstream. Sheeting will be overlapped such that the upstream portion covers the downstream portion with at least an 18-inch overlap.

Fabric Based Channel Excavation: The temporary channel will be sized to convey the 2-year storm event. All debris (rocks, sticks, etc.) will be removed and the channel surfaces made smooth so that the fabric will rest flush with the channel sides and bottom.

Stabilization with Geotextile Fabric:

- The fabric will have a minimum width such that it is keyed in and anchored at the top of the stream bank.
- The fabric will be placed so that it rests flush with the channel at all points of contact.
- The fabric will be placed such that one piece will line the entire channel. If this is not possible, the fabric will be placed so that it overlaps along the channel's transverse. Longitudinal overlaps will not be allowed. Upstream sections will overlap downstream sections. The overlap will equal .61 meters minimum.
- The fabric will be keyed into 2 x 2-foot trenches located at the upstream edge and at 15.24-meter intervals (the overlap nearest to each 50-foot increment). The key-in will be from top of channel to top of channel. Riprap will be carefully placed into the trench (without dropping onto the fabric).
- The fabric sections will be secured with pins (length of 18 inches minimum) and washer (diameter 1 inch minimum). Overlaps will be pinned along transverse and longitudinal axes with spacing equal to .914 meters maximum.
- The spacing of the pins must follow the manufacturer's specification and is dependent on the anticipated velocities and thickness and type of geotextile fabric. The entire bottom of the channel could be rip rapped if high velocities were anticipated. When the area is rip rapped, it is not required that the geotextile fabric underneath the riprap be pinned.
- An impervious plastic lining can be used in lieu of geotextile fabric. The plastic liner will be 6 mil or thicker and will be capable of maintaining strength against the effects of ultraviolet light for a period of at least 60 days.

Removal of the Diversion

Water will not be allowed through the natural stream until all Project work is completed. When the diversion is no longer needed, all structures will be removed within 2 calendar days.

Inspection and Maintenance:

Periodic inspection and maintenance will be performed as needed to ensure that the diversion infrastructure, streambed and stream banks are maintained and not damaged. Maintenance will include removal and disposal of any trapped sediment or debris. Sediment will be disposed of outside of the flood plain and stabilized. This practice is a high maintenance item and will be considered for use in a cautious manner. The impact of failure on downstream facilities will be carefully considered. Periodic inspection must be performed to ensure that the structure is maintained and not damaged, that sediment is not entering the stream or blocking fish passage or migration. Maintenance will be performed, as needed, to ensure that the structure complies with the standards and specifications. This will include removal and disposal of any trapped sediment or debris. Sediment will be disposed of outside of the floodplain and stabilized. Anticipate major storm events. If a major storm is predicted, emergency measures must be taken to minimize damage.

Dewatering

Purpose: The purpose of this BMP is to prevent water from entering and collecting in work areas. This practice is also incorporated into Project implementation to:

- Allow work to be performed in dewatered conditions.
- Reducing the transport of soil particles by flowing water.
- Reducing the liquefaction of soils.

Applications: This BMP may be used in, but not limited to, ditches, watercourses or streams, channels, swales and excavations. It will generally be used in combination with other BMPs.

Limitations: This BMP will not be used where flows are greater than pump capacity.

Standards and Specifications:

- Based upon pre-Project analysis of stream flows and conditions within the overall Project impact area, a determination has been made that Project work will require continuous dewatering. As a result, pumping, monitoring, equipment use and maintenance activities will be scheduled accordingly.
- Site barriers will be installed prior to dewatering in order to prevent exterior water from entering Project sites.
- Given the limited amount of turbid water anticipated to be collected through dewatering operations related to Project work, it will be discharged onto course gained soils in upland areas outside the meadow complex.
- One laborer will be employed to manage the pumping system and designated personnel will monitor and maintain the dewatering system to minimize the potential for Project related sediment releases. All dewatering activities will occur when streams have minimum flow.
- An adequate fuel supply and backup systems to be used in the event of mechanical failure will be maintained within or near the Project area.
- During non-work hours, gravity fed flex pipes will be employed to transmit clean water through the work area and back into the natural channel downstream from the Project site.
- The contractor will install silt fences, straw bales or other flow-filtering measures in the channel to reduce turbidity and suspended sediment when flow is reestablished through the work site.
- The site will require fish and amphibian relocation by a qualified fisheries biologist, as required by regulatory authorities.
- Project work within or near the stream will not begin until all temporary water quality diversions are functioning, and all protective erosion control measures are in-place.
- Area disturbed by BMP removal will be revegetated.

- Upon completion of Project work, all silt fences, pumps and equipment will be removed from the stream and each coffer dam will be breached returning stream flow to its natural channel. Stream flows will be reintroduced gradually into the dewatered portion of the Project area in order to reduce sediment generation.
- The measures listed above will allow for dewatering of the Project area with no negative impacts to aquatic or riparian species.

Inspection and Maintenance:

- Pumping, monitoring, equipment and maintenance activities will be scheduled in accordance with dewatering needs.
- During Project implementation, dewatering BMPs will be inspected daily during the workweek. Additional inspections will be schedule during storm events and any required repairs completed.
- Periodic inspections for soil erosion at discharge points will be made and water diversion equipment will be repaired or move as necessary.

Protection and Preservation of Existing Vegetation

Purpose: To protect and preserve existing desirable plants and trees in and near areas that will be exposed to land-disturbing activities. Protecting and preserving native vegetation will reduce the amount of erodible area and provide buffer zones that assist with infiltrating runoff and trapping sediment so that it does not discharge to waterways or the storm drain system.

Applications: Applicable on floodplains, steep slopes, next to wetlands, streams, rivers, lakes, and sensitive habitat areas that have existing desirable vegetation.

Limitations:

- Requires advanced planning.
- May constrict the area available for construction activity.
- Improper grading may negatively impact vegetation.

Standards and Specifications:

- Install high visibility temporary fencing to protect high value existing vegetation before beginning clearing or other soil-disturbing activities.
- Wherever possible, preserve native vegetation on steep slopes and near perennial and intermittent watercourses or swales.
- Wherever possible, preserve continuous areas or clumps of native or landscaped vegetation, instead of individual trees and shrubs.
- Consider the location, species, size, age, and vigor of existing vegetation.
- Consider tree health, age, species, space needed, aesthetic values, and wildlife benefits when deciding which trees to preserve.
- Follow existing contours and avoid stands of trees when locating temporary roadways.
- Do not place equipment, construction materials, topsoil, or fill dirt within the limits of preserved areas.
- Extend limits of fencing to tree drip lines (end of tree branches) when protecting trees. Wherever possible, extend the limits of the no-dig root protection zone outward such that it is twice as large as the outer perimeter of the branches.

- Do not cut tree roots within the tree drip line. Curve trenches around tree drip lines to avoid large root concentrations.
- Smoothly cut off the ends of damaged roots.
- Prior to the implantation of any Project activities perimeter fencing and temporary sediment control structures will be placed to prevent unwanted damage to the riparian area and sediment delivery to streams.
- Access routes and staging areas will be flagged to minimize disturbance and removal native vegetation and soil.
- The Best Management Practices developed to protect and preserve vegetation are in addition to the required Mitigation Measures listed in this Initial Study/Mitigated Negative Declaration designed to protect Biological Resources.

Inspection and Maintenance:

- Repair or replace damaged vegetation immediately. Smoothly cut off the ends of damaged roots.
- Monitor the protected areas to ensure that new structures won't compromise vegetation.
- Loosen compacted soil around the tree root zone.
- Cover exposed tree roots with soil or a wet burlap as soon as possible.

Mulching

Purpose: To prevent erosion by protecting bare soil from rainfall, reducing runoff velocity, conserving moisture, and fostering plant growth. Mulches can be composed of organic materials, straw, wood chips, bark or other wood fibers that will protect seeds from predators while reducing evaporation and insulating the soil.

Applications:

- Applicable to all bare soil surfaces where Project activities will cease for 14 days or more and will not resume within 21 days.
- Provides a temporary cover and aids in stabilization measures.
- Immediately follow temporary and permanent seeding of an area with mulching.

Limitations:

- Additional control measures are necessary for the establishment of vegetation if the area is susceptible to erosion.
- Straw and wood mulch may need to be removed before soil stabilization or permanent seeding is to take place.
- Straw and wood mulch are prone to removal by runoff and wind.
- The use of grasses may cause a fire hazard and require regular maintenance.
- Not all soil conditions are appropriate.

Standards and Specifications:

- The type of mulch to be applied depends on soil type, site conditions, landscape requirements, and economics.
- Roughen embankments and fill areas before applying mulch.
- Use as a temporary or permanent surface cover on disturbed areas until vegetation can be established.

- Apply at a minimum rate of 4,000 lb./acre.
- Straw mulch can be applied to a slope by crimping or punch roller-type rollers.
- Hold straw in place on steep slopes or in small areas by plastic netting or jute.
- Apply straw mulch at a rate of 125 lb./acre if tackifier is to be used.
- Wood Mulch and Shredded Wood
    - Primarily used as a temporary ground cover around trees, shrubs, and landscaping.
    - Is applicable as a covering for revegetated plantings.
    - Apply by hand and distribute mulch as a layer 2-3 inches thick. Green Material/Compost
- Green material mulch will be composted to kill weed seeds.
- Apply mulch evenly to a maximum thickness of 2 inches.
- Typically applied by hand.
- Life span is less than that of the wood fiber mulches.
- Hydraulic Mulches made from wood fiber
    - Industry standard is composed of whole wood chips. Wood fiber mulch can also be made from lumber mill waste.
    - Good for planting large areas quickly and economically.
    - Offers better wet-dry characteristics than paper mulch.

Inspection and Maintenance:

- Inspect for failures and loss of mulch during the wet season.
- Replace lost mulch immediately

Wind Erosion and Dust Control

Purpose: Storm water runoff, wind, erosion, and vehicle track out from Project sites can re-disperse sediments to the air by high winds and traffic. Therefore, the purpose of dust control is to minimize these effects.

Applications:

- All Project sites having exposed soils must perform dust control measures.
- Wind erosion and dust control is important in arid and windy regions.
- Areas with soils of silts and clays are prone to dust.
- Dust control is a treatment between disturbance and construction or revegetation and is temporary in nature.

Limitations:

- Dust control measures are only temporary and therefore require reapplication.
- Discharges from the site can occur if excessive water is sprinkled on the soils.
- Factors such as soil type, temperature, humidity, and wind velocity will impact the effectiveness of the dust control measures.

Standards and Specifications: Fugitive Dust

- The **RCDTC Project Manager** shall submit an application for and receive approval from the **Tehama County Air Quality Management District** of a Construction Emission/Dust Control plan prior to implementation of Project work. A copy of the permit will be maintained in the RCDTC Project files.

- All dust generating Project activities will be suspended when wind speeds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.
- All areas subject to ground disturbance will be watered as necessary to prevent fugitive dust violations. Water will be applied at least twice daily or as needed onto those sites requiring dust control. Chemical soil stabilizers will not be used to control dust anywhere within the Project area or along any access roads.
- All transfer processes involving free-fall of soil or other particulate matter will be operated in such a manner as to minimize the free-fall distance and fugitive dust emissions.
- All trucks hauling soil, sand, and other loose materials will be covered or required to maintain at least 2 ft. (0.6 m) of freeboard.
- Onsite stockpiles of soil or other particulate material will be enclosed or covered and watered as necessary in order to reduce windborne dust emissions. Chemical soil binders will not be used to reduce dust emissions from exposed stockpiles or other dust generating features.
- Traffic Speeds on all unpaved surfaces will be 15 miles per hour or less. Unnecessary vehicle traffic will be reducing by restricting access.

Inspection and Maintenance: The **RCDTC Project Manager** or other appointed RCDTC personnel shall be responsible for monitoring air quality at the site during Project implementation. Results of such monitoring shall be provided to the **RCDTC Project Manager**. Daily inspections shall occur for areas experiencing excessive winds, vehicle traffic, or rains as implemented by the **RCDTC Project Manager** or other appointed RCDTC personnel. If dust is observed to be leaving the site, corrective action will be taken immediately.

Revegetation

Purpose: To stabilize soils and slopes from raindrop impact and erosion, conserve soil moisture, decrease runoff, increase infiltration, and to provide wildlife habitat.

Applications: Can be applied on slopes, adjacent to waterways, along rights-of-way, as buffer strips, on stream banks and in cut and fill areas.

Limitations: Additional erosion control methods may be required if the site is prone to erosion and since it can take 3-5 years to establish adequate cover.

Standards and Specifications:

- Except for frozen ground conditions, permanent revegetation must be seeded or planted no later than 14 days after final grading, unless final grading takes places outside the planting window. In that case temporary erosion control is required until seeding can occur.
- Consider climate, soils, and topography when choosing the appropriate vegetation and seed mixes for installation. Develop seed mixes based on site-specific conditions. Soil testing is recommended and will include soil biology.
- Use variety of seed species, including grasses, forbs, and shrubs, when the objective is to re-establish native and adapted species that do not require irrigation.
- Fertilizers will not be applied.
- Germination is highly variable but normally begins in late March through mid-April.

- Final stabilization requires that perennial vegetation cover consist of 70 percent of the native background cover, determined from, a reference or baseline.
- Any newly exposed soil of over 100 square feet (9.2903 square meters) in area outside of the stream channel will be mulched or seeded with at a minimum, an appropriate mix of grass seed to minimize the potential for erosion.

Inspection and Maintenance: Examine seeded areas for failures. If failures have occurred, amend the soils, reseed and mulch as necessary. Verification of proper installation and sufficiency of mulching, seeding and other revegetation practices will be made by the RCDTC Project Manager prior to and following the season's first precipitation event and recorded in the RCDTC Project files.

Fiber Rolls

Purpose: Fiber rolls allow water to pass through while decreasing runoff velocity, increasing infiltration rates, and trapping sediments. Also known as sediment logs or straw wattles, they can provide temporary or permanent controls and biodegrade with time.

Applications:
- Along the top and face of slopes to reduce the slope length and to spread runoff as sheet flow.
- At grade breaks where transition from shallow to steep slopes.
- As check dams in drainage swales where flows will not exceed 1 cfs.
- Along stream banks
- Down-slope of exposed soil areas.
- Around temporary stockpiles.
- Along the Project perimeter.

Limitations:
- Proper sighting and installation are critical to ensure effectiveness and to prevent exacerbated erosion and/or blockage of storm drain systems.
- Not to be used where surface flows are anticipated to exceed 1 cfs.
- Fiber rolls can be transported by high flows if not properly anchored.
- Fiber rolls are not to be used at the base of slopes in place of linear sediment barriers such as silt fences.
- Do not use fiber rolls on slopes subject to creep, slumping of landslides.
- Fiber rolls are difficult to move or remove when saturated.

Standards and Specifications:
- Fiber rolls consist of straw, flax, coconut fiber, or similar materials contained in tubular cylinders of synthetic netting.
- When placed along the face of slopes, spacing between rows of fiber rolls is determined by slope inclination and slope length as shown in the Table below.

Slope Steepness and Fiber Roll Spacing

Slope Steepness	Fiber Roll Spacing:
2H:1V or steeper	3.05 meters or less
4H:1V to 2H:1V	4.57 meters or less
4H:1V or flatter	6.09 meters or less

- Create a 2-4-inch-wide concave trench along the proposed installation route. Place the excavated soil on the uphill or downhill side of the roll to prevent undercutting.
- Remove debris and stones from the trench before installing fiber rolls. Lay the fiber roll into the trench, stake it on both sides of the roll at the ends, and continue to stake every 1.22 meters.
- Stakes will have a minimum dimension of ¾-inch X ¾-inch X 24-inches.
- Install stakes on alternating sides of the fiber roll.
- If more than one fiber roll is placed in a row, overlap the end sections. Do not abut the ends or leave gaps between the end sections.

Inspection and Maintenance:
- Repair and/or replace torn, split, unraveling, or slumping fiber rolls.
- Inspect fiber rolls before and after storm events. Check fiber rolls daily during prolonged rainfall events.
- Re-trench and stake down fiber rolls that are undercut by rills or gullies.
- Remove accumulated sediment when it reaches three quarters (3/4) of the barrier height. Properly disposed of collected sediment or move to a vegetated area or other place at the site where it will not wash into storm drains, ditches, channels, or streams.
- Fiber rolls are typically removed if part of the permanent erosion control and site stabilization. If fiber rolls are removed, collect and dispose of sediment accumulation, and fill and compact holes, trenches, depressions or any other ground disturbance to blend with adjacent ground. Seed and mulch, or otherwise stabilize, the regarded area where the fiber rolls were removed (apply seed during winter or fall months).

Silt Fences

Purpose: To slow and detain sediment laden sheet flow from disturbed areas, which allows the settlement of sediment and reduces or prevents sediment from discharging to storm drains, streams or other watercourses.

Applications:
- Along Project site perimeters.
- Below the toe of slopes.
- Along stream banks and channels.
- Around temporary stockpiles.

Limitations:
- Not effective unless properly installed.
- Do not use on slopes greater than 4H:1V.
- Labor-intensive maintenance may be required.
- Fencing must be removed and disposed of properly upon completion of Project work.

Standards and Specifications:

- Do not install silt fences across streams, channels, or in any location where flows may be concentrated.
- Fencing must be located where waters may temporarily pond and sediments can be deposited.
- Application in environmentally sensitive areas requires additional practices.
- Install the fencing along a level contour at the toe of a slope.
- Install fencing a minimum of .914 meters from the toe of the slope or at the top of the bank.
- Limit drainage area upstream of fence to 0.25 acre/30.48 meters of fence.
- Limit the length of the slope area draining to any point along the silt fence to 30.48 meters or less.
- Maximum length of any single run of fencing is 152.4 meters.
- Angle the last 2.4 meters of fence upslope in a “J” or “L” shape to allow for ponding.
- Silt fence material will be woven nylon reinforced polypropylene with a built-in top chord running along the top of the fabric.
- Minimum requirements of fabric are: tensile strength (ASTM D4632) of 90 lbs., puncture rating (ASTM D4833) of 60 lbs., and mullen burst rating (ASTM D3786) of 280 psi.
- Fence posts will be free from decay, splits, or cracks, have a minimum thickness of 2 inches, and have a minimum length of 1.22 meters. Fence posts will be installed a minimum distance of 12 inches into the ground and have a maximum spacing of 2.4 meters.
- Steel fence posts may also be used.
- Areas prone to high winds will require closer spacing of fence posts.
- Fence posts will be located on the downstream side of the fabric and mesh.
- Fabric must be stapled or wired to the posts.
- Locate a 6-inch X 6-inch trench on the upstream side of the fence.
- Overlap at least 6 inches of fabric into the trench. Key in the bottom of the fence.
- Fill the trench with tamped native soil or washed gravel.

Silt fence fabric sizing:

- If less than 50 percent of the soil by weight will pass through a U.S. Standard Sieve no. 200, select the equivalent opening size (EOS) to retain 85 percent of the soil. The EOS will not be finer than U.S. Standard Sieve no. 70.
- For all other soils, the EOS will not be finer than U.S. Standard Sieve no. 70, except where discharge to streams or wetlands occurs. In that case, the EOS will not be larger than U.S. Standard Sieve no. 100.
- If 85 percent of the soil by weight is finer than U.S. Standard Sieve no. 200, then filter fabric will not be used.

Inspection and Maintenance:

- Inspect before and after each rain event.
- Repair any damage caused by Project implementation (undercutting of the fence, split, torn, and weathered fabrics, or slumping of the fence).
- Fabrics may have to be replaced every 5-8 months.
- Remove silt when the depth of the deposit reaches one-third the fence height.
- Remove silt and dispose of to avoid siltation problems.
- From May through October, do not allow water to pond behind silt fences for more than 7 days.
- Remove fencing at the completion of the Project or when the site has been stabilized.
- Backfill any holes or depressions caused by the removal of the silt fence according to standard specifications.

Temporary Stream Crossing (Stream Ford)

Purpose: As related to the **Restoring the Deer Creek Headwaters at Childs Meadows Project**, a temporary stream crossing in the form of a ford will be placed within a dewatered portion of the Project area. This structure will allow access to the stream channel to convey Project related traffic and to complete the installation of erosion control infrastructure without the need to cross it. This structure stabilizes and minimizes erosion of the stream banks and channel.

Applications:

- At sites where Project vehicles will frequently cross a stream or waterway.
- At sites where duration of Project activities will not exceed one year.

Limitations:

- May require a CDFW Streamside Alteration Agreement (1600 Permit), U.S. Army Corps of Engineers 404 Permit, a 401 Water Quality Certification from NDEP, and other permits.

- Disturbance of the waterway will occur during the installation and removal of temporary stream crossings. Consequently, sediment control measures may need to be installed in the waterway during Project implementation.
- Requires stabilization of disturbed areas both during Project implementation and after removal of the structure.
- Structures may obstruct flow in the waterway during prolonged storm events causing flooding and/or washouts.
- Diversion or dewatering of the channel may be required during the installation of the stream crossing structure.

Standards and Specifications: General Considerations

- A California registered civil or engineering geologist is required to design temporary stream crossing structures.
- Sediment traps need to be installed immediately downstream of crossings to capture sediments.
- Used in arid areas during the dry season for dry washes and ephemeral streams.
- Cannot be used on perennial streams.
- Approach roads must be designed with a maximum slope of 7H:1V.
- Use filter fabric and compacted aggregate to stabilize road surface.
- Oil or hazardous materials cannot be applied to the roadway.

Inspection and Maintenance:

- Inspect weekly as well as before and after significant rainfall events.
- Inspect for sediment buildup in the culverts or blockage of the channel.
- Inspect for structural weakening of the temporary crossing.
- Inspect for channel sour, erosion of the abutments, riprap displacement, or piping in the soil.
- Remove silt behind fords, in culverts, and under bridges.
- Repair stream bank erosion.
- Promptly remove temporary stream crossings when no longer needed.
- Proper management of stockpiled materials can reduce or eliminate pollution of storm water from these sources **(See Stockpile Management below)**.

Stockpile Management

Applications: All locations and Projects where materials such as soils, composts, aggregates, and paving materials are stockpiled.

Limitations: Not all stockpile locations have been identified.

Standards and Specifications:
- Locate stockpiles away from storm water flows, drainage courses and inlets.
- Use temporary berms, dikes, silt fences, fiber rolls, sandbags or gravel bag barriers to surround and contain stockpiles to prevent transport of materials offsite from storm water runoff.
- Apply non-chemical wind erosion and dust control measures on the surface of stockpiles.
- Place bagged materials on pallets and cover.
- Install stockpile perimeter controls such as temporary berms, dikes, silt fences, fiber rolls, sandbags or gravel bag barriers as soon as possible after stockpiles are created. These temporary sediment transport barriers can be temporarily removed or moved to one side when materials are removed or added to the stockpile.
- If stockpiles are not to be used within 21 days, temporary covers (plastic covers, etc.) must be installed as soon as practicable and no later than 14 days after stockpiles are created. Covers will be placed on stockpiles as soon as practicable unless rain or wind events are anticipated. In such an occurrence, temporary covers will be placed immediately over stockpiles.

Inspection and Maintenance:
- Inspect perimeter controls and covers weekly as well as before and after storm events.
- Inspect temporary covers before, during and after windy weather.
- Replace or repair perimeter controls and covers as needed.

General Best Management Practices Related to Operations, Site and Materials Management, Hazards Air Protection, Equipment Use and Project Demobilization

- Keep waste storage areas clean, well-organized, and well equipped.

- Post information on proper storage, clean up and spill response at a visible and accessible location at all times.

- Educate employees and subcontractors about what a “significant” and “insignificant” spill is for each chemical used on-site and train in spill prevention and cleanup.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

- Locate chemical storage and handling areas away from storm drains, waterways, or reservoirs.

- Do not store chemicals in areas where they may be susceptible to rain.

- Provide a secondary containment structure in case of leaks or spills.

- Always use a secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.

- Place drip pans or absorbent material under paving equipment when not in use.

- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave full drip pans or other open containers lying around.

- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute storm water. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal.

- Store cracked batteries in a non-leaking secondary container.

- When vehicles and equipment are fueled on site:
    - Discourage “topping off”.
    - Use designated areas located away from waterways and drainages.
    - Use a secondary containment to catch drips or spills.
    - Place a stockpile of spill cleanup materials where it will be readily accessible.
    - Clean up spills immediately and dispose of contaminated soils and clean up materials properly.

- Sweep up dry spills. Do not wash or hose down the area.

- Use absorbents for wet spills on impermeable surfaces.

- Wet spills on soils require digging up and disposing of the contaminated soil.

- A secondary containment with enough capacity to contain a spill is required for fueling areas.

- Report significant spills to appropriate federal, State and Local agencies that may assist in the cleanup.

- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

- Project implementation will generally occur during the lowest flow period of the year.

- Project implementation will occur during the dry period if the channel is seasonally dry.

- Prevent any Project related debris from falling into the stream channel. Any material that does fall into a stream during Project implementation will be immediately removed in a manner that has minimal impact to the streambed and water quality.

- Temporary fill must be removed in its entirety prior to close of work-window.

- Areas for fuel storage, refueling, and servicing of Project equipment must be located in an upland location.

- Prior to use, clean all equipment to remove external oil, grease, dirt, or mud. Wash sites must be located in upland locations so that dirty wash water does not flow into stream channel or wetlands.

- Petroleum products or deleterious materials must not enter the stream channel.

- Isolate the Project area from flowing water until Project materials are installed and erosion protection is in place.

- Erosion control measures will be in place at all times during Project implementation. Do not start impactful Project work until all temporary control devices (straw bales, silt fences, etc.) are in place down slope or downstream of Project site.

- A potential for introducing weed-seed and unwanted plant material exists. Ensure that mulch is weed free. Impacts attributable to infestation of noxious weeds will be reduced through the implementation of formally established Mitigation Measures established in relation to invirase plant control as Described in **Appendix E Mitigation Monitoring and Reporting Plan**.
- Exhaust emissions will be minimized by maintaining equipment in good repair and proper tune according to the manufacturer's specifications. Proof of maintenance, repair and tuning will be provided to the RCDTC Project Manager.

- To the extent practicable, the use of diesel-powered equipment meeting CARB's 1996 or newer certification standard for off-road heavy-duty diesel engines will be maximized.

- Construction contracts will include language that prohibits the use of all pre-1996 heavy-duty off-road diesel equipment on forecast "Spare the Air" days.

- Unnecessary vehicle idling will be restricted to 5 minutes or less.

- Visibility emissions from stationary diesel-powered equipment will not exceed 40% opacity for more than three minutes in any one hour.

- All Project equipment used in connection with this Project will have rubber tires or rubber tracks to reduce impacts to the stream bed within work areas.

- Fuel, oil and other petroleum products will be stored only at designated staging areas. Staging areas will be located greater than 30.48 meters from any aquatic or riparian habitat. The use of hazardous materials will be avoided or minimized where possible. Material containment containers will be clearly labeled with the identity of the materials, handling and safety instructions, and emergency contact. Any soils contaminated by spills will be contained and will be removed to an approved disposal site.

- During fuel transfer and filling, absorbent pads, pillows, socks, booms or other spill containment materials will be available. Trained personnel will monitor the filling of equipment and will stop fuel flow immediately if a spill occurs. Fuel transfer/filling will not resume until the problem is resolved.

- All equipment used in connection with Project work will be maintained in a manner that minimizes fuel and lubricant drippings. Stationary power equipment (e.g., engines, pumps, generators) will be positioned over drip pans. Equipment operators or other responsible parties will make daily inspection of equipment for leaks, correcting and repairing any such leaks prior to resuming their use. Inspection reports will be submitted to the RCDTC Project Manager along with evidence of any repairs required and completed. Inspection reports and evidence of repairs completed will be incorporated into the RCDTC Project files.

- To reduce potential impacts associated with fuel spills in streams and riparian areas, the RCDTC Project Manager or assigned RCDTC representative will ensure that fuels and lubricants are at no time transported across a live stream other than in the tank of equipment being moved or already applied to such equipment. Only existing roads will be used to move personnel, equipment and materials across stream courses as well as into and out of the Project site unless previously approved and flagged by the RCDTC Project Manager.

- The RCDTC Project Manager or assigned RCDTC representative will select refueling and maintenance sites for all equipment including power hand tools on flat sites that are away from "No Treatment Areas" and other buffers related to dry or wet waterways along with areas that could potentially flow into a stream in the event of an accidental spill. Such sites will also be established on flat sites outside of "No Treatment Areas" and other exclusion zones established in order to protect wildlife and plant resources. Fuel containment equipment including absorbent sheets and waddles will be made available at all refueling and maintenance areas. Equipment operators will be responsible for the immediate containment and removal of any spilled material and will immediately inform the RCDTC Project Manager or assigned RCDTC representative of such spills. The RCDTC Project Manager or assigned RCDTC representative will then immediately contact appropriate authorities including the CDFW. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur. Equipment will be stored and maintained within properly cleared areas. The RCDTC Project Manager or assigned RCDTC representative will inspect refueling areas to assure compliance with this Mitigation Measure. These inspections will also verify these sites' adequacy in protecting riparian and terrestrial resources as well as the availability of containment equipment.

- All equipment used in connection with Project work will be provided adequate fire protection equipment including fire extinguishers attached to all mechanized equipment. In addition, firefighting hand tools and a water wagon will be available at all areas where equipment is operated.

Demobilization/Site Restoration

Upon completion of operations, the temporary access road will be ripped with crossroad drainage installed at a frequent spacing. If necessary, complete recontouring of access routes will be completed in order to disperse runoff and blend the former roadway with undisturbed adjacent terrain. Any disturbed areas including stream banks, will be fully regraded and restored upon completion of the Project. Any branches and woody debris from trees felled pursuant to this Project's construction plans will be left on the access road for erosion control. Large stems will be left if they can serve as useful habitat within the Project area.

Appendix C: Botanical Survey Report

Childs Meadow Restoration Project Botanical Survey Report

Prepared for Point Blue Conservation Science
by Wendy L. Boes
January 17, 2021

INTRODUCTION

In September of 2020, a botanical survey was initiated at the request of Blue Point Conservation Science for rare, threatened and endangered and other special status plants in the areas to be included in the Childs Meadow Restoration Project. Childs Meadow is in Tehama County and is covered by the Childs Meadow 7.5 minute USGS quadrangle from portions of T29N R4E Section 25, 26 & 36, T29N R5E Section 30 & 31, T28N R5E Sections 5 & 6, and T28N R4E Section 1.
Surveys were conducted specifically for the Blue Point Conservation Science Restoration Project, and for a Collins Pine Timber Company Restoration Timber Harvest Plan Project in July and August of 2019; and July, August and September of 2020. The purpose of this report is to document and describe the botanical surveys conducted in July and August of 2019, July and August and September of 2020, to summarize their results, and to suggest actions that could protect and mitigate harm to the rare plants that were documented as to eliminate a substantial reduction in numbers or reduction in range
The restoration treatment areas are throughout the southern three quarters of Childs Meadow that is owned by Collins Pine Timber Co. Throughout the restoration area, in a continuum with the surrounding landscape, there are peatlands, wet meadows, dry meadows, riparian, and wetland to upland transitional habitats present. Gurnsey Creek meanders through the meadow, eventually joining with Deer Creek. Elevation is approximately 5,000 feet.

METHODS

Methods used in preparation of this report comprised a review of existing resource databases and vegetation community information gathered during its preparation of a biological resources assessment for the study. These reviews were followed by a floristic field survey where habitat was targeted for special-status plant species in the study area.

SURVEYOR QUALIFICATIONS

This survey was conducted by Wendy Boes (2019-2020) and Reed Kenny (2020). Wendy Boes was the lead botanist, holds a B.S. in Botany from Humboldt State University. She has worked in California as a botanist since 2003, conducting numerous floristic and rare plant surveys. She is a member of the California Native Plant Society. She has applicable regional experience on the Lassen National Forest and in private consulting for a total of ten years. Reed Kenny has worked in the California Floristic Province and Great Basin in professional and academic settings for 5 years. Reed conducted his master's thesis work on the floristics, has a strong background in designing and implementing plant ecological monitoring, and is currently pursuing a Doctorate degree at UC Davis in plant systematics.

EXISTING RESOURCE REVIEW

For the purpose of this evaluation, special status plant species include plants that are: 1) listed as threatened or endangered under the California Endangered Species Act or the federal Endangered Species Act; 2) proposed for listing as endangered or threatened by the U.S. Fish and Wildlife Service; 3) designated as rare by the California Department of Fish and Wildlife (CDFW); 4) a state or federal candidate species for listing as threatened or endangered; and/or 5) have a California Rare Plant Rank (CRPR) of 1, 2, 3, or 4.

PRE-FIELD SCOPING

The original basis for scoping for these surveys were based in prefield scoping that was conducted in 2018 by John Hale and staff at Collins Pine Timber Company. An updated search was conducted on June 30, 2019. Searches were made of the California Department of Fish and Wildlife's Natural Diversity Database (CNDDB), California Native Plant Society's Rare Plant Inventory (CNPS 2019), and the Lassen National Forest GIS datasets of the following quadrangles to develop a list of species with the potential to occur in the area. Pre-field scoping was re-conducted in August of 2020 to confirm datasets. There was also additional information provided by Lassen N.F. assistant botanist Kirsten Bovee that called into question the original determination of the *Packera indecora.* It was noted that there were morphological characteristics that aligned it more with the closely related *Packera pauciflora.*

Lassen Peak (4012145)

Reading Peak (4012144)

Mt. Harkness (4012143)

Mineral (4012135)

Childs Meadows (4012134)

Stover Mtn. (4012133)

Onion Butte (4012125)

Humboldt Peak (4012124)

Humbug Valley (4012123)

The search of the CNDDB, CNPS, and Lassen NF datasets yielded 44 California Rare Plant Ranked (CRPR) 1 to 3 plant taxa, 25 CRPR 4 plant taxa. The combined results are shown below in Table 1.

Table 1: Scoping list of plants

Scientific Name	Common Name	Status CRPR/State/Federal[1]
Anemone multifida var. multifida	cut-leaf anemone	2B.2
Anthoxanthum nitens ssp. nitens	vanilla-grass	2B.3
Asplenium septentrionale	northern spleenwort	2B.3
Astragalus pulsiferae var. suksdorfii	Suksdorf's milk-vetch	1B.2
Betula glandulosa	dwarf resin birch	2B.2
Botrychium ascendens	upswept moonwort	2B.3
Botrychium crenulatum	scalloped moonwort	2B.2
Botrychium minganense	Mingan moonwort	2B.2
Botrychium montanum	western goblin	2B.1
Botrychium pinnatum	northwestern moonwort	2B.3
Brasenia schreberi	Watershield	2B.3
Carex lasiocarpa	woolly-fruited sedge	2B.3
Carex limosa	mud sedge	2B.2
Castilleja lassenensis	Lassen paintbrush	1B.3
Collomia larsenii	talus collomia	2B.2
Draba aureola	golden alpine draba	1B.3
Drosera anglica	English sundew	2B.3
Epilobium palustre	marsh willowherb	2B.3
Erigeron nivalis	snow fleabane daisy	2B.3
Eriogonum pyrolifolium var. pyrolifolium	pyrola-leaved buckwheat	2B.3
Haplodontium tehamense	Lassen Peak copper moss	1B.3
Hulsea nana	little hulsea	2B.3
Lysimachia thyrsiflora	tufted loosestrife	2B.3

Scientific Name	Common Name	Status CRPR/State/Federal[1]
Meesia longiseta	long seta hump moss	2B.3
Meesia uliginosa	broad-nerved hump moss	2B.2
Oreostemma elatum	tall alpine-aster	1B.2
Packera indecora	rayless mountain ragwort	2B.2
Panicum acuminatum var. thermale	Geysers panicum	1B.2/ CE
Phlox muscoides	squarestem phlox	2B.3
Polemonium pulcherrimum var. shastense	Mt. Shasta sky pilot	1B.2
Potamogeton praelongus	white-stemmed pondweed	2B.3
Rhynchospora alba	white beaked-rush	2B.2
Rupertia hallii	Hall's rupertia	1B.2
Scheuchzeria palustris	American scheuchzeria	2B.1
Schoenoplectus heterochaetus	slender bulrush	2B.1
Schoenoplectus subterminalis	water bulrush	2B.3
Scutellaria galericulata	Marsh skullcap	2B.2
Silene occidentalis ssp. longistipitata	long-stiped campion	1B.2
Silene suksdorfii	Cascade alpine campion	2B.3
Smelowskia ovalis	alpine smelowskia	1B.2
Stuckenia filiformis var. alpina	Fineleaf pondweed	2B.2
Stellaria longifolia	long-leaved starwort	2B.2
Utricularia intermedia	flat-leaved bladderwort	2B.2
Utricularia ochroleuca	cream-flowered bladderwort	2B.2
CRPR List 4 plant taxa with the potential to occur		
Astragalus rattanii var. rattanii	Rattan's milk-vetch	4.3
Bruchia bolanderi	Bolander's bruchia	4.2
Bulbostylis capillaris	thread-leaved beakseed	4.2
Campanula scabrella	rough harebell	4.3
Cardamine bellidifolia var. pachyphylla	fleshy toothwort	4.3
Claytonia palustris	marsh claytonia	4.3
Cypripedium montanum	mountain lady's-slipper	4.2
Erigeron elegantulus	volcanic daisy	4.3
Erigeron inornatus var. calidipetris	hot rock daisy	4.3
Eriophorum gracile	slender cottongrass	4.3

Scientific Name	Common Name	Status CRPR/State/Federal[1]
Erythranthe glaucescens	shield-bracted monkeyflower	4.3
Limnanthes floccosa ssp. floccosa	woolly meadowfoam	4.2
Lupinus dalesiae	Quincy lupine	4.2
Lycopus uniflorus	northern bugleweed	4.3
Meesia triquetra	three-ranked hump moss	4.2
Penstemon heterodoxus var. shastensis	Shasta beardtongue	4.3
Piperia colemanii	Coleman's rein orchid	4.3
Sanicula tracyi	Tracy's sanicle	4.2
Sidalcea gigantea	giant checkerbloom	4.3
Silene occidentalis ssp. occidentalis	Western campion	4.3
Stellaria obtusa	obtuse starwort	4.3
Streptanthus longisiliquus	long-fruit jewelflower	4.3
Subularia aquatica ssp. americana	water awlwort	4.3
Trillium ovatum ssp. oettingeri	Salmon Mountains wakerobin	4.2
Utricularia minor	lesser bladderwort	4.2

****CRPR Plant Rank***

California Rare Plant Rank 1A: Plants presumed extirpated in California and either rare or extinct elsewhere
California Rare Plant Rank 1B: Plants rare, threatened, or endangered in California and elsewhere
California Rare Plant Rank 2A: Plants presumed extirpated in California but common elsewhere
California Rare Plant Rank 2B: Plants rare, threatened, or endangered in California but more common elsewhere
California Rare Plant Rank 3: Review List: Plants about which more information is needed
California Rare Plant Rank 4: Watch List: Plants of limited distribution

Threat Ranks

Ranks at each level also include a threat rank (e.g., CRPB 4.3) and are determined as follows:

0.1-Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2-Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3-Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

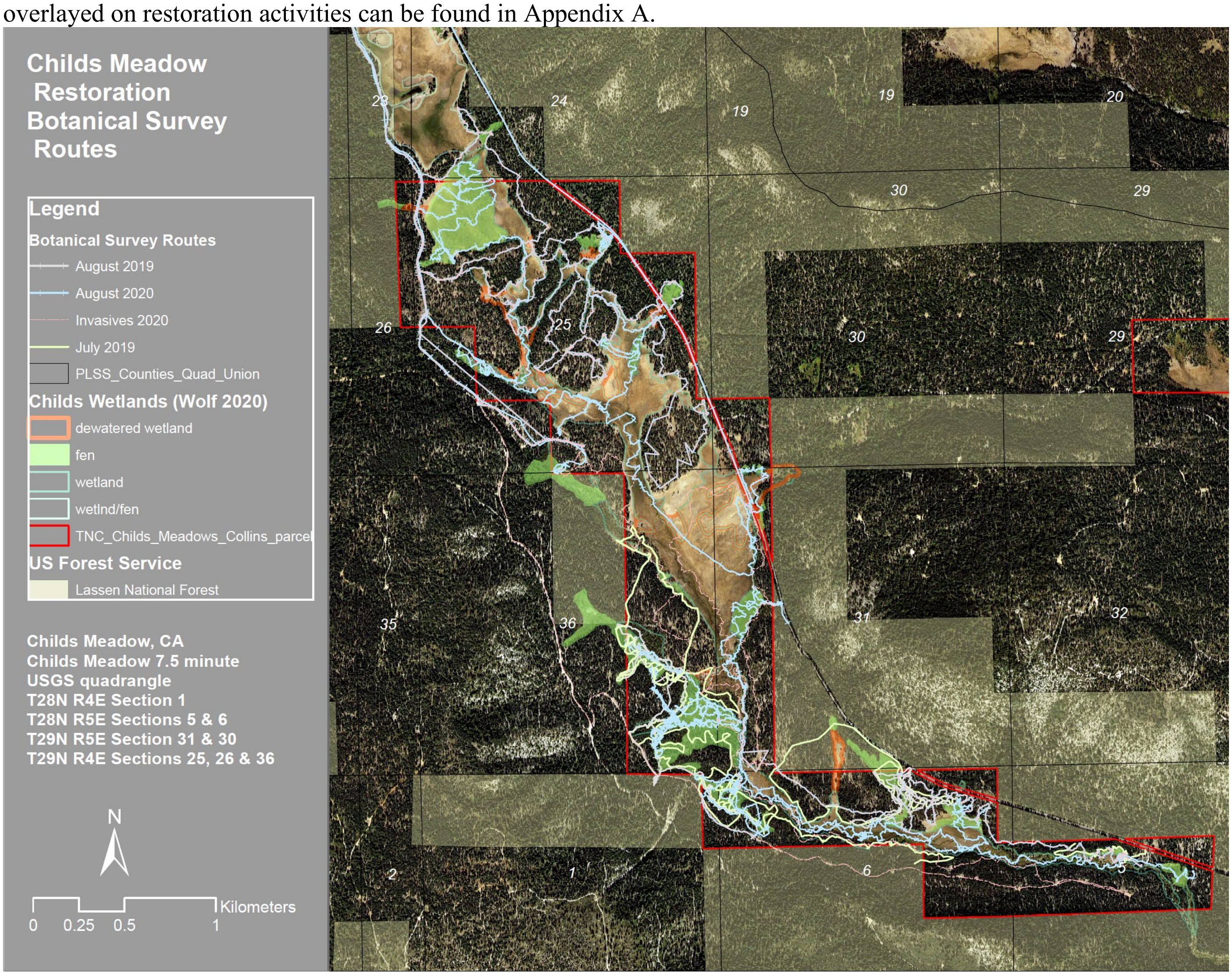
BOTANICAL SURVEYS

The botanical field survey was conducted in general accordance with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018). Wendy Boes, botanist, served as the lead investigator for the botanical survey. The field survey was floristic in nature and consisted of identifying each species observed to the taxonomic level necessary to determine whether the plant is a federal or state listed special-status species. Plant taxonomy followed Baldwin et al. (2012), including applicable errata and supplements (Jepson Flora Project 2020). The field surveys were performed by walking meandering transects through microhabitats with the potential to support special-status plants. Survey intensity was heightened in areas corresponding to vegetation communities having the potential to support the special status plants identified in the pre-field resource review. At the Childs Meadow site this meant that there was high intensity surveys conducted throughout much of the project area due to the abundance of peatlands, fens, springs, meadows, and riparian habitat.

RESULTS

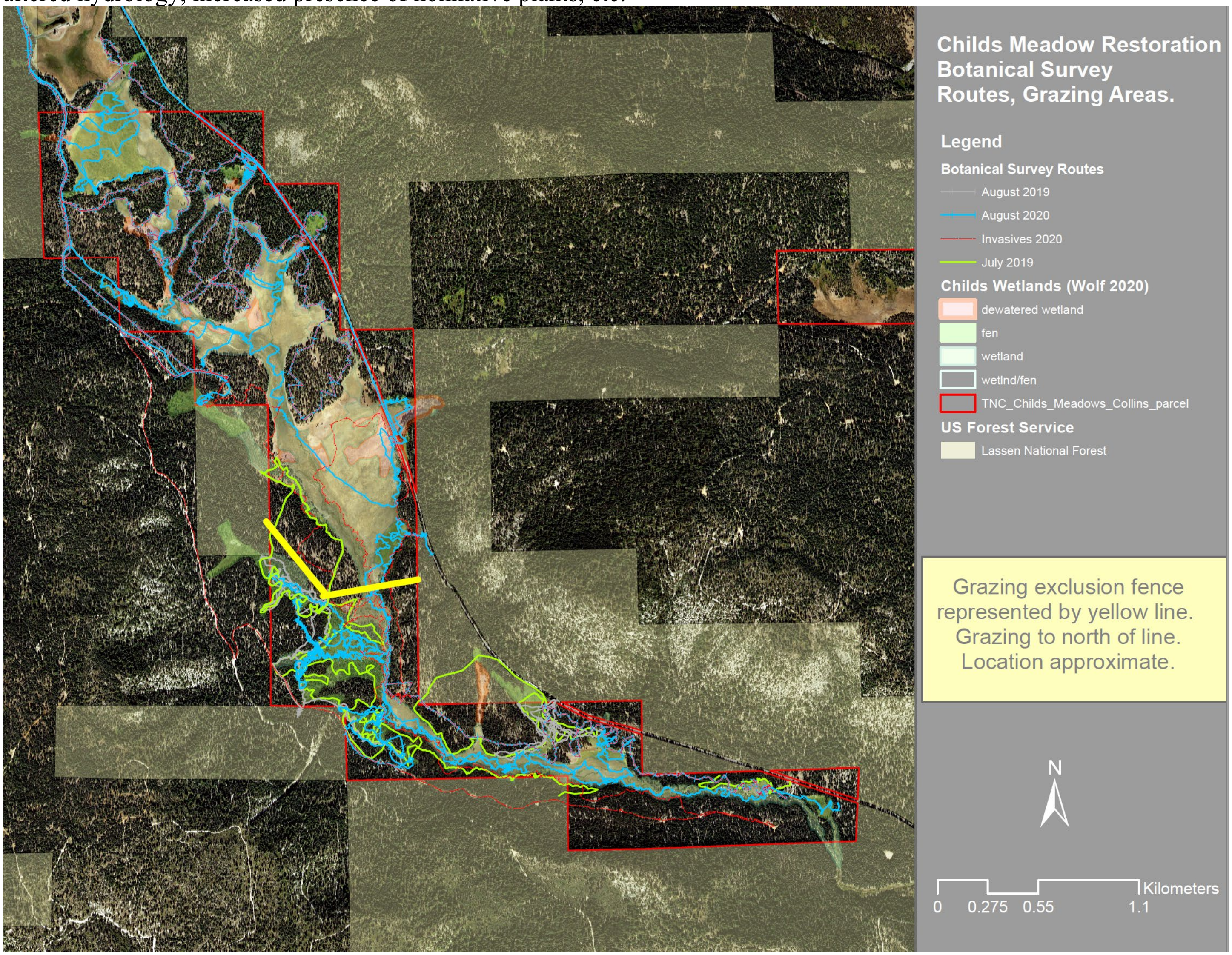
Field surveys -were conducted by Wendy Boes July 5-11 and August 1-2, 2019. The field survey was conducted at a time when all potentially occurring special-status plant species could be identified. Additional surveys were conducted in July 2020 to document invasive plants, and special status plants were documented when observed, though these surveys were targeted more towards areas that would have invasive plants, such as roads, heavily grazed areas, etc. Additional rare plant surveys were conducted by Wendy Boes and Reed Kenny August 18-20, 2020. These surveys were to target areas of Childs Meadow with high probability for special-status plants in areas that might be impacted by restoration activities. The full restoration plan design was not complete at the time of these surveys, but a wetland map had been created identifying where all the fens and other types of wetlands were located (Wolf 2020). Fens were prioritized for full coverage surveys and other wetlands were surveyed in the remaining allocated time. Some areas that will have restoration activities were not surveyed and have been identified for pre-implementation surveys.

Surveys were conducted exclusively on foot and are displayed on the following map. Additional maps with surveys overlayed on restoration activities can be found in Appendix A.



A complete list of observed plant species identified in the study area during the botanical survey is provided as Appendix B.

Adverse conditions were encountered in the 2020 surveys, north of the cattle exclusion fence. Cattle had been grazing Childs Meadow for at least a full month prior to botanical surveys being conducted in Childs Meadow. This could affect the identification of potential special-status plant species, as the cattle had eaten the above ground portions of some plants, and some trampling of plants had occurred. The following map displays the approximate location of the cattle exclusion fences. It is also worth noting that the suitability of the habitat for rare plants had been degraded due to impacts such as trampling, altered hydrology, increased presence of nonnative plants, etc.



SPECIAL STATUS PLANTS

Surveys informed the elimination of special status plants due to the absence of their specified habitat, as follows.

The following plant was dropped due to lack of thermal hot spring habitat:

Panicum acuminatum var. thermale

The following plants were dropped due to absence of rock outcrops, rocky habitat:

Anemone multifida var. multifida
Asplenium septentrionale
Astragalus pulsiferae var. suksdorfi
Collomia larsenii
Draba aureola
Eriogonum prociduum
Eriogonum spectabile

The following plants were dropped due to absence of alpine habitat:

Erigeron nivalis
Eriogonum pyrolifolium var. pyrolifolium
Hulsea nana
Haplodontium tehamense
Polemonium pulcherrimum var. shastense
Silene suksdorfi
Smelowskia ovalis

The following plants were dropped due to the absence of upland coniferous forest and woodland:

Silene occidentalis ssp. longistipitata
Rupertia hallii

Table 2 displays a summary of the scoped CRPR 1 to 3 species and the survey results.

Table 2. List of special status plants, their habitat preferences and results from botanical surveys of the Childs Meadow Restoration Project area.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Anemone multifida var. multifida	cut-leaf anemone	2B.2	Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. Microhabitat of rocky, gravelly, carbonate or volcanic. 5,575 to 9,020 ft. elevation.	No suitable habitat present. Not observed during surveys.
Anthoxanthum nitens ssp. nitens	vanilla-grass	2B.3	Meadows and seeps (mesic). 4,920 to 6,215 feet elevation.	Suitable habitat present. Not observed during surveys.
Asplenium septentrionale	northern spleenwort	2B.3	Chaparral, Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. Microhabitat of rocky, granitic areas. Elevational range 5,295 to 10,990 feet,	No suitable habitat present. Not observed during surveys.
Astragalus pulsiferae var. suksdorfii	Suksdorf's milk-vetch	1B.2	Great Basin scrub, Lower montane coniferous forest, Pinyon and juniper woodland. Microhabitat of volcanic, gravelly, rocky areas. Elevational range of 4,265 to 6,560 ft.	No suitable habitat present. Not observed during surveys.
Betula glandulosa	dwarf resin birch	2B.2	Bogs and fens, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps, Subalpine coniferous forest. Elevational range of 4,265 to 7,545 feet.	Suitable habitat present. Not observed during surveys.
Botrychium ascendens	upswept moonwort	2B.3	Lower montane coniferous forest, Meadows and seeps. Elevational range of 3,655 to 9,990 feet.	Suitable habitat present. Not observed during surveys.
Botrychium crenulatum	scalloped moonwort	2B.2	Bogs and fens, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps (freshwater), Upper montane coniferous forest. Elevational range of 4,160 to 10,760 feet.	Suitable habitat present. Not observed during surveys.
Botrychium minganense	Mingan moonwort	2B.2	Bogs and fens, Lower montane coniferous forest, Meadows and seeps (edges), Upper montane coniferous forest. Elevational range of 4,770 to 7,150 feet.	Suitable habitat present. Not observed during surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Botrychium montanum	western goblin	2B.1	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest. Elevational range of 4,805 to 7,150 feet.	Suitable habitat present. Not observed during surveys.
Botrychium pinnatum	northwestern moonwort	2B.3	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest. Elevational range of 5,805 to 6,695 feet.	Suitable habitat present. Not observed during surveys.
Brasenia schreberi	watershield	2B.3	Marshes and swamps (freshwater). Elevational range of 95 to 7,220 feet.	Suitable habitat present. Not observed during surveys.
Carex lasiocarpa	woolly-fruited sedge	2B.3	Bogs and fens, Marshes and swamps (freshwater, lake margins). Elevational range of 5,575 to 6,890 feet.	Suitable habitat present. Not observed during surveys.
Carex limosa	mud sedge	2B.2	Bogs and fens, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps, Upper montane coniferous forest. Elevational range of 3,935 to 8,860 feet.	Suitable habitat present. Not observed during surveys.
Castilleja lassenensis	Lassen paintbrush	1B.3	Meadows and seeps, Subalpine coniferous forest. Volcanic soils. Elevational range of 3,310 to 10,235 feet.	Suitable habitat present. One population from three sub populations documented during field surveys.
Collomia larsenii	talus collomia	2B.2	Alpine boulder and rock field, Closed-cone coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. Volcanic talus. Elevational range of 7,250 to 11,485 feet.	No suitable habitat present. Not observed during surveys.
Draba aureola	golden alpine draba	1B.3	Alpine boulder and rock field, Subalpine coniferous forest. Elevational range of 6,560 to 11,005 feet.	No suitable habitat present. Not observed during surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Drosera anglica	English sundew	2B.3	Bogs and fens, Meadows and seeps (mesic). Elevational range of 4,265 to 7,400 feet.	Suitable habitat present. Not observed during surveys.
Epilobium palustre	marsh willowherb	2B.3	Bogs and fens, Meadows and seeps (mesic). Elevational range of 7,215 to 7,220 feet.	Suitable habitat present. Not observed during surveys.
Erigeron nivalis	snow fleabane daisy	2B.3	Alpine boulder and rock field, Meadows and seeps, Subalpine coniferous forest. Elevational range of 5,690 to 9,515 feet.	No suitable habitat present. Not observed during surveys.
Eriogonum pyrolifolium var. pyrolifolium	pyrola-leaved buckwheat	2B.3	Alpine boulder and rock field (sandy or gravelly, pumice). Elevational range of 5,495 to 10,500 feet.	No suitable habitat present. Not observed during surveys.
Haplodontium tehamense	Lassen Peak copper moss	1B.3	Alpine boulder and rock field (volcanic, mesic, rock and soil). Elevational range of 8,200 to 9,185 feet.	No suitable habitat present. Not observed during surveys.
Hulsea nana	little hulsea	2B.3	Alpine boulder and rock field, Subalpine coniferous forest. Elevational range of 5,640 to 11,005 feet.	No suitable habitat present. Not observed during surveys.
Lysimachia thyrsiflora	tufted loosestrife	2B.3	Meadows and seeps mesic, Marshes and swamps, Upper montane coniferous forest. Elevational range of 3,195 to 5,495 feet.	Suitable habitat present. One population documented during field surveys.
Meesia longiseta	long seta hump moss	2B.3	Bogs and fens, Meadows and seeps, Upper montane coniferous forest. Elevational range of 5,740 to 9,990 feet.	Suitable habitat present. Not observed during surveys.
Meesia uliginosa	broad-nerved hump moss	2B.2	Bogs and fens, Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest. Elevational range of 3,965 to 9,200 feet.	Suitable habitat present. One population documented during field surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Oreostemma elatum	tall alpine-aster	1B.2	Bogs and fens, Meadows and seeps, Upper montane coniferous forest. Elevational range of 3,295 to 6,890 feet.	Suitable habitat present. Not observed during surveys.
Packera indecora	rayless mountain ragwort	2B.2	Meadows and seeps (mesic). Elevational range of 5,245 to 6,560 feet.	Suitable habitat present. Incorrectly documented during 2019 surveys. Determined in 2020 to be *Packera pauciflora.* This species not present in Childs Meadow.
Panicum acuminatum var. thermale	Geysers panicum	1B.2/ CE	Closed-cone coniferous forest, Riparian forest, Valley and foothill grassland. Microhabitat of geothermally-altered soil, sometimes streamsides. Elevational range of 1,000 to 8,105 feet.	No suitable habitat present. Not observed during surveys.
Phlox muscoides	squarestem phlox	2B.3	Alpine boulder and rock field, Great Basin scrub, Subalpine coniferous forest. Elevational range of 4,195 to 8,860 feet.	No suitable habitat present. Not observed during surveys.
Polemonium pulcherrimum var. shastense	Mt. Shasta sky pilot	1B.2	Alpine boulder and rock field, Subalpine coniferous forest, Upper montane coniferous forest. Elevational range of 7,135 to 12,795 feet.	No suitable habitat present. Not observed during surveys.
Potamogeton praelongus	white-stemmed pondweed	2B.3	Marshes and swamps (deep water, lakes). Elevational range of 5,905 to 9,845 feet.	No suitable habitat present. Not observed during surveys.

Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Rhynchospora alba	white beaked-rush	2B.2	Bogs and fens, Meadows and seeps, Marshes and swamps (freshwater). Elevational range of 195 to 6,695 feet.	Suitable habitat present. Eight (sub)populations observed during field surveys.
Rupertia hallii	Hall's rupertia	1B.2	Cismontane woodland, Lower montane coniferous forest. Elevational range of 1,785 to 7,380 feet.	No suitable habitat present. Not observed during surveys.
Scheuchzeria palustris	American scheuchzeria	2B.1	Bogs and fens, Marshes and swamps (lake margins). Elevational range of 4,490 to 6,560 feet.	Suitable habitat present. Not observed during surveys.
Schoenoplectus heterochaetus	slender bulrush	2B.1	Lower montane coniferous forest, Marshes and swamps (lake margins). Elevational range of 5,245 to 5,250 feet.	Suitable habitat present. Not observed during surveys.
Schoenoplectus subterminalis	water bulrush	2B.3	Bogs and fens, Marshes and swamps (montane lake margins). Elevational range of 2,460 to 7,380 feet.	Suitable habitat present. Not observed during surveys.
Scutellaria galericulata	Marsh skullcap	2B.2	meadows, freshwater-marsh	Suitable habitat present. Not observed during surveys.

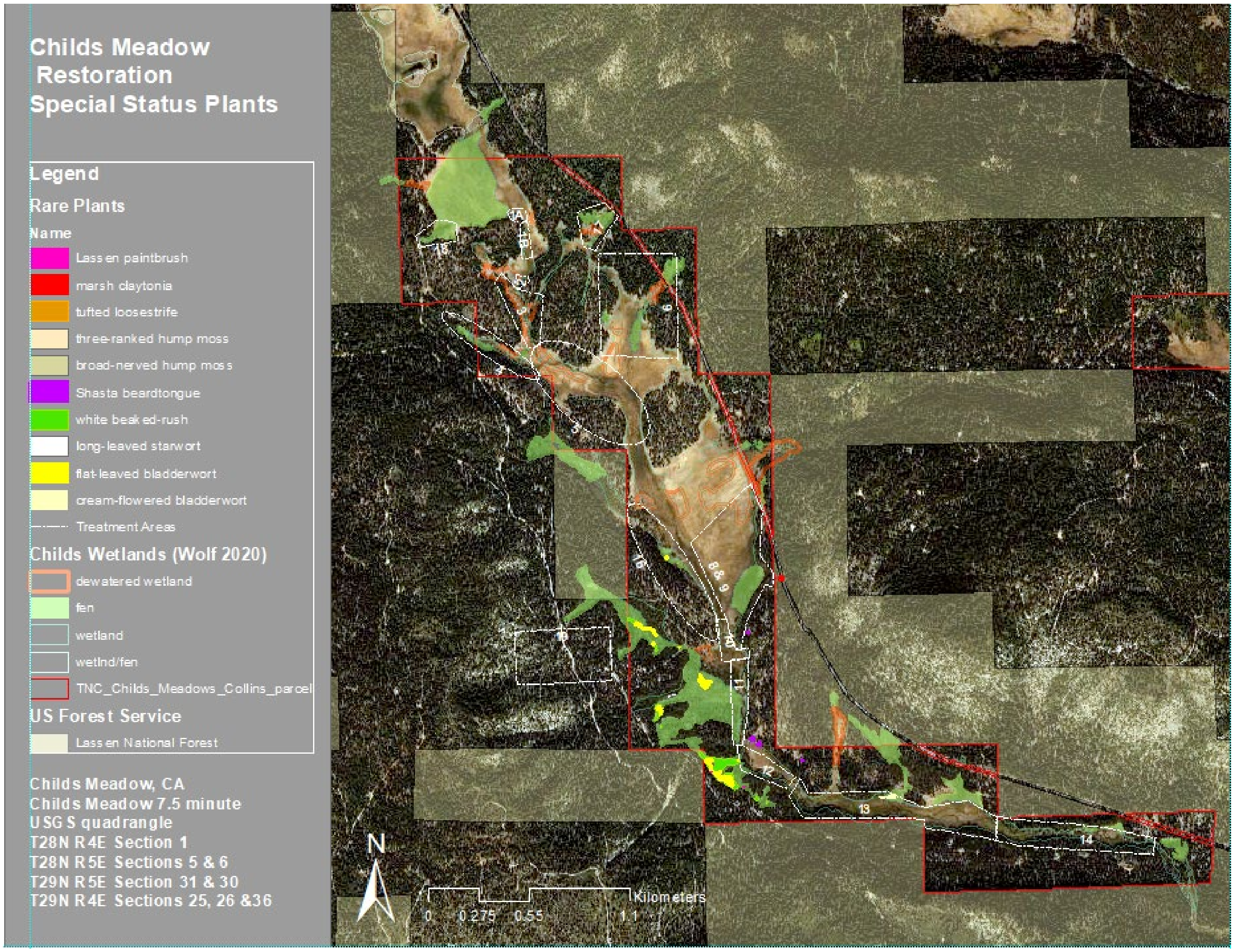
Scientific Name	Common Name	Status CRPR/State/ Federal[1]	Habitat	Potential for Occurrence/Survey Results
Silene occidentalis ssp. longistipitata	long-stiped campion	1B.2	Chaparral, Lower montane coniferous forest, Upper montane coniferous forest. Elevational range of 3,280 to 6,560 feet.	No suitable habitat present. Not observed during surveys.
Silene suksdorfii	Cascade alpine campion	2B.3	Alpine boulder and rock field, Subalpine coniferous forest, Upper montane coniferous forest. Elevational range of 7,725 to 10,205 feet.	No suitable habitat present. Not observed during surveys.
Smelowskia ovalis	alpine smelowskia	1B.2	Alpine boulder and rock field. Elevational range of 8,005 to 10,170 feet.	No suitable habitat present. Not observed during surveys.
Stuckenia filiformis var. alpina	Fineleaf pondweed	2B.2	freshwater-marsh	Suitable habitat present. Not observed during surveys.
Stellaria longifolia	long-leaved starwort	2B.2	Bogs and fens, Meadows and seeps (mesic), Riparian woodland, Upper montane coniferous forest. Elevational range of 2,950 to 6,005 feet.	Suitable habitat present. One population documented in project area during field surveys.
Utricularia intermedia	flat-leaved bladderwort	2B.2	Bogs and fens, Meadows and seeps (mesic), Marshes and swamps (lake margins), Vernal pools. Elevational range of 3,935 to 8,860 feet.	Suitable habitat present. Two populations from eight sub-populations were documented in project area during field surveys
Utricularia ochroleuca	cream-flowered bladderwort	2B.2	Meadows and seeps (mesic), Marshes and swamps (lake margins). Elevational range of 4,705 to 4,725 feet.	Suitable habitat present. Two populations documented during field surveys.

SPECIAL STATUS PLANTS OCCURRING IN CHILDS MEADOW RESTORATION PROJECT

Ten special status plant species were documented from multiple populations in the Childs Meadow Restoration Project Area:

There was a single CRPR 2B.3 species: tufted loosestrife. There were five CRPR 2B.2 species: broad-nerved hump moss, cream-flowered bladderwort, flatleaved bladderwort, white beaked rush, and long leaved starwort. There was a single CRPR 1B.3 species: Lassen paintbrush. All the populations are displayed in the figure below, and individually in the following sections. Three CRPR 4 species were documented: marsh claytonia, three-ranked humpmoss, Shasta beardtongue, plants were documented in the restoration area (see Appendix D).

A photolog of the special status plants and their habitat can be found in Appendix C.



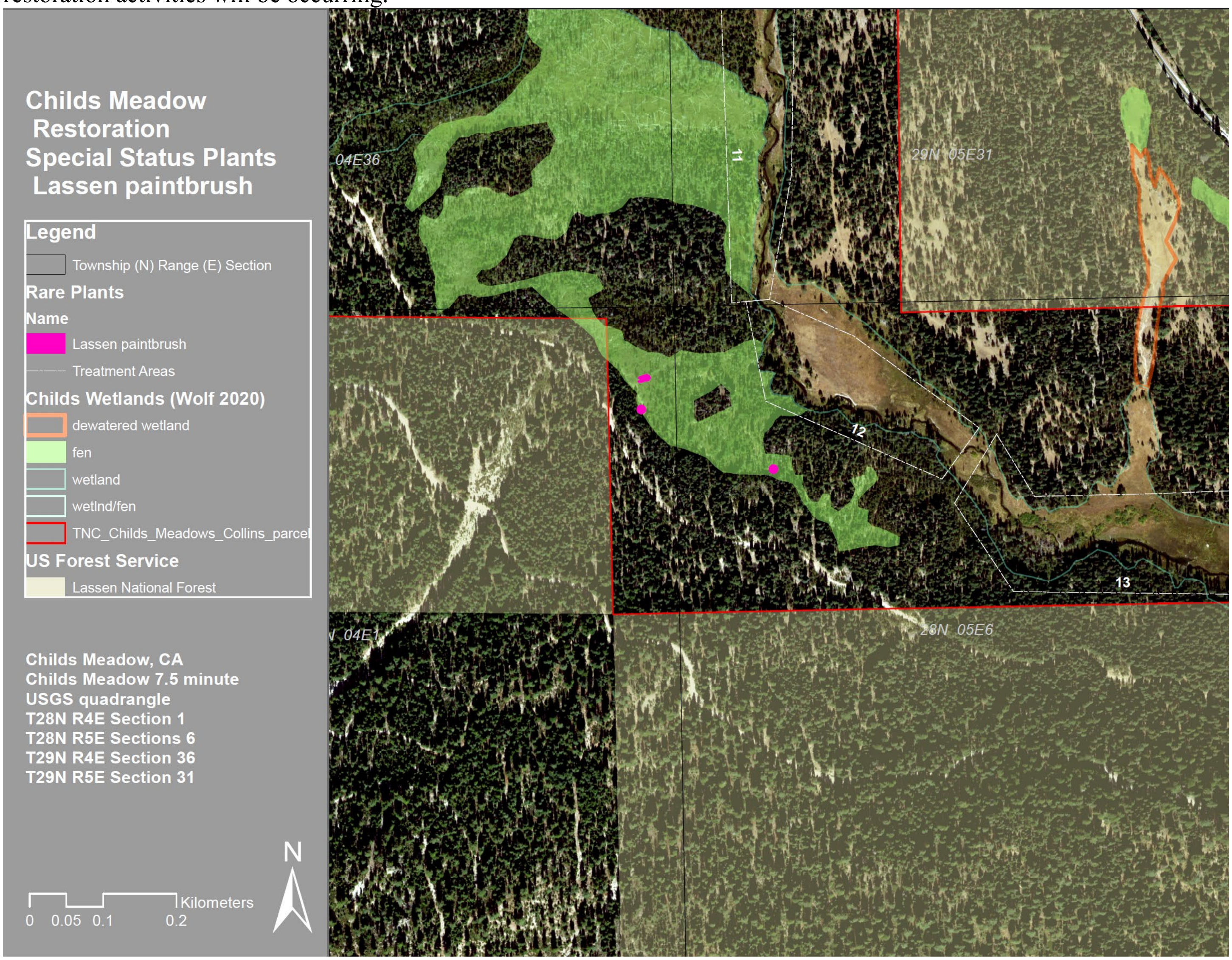
LASSEN PAINTBRUSH (*CASTILLEJA LASSENSIS*)

Federal Status: not listed; State Status: not listed; CRPR: 1B.3

Lassen paintbrush is known from volcanic soils in meadows, seeps, and subalpine coniferous forest (CNPS 2019). Lassen paintbrush is known from Plumas, Lassen and Shasta Counties. Lassen paintbrush occurs at elevational ranges of 3,935 to 10,235 feet.

Lassen paintbrush is a perennial herb in the Broomrape Family (Orobanchaceae). It is a hemi parasitic, bright pink plant. It was previously synonomized with *Castilleja lemmonni* but has recently been differentiated due to floral color and endemism to volcanic substrates (CNPS 2019).

Lassen paintbrush was documented from two sub populations in the Childs Meadow Restoration Project treatment area in 2019. It was documented from one additional sub population in 2020. It was documented here in acidic wetland habitats, growing on short tussocks in flowing water and in wet meadow habitat. There are no populations in the areas where restoration activities will be occurring.



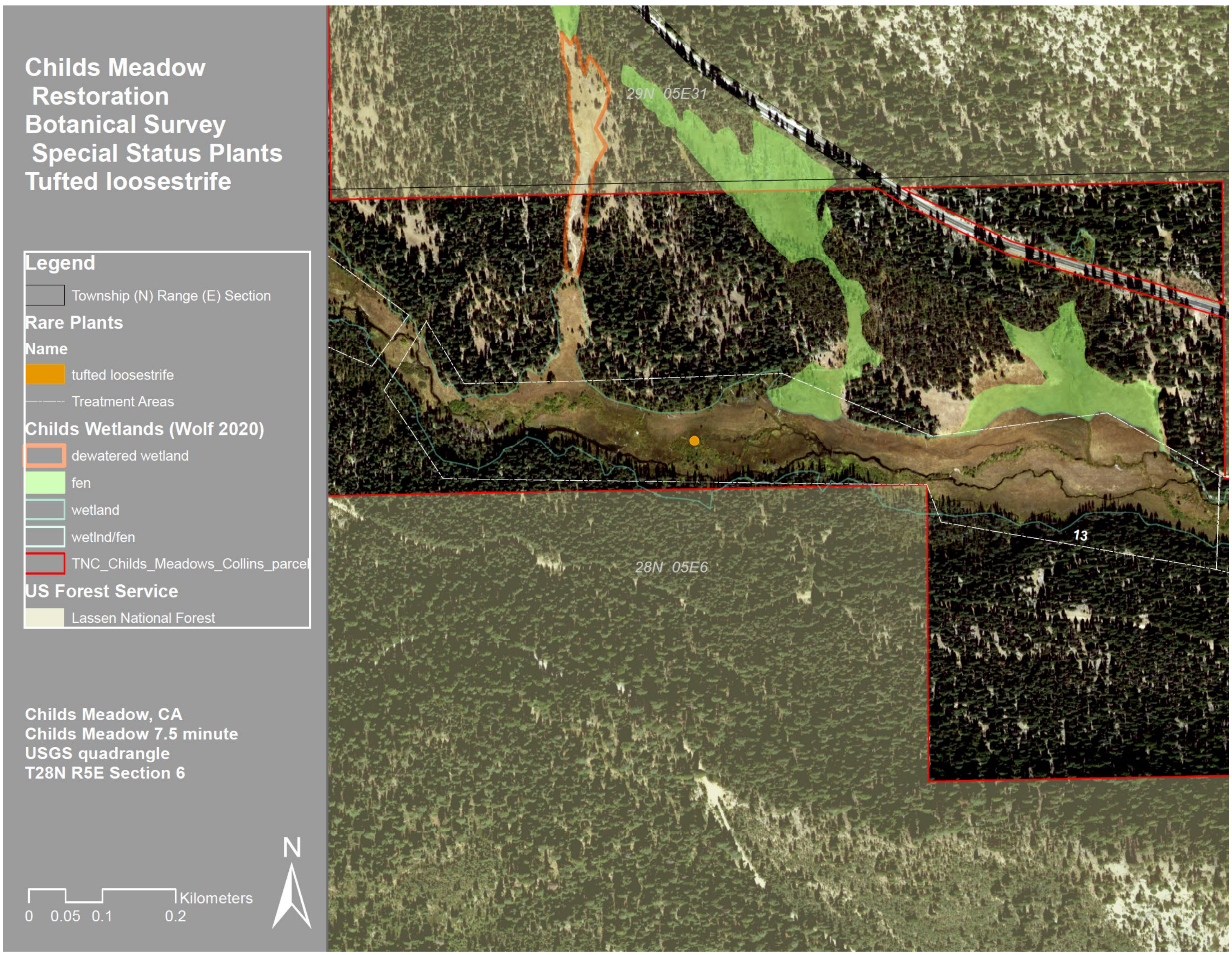
TUFTED LOOSESTRIFE (LYSIMACHIA THYRSIFLORA)

Federal Status: not listed; State Status: not listed; CRPR: 2B.3

Tufted loosestrife is known to grow in meadows and mesic seeps, marshes and swamps, in upper montane coniferous forests (CNPS 2021). Tufted loosestrife is known from Plumas, Shasta, and possibly Calaveras Counties in California. It is also known from Colorado, Oregon, Utah, Washington and Wyoming. Tufted loosestrife occurs at elevational ranges of 3,198 to 5,495 feet.

Tufted loosestrife is a perennial herb in the Myrsine Family (Myrsinaceae). It is rhizomatous (spreading through undergound stems) with opposite leaves with flowers in heads in the leaf axils (Cholewa 2014).

Tufted loosestrife was documented from one population in the Childs Meadow Restoration Project treatment area in 2020. It was documented from wet meadow habitat, growing at the peripheral bases of a stand of willow in saturated soils and standing water. Tufted loosestrife occurs in Treatment Area 13, but is not in a location where direct activities would occur.



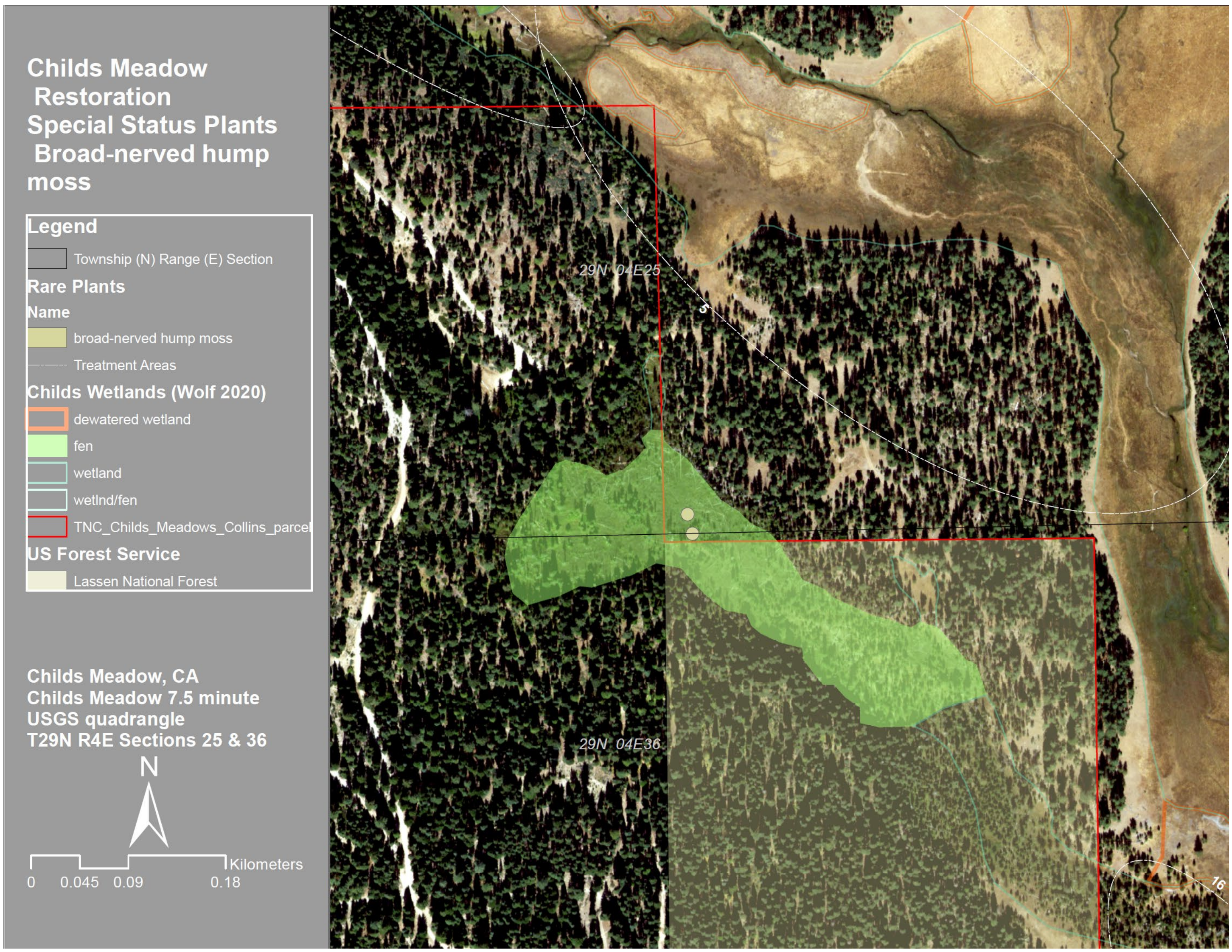
BROAD-NERVED HUMP MOSS (*MEESIA ULIGINOSA)*

Federal Status: not listed; State Status: not listed; CRPR: 2B.2

Broad-nerved hump moss is known to grow on damp soil and wood in bogs and fens, meadows and mesic seeps, in subalpine and upper montane coniferous forests (CNPS 2021). Broad-nerved hump moss is known from Butte, El Dorado, Fresno, Lassen, Madera, Modoc, Nevada, Plumas, Riverside, Shasta, Sierra, Siskiyou Tehama and Tulare counties in California. It is also known from Alaska, Colorado, Michigan, Minnesota, Montana, Nevada, New York, Oregon, South America, Vermont, Washington, Wisconsin, and Wyoming. Broad-nerved humpmoss occurs at elevational ranges of 3,198 to 5,495 feet.

Broad-nerved hump moss is a moss in the Messia Family (Meesiaceae). It is tufts of erect, branched stems, with a characteristically broad nerve (midvein) that consists of 1/3 to 2/3 of the leaf width (Malcolm et. al 2009). In California, Broad-nerved hump moss is primarily restricted to montane areas in peatlands.

Broad-nerved hump moss was documented from one population in the Childs Meadow Restoration Project treatment area in 2020. It was documented from fen habitat, growing at the peripheral bases of some decomposing wood in saturated soils and standing water. There are no populations in the areas where restoration activities will be occurring.



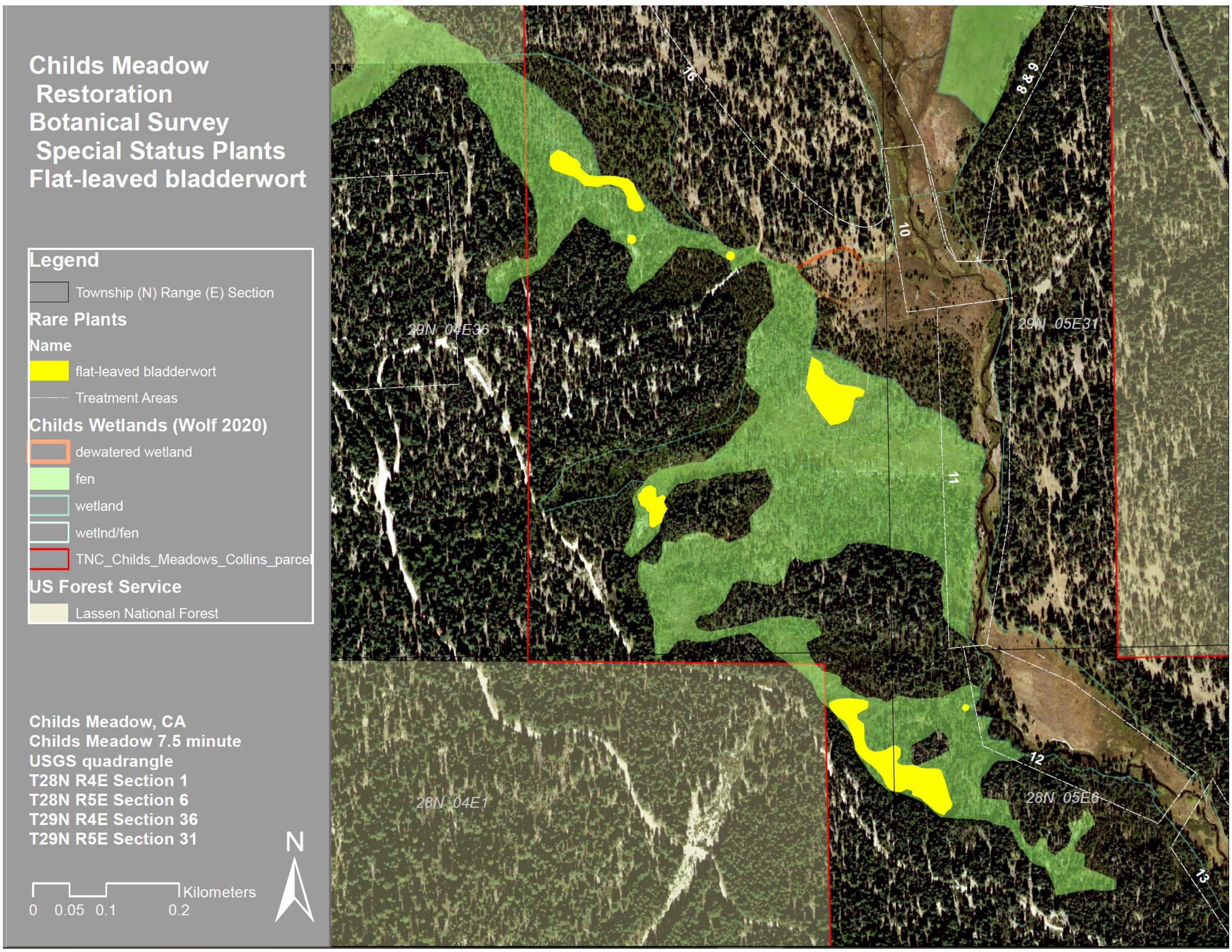
FLATLEAVED BLADDERWORT (*UTRICULARIA INTERMEDIA*)

Federal Status: not listed; State Status: not listed; CRPR: 2B.2

Flatleaved bladderwort is known to occur in meadows, seeps, marshes and swamps (lake margins) (CNPS 2019), in shallow (generally <30 cm.) acidic waters (Rice 2012). It is known from El Dorado, Modoc and Plumas Counties (CNPS 2019), and from an occurrence in Tehama County on Lassen National Forest lands (LNF 2017) in a fen adjacent to the Childs Meadow Restoration Project area. Flatleaved bladderwort occurs at elevational ranges of 4,705 to 4,725 feet.

Flatleaved bladderwort is a rooted or floating perennial, stoloniferous carnivorous, aquatic plant in the Bladderwort Family (Lentibulariaceae). It has yellow flowers and two types of leaves, some free floating and others with bladders rooted in mud (Rice 2012).

Flatleaved bladderwort was located at three populations, six sub-populations, in the Childs Meadow Restoration Project Area. Flatleaved bladderwort was documented here in acidic wetland habitats, growing in shallow, slow flowing to stagnant water and mudflats. There are no populations in the areas where restoration activities will be occurring.



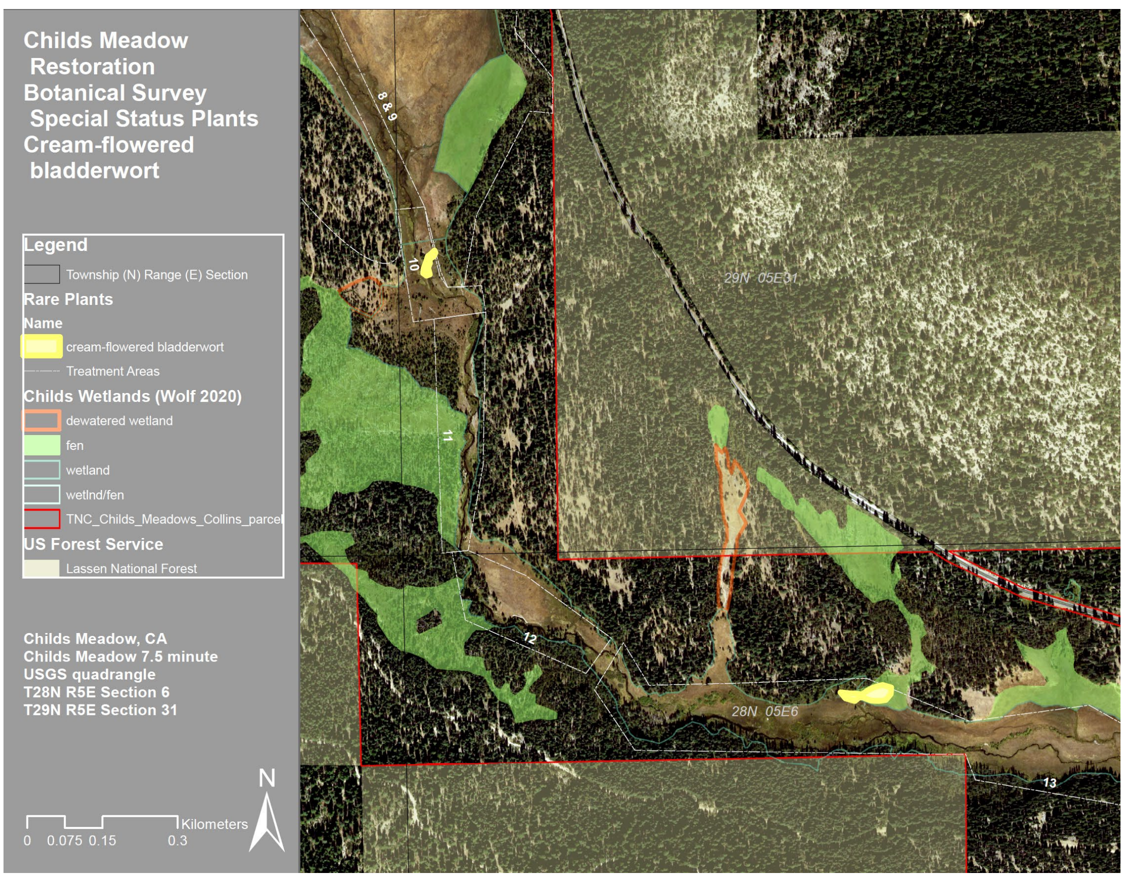
CREAM-FLOWERED BLADDERWORT (*UTRICULARIA OCHROLEUCA*)

Federal Status: not listed; State Status: not listed; CRPR: 2B.2

Cream-flowered bladderwort is known to occur in meadows, seeps, marshes and swamps (lake margins) (CNPS 2019), in shallow (generally <30 cm.) acidic waters (Rice 2012). It is known from El Dorado, Modoc and Plumas Counties (CNPS 2019), and from an occurrence in Tehama County on Lassen National Forest lands (LNF 2017) in a fen adjacent to the Childs Meadow Restoration Project area. Cream-flowered bladderwort occurs at elevational ranges of 4,705 to 4,725 feet.

Cream-flowered bladderwort is a rooted or floating perennial, stoloniferous carnivorous, aquatic plant in the Bladderwort Family (Lentibulariaceae). It has yellow flowers and two types of leaves, some free floating and others with bladders rooted in mud (Rice 2012). It is thought to be of hybrid origin between *U. intermedia* and *U. minor* and has not been observed to produce fruits. It is thought to reproduce exclusively from vegetative propagules, one being turions, or winter buds that are formed on the leaf tips and overwinter to produce new plants the following growing season. It also spreads vegetatively through stolon's, or above ground stems that root at nodes.

Cream-flowered bladderwort was located at two populations in the Childs Meadow Restoration Project Area. Cream-flowered bladderwort was documented here in acidic wetland habitats, growing in shallow, slow flowing to stagnant water and mudflats. One population of approximately 50 individuals is in Treatment Area 10. This population occurs in a channel where beaver dam analogues are to be constructed. The other population is in Treatment area 13 but is well outside of where project related activities would occur. Approximately five thousand individuals are known from this population over ¾ acres. Please refer to the following section for a discussion on proposed mitigating actions.



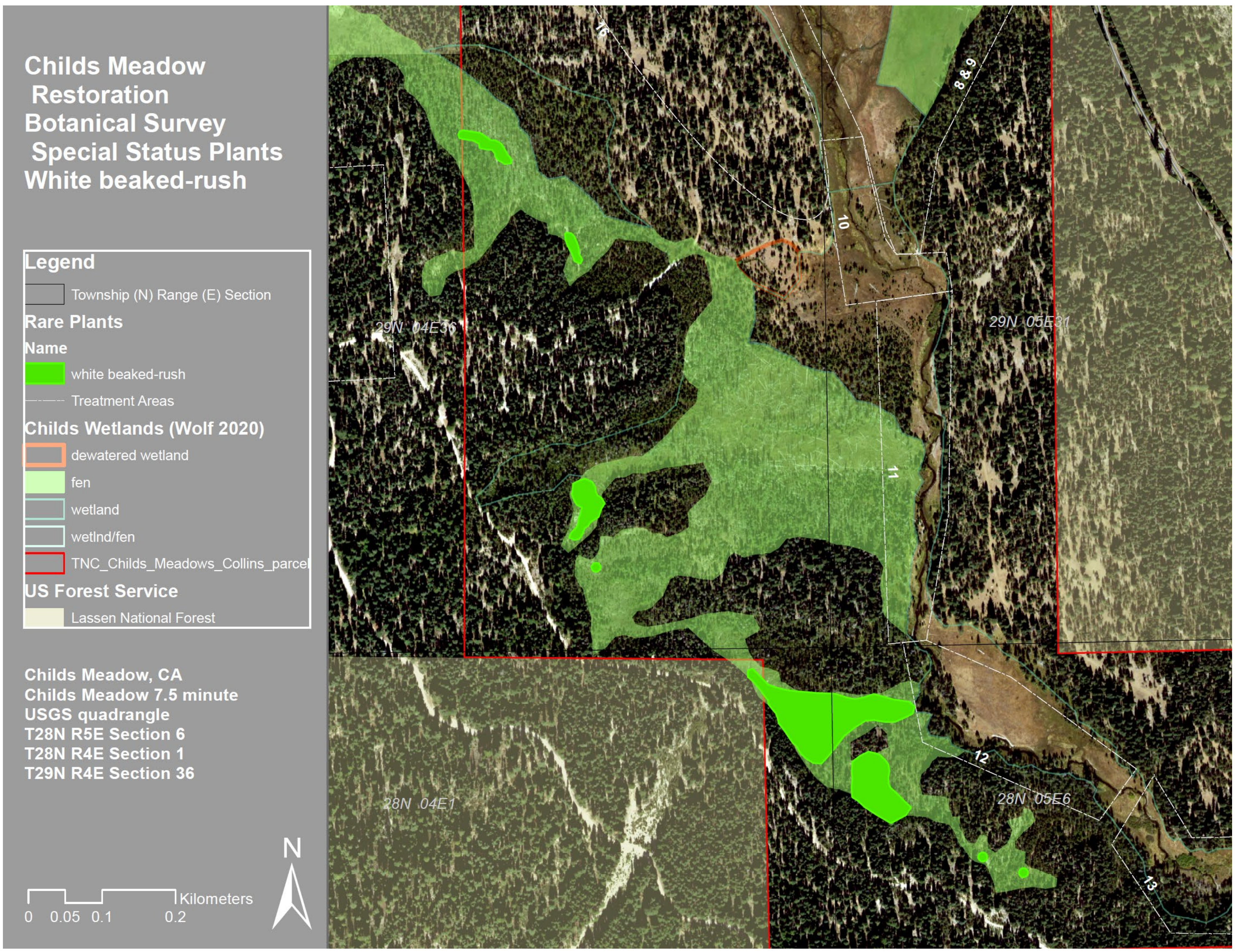
WHITE BEAKED RUSH (*RYNCHOSPORA ALBA*)

Federal Status: not listed; State Status: not listed; CRPR: 2B.2

White beaked rush is known from bogs, fens, meadows, seeps, marshes and freshwater swamps (CNPS 2019). It is known from Mendocino, Mariposa, Nevada, Plumas, Sonoma, Trinity, and Inyo Counties (CNPS 2019). White beaked rush occurs at elevational ranges of 195 to 6,695 feet.

White beaked rush is a short tufted, grasslike, perennial rhizomatous herb in the sedge Family (Cyperaceae). It has pale brown to white flower bracts (Smith 2012).

White beaked rush was located at three populations, eight sub-populations, in the Childs Meadow Restoration Project Area in 2019. One additional sub population was documented adjacent to the THP in 2020. White beaked rush was documented here in acidic wetland habitats, growing in short tussocks in flowing/sheeting water, or on the margins of flowing water. There are no populations in the areas where restoration activities will be occurring.



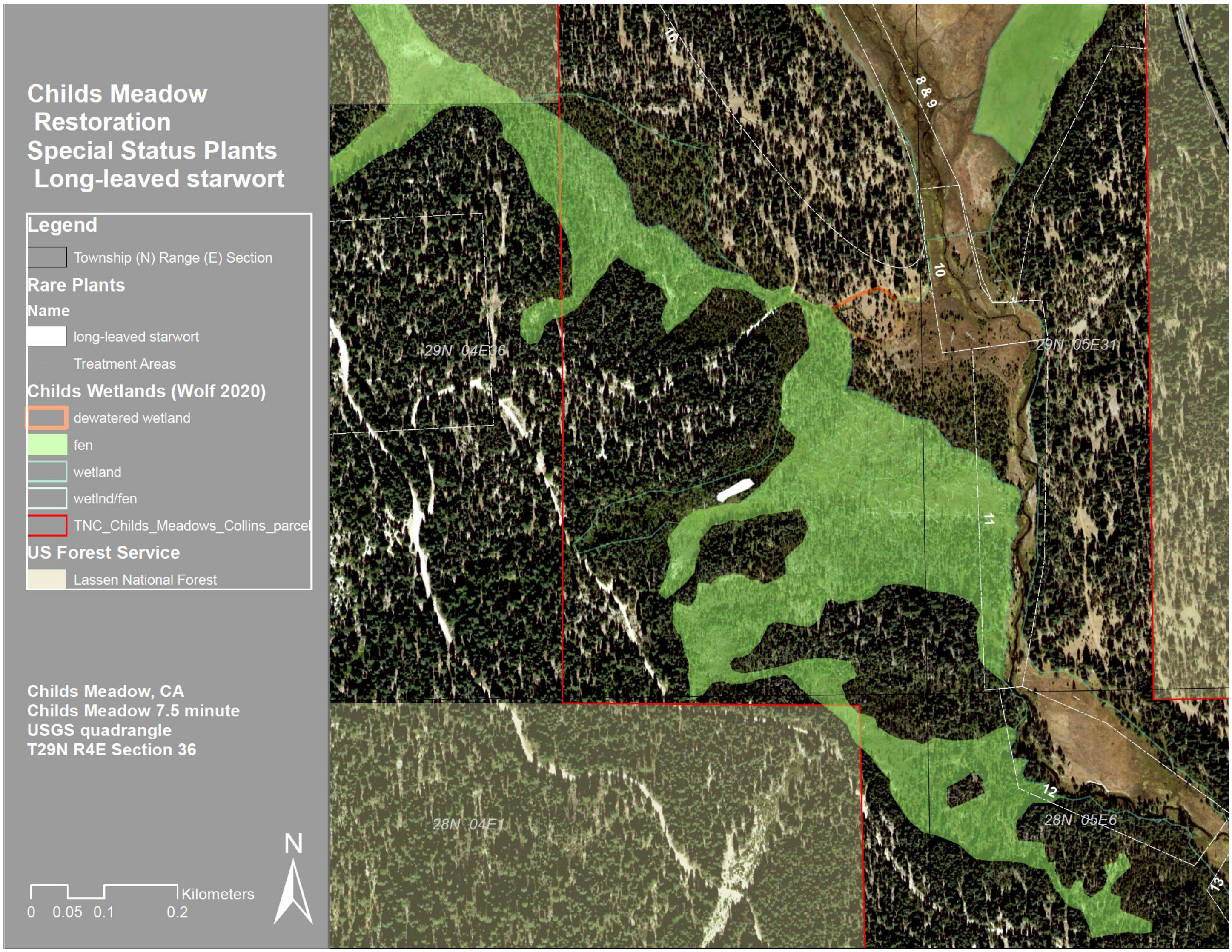
LONG LEAVED STARWORT (*STELLARIA LONGIFOLIA*)

Federal Status: not listed; State Status: not listed; CRPR: 2B.2

Long leaved starwort is known from bogs and fens, meadows and seeps (mesic), riparian woodland, and upper montane coniferous forest (CNPS 2019). It is known from elevational ranges of 2,950 to 6,005 feet. (CNPS 2019).

Long leaved starwort is a sprawling, rhizomatous, perennial herb in the Pink Family (Caryophyllaceae). Long leaved starwort has a many flowered inflorescence, with white notched petals, and minute papillae on the leaf margins (Hartman and Rabeler 2012).

Long leaved starwort was documented from one population in the Childs Meadow Restoration Project treatment area. It was found in wetlands with saturated soils, clambering on thickets of other tall wetland vegetation, in partial shade. There are no populations in the areas where restoration activities will be occurring.



RECOMMENDED MITIGATION MEASURES

This section seeks to provide guidance for mitigating and minimizing the potential adverse impacts to sensitive plants.

PRE-IMPLEMENTATION SURVEYS

Conduct surveys for sensitive plants in the appropriate phenological time period, at least 30 days prior to construction activities. Project design was not yet complete when botanical surveys were conducted. Areas have been identified where botanical surveys are incomplete and should be completed before implementation.

AVOIDANCE

All of the sensitive plant species documented at Childs Meadow, with the exception of Shasta beardtongue, are known from wet soils to standing water and will all benefit to some extent from activities that lead to increased hydrological restoration. Shasta beardtongue is known from the transitional zone from mesic to upland and is generally found on meadow edges.

Avoid impacts to sensitive plants. Flag populations with highly visible flagging, and buffer by 30 feet from the population edge. Educate persons performing restoration activities as to locations of sensitive plants and provide picture guide so they can familiarize themselves with the species.

The following are recommended to avoid or minimize any direct or indirect impacts from project activities and are recommended on an individual species basis:

1. Flag and avoid population of flat leaved bladderwort with a 30 foot buffer.
2. Flag with a 30 foot buffer, populations of Shasta beardtongue near where staging area will be established. Flag a pathway from the staging area into the restoration activity area avoiding Shasta beardtongue individuals.
3. Flag and avoid populations of tufted loosestrife with a 30 foot buffer.
4. Flag and avoid populations of cream-flowered bladderwort in Treatment Area 13 with a 30 foot buffer. Develop a transplanting and monitoring plan for the cream-flowered bladderwort. Transplant the individuals of cream-flowered bladderwort that fall within the disturbance footprint, or deep (>8"- 1 ft.) inundation zones, of Treatment Area 10. Individuals should be moved upstream, ensuring the site has similar soil (peat), hydrologic, vegetation type and aspect. Site selected should extend the known population spatially, in other words, planting beyond the known perimeters of the existing population is preferable, if possible, to maintain population coverage. Transplanting shall occur in the season deemed to have the greatest potential for success, generally the fall, after the turions have formed on the bladderwort. Transplanting should occur in a 25 to 1 ratio for each individual that may be destroyed, and some propagules may be used from the population to the south (T28N R5E NW 1/4 of Section 6) to augment. Transplants will be monitored every month for the first year during the growing season, then subsequently, every for the first two years. After two summer seasons of monitoring finding successful establishment and flowering for the second season, transplanting will have been deemed successful.

The following addresses each species, the expected effects, if any, and summaries of the proposed mitigations to minimize adverse effects.

Sensitive Plant	No. documented from surveys (populations and subpopulations)	Treatment areas	Adverse effects to population anticipated (Y/N). Justification
Castilleja lassenensis- Lassen paintbrush	3	Outside treatment areas	N, topographic position upslope from where hydrology will be affected.
Claytonia palustris- marsh claytonia	1	Outside treatment areas	N, topographic position upslope from where hydrology will be affected.
Lysmachia thyrsiflora- tufted loosestrife	1	13	N, flag and avoidance measures will eliminate direct effects. This species is known from standing water and will benefit from proposed changes to hydrology.
Meesia triquetra- three ranked humpmoss	1	Outside treatment areas	N, topographic position upslope from where hydrology will be affected.
Meesia uliginosa- broadnerved humpmoss	1	Outside treatment areas	N, topographic position upslope from where hydrology will be affected.
Penstemon heterodoxus var. s*hastensis*- Shasta beardtongue	3	Near staging area	N, population adjacent to where staging area is to be located. Flag and avoidance measures will eliminate direct affects. Topographic position upslope from where hydrology will be affected.
Rynchyospora alba- white beaked rush	8	Outside treatment areas	N, adjacent to area. It is anticipated that the populations adjacent to Treatment area 12 will become wetter. This is expected to benefit this species as it often grows in saturated soils forming tussocks in standing water.
Stellaria longifolia- long leaved starwort	1	Outside treatment areas	N, topographic position upslope from where hydrology will be affected.
Utricularia intermedia- flat leaved bladderwort	8	16	N, flag and avoidance measures will eliminate direct effects. This species is known from standing water in a spring mound, and will benefit from proposed changes to hydrology
Utricularia ochroleuca- cream-flowered bladderwort	1	10, 13	Y, flag and avoidance measures will eliminate direct effects to population in Treatment Area 13 and it is anticipated to benefit from increased moisture from treatments in this area. Transplanting and monitoring are expected to assist the population in Treatment Area 10 to expand to the suitable habitat on the margins of the population as the current habitat becomes potentially too inundated with deep water to continue to serve as suitable habitat.

INVASIVE NONNATIVE PLANTS

There is the potential for some indirect impacts from the disturbance and material movement resulting in the spread of invasive nonnative plant species. This effect is anticipated to be short term, though recommendations are listed below.

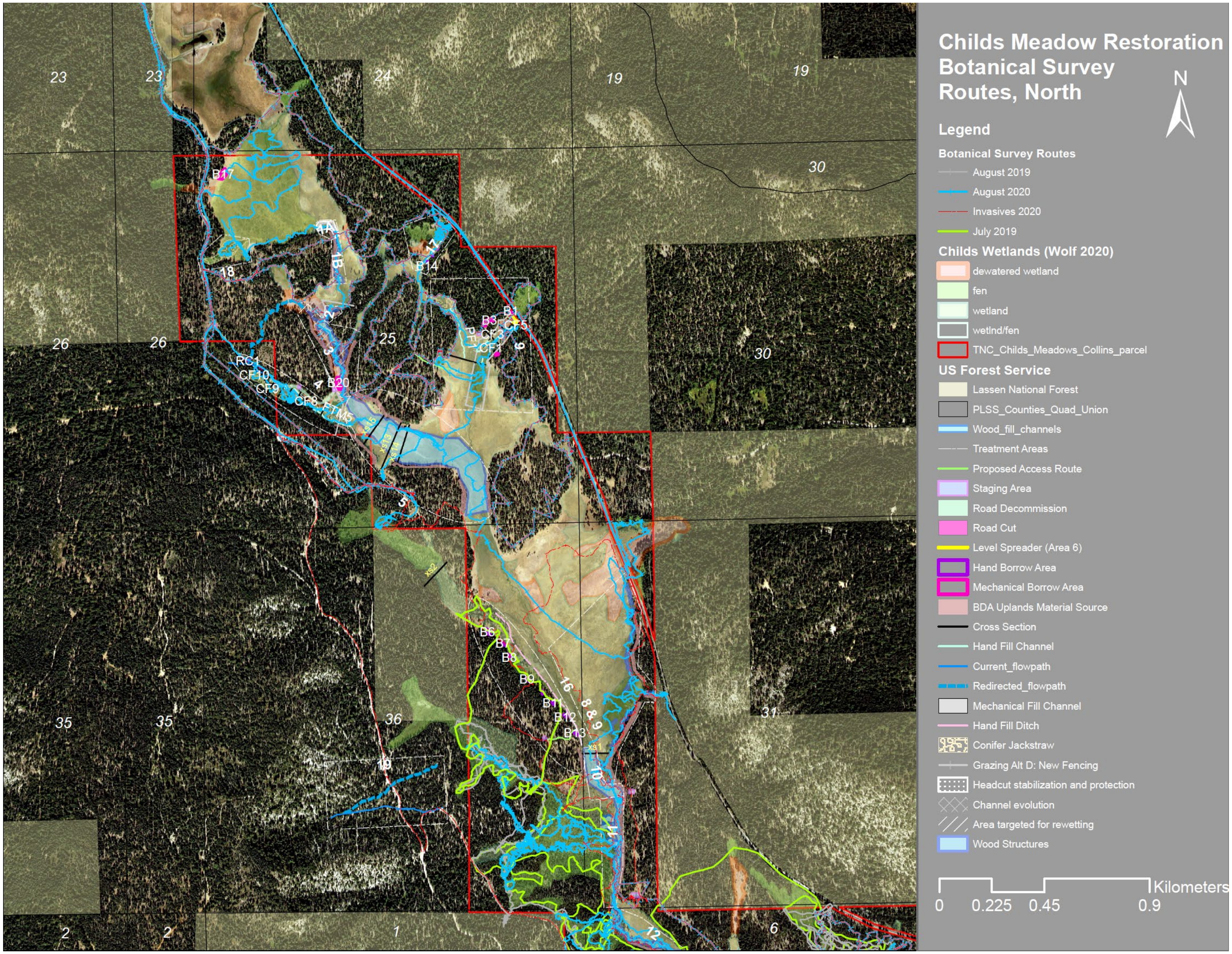
1. Prior to moving soil from one location to another, site should be inspected for nonnative invasive species. Soil should be borrowed from another location if invasive nonnative plants are found to be present.
2. Sites where borrow dirt is imported should be monitored and treated for 3 years for invasive nonnative plants.
3. Staging areas should be located away from areas containing invasive nonnative plants.

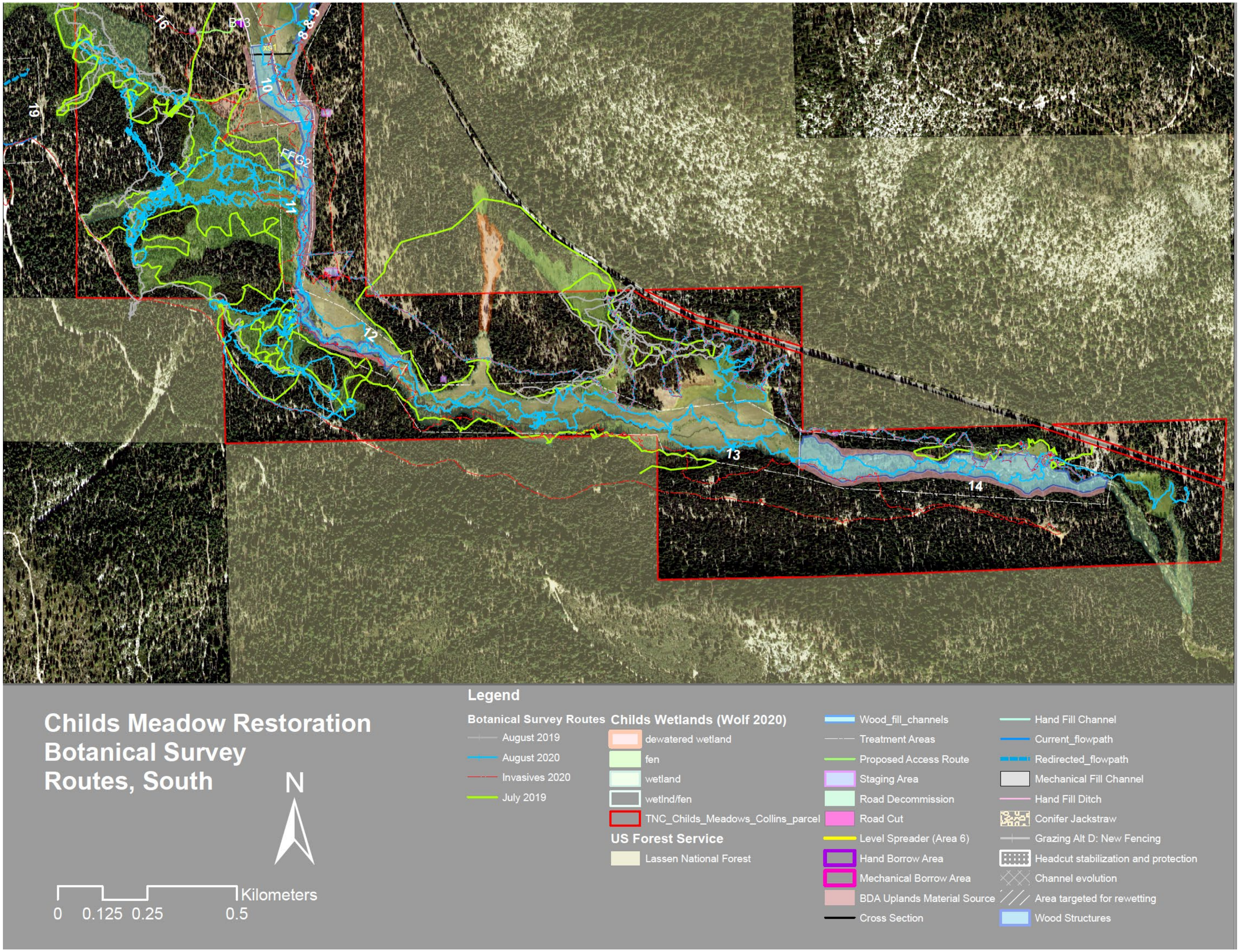
4. Pathways from staging areas to restoration locations should be routed and buffered away from areas containing nonnative invasive plants.

Known invasive nononative plant populations at borrow (including BDAs) sites

Site	Nonnative Invasive plant	Mitigating action
Borrow site B3	Bull thistle	Move borrow site, or flag area with bull thistle, monitor fill locations 3 years
Borrow site B17	Woolly mullein	Move borrow site, or flag area with woolly mullein, monitor fill locations 3 years

APPENDIX A: MAP OF ROUTES FOR BOTANICAL SURVEYS FROM 2019 AND 2020.




Childs Meadow Restoration
Botanical Survey
Routes, South
N
Kilometers
0 0.125 0.25 0.5
Legend
Botanical Survey Routes
August 2019
August 2020
Invasives 2020
July 2019
Childs Wetlands (Wolf 2020)
dewatered wetland
fen
wetland
wetlnd/fen
TNC_Childs_Meadows_Collins_parcel
US Forest Service
Lassen National Forest
Wood_fill_channels
Treatment Areas
Proposed Access Route
Staging Area
Road Decommission
Road Cut
Level Spreader (Area 6)
Hand Borrow Area
Mechanical Borrow Area
BDA Uplands Material Source
Cross Section
Hand Fill Channel
Current_flowpath
Redirected_flowpath
Mechanical Fill Channel
Hand Fill Ditch
Conifer Jackstraw
Grazing Alt D: New Fencing
Headcut stabilization and protection
Channel evolution
Area targeted for rewetting
Wood Structures

APPENDIX B: VASCULAR PLANTS KNOWN FROM CHILDS MEADOW RESTORATION PROJECT

Scientific Name	Common Name	Rarity Status	CAL-IPC Status
Abies concolor	White silver fir	-	-
Abies magnifica	Magnificant silver fir	-	-
Achillea millefolium	Yarrow	-	-
Acmispon americanus var. americanus	Spanish lotus	-	-
Adenocaulon bicolor	Trail plant	-	-
Agoseris glauca var. glauca	Short beaked agoseris	-	-
Agoseris monticola	Mountain agoseris	-	-
Agrostis exarata	Bentgrass	-	-
Agrostis idahoensis	Colonial bentgrass	-	-
Agrostis pallens	Diego bent grass	-	-
Agrostis scabra	Rough bentgrass	-	-
Allium campanulatum	Dusky onion	-	-
Allium validum	Swamp onion	-	-
Alnus incana ssp. tenuifolia	Creek alder	-	-
Alopecurus aequalis	Sonoma alopecurus	-	-
Amelanchier utahensis	Pale leaved serviceberry	-	-
Anaphalis margaritacea	Pearly everlasting	-	-
Arnica sororia	Twin arnica	-	-
Athyrium filix-femina var. cyclosorum	Western lady fern	-	-
Bistorta bistortoides	American bistort	-	-
Bromus tectorum	Downy chess	-	High
Calamagrostis canadensis	Canada reedgrass	-	-
Calamagrostis stricta	Narrow hairgrass	-	-
Callitriche heterophylla	Water starwort	-	-
Calocedrus decurrens	Incense cedar	-	-
Calochortus nudus	Naked mariposa lily	-	-
Caltha leptosepala	White marsh marigold	-	-
Camassia quamash ssp. breviflora	Small camas	-	-
Carex abrupta	Abrupt beaked sedge	-	-
Carex angustata	Narrow leaved sedge	-	-
Carex aquatilis var. aquatilis	Water sedge	-	-
Carex athrostachya	Slender leaved sedge	-	-
Carex aurea	Golden fruited sedge	-	-
Carex disperma	Soft leaf sedge	-	-
Carex echinata	Bristle fruit sedge	-	-
Carex feta	Green sheathed sedge	-	-
Carex integra	Smooth beak sedge	-	-
Carex jonesii	Jones' sedge	-	-
Carex lemmonii	Lemmon's sedge	-	-
Carex luzulifolia	Littleleaf sedge	-	-

Scientific Name	Common Name	Rarity Status	CAL-IPC Status
Carex luzulina	Wood rush sedge	-	-
Carex nebrascensis	Nebraska sedge	-	-
Carex pachystachya	Thick headed sedge	-	-
Carex pellita	Woolly sedge	-	-
Carex rossii	Ross' sedge	-	-
Carex scopulorum var. bracteosa	Bracted sedge	-	-
Carex simulate	Short beaked sedge	-	-
Carex subfusca	Brown sedge	-	-
Carex utriculate	Beaked sedge	-	-
Carex vesicaria	Blister sedge	-	-
Castilleja lacera	Foothill owl's clover	-	-
Castilleja lassenensis	Lemmon's paintbrush	-	-
Castilleja miniata ssp. miniata	Scarlet indian paintbrush	-	-
Cerastium fontanum ssp. vulgare	Common chickweed	-	-
Cerastium glomeratum	Large mouse ears	-	-
Chamerion angustifolium ssp. circumvagum	Fireweed	-	-
Chimaphila umbellata	Blake's prince's pine	-	-
Chrysolepis sempervirens	Sierra chinquapin	-	-
Cichorium intybus	Chicory	-	-
Circaea alpina ssp. pacifica	Pacific enchanter's nightshade	-	-
Cirsium douglasii	Swamp thistle	-	-
Cirsium vulgare	Bullthistle	-	Moderate
Comarum palustre	Marsh cinquefoil	-	-
Corallorhiza maculata	Summer coral root	-	-
Dactylis glomerata	Orchardgrass	-	Limited
Danthonia californica	California oatgrass	-	-
Danthonia intermedia ssp. intermedia	Intermediate oat grass	-	-
Deschampsia cespitosa	Tufted hair grass	-	-
Deschampsia danthonioides	Annual hairgrass	-	-
Deschampsia elongata	Hairgrass	-	-
Dicentra formosa	Pacific bleedinghearts	-	-
Drosera rotundifolia	Round leaved sundew	-	-
Drymocallis lactea var. austiniae	Austin's woodbeauty	-	-
Eleocharis bella	Beautiful spikerush	-	-
Eleocharis macrostachya	Spike rush	-	-
Eleocharis sp.	-	-	-
Elymus elymoides	Squirrel tail grass	-	-
Elymus glaucus	Blue wildrye	-	-
Epilobium brachycarpum	Willow herb	-	-

Scientific Name	Common Name	Rarity Status	CAL-IPC Status
Epilobium ciliatum ssp. glandulosum	Glandular willowherb	-	-
Epilobium densiflorum	Willow herb	-	-
Epilobium oregonense	Slimstem willowweed	-	-
Equisetum arvense	Common horsetail	-	-
Erigeron eatonii	Eaton's daisy	-	-
Erigeron pumilus var. intermedius	Shaggy fleabane	-	-
Eriogonum nudum	Naked buckwheat	-	-
Festuca arundinacea	Reed fescue	-	Moderate
Festuca occidentalis	Western fescue	-	-
Fragaria virginiana	Mountain strawberry	-	-
Galium aparine	Cleavers	-	-
Galium trifidum ssp. columbianum	Threepetal bedstraw	-	-
Galium triflorum	Sweet bedstraw	-	-
Gaultheria ovatifolia	Western wintergreen	-	-
Gayophytum diffusum ssp. diffusum	Diffuse gayophytum	-	-
Gayophytum diffusum ssp. parviflorum	Small flowered groundsmoke	-	-
Gentiana newberryi var. tiogana	Sierra alpine gentian	-	-
Geum macrophyllum	Large leaved avens	-	-
Glyceria elata	Tall mannagrass	-	-
Gnaphalium palustre	Lowland cudweed	-	-
Goodyera oblongifolia	Rattlesnake plantain	-	-
Hastingsia alba	White hastingsia	-	-
Helenium bigelovii	Bigelow's sneezeweed	-	-
Heterocodon rariflorum	Heterocodon	-	-
Hieracium albiflorum	White flowered hawkweed	-	-
Hippuris vulgaris	Mare's tail	-	-
Hordeum brachyantherum ssp. brachyantherum	Meadow barley	-	-
Horkelia tridentata	Three toothed horkelia	-	-
Hosackia oblongifolia	Narrow leaved lotus	-	-
Hypericum anagalloides	Creeping St. John's wort	-	-
Hypericum scouleri	Scouler's st john's wort	-	-
Juncus balticus ssp. ater	Baltic rush	-	-
Juncus bufonius	Common toad rush	-	-
Juncus dubius	Mariposa rush	-	-
Juncus effusus	Common bog rush	-	-
Juncus nevadensis	Sierra rush	-	-
Juncus orthophyllus	Straight leaved rush	-	-
Juncus oxymeris	Pointed rush	-	-
Juncus saximontanus	Rocky mountain rush	-	-
Juncus tenuis	Slender rush	-	-

Scientific Name	Common Name	Rarity Status	CAL-IPC Status
Juncus xiphioides	Iris leaved rush	-	-
Kalmia polifolia	Mountain laurel	-	-
Kelloggia galioides	Kelloggia	-	-
Kyhosia bolanderi	Bolander's madia	-	-
Lactuca serriola	Prickly lettuce	-	-
Lemna sp.	-	-	-
Leptosiphon harknessii	Harkness' flaxflower	-	-
Leucothoe davisiae	Sierra laurel	-	-
Ligusticum grayi	Gray's lovage	-	-
Lilium pardalinum	California tiger lily	-	-
Listera convallarioides	Broad lipped twayblade	-	-
Lonicera conjugialis	Purpleflower honeysuckle	-	-
Lonicera involucrata	Coast twinberry	-	-
Lupinus lepidus var. sellulus	Stool lupine	-	-
Luzula comosa	Hairy wood rush	-	-
Luzula comosa var. comosa	Hairy wood rush	-	-
Luzula subcongesta	Donner wood rush	-	-
Lysimachia thyrsiflora	Tufted yellow loosestrife	Rank 2B.3	-
Madia exigua	Small tarweed	-	-
Maianthemum stellatum	Starry false lily of the valley	-	-
Melica harfordii	Harford's melic	-	-
Mentha arvensis	American wild mint	-	-
Micranthes oregana	Bog saxifrage	-	-
Mimulus breweri	Brewer's monkeyflower	-	-
Mimulus guttatus	Yellow monkey flower	-	-
Mimulus moschatus	Musk monkeyflower	-	-
Mimulus primuloides	Primrose monkeyflower	-	-
Mimulus torreyi	Torrey's monkeyflower	-	-
Monardella odoratissima	Mountain monardella	-	-
Montia chamissoi	Spring beauty	-	-
Muhlenbergia filiformis	Slender muhly	-	-
Myosotis scorpioides	Forget me not	-	-
Narthecium californicum	California bog asphodel	-	-
Navarretia divaricata ssp. divaricata	Mountain navarretia	-	-
Navarretia leucocephala	White headed navarretia	-	-
Navarretia leucocephala ssp. leucocephala	White headed navarretia	-	-
Navarretia sp.	-	-	-
Nemophila pedunculata	Meadow nemophila	-	-
Nuphar polysepala	Rocky mountain pond-lily	-	-
Oreostemma alpigenum var. andersonii	Tundra aster	-	-

Scientific Name	Common Name	Rarity Status	CAL-IPC Status
Orthilia secunda	One sided wintergreen	-	-
Osmorhiza berteroi	Sweetcicely	-	-
Oxypolis occidentalis	Western cow bane	-	-
Packera indecora	Elegant groundsel	Rank 2B.2	-
Panicum acuminatum var. fasciculatum	Pacific panic grass	-	-
Pedicularis attollens	Attol lousewort	-	-
Pedicularis groenlandica	Elephant head lousewort	-	-
Penstemon rydbergii var. oreocharis	Meadow beardtongue	-	-
Penstemon heterodoxus var. shastensis	Shasta beardtongue	Rank 4.2	-
Perideridia parishii	Parish's yampah	-	-
Perideridia sp.	-	-	-
Phacelia ramosissima	Branching phacelia	-	-
Phleum pratense	Common timothy	-	-
Pinus contorta ssp. murrayana	Lodgepole pine	-	-
Pinus jeffreyi	Jeffrey pine	-	-
Plagiobothrys bracteatus	Bracted allocarya	-	-
Plagiobothrys sp.	-	-	-
Plantago major	Common plantain	-	-
Plantago ovata	Desert plantain	-	-
Platanthera dilatata var. leucostachys	Sierra bog orchid	-	-
Poa bolanderi	Bolander's bluegrass	-	-
Poa bulbosa	Bulbous blue grass	-	-
Poa pratensis ssp. pratensis	Kentucky blue grass	-	-
Polygonum douglasii	Douglas' knotweed	-	-
Polygonum polygaloides ssp. kelloggii	Kellogg's knotweed	-	-
Potamogeton berchtoldii	Narrow leaved pondweed	-	-
Potamogeton natans	Floating leaved pondweed	-	-
Potentilla gracilis	Northwest cinquefoil	-	-
Potentilla millefolia	Cut leaf cinquefoil	-	-
Poterium sanguisorba	Garden burnet	-	-
Primula tetrandra	Alpine shooting star	-	-
Prunella vulgaris	Self heal	-	-
Pseudotsuga menziesii var. menziesii	Douglas fir	-	-
Pteridium aquilinum var. pubescens	Western bracken fern	-	-
Pyrola asarifolia	Bog wintergreen	-	-
Ranunculus alismifolius var. alismifolius	Water plantain buttercup	-	-
Ranunculus aquatilis	Whitewater crowfoot	-	-
Ranunculus orthorhynchus	Bloomer's buttercup	-	-
Rhododendron columbianum	Western labrador tea	-	-
Rhynchospora alba	White beaked rush	Rank 2B.2	-
Ribes inerme	White stemmed gooseberry	-	-

Scientific Name	Common Name	Rarity Status	CAL-IPC Status
Ribes roezlii	Sierra gooseberry	-	-
Rosa pisocarpa	Cluster rose	-	-
Rumex acetosella	Sheep sorrel	-	Moderate
Rumex crispus	Curly dock	-	Limited
Rumex occidentalis	Western dock	-	-
Rumex transitorius	Willow dock	-	-
Rumex triangulivalvis	Willow dock	-	-
Sagina saginoides	Alpine pearlwort	-	-
Salix jepsonii	Jepson's willow	-	-
Salix lasiandra	Pacific willow	-	-
Salix lasiolepis	Arroyo willow	-	-
Salix lemmonii	Lemmon's willow	-	-
Sanicula tuberosa	Turkey pea	-	-
Sceptridium multifidum	Leather grape-fern	-	-
Scirpus congdonii	Congdon's bulrush	-	-
Scirpus diffuses	Diffuse rush	-	-
Scirpus microcarpus	Mountain bog bulrush	-	-
Senecio hydrophilus	Alkali marsh ragwort	-	-
Senecio triangularis	Groundsel	-	-
Sidalcea oregana	Oregon checker mallow	-	-
Silene lemmonii	Lemmon's catchfly	-	-
Sisyrinchium bellum	Blue eyed grass	-	-
Sisyrinchium californicum	California golden eyed grass	-	-
Sisyrinchium elmeri	Elmer's golden eyed grass	-	-
Sisyrinchium idahoense	Idaho blue eyed grass	-	-
Solidago elongata	West coast canada goldenrod	-	-
Sorbus californica	California mountain ash	-	-
Sorbus sp.	-	-	-
Sparganium angustifolium	Narrow leaved bur reed	-	-
Sparganium natans	Small bur reed	Rank 4.3	-
Sphenosciadium capitellatum	Grayswamp whiteheads	-	-
Spiraea douglasii	Douglas spiraea	-	-
Spiranthes porrifolia	Western ladies tresses	-	-
Stachys rigida	Rough hedgenettle	-	-
Stellaria borealis ssp. sitchana	Boreal starwort	-	-
Stellaria longifolia	Long leaved starwort	Rank 2B.2	-
Stellaria longipes ssp. longipes	Chickweed, starwort	-	-
Stipa occidentalis	Western needlegrass	-	-
Symphyotrichum spathulatum	Western mountain aster	-	-
Taraxacum officinale	Red seeded dandelion	-	-
Torreyochloa pallida var. pauciflora	Mannagrass	-	-

Scientific Name	Common Name	Rarity Status	CAL-IPC Status
Tragopogon dubius	Goat's beard	-	-
Triantha occidentalis ssp. occidentalis	Western false asphodel	-	-
Trichostema oblongum	Mountain bluecurls	-	-
Trifolium longipes	Long stalked clover	-	-
Trifolium repens	White clover	-	-
Trifolium wormskioldii	Cow clover	-	-
Trisetum canescens	Nodding trisetum	-	-
Triteleia hyacinthina	Wild hyacinth	-	-
Utricularia intermedia	Flat leaved bladderwort	Rank 2B.2	-
Utricularia macrorhiza	Common bladderwort	-	-
Utricularia ochroleuca	Yellowishwhite bladderwort	Rank 2B.2	-
Vaccinium uliginosum ssp. occidentale	Western blueberry	-	-
Ventenata dubia	Ventenata grass	-	-
Veratrum californicum var. californicum	California corn lily	-	-
Verbascum thapsus	Woolly mullein	-	Limited
Veronica americana	American brooklime	-	-
Veronica peregrina ssp. xalapensis	Speedwell	-	-
Veronica scutellata	Marsh speedwell	-	-
Veronica serpyllifolia ssp. humifusa	Sprawling speedwell	-	-
Vicia americana ssp. americana	American vetch	-	-
Viola adunca ssp. adunca	Western dog violet	-	-
Viola glabella	Stream violet	-	-
Viola macloskeyi	Macloskey's violet	-	-
Viola purpurea ssp. integrifolia	Smooth leaved violet	-	-

*****Cal-IPC Ranking Definitions***

High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

APPENDIX C: PHOTOS OF CRPR 1 and 2 PLANTS IN CHILDS MEADOW RESTORATION PROJECT AREA

Lassen paintbrush (Castilleja lassenensis)

Tufted loosestrife (Lysimachia thyrsiflora)

Individual (photo in forefront) habitat (photo in back)

Broad-nerved hump moss (*Meesia uliginosa)*

White beaked rush (*Rynchyospora alba*)

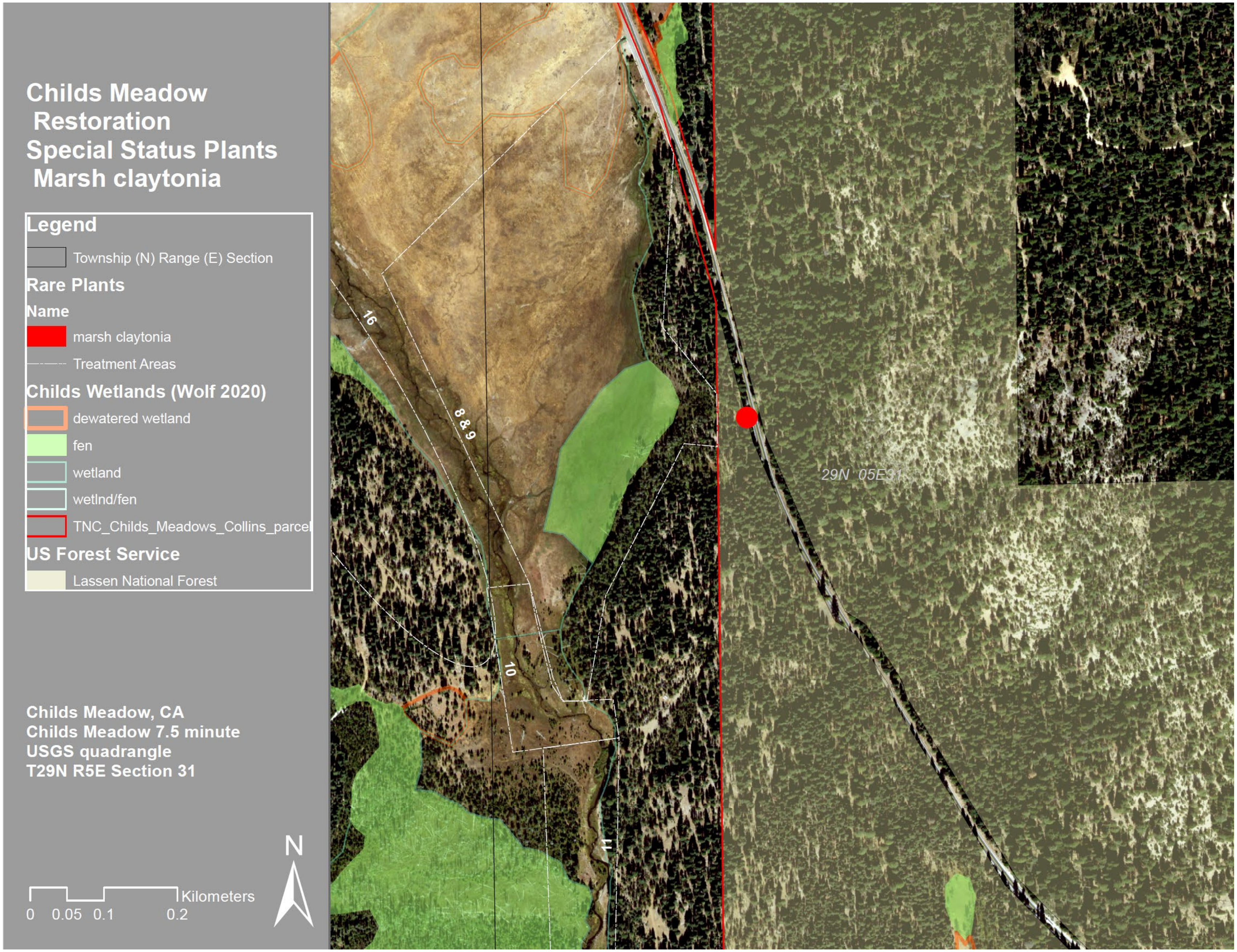
Individual (photo in forefront) habitat (photo in back)

Long leaved starwort (*Stellaria longifolia*)

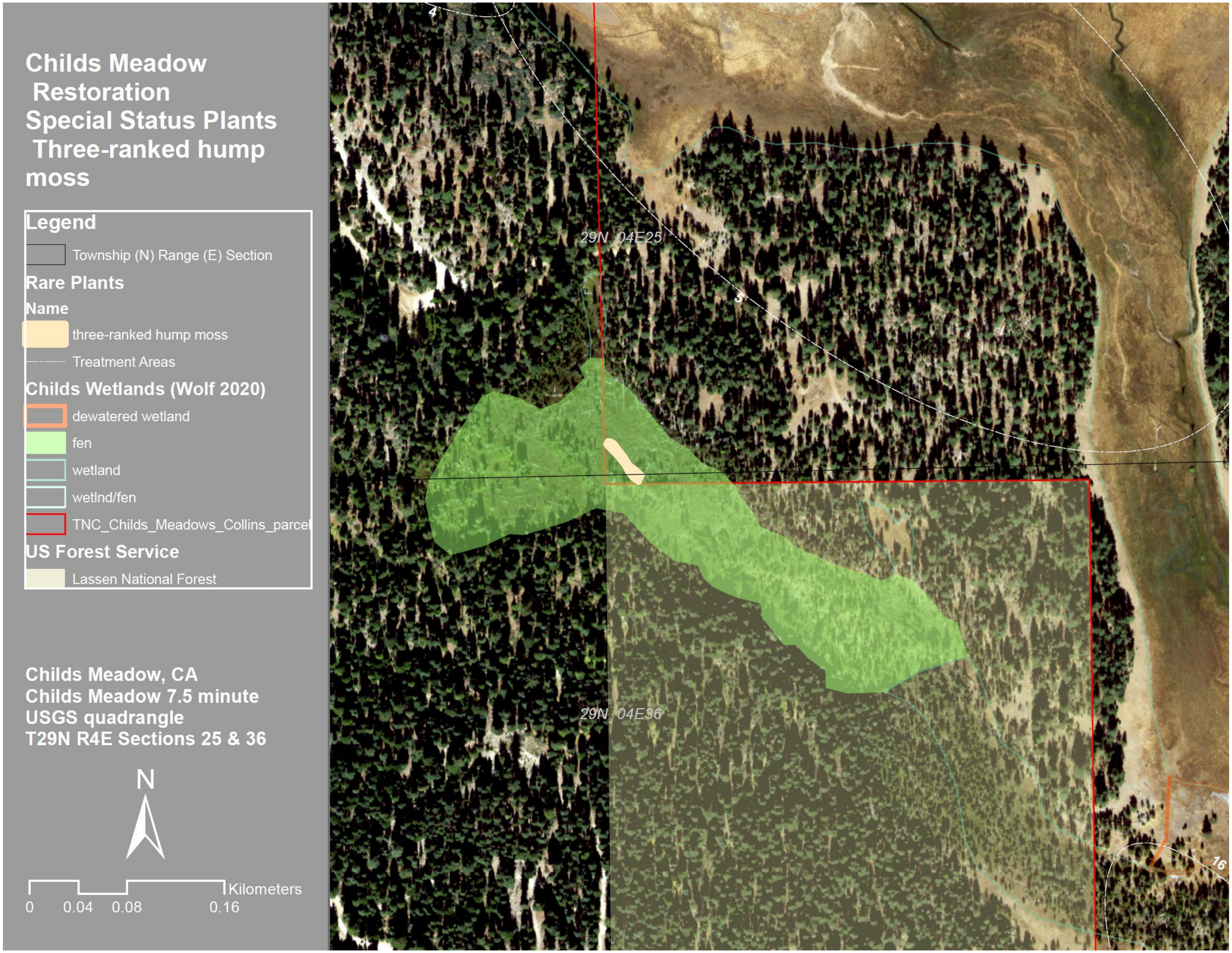
Cream-flowered bladderwort (*Utricularia ochroleuca*)

Flatleaved bladderwort (*Utricularia intermedia*)

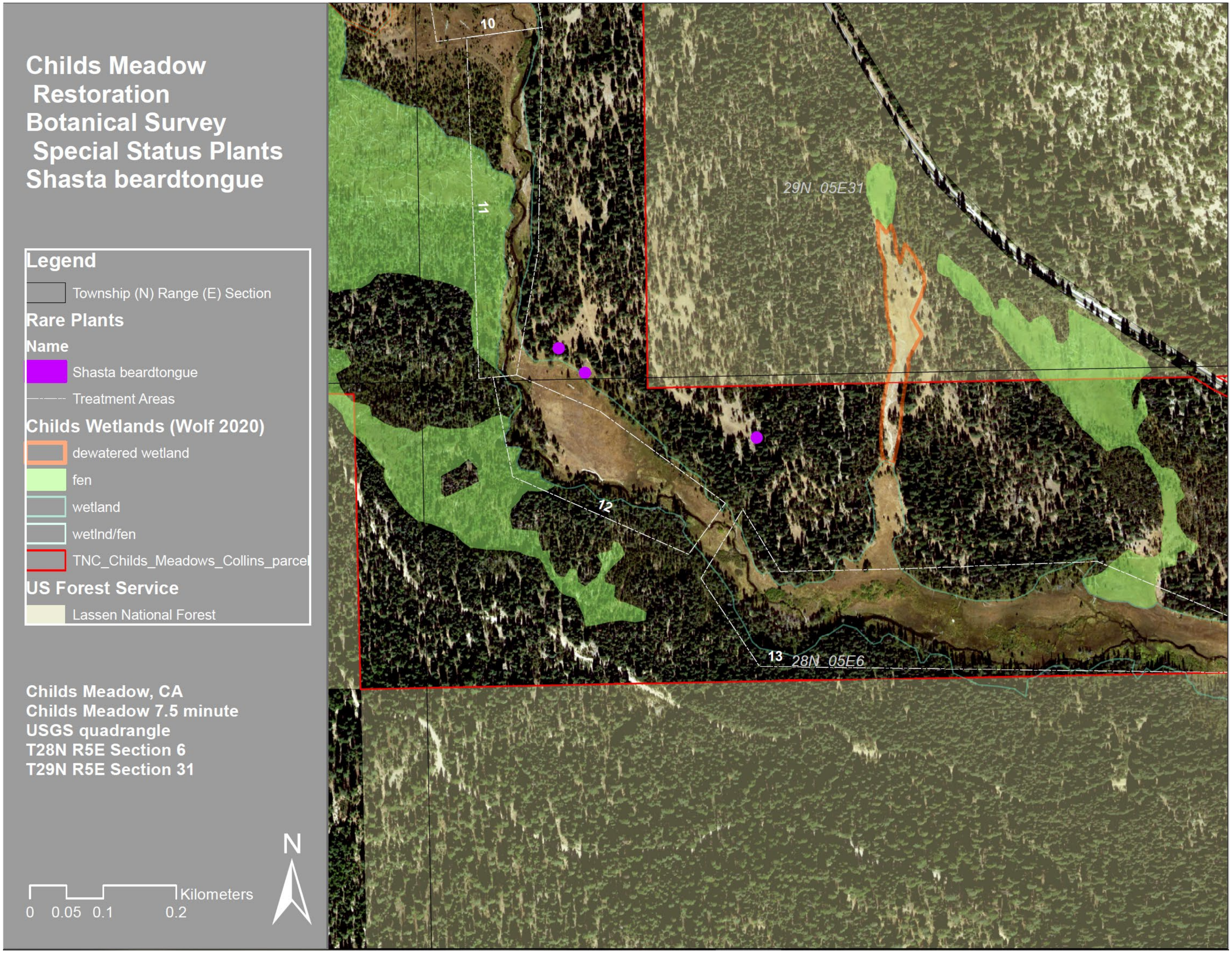
APPENDIX D: CRPR LIST 4 PLANTS – PHOTOS AND MAPS
Marsh claytonia (Claytonia palustris)


Childs Meadow
Restoration
Special Status Plants
Marsh claytonia
Legend
Township (N) Range (E) Section
Rare Plants
Name
marsh claytonia
Treatment Areas
Childs Wetlands (Wolf 2020)
dewatered wetland
fen
wetland
wetlnd/fen
TNC_Childs_Meadows_Collins_parcel
US Forest Service
Lassen National Forest
Childs Meadow, CA
Childs Meadow 7.5 minute
USGS quadrangle
T29N R5E Section 31
0 0.05 0.1 0.2
Kilometers
N
16
8 & 9
10
11
29N 05E31

Three ranked humpmoss (*Meesia triquetra*)


Childs Meadow
Restoration
Special Status Plants
Three-ranked hump
moss
Legend
Township (N) Range (E) Section
Rare Plants
Name
three-ranked hump moss
Treatment Areas
Childs Wetlands (Wolf 2020)
dewatered wetland
fen
wetland
wetlnd/fen
TNC_Childs_Meadows_Collins_parcel
US Forest Service
Lassen National Forest
Childs Meadow, CA
Childs Meadow 7.5 minute
USGS quadrangle
T29N R4E Sections 25 & 36
N
0
0.04
0.08
0.16
Kilometers
29N 04E25
29N 04E36

Shasta beardtongue (Penstemon heterodoxus var. shastensis)


Childs Meadow
Restoration
Botanical Survey
Special Status Plants
Shasta beardtongue
Legend
Township (N) Range (E) Section
Rare Plants
Name
Shasta beardtongue
Treatment Areas
Childs Wetlands (Wolf 2020)
dewatered wetland
fen
wetland
wetlnd/fen
TNC_Childs_Meadows_Collins_parcel
US Forest Service
Lassen National Forest
Childs Meadow, CA
Childs Meadow 7.5 minute
USGS quadrangle
T28N R5E Section 6
T29N R5E Section 31
N
0 0.05 0.1 0.2 Kilometers
10
11
12
13
29N 05E31
28N 05E6

APPENDIX E. REFERENCES AND RESOURCES

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Evaluation of Impacts to Terrestrial and Aquatic Wildlife Resources for the Proposed Childs Meadow Restoration Project

Prepared by Brent R. Campos, Point Blue Conservation Science
March 3, 2021

Introduction

This report is an evaluation of the potential environmental impacts to terrestrial and aquatic wildlife resources for the Childs Meadow Restoration Project in Tehama County. This evaluation focused on special-status animal species that are (1) listed as threatened or endangered under the CESA or the ESA; (2) proposed for federal listing as threatened or endangered; (3) identified as state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as Species of Special Concern or California Fully Protected Species.

Methods

To assess potential special status wildlife species occurring in or adjacent to the Childs Meadow Restoration Project area, we completed a 9-quad search using CNDDB RareFind. The 9 quads (USGS code) used include: Lassen Peak (4012145), Reading Peak (4012144), Mt. Harkness (4012143), Stover Mtn. (4012133), Humbug Valley (4012123), Humboldt Peak (4012124), Onion Butte (4012125), Childs Meadow (4012134), and Mineral (4012135).

Additionally, staff from Point Blue Conservation Science (Point Blue), Collins Almanor Forest (CAF), Lassen National Forest, Pacific Southwest Research Station, and Washington State University have conducted biological resource surveys for special-status aquatic species, birds, and carnivores within the project area and adjacent environments from 2010 to 2020. Surveys included the use of focused searches, visual encounter surveys, call backs, camera traps, and point count methods for birds. CAF staff conducted visual encounter surveys for special status amphibians occurred in summers of 2018, 2019, and 2020 across nearly all aquatic habitats holding standing water on Childs Meadow, including class I and II watercourses, spring and fen areas, waterholes, and ephemeral pools. Surveys in 2019 were spread out across the spring, summer, and fall months to assess seasonal movement of amphibians. Call back surveys for northern goshawks occurred in forested areas of the project area determined to be suitable goshawk breeding habitat in 2018 and 2019 by CAF staff biologists and technicians. Call back surveys for great gray owl occurred in 2019 and 2020, per survey requirements outlined in the Collins pending great gray owl Safe Harbor Agreement. California spotted owl call back and nesting status surveys are performed annually around the project area by the Lassen National Forest CSO Demographic Study. To date, there are no nesting spotted owls in or adjacent to Childs Meadow. Point Blue performed willow flycatcher and sandhill crane surveys in June of 2017, 2018, and 2020. Point Blue also surveyed birds using point count surveys along Gurnsey

Creek in June of 2010-2020, except 2018. Camera surveys for mammals were completed by CAF staff in winter 2017-2018 and 2018-2019 (baited) and summer of 2018 and 2019 (unbaited) in and adjacent to the project area.

RESULTS

Twenty-six special status species were considered in this analysis (Table 1).

Table 1. Special status species evaluated for this analysis. Species were classified as special status if they are (1) listed as threatened or endangered under the CESA or the ESA; (2) proposed for federal listing as threatened or endangered; (3) identified as state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as Species of Special Concern or California Fully Protected Species.

Species	Listing Status* (Fed / State)	Habitat	Species or potential suitable habitat present	Determination
Invertebrates				
Western bumble bee (*Bombus occidentalis)*	FSS / Candidate E	Access to flowering plants and abandoned rodent burrows	Not known to occur in the project area, but suitable habitat may be present.	No impact
Fish				
chinook salmon - Central Valley spring-run ESU (*Oncorhynchus tshawytscha*)	T / T	Anadromous waters of the Central Valley <27°C.	Cannot occur in the project area because of natural stream passage barrier downstream.	No impact

steelhead - Central Valley DPS (Oncorhynchus mykiss irideus)	T / --	Anadromous waters of the Central Valley.	Cannot occur in the project area because of natural stream passage barrier downstream.	No impact
Amphibians				
Cascades frog (*Rana cascadae*)	-- / Candidate E, SSC	Mountain lakes, small streams, and ponds in meadows < 8,200 ft. Typically no fish present.	Known to occur in the project area based on resource surveys.	Less than significant impact with mitigation
Foothill yellow-legged frog (*Rana boylii*)	BLMSS, FSS / E, SSC	Partly shaded rocky streams and riffles with a rocky substrate in a variety of habitats	Not known to occur in the project area, but suitable habitat may be present.	No impact
Sierra Nevada yellow-legged frog (*Rana sierrae*)	E / T	Mountain lakes, small streams, and ponds in meadows. Typically no fish present.	Not known to occur in the project area, but suitable habitat may be present.	No impact

Southern long-toed salamander (*Ambystoma macrodactylum sigillatum)*	-- / SSC	High elevation meadows and lakes.	Known to occur in the project area based on resource surveys.	Less than significant impact with mitigation
Birds				
Bald eagle (*Halieaeetus leucocephalus)*	BLMSS, FSS / E, FP	In western North America, nests and roosts in coniferous forests within 1 mile of a lake, a reservoir, a stream, or the ocean	No bald eagle nests are located within the project area, but suitable habitat is present.	No impact
California spotted owl (*Strix occidentalis occidentalis)*	FSS, MIS / SSC	Late seral closed canopy coniferous forest	Not known to occur in the project area.	No impact
Great gray owl (*Strix nebulosa)*	FSS / E	Late seral closed canopy coniferous forest adjacent to wet meadows	Not known to occur in the project area, but suitable habitat present	No impact

Greater sandhill crane (*Antigone canadensis tabida)*	BLMSS, FSS / T, FP	Summers in open terrain near shallow lakes or freshwater marshes; winters in plains and valleys near bodies of fresh water	<u>Known to occur</u> within the project area.	Less than significant impact with mitigation
Northern goshawk (*Accipiter gentilis)*	BLMSS, FSS / SSC	Coniferous forest. Red fir, lodgepole pine, Jeffrey pine, and aspen are typical nest trees.	<u>Known to occur</u> within the project area.	Less than significant impact with mitigation
Olive-sided flycatcher (*Contopus cooperi)*	-- / SSC	Conifer forests, burns, clearings. Breeds mostly in coniferous forest of the north and the higher mountains, especially around the edges of open areas including	<u>Known to occur</u> in the project area.	No impact

		bogs, ponds, clearings.		
Osprey (*Pandion haliaetus)*	-- / SSC	Nests in snags or cliffs or other high, protected sites near the ocean, large lakes, or rivers with abundant fish populations	<u>Known to occur</u> in the project area.	Less than significant impact
Vaux's Swift (*Chaetura vauxi)*	-- / SSC	Nests in hollow, burned-out tree trunks in large conifers; most other activities are conducted in the air	<u>Known to occur</u> in the project area.	No impact
Willow flycatcher (*Empidonax traillii)*	FSS / E	Riparian areas and large, wet meadows with abundant willows for breeding; usually found in riparian habitats during migration	<u>Known to occur</u> in the project area.	Less than significant impact with mitigation

Yellow rail (*Coturnicops noveboracensis)*	FSS / SSC	Grassy marshes and wet meadows	Not known to occur in the project area, but suitable habitat present.	No impact
Yellow warbler (*Dendroica petechial*)	MIS / SSC	Primarily nests in riparian habitats adjacent to creeks and rivers in thickets.	Known to occur in the project area.	Less than significant impact with mitigation
Mammals				
American badger (*Taxidea taxus)*	-- / SSC	Drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	Not known to occur in the project area, but suitable habitat present.	Less than significant impact
California wolverine (*Gulo gulo luteus)*	Proposed T, FSS / T, FP	Remote, high elevation, tree-line habitat and areas of deep snowpack	Not known to occur in the project area and suitable habitat not present.	No impact
Gray wolf (*Canis lupus)*	E / E	Habitat generalist, including coniferous	Not known to occur in the project area, but	No impact

		forests and wet meadows	suitable habitat present.	
Pacific fisher – (*Pekania pennanti)*	BLMSS, FSS / T, SSC	Intermediate to large tree stages of coniferous forests and deciduous-riparian areas with high percent canopy closure. Uses cavities, snags, logs, rocky areas for cover and denning. Large areas of mature, dense forest.	Not known to occur in the project area and suitable habitat not present.	No impact
Sierra Nevada mountain beaver (*Aplodontia rufa californica)*	-- / SSC	Dense growth of small deciduous trees and shrubs in riparian areas, wet soil, abundance of forbs.	Not known to occur in the project area, but suitable habitat present	No impact

Sierra Nevada red fox (*Vulpes vulpes necator)*	Proposed E, FSS / T	Mainly mountain meadows and woodlands near treeline. Some winter use of high elevation coniferous forest	Not known to occur in the project area, but suitable habitat present	Less than significant impact
Sierra Nevada snowshoe hare	-- / SSC	Thickets of deciduous trees, shrubs, and young conifers in high-elevation riparian areas.	Not known to occur in the project area, but suitable habitat present	Less than significant impact
Spotted bat (*Euderma maculatum)*	BSSC / SSC	Habitat generalist needing needing rock crevices in cliffs or caves for roosting.	Not known to occur in the project area and suitable roosting habitat not present	No impact

[*]Status definitions:

E=Listed as Endangered under the federal or state Endangered Species Act

T=Listed as Threatened under the federal or state Endangered Species Act

SSC=California species of special concern

FP=California fully protected species

FSS=United States Forest Service Sensitive Species

BLMSS=Bureau of Land Management Sensitive Species

MIS=United States Forest Service Management Indicator Species

Special status species detected in the project area

Nine special-status wildlife species are known to occur in the project area. All of these species (Cascades frog, southern long-toed salamander, greater sandhill crane, northern goshawk, olive-sided flycatcher, osprey, Vaux's swift, willow flycatcher, yellow warbler) were detected in the project area during biological resource surveys. Below is a discussion of the habitat requirements and distribution for each of these species relative to the project area. No other special-status wildlife species were detected in biological resource surveys or have recorded detections within the project area in CNDDB.

Cascades frog. Cascades frogs can be found in a range of aquatic habitats, including large lakes, ponds, wet meadows, and flowing streams, with occurrence in these habitats varying by life stage and season (Pope et al. 2014). Reproduction occurs in shallow still-water habitats that are the first to become exposed by snowmelt early in the spring and retain water long enough for egg and tadpole development: about 3 to 4 months (Pope et al. 2014). These habitats include shallow alcoves of lakes, ponds, potholes, flooded areas in meadows, and occasionally slow-moving streams or stream backwaters (Pope et al. 2014). Nonbreeding active-season habitat is more variable than breeding habitat (Pope et al. 2014). Adults and subadults use a wide array of aquatic habitats during the nonbreeding season; these include ponds, meadows, lakes, and streams (Pope et al. 2014). Adults often use sites with open, sunny areas, often along the shorelines, which may be favorable because they provide basking and foraging opportunities (Pope et al. 2014). They also use floating logs or emerged rocks that provide basking and foraging opportunities while also providing an aquatic escape from predators (Pope et al. 2014). Juveniles are often found in similar habitats as adults (Pope et al. 2014). The frogs are suspected of overwintering in aquatic sites that do not freeze solid (e.g., springs and deep lakes), similar to the mountain yellow-legged frog (*Rana muscosa* and *R. sierrae*) in the Sierra Nevada (Pope et al. 2014).

A population of Cascades frog is known to occur in many locations throughout Childs Meadow in the project area (Figure 1). A portion of this population has been monitored for multiple years using mark-recapture techniques by the US Forest Service Pacific Southwest Research Station and researchers from Washington State University. In 2019 under the CAF California Scientific Collecting Permit, the CAF staff biologist also began marking Cascades frogs at all areas across Childs Meadow where frogs were detected in order to better understand the population status. Mark-recapture techniques will continue to be used to monitor this population during meadow restoration efforts. Cascades frogs are also swabbed to assess disease loading, and this aspect of the research will also continue in order to understand how restoration activities may alter disease loading.

Southern long-toed salamander. Southern long-toed salamander use high elevation meadows and lakes in the Sierra Nevada, Cascade, and Klamath mountains. Aquatic larvae occur in ponds and lakes. Outside of the breeding season, adults are terrestrial and associated with underground burrows of mammals and moist areas under logs and rocks in close proximity to water. A population of long-toed salamander is known to occur in Childs Meadow within a small ephemeral pool (Figure 2). The distribution and extent of their hibernation habitat is unknown.

Greater sandhill crane. Pairs of greater sandhill crane in California generally nest in wet meadow, shallow lacustrine, and fresh emergent wetland habitat, with nests constructed of large mounds of water plants emerging from shallow water. Sandhill cranes are known to occur and breed in Childs Meadow, however exact breeding locations may change year to year. Point Blue detected greater sandhill crane every year in the project area during the breeding season in 2012, 2013, 2016-2018, and 2020.

Northern goshawk. Northern goshawks are found in forested communities, including mixed conifer, true fir, montane riparian, Jeffrey pine, ponderosa pine, and lodgepole pine forests. In 2018, CAF staff biologists had multiple detections of both adult and juvenile goshawks in the project area during call back surveys (Figure 3). Follow-up surveys in 2018 were inconclusive and were performed again in 2019. No nests or goshawks were observed in 2019, nor in 2020 during limited time spent searching. Though northern goshawks have not been detected in the project area, suitable nesting and foraging habitat exists in the project area.

Olive-sided flycatcher. Olive-sided flycatcher habitat includes conifer forests, and the edges of burns and clearings in conifer forest. The bird breeds mostly in coniferous forests (both early seral and old-growth), especially around the edges of open areas including meadows, bogs, ponds, and clearings, and nest in early successional post-fire forests and forage in forest openings, along edges, and over forest canopies (Kotliar 2007). They require suitable foraging and singing perches, which include dead branches of live trees or snags. The nest high in large, tall trees. Point Blue has detected olive-sided flycatcher within the project area every year from 2010-2020 during the breeding season.

Osprey. Osprey nesting habitat varies greatly, but common denominators are: (1) adequate supply of accessible fish within energetically adequate commuting distance (10–20 km) of nest; shallow waters (0.5–2 m deep) generally provide most accessible fish; (2) open, elevated nest sites free from predators such as trees, large rocks over water, bluffs, predator-free islands, or artificial structures such as nest platforms, towers supporting electrical lines or cellphone relays, and channel markers. Osprey have been recorded actively flying over the project area during the breeding season in 2012, 2013, 2017 and 2020. In 2020 CAF staff found an inactive raptor nest in the project area, determined to be an osprey nest (Figure 4).

Vaux's swift. Vaux's swift nests in hollow, burned-out tree trunks in large conifers and snags, while most other activities are conducted in the air. Vaux's swift is known to occur in the project area based on surveys completed by Point Blue. Vaux's swift have occasionally been detected foraging above Childs Meadow once in 2011 during the breeding season, but there is no evidence that they are breeding in the project area.

Willow flycatcher. Willow flycatcher require large, wet meadows with riparian areas characterized by dense willows and shrub cover. Breeding willow flycatchers are known to occur in some but not all years at Childs Meadow within the project area. They have been detected along Gurnsey Creek within the project area during the breeding season in 2010-2015, 2018, and 2020.

Yellow warbler. Yellow warbler habitat requirements are similar to willow flycatcher, and include riparian areas with riparian vegetation (especially shrubs, trees) in close proximity to water along streams and in wet meadows. Yellow warbler have been detected in the project area along Gurnsey Creek every year from 2010-2020.

Special status species not detected within the project area

Thirteen special-status species may have suitable habitat present, but were not detected by resource surveys in the project area nor have CNDDB detections in the project area. These species include western bumble bee, foothill yellow-legged frog, Sierra yellow-legged frog, bald eagle, California spotted owl, great gray owl, yellow rail, American badger, gray wolf, Sierra Nevada mountain beaver, Sierra Nevada red fox, Sierra Nevada snowshoe hare, and spotted bat. Four additional special status species – chinook salmon, steelhead, California wolverine and Pacific fisher – lack suitable habitat in the project area. Details about all seventeen of these species are included in this section.

Western bumble bee. Western bumble bee habitat includes meadows and other areas with a diverse and productive understory plant community. No dedicated surveys have been undertaken for western bumble bee at Childs Meadow, although suitable habitat does exist within the project area. The closest record of western bumble bee in the 9-quad search was documented in the general vicinity of the town of Mineral 5.5 miles away.

Chinook salmon and steelhead. Habitat in the Deer Creek watershed for the chinook salmon Central Valley spring-run evolutionarily significant unit and the steelhead Central Valley distinct population segment includes the anadromous waters of Deer Creek and its tributaries. There is a natural barrier to anadromy, Deer Creek falls, located >13 stream miles downstream of the Childs Meadow restoration project area boundary, thus, these species cannot reach Childs Meadow. We anticipate no impact of project activities on the waters below Deer Creek falls. However, we hope the project will contribute to lower water temperatures for downstream anadromous fishes.

Foothill yellow-legged frog. In the Sierra Nevada, habitat includes mid-elevation rocky streams and rivers with rocky substrate and open, sunny banks, in forests, chaparral, and woodlands. Sometimes found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools. Suitable habitat may exist in the downstream quarter of the project area where the substrate of Gurnsey Creek is coarse. Despite extensive amphibian surveys throughout Childs Meadow since 2011, this species has not been detected. Even though suitable habitat may exist, it can safely be assumed the species does not exist in the project area. There were several detections of this species in the 9-quad search in CNDDB as close as 7 miles away, from as recently as 1999, downstream from the project area along and on tributaries to Deer Creek.

Sierra yellow-legged frog. Inhabits lakes, ponds, meadow streams, isolated pools, and sunny riverbanks in the Sierra Nevada Mountains. Usually found in or very close to water, typically within a couple of meters. Highly adaptable in regards to what perching conditions (i.e., slope, canopy, cover, and substrate) are available. Waters that do not freeze to the bottom and which do not dry up completely are required. Despite extensive amphibian surveys throughout Childs Meadow since 2011, this species has not been detected. Even though suitable habitat may exist, it can safely be assumed the species does not exist in the project area. The only detection of this species in the 9-quad search in CNDDB is from 1923 in Jonesville, about 14 miles south of the project area in the Butte Creek watershed.

Bald eagle. Bald eagles typically breed in forested areas adjacent to large bodies of water. They nests in trees, and rarely on cliff faces and ground nests in treeless areas. Nests occur in mature and old-growth forest with some habitat edge, relatively close (usually <2 km) to water with suitable foraging opportunities. Actual distance to water varies within and among populations. In some cases, distance to water is not as critical as the quality of the foraging area that is present. The forest around Childs Meadow represents potentially suitable nesting habitat, though prey populations in Childs Meadow may not be sufficient to support nesting eagles.

California spotted owl. California spotted owl consists of late seral closed canopy coniferous forest. The Lassen National Forest has been a part of a long-term California Spotted Owl demography study that covers the majority of suitable habitat on the Almanor Ranger District and covers the suitable forested habitat around Childs Meadow, including CAF lands. To date, there are no nesting spotted owls on Childs Meadow.

Great gray owl. Great gray owl use late seral closed canopy coniferous forest adjacent to wet meadows. The owl has never been confirmed as a breeding species in the Lassen area, although very infrequent sightings of the owl have been confirmed. In 2019 and 2020 the CAF biologist completed call station surveys for great gray owls in suitable habitat in and around the Childs Meadow area without any detections.

Yellow rail. Yellow rails that breed in the Sierra Nevada require sedge marshes/meadows with moist soil or shallow standing water. Within the project area, there is suitable habitat for the species in Childs Meadow. However, the lack of tall herbaceous vegetation and meadow wetness in most of the project area likely limits suitability for the species. No yellow rails have been detected within Childs Meadow during extensive passive survey efforts for all birds. While it is possible the species occurs within Childs Meadow, this evidence suggests that probability is low. The closest detections of yellow rail are approximately 7.6 miles northwest of the project area at Willow Lake.

American badger. American badger habitat includes drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Badger are also known to occur in the vicinity of Lake Almanor. CAF has conducted forest carnivore surveys via baited camera stations in the project area since 2017 without badger detections.

California wolverine. Habitat consists of remote, high elevation, tree-line habitat and areas of deep snowpack. This habitat does exist in the project area. CAF has conducted forest carnivore surveys via baited camera stations in the project area since 2017 without wolverine detections.

Gray wolf. Gray wolves are habitat generalists, using many different habitat types ranging from mountain meadow habitat to closed canopy forests. Though the entire project area can be considered suitable habitat, it is located outside the Known Wolf Area Activity mapped by

CDFW. CAF has conducted forest carnivore surveys via baited camera stations in the project area since 2017 without wolf detections.

Pacific fisher. Pacific fisher habitat includes intermediate to large tree stages of coniferous forests and deciduous-riparian areas with high percent canopy closure, with a preference for mature, dense forest. Fisher use cavities, snags, logs, and rocky areas for cover and denning. CAF has conducted forest carnivore surveys via baited camera stations in the project area since 2017 without fisher detections. Although fishers are not known to breed in the vicinity of the project area, it is possible that fishers pass through or forage within the project area.

Sierra Nevada mountain beaver. Sierra Nevada mountain beaver habitat consists of dense growth of small deciduous trees and shrubs in riparian areas along with wet soil, an abundance of forbs, an abundant supply of water, and a dense understory for food and cover. There have been no formal surveys for mountain beaver in the project area and there are no detections of the beaver recorded on CNDDB for the project area, though suitable riparian habitat is available. Mountain beaver populations are uncommon throughout the Sierra, which may explain why they may not be present in the project area.

Sierra Nevada red fox. Sierra Nevada red fox (SNRF) use multiple habitat types including meadows and rocky areas and high-elevation conifer habitat. CAF has conducted forest carnivore surveys via baited camera stations in the project area since 2017 without red fox detections, though the entire project area is potentially suitable habitat for denning and foraging.

Sierra Nevada snowshoe hare. The Sierra Nevada snowshoe hare occurs in riparian communities characterized by thickets of deciduous trees and shrubs such as willows and alders, as well as dense stands of young conifers, and chaparral from about 4,800 feet to 8,000 feet. They are primarily crepuscular and nocturnal, with daylight hours spent in shallow depressions called forms, scraped out under cover, such as brushy thickets or log piles. The nearest detection of SNSH in the CNDDB database is from the vicinity of Mineral in 1925, 5.5 miles to the W of the project area.

Spotted bat. Spotted bats occupy a wide variety of habitats including montane conifer forests, but are most common in rough and dry habitats, including deserts. They roost in rock crevices of cliffs and caves. It is thought that the distribution of spotted bats may be limited by the availability of suitable roosting habitat. The project area lacks large rock outcrops, caves, and cave-like manmade structures. Wet montane meadows are known to provide foraging habitat for spotted bats in the Sierra Nevada. The nearest detection of spotted bat in the CNDDB database is from Diamond Lake near Turner Mountain, in July of 2000, 8 miles to the WSW of the project area.

Discussion and Impact Assessment

Based on the expected project activities, known occurrences of special-status species, or likelihood of occurrence of those species, the following assessment was made for potential impacts for species with suitable habitat or known occurrence in the project area. This assessment was made with the understanding that all construction activities, including material gathering, will occur no earlier than August 1 of each calendar year.

Species unlikely to be impacted by project activities

The project is unlikely to result in direct or indirect impacts to 16 of the 26 species reviewed: western bumble bee, chinook salmon, steelhead, foothill yellow-legged frog, Sierra yellow-legged frog, bald eagle, California spotted owl, great gray owl, olive-sided flycatcher, Vaux's swift, yellow rail, California wolverine, gray wolf, Pacific fisher, and Sierra Nevada mountain beaver, spotted bat.

Western bumble bee. Western bumble bees have not been detected within the project area. Project activities will likely improve habitat quality for the species by planting an array of important pollinator plant species. As a result, the project is unlikely to impact western bumble bee.

Chinook salmon and steelhead. Chinook salmon and steelhead cannot reach Childs Meadow because of a natural barrier to anadromy over thirteen stream miles downstream of the project area. I anticipate no impact of project activities on the waters below Deer Creek falls. However, the project may contribute to lower water temperatures for downstream anadromous fishes in a warming future.

Foothill yellow-legged frog. There are no expected impacts from project activities to foothill yellow-legged frog, as they are not known to occur in or around the project area despite a decade of thorough amphibian surveys. Habitat suitability for frogs is expected to be improved by project activities, should this species colonize Childs Meadow in the future.

Sierra yellow-legged frog. There are no expected impacts from project activities to Sierra yellow-legged frog, as they are not known to occur in or around the project area despite a decade of thorough amphibian surveys. Habitat suitability for frogs is expected to be improved by project activities, should this species colonize Childs Meadow in the future.

Bald eagle. There are no anticipated impacts of the project on bald eagle. They are not known to nest in the project are and the suitability of potential nesting and foraging habitat would not be altered. Tree harvest associated with the project will focus on very small diameter trees which would not affect California Wildlife Habitat Relationship stand classifications nor potential nest trees.

California spotted owl. There would be no direct or indirect effects from treatment activities to California spotted owl, as they are not known to occur in or around the project area. Treatments would also not affect suitable California spotted owl habitat adjacent to the project area. Tree harvest associated with the project will focus on small diameter timber which would not affect California Wildlife Habitat Relationship stand classifications.

Great gray owl. Great gray owls are not known to occur in the project area though suitable habitat is present. Proposed treatments will increase and improve suitable habitat for the species by restoring meadow hydrology, providing structural diversity, and improving habitat for prey species. Snags and important wildlife trees will not be affected by project activities, which could provide potential nest sites. Thus, great gray owl is unlikely to be impacted by the project.

Olive-sided flycatcher. Meadow treatments are expected to have no impact on olive-sided flycatcher. Hand-felling of small diameter timber on the meadow ecotone will likely not affect nest locations, as they nest in tall, large diameter trees. Neither will the timber felling affect nesting habitat for this species.

Vaux's swift. Though Vaux's swift have been detected foraging on occasion above Childs Meadow, there is no evidence that Vaux's swift nests in the project area. Therefore, they will likely not be impacted by project activities.

Yellow rail. Yellow rail is not known to occur in the project area despite extensive surveys by knowledgeable experts where other rail species (Virginia rail) were detected. Suitable habitat for this species in Childs Meadow occurs in the limited areas that support a tall dense herbaceous understory with saturated conditions, which limited in the project area. Yellow rail are therefore unlikely to be impacted by project activities.

California wolverine. The project area does not support suitable habitat for wolverine and it has not been detected in the project area, therefore it will not be impacted by project activities.

Gray wolf. The project area is outside of the CDFW-mapped area of Known Wolf Activity. As it is suitable habitat, it is possible that wolves outside of the Known Wolf Activity Area could be foraging or traveling through the project area and impacted by activities and noise from the proposed actions, as wolves tend to avoid human disturbance. However, given the limited extent of activities relative to the landscape, project activities would be avoidable by gray wolf passing through the area. Therefore, the project is not likely to impact gray wolf.

Pacific fisher. The project area does not support suitable habitat for pacific fisher and fishers been detected on recent surveys. Project activities will also not alter potential fisher habitat. Therefore, pacific fisher will not be impacted by project activities.

Sierra Nevada mountain beaver. Mountain beaver have not been detected in the project area but suitable habitat may exist in the riparian areas of Gurnsey Creek. Yet it is unlikely that proposed project activities would impact mountain beavers because of the very limited extent of mechanical ground-disturbing activities adjacent to the suitable habitat around Gurnsey Creek. Therefore, Sierra Nevada mountain beaver will likely not be impacted by project activities. Expected increases in forbs and riparian shrubs and trees resulting in project activities would improve foraging opportunities for this species.

Spotted bat. Spotted bat has not been detected in the project area. Suitable roosting habitat does not exist in the project area, so there are no anticipated impacts to roosting spotted bat. The meadow may be suitable foraging habitat for spotted bat. Yet it is highly unlikely that proposed project activities would spotted bat foraging given construction activities would take place during the day and spotted bats feed exclusively at night. Therefore, spotted bat will likely not be impacted by project activities. Expected improvements to the health of Childs Meadow from project activities would likely improve foraging opportunities for this species.

Species potentially impacted by project activities

Of the 26 species reviewed, 10 have the potential to be impacted by project activities. These species include Cascades frog, Southern long-toed salamander, greater sandhill crane, northern goshawk, osprey, willow flycatcher, yellow warbler, American badger, Sierra Nevada red fox, Sierra Nevada snowshoe hare. Details on potential direct and indirect impacts of the project on each of these species and how these impacts are less than significant or could be mitigated to less than significant levels are described below.

Cascades frog. Several of the proposed meadow treatments overlap areas and habitats occupied by Cascades frog. Direct effects of the project on Cascades include disturbance during their reproductive period or direct incidental mortality of individuals during construction activities. There are no anticipated indirect effects of the project on Cascades frog, as the suitability of their breeding and post-breeding habitat is expected to be improved by project activities. Direct effects can be avoided with the following measures: (1) Suitable Cascades frog habitat in areas identified for restoration activities will be surveyed immediately prior to operations commencing. We define suitable Cascades frog habitat in these protection measures as saturated soils or wetter. If the restoration area is not suitable Cascades frog habitat, operations may commence. If frogs are observed during these surveys, all operations within 75 feet of the observation will halt, and CDFW will be contacted for site-specific protection measures. (2) If Cascades frogs are not observed, but the area being operated on or the immediately adjacent area is suitable habitat, the biologist will survey the area every morning. If frogs are observed during these additional surveys, all operations within 75 feet of the observation will halt, and CDFW will be contacted for site-specific protection measures. Dr. Karen Pope, a Cascades frog expert with the Pacific Southwest Research Station of the US Forest Service and member of the Childs Meadow project restoration team, recommends consulting with CDFW before construction occurs to outline site-specific mitigation measures. Dr. Pope recommends a qualified and permitted biologist survey suitable habitat for frogs in the morning prior to each day's restoration construction activities. If frog(s) are present, she recommends capturing them and holding them until activities end for the day within 75 feet of the capture site. Frogs should be kept in the shade in a clear plastic bin tilted on angle and partway filled with cold stream water so the frog can chose to be in or out of the water. Exact measures would be refined in consultation with CDFW. The timing of restoration activities should occur after tadpoles have metamorphosed. In the southern Cascades, larvae usually hatch in June and metamorphose in late August (Pope 2014).

Southern long-toed salamander. No project activities or impacts are anticipated where southern long-toed salamander (SLTS) is associated with wet meadow pools, so the project activities will not have any impacts to breeding sites. SLTS migrate to breeding sites in spring, while the restoration will take place in the fall. Direct effects of the meadow restoration on salamanders may include disruption of fall migration to overwintering habitats and impacts to hibernation sites. However, these effects are unlikely to be significant, as SLTS migration occurs at night, while construction activities will occur during daytime hours. There are little data available on hibernation sites for SLTS, but may include aquatic sites for larvae under logs, bottom debris, and subsurface springs and terrestrial locations such as logs for adults. Effects to possible hibernation sites will be mitigated to less than significant levels by ensuring that downed trees and logs are not moved when harvesting material for BDA construction in the uplands.

Greater sandhill crane. There are no direct effects anticipated from project activities. Indirect effects to sandhill crane include potential disturbance to meadow understory vegetation during hydrologic restoration implementation, increased human activity during implementation, and noise from mechanical equipment. Disturbances associated with meadow restoration implementation are considered temporary impacts. Restoration actions in the long-term will have a net benefit to this species by increasing suitable nesting habitat (standing water and tall herbaceous vegetation). Impacts to greater sandhill crane can be avoided by conducting preconstruction nesting surveys within 0.5 mile of the proposed work area no more than 30 days prior to the start of construction for work occurring during the breeding season (April 1 through July 31). If no occupied nests, no further mitigation needed. If active nests or flightless young are identified within the survey area, no-disturbance buffers shall be established at a distance sufficient to minimize disturbance based on the nest location, topography, and cover. Because greater sandhill cranes are a California Fully Protected species with no take authorization and are sensitive to disturbance, the no-disturbance buffer shall be no less than 500 feet. If active nests or flightless young are found within the survey area but outside of the 500-foot no-disturbance buffer, a qualified biologist shall be on site to monitor the nest/flightless young for signs of disturbance (e.g., agitated behavior or modified foraging or feeding behavior). If it is determined by the biologist that construction activities are resulting in disturbance, work shall cease immediately and CDFW shall be contacted to determine adequate protective measures.

Northern goshawk. Direct effects of the project on northern goshawk include disturbance during their reproductive period. There are no anticipated indirect effects of the project on northern goshawk, as the suitability of their nesting habitat would not be altered and there would be no negative impact to the abundance or availability of prey species. Tree harvest associated with the project will focus on very small diameter trees which would not affect California Wildlife Habitat Relationship stand classifications. Direct effects can be mitigated to a less than significant level by avoiding the use of mechanical equipment during the nesting period, from February 15 to September 15, within ¼ mile of suitable nesting habitat or nest if a nest is confirmed. The restriction may be lifted if it is determined through intensive stand searches or other surveys that the suitable habitat is not occupied. If a northern goshawk nest is found in the project area or within a ¼ mile of proposed treatment areas, the nest tree would be protected. Improved meadow habitat will likely provide long-term benefits to this species.

Osprey. Direct effects of the project on osprey include disturbance during their reproductive period. There are no anticipated indirect effects of the project on osprey as the suitability of their nesting habitat would not be altered and there would be no negative impact to the abundance or availability of prey species. Tree harvest associated with the project will focus on very small diameter trees which would not affect California Wildlife Habitat Relationship stand classifications. Direct effects can be mitigated to a less than a significant level if the known osprey nest or any other osprey nest found in the project area or within 1/8 mile of proposed treatment areas are protected.

Willow flycatcher. Impacts of project activities to willow flycatcher include potential reduction in nesting substrate and disturbance from project activities during the nesting season. Willows are critical nesting substrate for this species. Up to 20% of an individual willow's stems <2 inches at the widest point are proposed to be harvested for building structures used in hydrologic restoration. Impacts to willow flycatcher nesting substrate can be avoided by not cutting willows within 50 m of all currently known willow flycatcher territories (Figure 5) and any new willow flycatcher territories that may be established during future pre-restoration surveys. Impacts to willow flycatchers from disturbance can be avoided by restricting within-meadow restoration activities to be outside the nesting period from June 1 – August 15. These dates are based on Point Blue banding and nest monitoring data for this species in the Lassen area. Meadow restoration is expected to improve habitat for willow flycatcher by rewetting the meadow, increasing frequency of floodplain inundation, and increased riparian shrub cover, factors known to improve habitat for these species (Campos et al. 2014, Campos et al. 2020).

Yellow warbler. Impacts of project activities to yellow warbler includes the disturbance during implementation. Current willow harvest limits of up to 20% of an individual willow's stems <2 inches at the widest point occurs are not expected to be sufficient to not impact the nesting habitat of yellow warblers. Impacts to yellow warblers from disturbance can be avoided by restricting within-meadow restoration activities to be outside their nesting period from May 15 – July 31. These dates are based on Point Blue banding and nest monitoring data for this species the Lassen area. Meadow restoration is expected to improve habitat for yellow warbler by increased riparian shrub cover, a strong indicator of habitat quality for these species (Campos et al. 2014, Campos et al. 2020).

American badger. Potential direct effects to badger from project activities include disturbance or mortality associated with mechanical material sourcing in upland habitats for channel fill. These effects are less than significant because of their very small extent and very low likelihood of impacting individuals. Even if an individual was impacted, there would be insignificant impacts to the local population. Indirect effects include alterations to habitat such as soil compaction and soil disturbance from heavy equipment. These effects are also less than significant because of the small footprint of mechanical equipment activities off of roads in upland habitats. Impacts are also less than significant as this species has not been detected in the project area.

Sierra Nevada red fox. Direct effects of the project to Sierra Nevada Red Fox are likely to be less than significant because the species is not known to occur in the project area. The project area is below the elevation range the species primarily occupies during the warm season (Perrine 2005). If the species were to occur in the project area it would likely be a dispersing individual passing through. The disturbance could include noise from the use of mechanized equipment. However, these effects are considered less than significant due to inverse differences in peak activity hours as peak activity for the fox occurs during nighttime hours while all project activities will occur during daylight hours. The minimal extent of mechanical treatments proposed are such that active implementation areas would be avoidable by Sierra Nevada red fox passing through the area. The project is expected to increase meadow habitat suitable for foraging.

Sierra Nevada snowshoe hare. Direct effects of the project to Sierra Nevada snowshoe hare are likely to be less than significant primarily because the species is not known to occur in the project area. The project area is also at the very low end of the elevation range the species is known to occupy. Potential effects include disturbance from noise from the use of mechanized equipment and during the removal of conifers at the meadow-upland ecotone. The effects from mechanized equipment are considered less than significant due to differences in peak activity hours of snowshoe hares being during crepuscular and nighttime hours while all project activities will occur during daylight hours. The effects of conifer material harvest are considered less than significant because harvest will occur by hand over a limited extent relative to available habitat, and after the hare breeding season (May – July). The project is expected to increase the cover of suitable riparian shrub and deciduous tree habitat for this species.

Figures

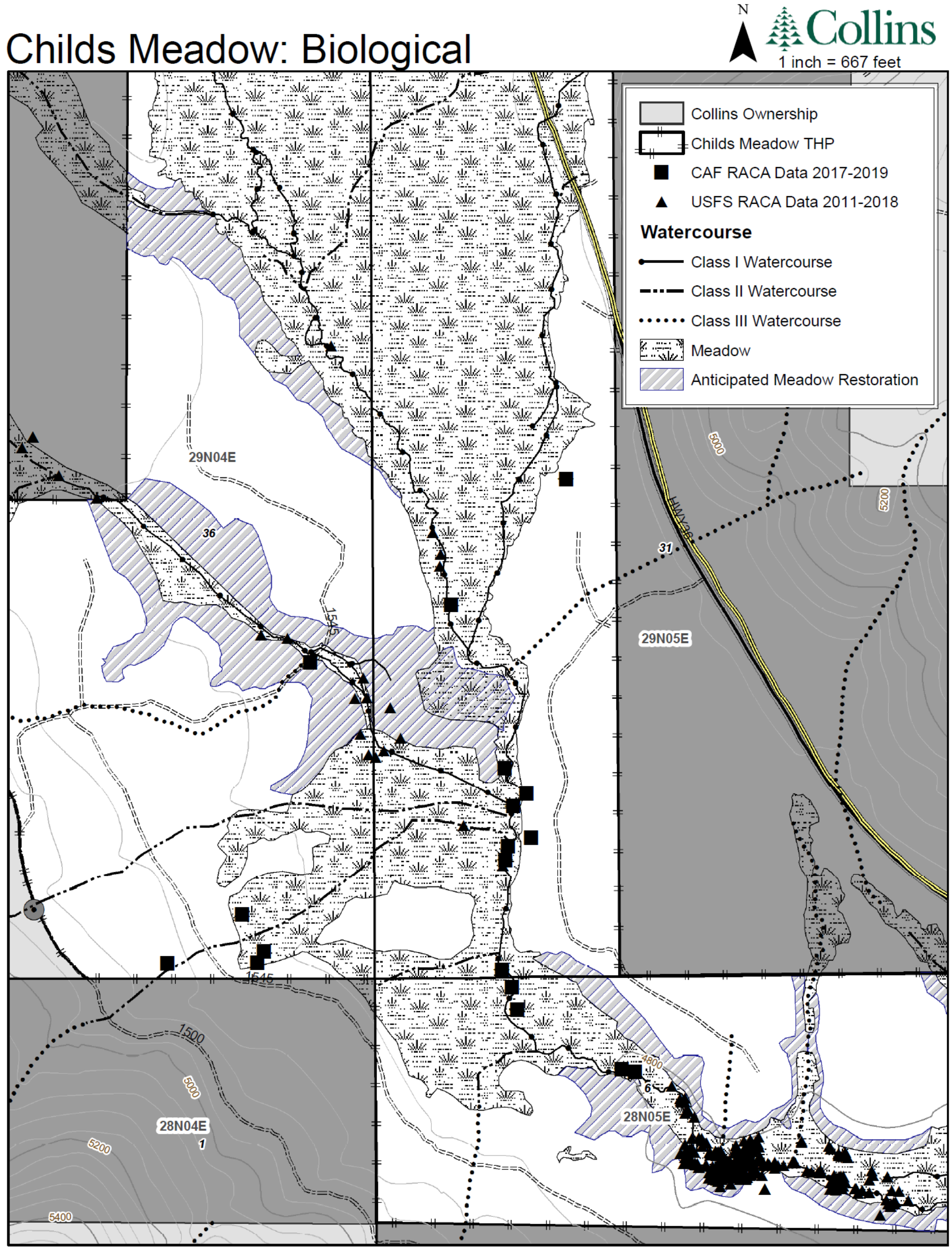

Figure 1. Detections of Cascades frog (*Rana cascade*; RACA) in Childs Meadow from 2011 to 2019. Anticipated meadow restoration refers to Collins' THP activities, not the project activities and boundaries evaluated for this report.

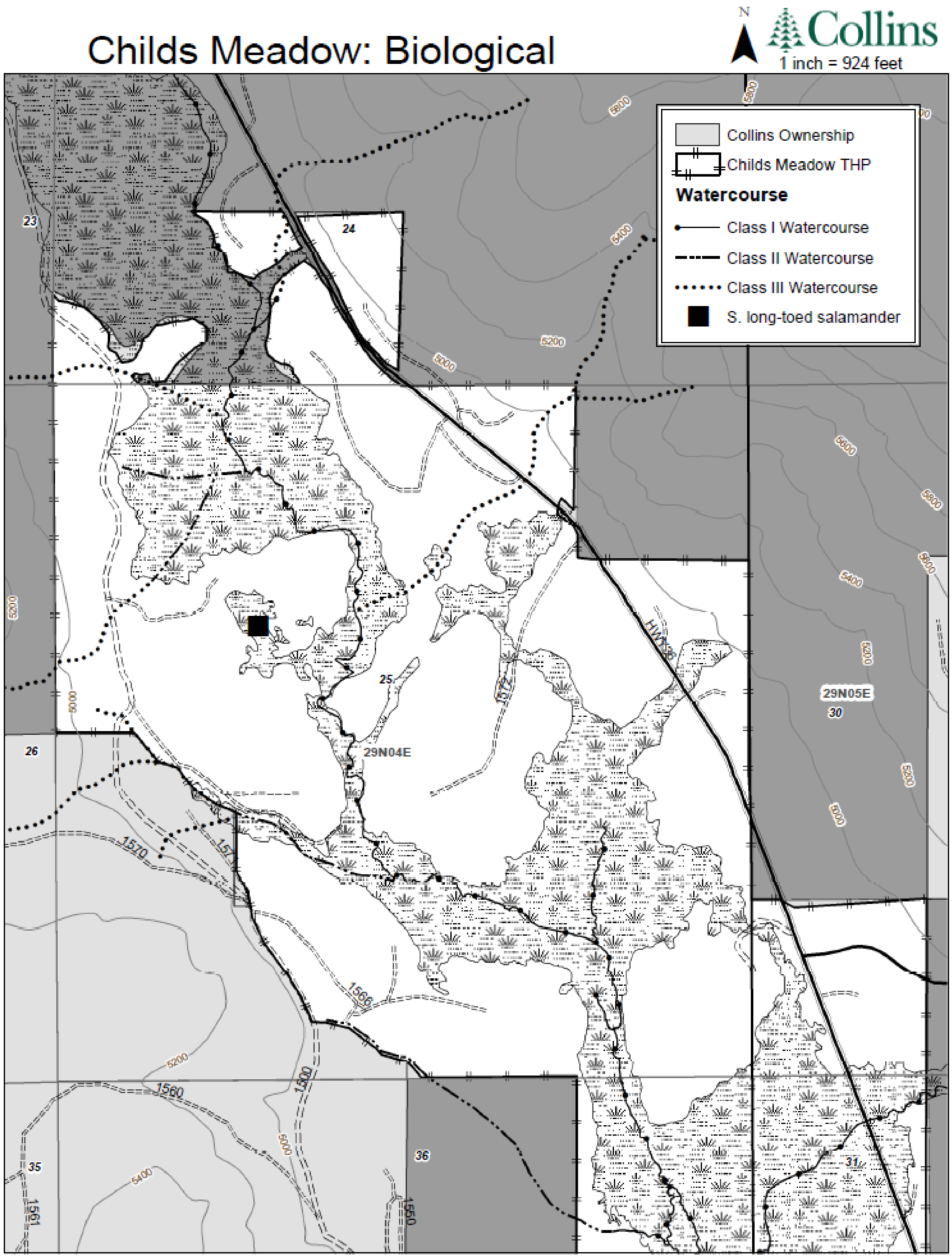

Figure 2. Detections of southern long-toed salamander in Childs Meadow Restoration project area in 2018.

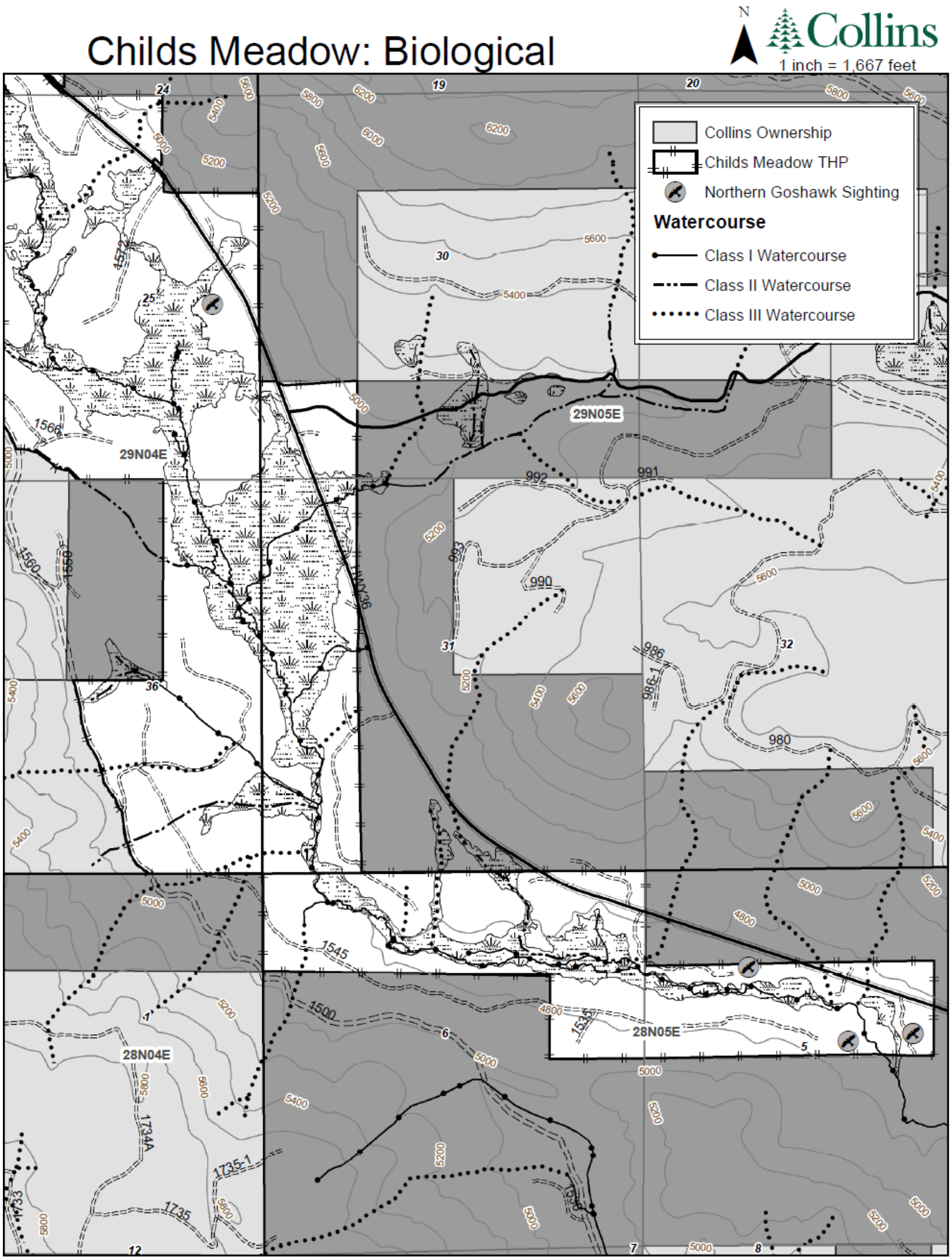

Figure 3. Detections of northern goshawk in Childs Meadow Restoration project area in 2018.

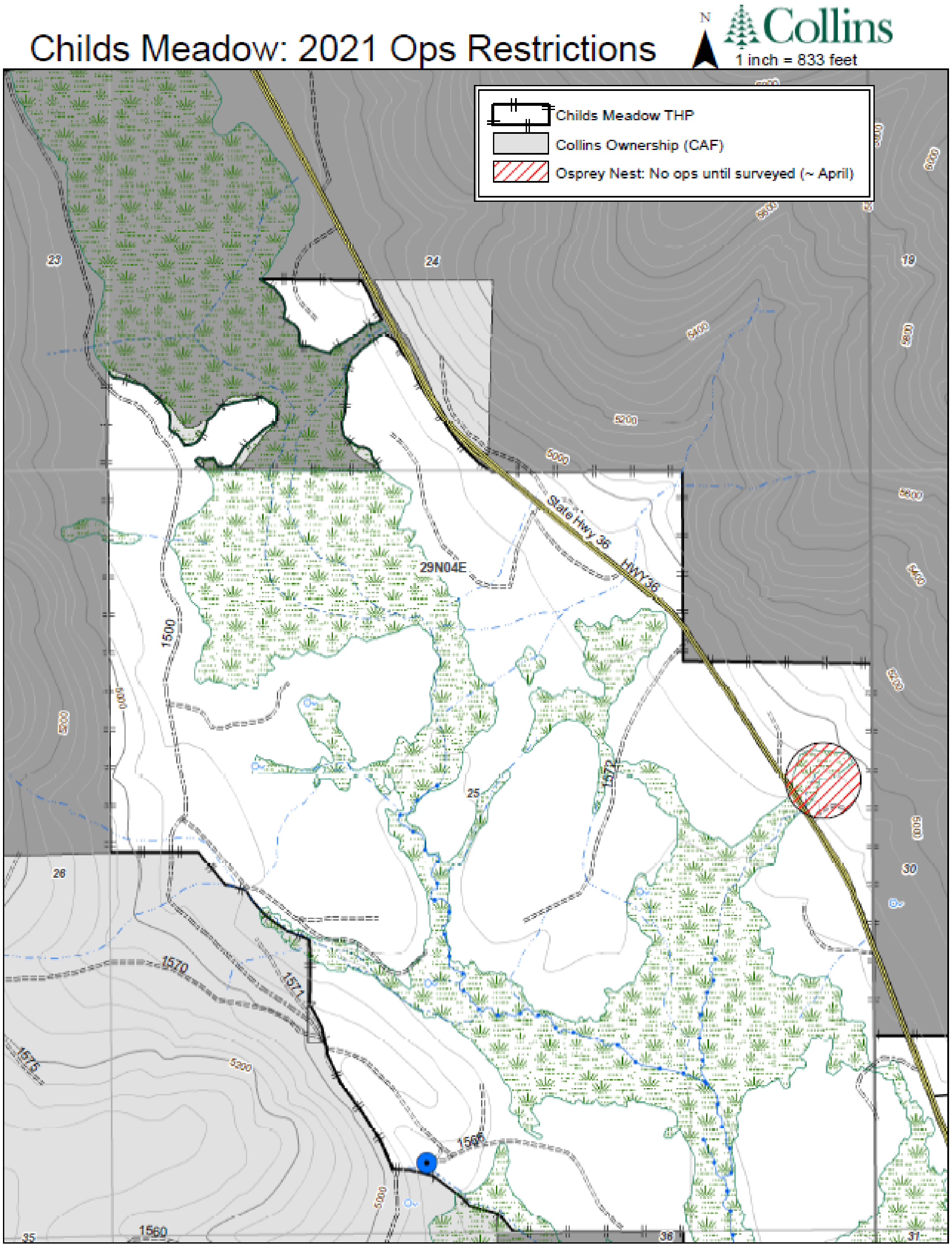

Figure 4. Osprey nest (inactive in 2017-2020) in Childs Meadow Restoration project area.

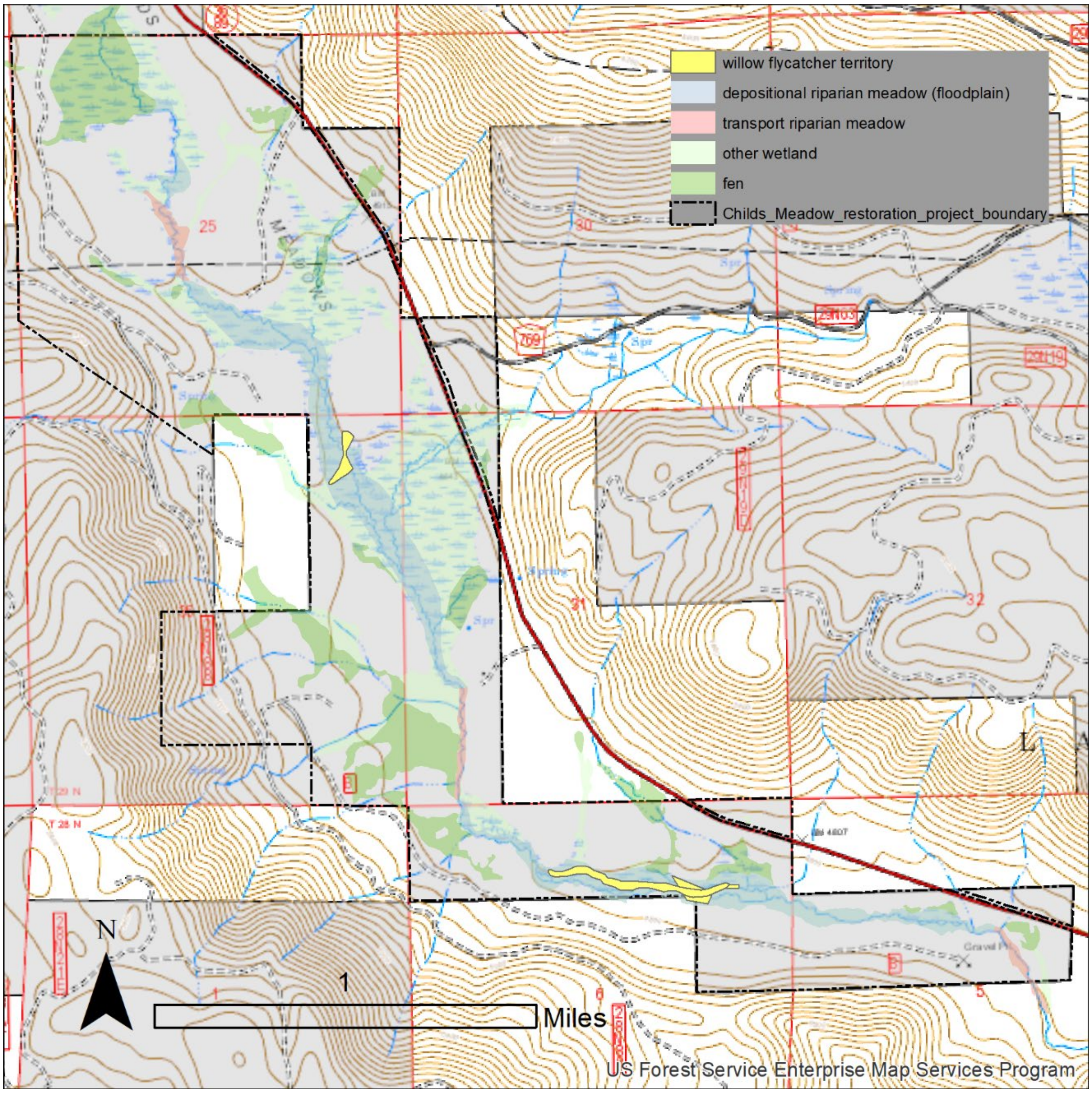

Figure 5.Willow flycatcher territories in Childs Meadow Restoration project area 2015-.

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Appendix E: Wetland Delineation and Assessment

Wetland delineation and assessment in Childs Meadow, Tehama County, CA

Evan Wolf

2020 February 19

Childs Meadow is a privately owned valley located at 4750-4900 feet elevation, approximately 5 miles south of Lassen National Park. The valley was carved by Tahoe-aged (70,000 years ago) and pre-Tahoe glaciations, and glacial till and outwash deposits, along with more recent fluvial deposits, fill the valley floor (Crandell 1972). The full glacially-scoured valley width ranges from 6000 to 1500 feet in the Childs Meadow reach. The valley floor meadow occupies about 2000 feet of the full-valley width about 2 miles from the head of the meadow, shrinking to less than 200 feet wide at it furthest downstream extent.
The meadow surface of the valley floor is nearly level in cross-section, with the exception of several gully incisions and slightly elevated glacial deposits, most likely moraines or kames. Colluvium, talus, and glacial deposits form forested slopes that fill the remaining valley width at the base of the bedrock valley walls. The cliffs that form the valley walls are composed of extrusive volcanic deposits of rhyolite, andesite, and basalt 1-2 million years old (Muffler & Clynne 2015).

Over its 5-mile length, Childs Meadow drops 150 feet in elevation, resulting in an average slope of 0.57%, with locally steeper or shallower grades. Groundwater discharge emerges at hillslope springs upto 120 feet above the elevation of the valley floor. The water flows down colluvium and talus hillslopes with grades of 1.24% to 12.5%. On both the west and east sides of the valley, these elevated springs arelocated near where older volcanic units are exposed above lower and younger concealing deposits of Holocene and Pleistocene colluvium and talus (Figure 1).

This hillslope groundwater saturates sloping fens that connect to wetlands on the valley floor, forming upslope arms of the Childs Meadow wetland complex. Groundwater also emerges at the valley floor elevation, as diffuse discharge, or at several discrete spring mounds. Spring mounds form where dense mats of vegetation form a confining layer over a spring discharge point, trapping and pressurizing the underlying water, and forming a raised floating mound of saturated fen vegetation and peat soil. The wetland sedge *Carex simulata* forms a floating spring mound at study plot 17. The electrical conductivityof the water with the wetlands ranges from about 50 to 200 µS/cm seasonally, which is similar to the findings from a broad sample of fens that occur on volcanic bedrock (Wolf & Cooper 2014).

The watershed for Childs Meadow is 8.791 square miles (Figure 2). The uppermost significant surface flow feature in the meadow is a discontinuous erosion gully with a headcut located at study plot 59. An upper sub-basin of 1.07 square miles drains into this headcut. The largest headcut in the meadow occurs1400 feet downstream of the uppermost headcut, at study plot 46 (Figure 13). The uppermost gully dissipates about 400 feet upstream of the headcut at plot 46. A second sub-basin is described to include all areas of Childs Meadow upstream of the only significant side valley to join the Childs Meadow valley. This side valley leads up to Wilson Lake, east of Childs Meadow, although the lake and associated wetland are located across the watershed divide and drain into Lost Creek. The second sub-basin adds an additional 1.67 sq miles of drainage, for a total of 2.74 sq miles of watershed for Childs Meadow above the Wilson Lake valley.

The third sub-basin adds 2.42 sq miles for a total of 5.16 sq miles that includes drainage from the eastern "Wilson Lake" side valley and terminates below the main 2000-foot wide valley meadow. The head of Gurnsey Creek definitively begins at the bottom of this third sub-basin. However, a network of connected erosion gullies extends upstream to the outlet of sub-basin two, and since these form continuous and connected surface flow, the head of Gurnsey Creek could be considered the outlet of the second sub-basin. Above the outlet of the second sub-basin, surface flow channels are discontinuousand unstable. The last downstream 3.62 sq mile sub-basin drains into the relatively narrow (200-500 feet) valley floor meadow that makes up the downstream 2.3 miles of Childs Meadow.

In order to delineate and assess the function of the wetlands in Childs Meadows, the soils, hydrology, and vegetation were described at 65 plots throughout the meadow (Figures 2-9). An ocular estimate of plant cover was made for 63 plant species identified at the plots. The percent cover and wetland indicator status of each plant species was used to determine if wetland vegetation was present in each plot. A soil pit was dug at each plot and soils were investigated for indications of wetland conditions. Thepresence of wetland hydrology was determined in each soil pit as well (Table 1). A network of existing wells within sub-basin three were used to determine the duration of wetland hydrologic conditions at nearby study plots.

Using the data from the 65 study plots, multi-spectral aerial imagery, and detailed topography, the wetlands, fens, and dewatered wetlands were delineated throughout the meadow (Figures 2-9). Fens are a subclass of wetland that require 16-inches of peat soil, perennial groundwater saturation, anddominance of wetland plants.

The valley floor and hillslope wetland complex covers 520.4 acres, approximately 9% of the Childs Meadow watershed. The wetland complex contains 138.7 acres of fen, 259.3 acres of non-fen wetland, 42.1 acres of dewatered former wetland, and 80.3 acres of mixed wetland/fen on un-surveyed privateland at the north end of the Childs Meadow watershed.

Several of the hillslope fens contain communities of plants that are not common within fen localities. Study plot 20 (Figure 12), and the large fen on the western side of furthest downstream sub-basin (Figure 7), contain significant cover of lodgepole pine. Although establishment of conifers within wetlands can occur following dewatering, lodgepole pine is extremely tolerant of completely saturatedsoil and can occur naturally to form treed fens. The hydrology of the treed fens on the western side of Childs Meadow appears largely intact, and the presence of lodgepole in these areas is natural. These fens, along with study plot 12, support populations of other interesting wetland-obligate plants such as *Triantha occidentalis, Caltha leptosepala,* and the carnivorous *Drosera rotundifolia.*

In addition to the 63 plant species found during this survey, 112 other plants have been described from the meadow or immediate vicinity (CalFlora 2020). Several of these plants are listed as rare or have other special or protected status. In addition, the endangered willow flycatcher and Cascades frog use portions of Childs Meadow for habitat. Beaver have occupied and dammed the main flow channel withinthe fourth, most downstream, sub-basin. The occurrences of willow flycatcher and Cascades frog are closely tied to the presence of willow stands and ponds, which correspond to beaver dam sites.

The entire delineated area of Childs Meadow has been grazed by cattle for at least a century. Portions ofthe meadow have been fenced off to prevent cattle grazing since about 2015. A partial cross-valley fence was constructed in 2015 to exclude cattle from the meadow reach in the downstream forth sub- basin. In addition, a 15-acre parcel at the downstream end of the third sub-basin was fenced to prevent grazing near the channelized western side of this valley reach. Both fences experienced periodic breaches and required annual maintenance, but generally functioned to prevent most cattle grazing.

The 15-acre parcel was part of a controlled wetland restoration experiment, and the exclusion of grazingin this reach resulted in significantly greater plant productivity as compared to a grazed section of the meadow. The 360 acres of unfenced wetland meadow receive approximately 500 animal unit months (AUMs) of grazing pressure per year.

The grazing effect on vegetation in unfenced areas is visually apparent and evidenced by data on plantbiomass, height, and CO_2 uptake. Within the controlled experiment, plants that were fenced off and ungrazed grew about a foot taller, contained about 1500 lbs/acre (170 g/ m^2) more residual dry aboveground biomass, and net-stored about 300 grams more CO_2-C per m^2.

The primary impact to wetland function within Childs Meadow is cattle grazing. Both aboveground vegetation removal through direct consumption, and physical damage to soil and belowground plantparts by hoof punching was evident throughout the site. These grazing impacts leave soil more vulnerable to erosion, and several large erosion gullies are present, some of which are actively headcutting. These gullies form topographic low trenches within an otherwise level in cross-section meadow. Surface and groundwater drain to these low areas and flow downstream. The drainage of groundwater into surface flow features like gullies is a particularly significant impact because water moves about 100 to 1000 times faster down gradient as surface water over land than it does asgroundwater in soil.

Deep gullies drain the groundwater away from adjacent meadow areas. In several areas of Childs Meadow, these drained meadow areas are evident as level terraces that retain wetland soils, even though they currently have deep water tables that no longer support wetland plant and soil processes(Figure 13, Figure 14, Figure

15, and Figure 16). Grazing-induced gully erosion leading to groundwater drainage and exposure of remnant wetland soils and landforms is common throughout the Sierra Nevada (Wood 1975; Wolf & Cooper 2016).

Some wetland obligate species can persist despite the loss of wetland hydrology by drainage. Although these species require wetland conditions to establish and grow as small individuals, once they have a large belowground root network, they can track a declining water table and derive sufficient moisture tostay alive in non-wetland conditions. *Carex nebrascensis* appears to be one such species, as it is persisting in study plot 14 despite the lack of wetland hydrology. The dry peat soils and presence of *Carex nebrascensis* indicates that this area was a former fen. The drainage ditch that runs through plot 13 has evidently dewatered this area, but the high-organic wetland soils, and a few obligate wetland plants still persist (Figure 10 and Figure 11).

Several groundwater-saturated sections of the Childs Meadow have been dewatered by the installation of drainage ditches. The longest of these ditches extends for about 2000 feet, from above study plot 7 (Figure 6) to below study plot 5 (Figure 7). This ditch was partially blocked in 2015 as part of the restoration experiment, and even the partial and haphazard blockage redistributed water across a largearea of meadow. Other ditches are having a similar dewatering effect near plots 13 and 14 (Figure 5 andFigure 10) and adjacent to and downstream of plot 25-37 and between plots 4 and 8 (Figure 6)

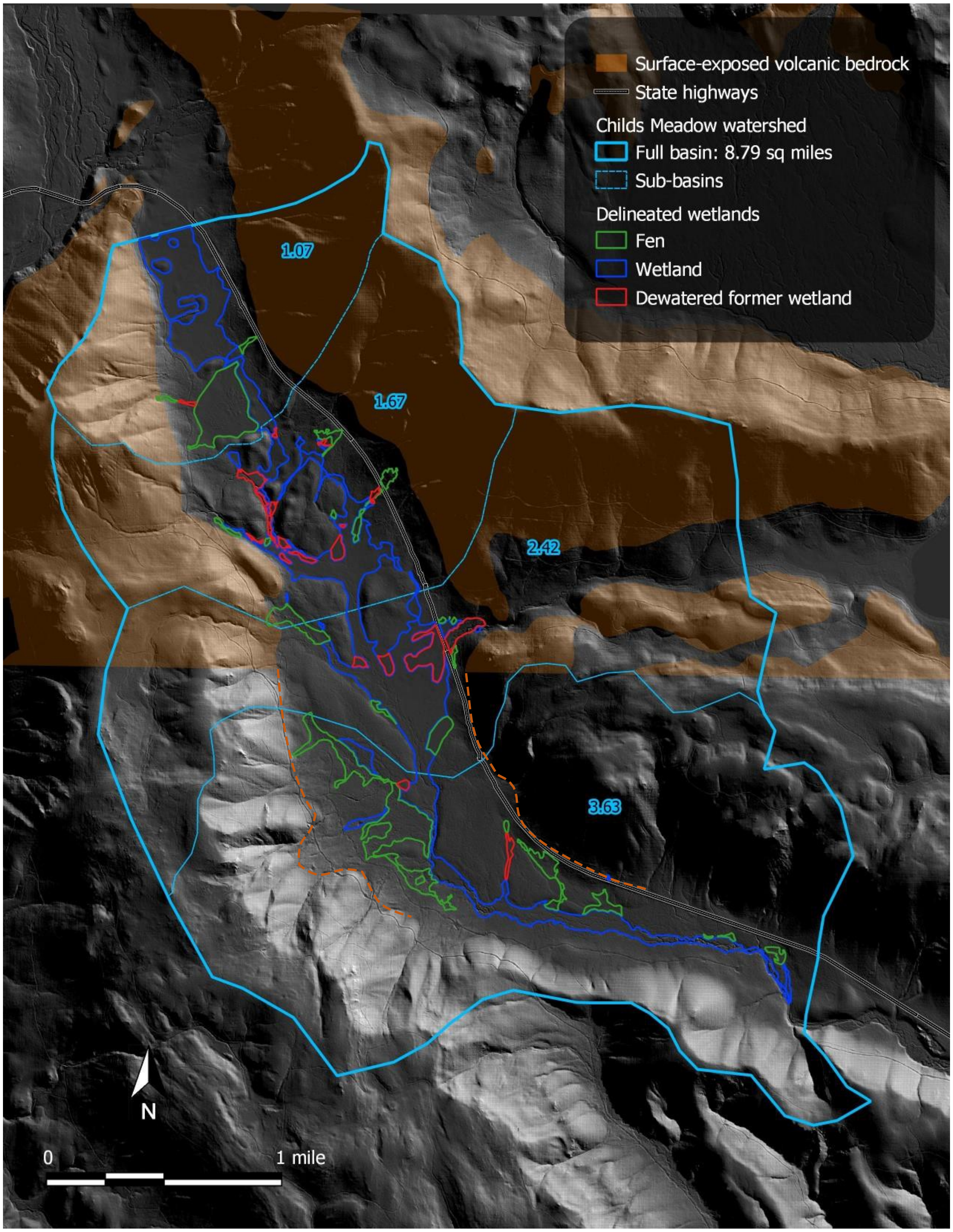

Figure 1. A hillshade relief map showing the delineated wetlands, watershed, and exposed volcanic bedrock in Childs Meadow. Note that obtainable detailed geologic mapping only covers the northern half of Childs Meadow, terminating at the straight east-west line where mapping stopped. The surface contact between volcanic bedrock and colluvial/alluvial valley fill is approximated by the slope break at the toe of the valley walls, shown as brown dashed lines.

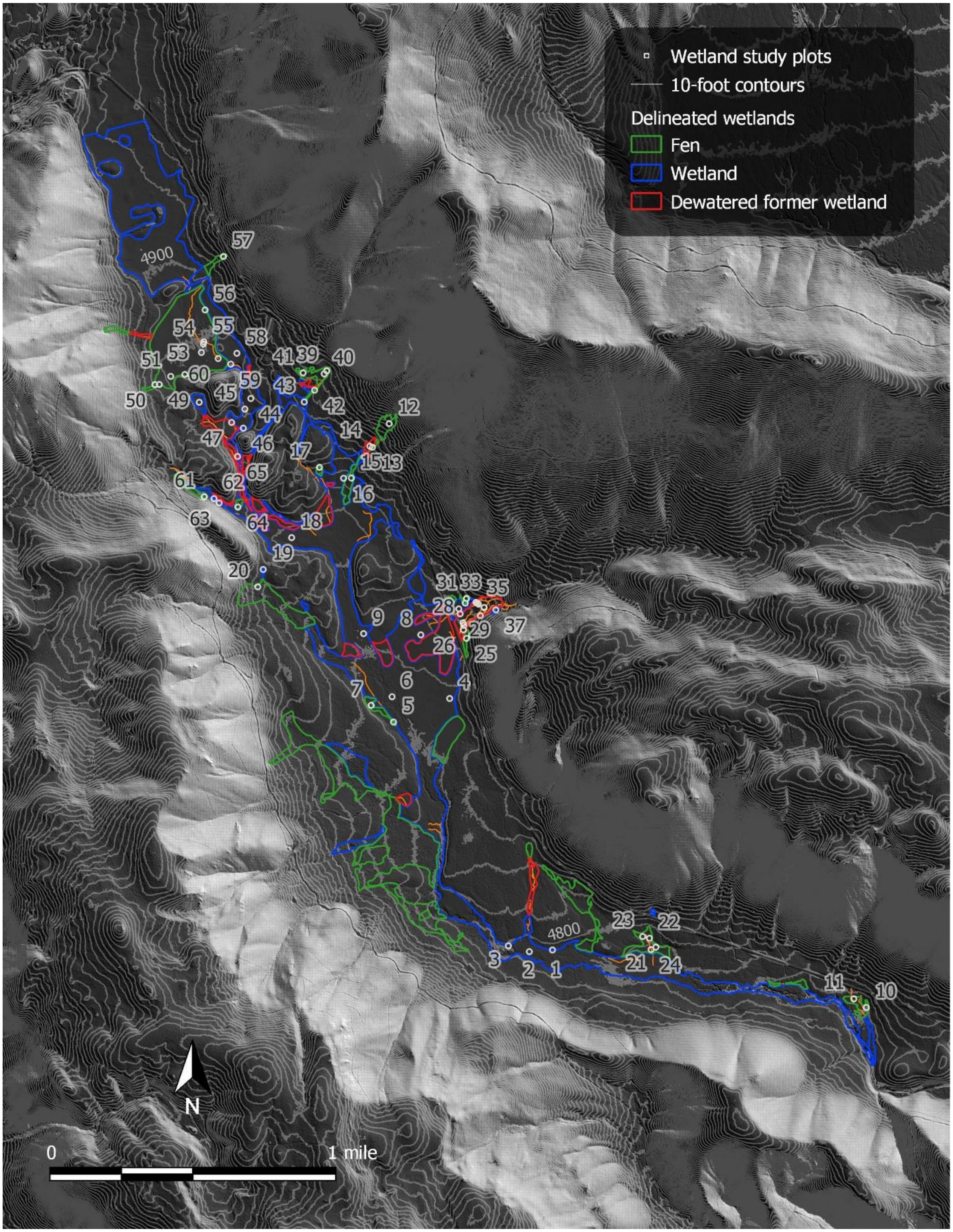

Figure 2. Shaded relief topographic map showing study plot locations and delineated wetlands in Childs Meadow.

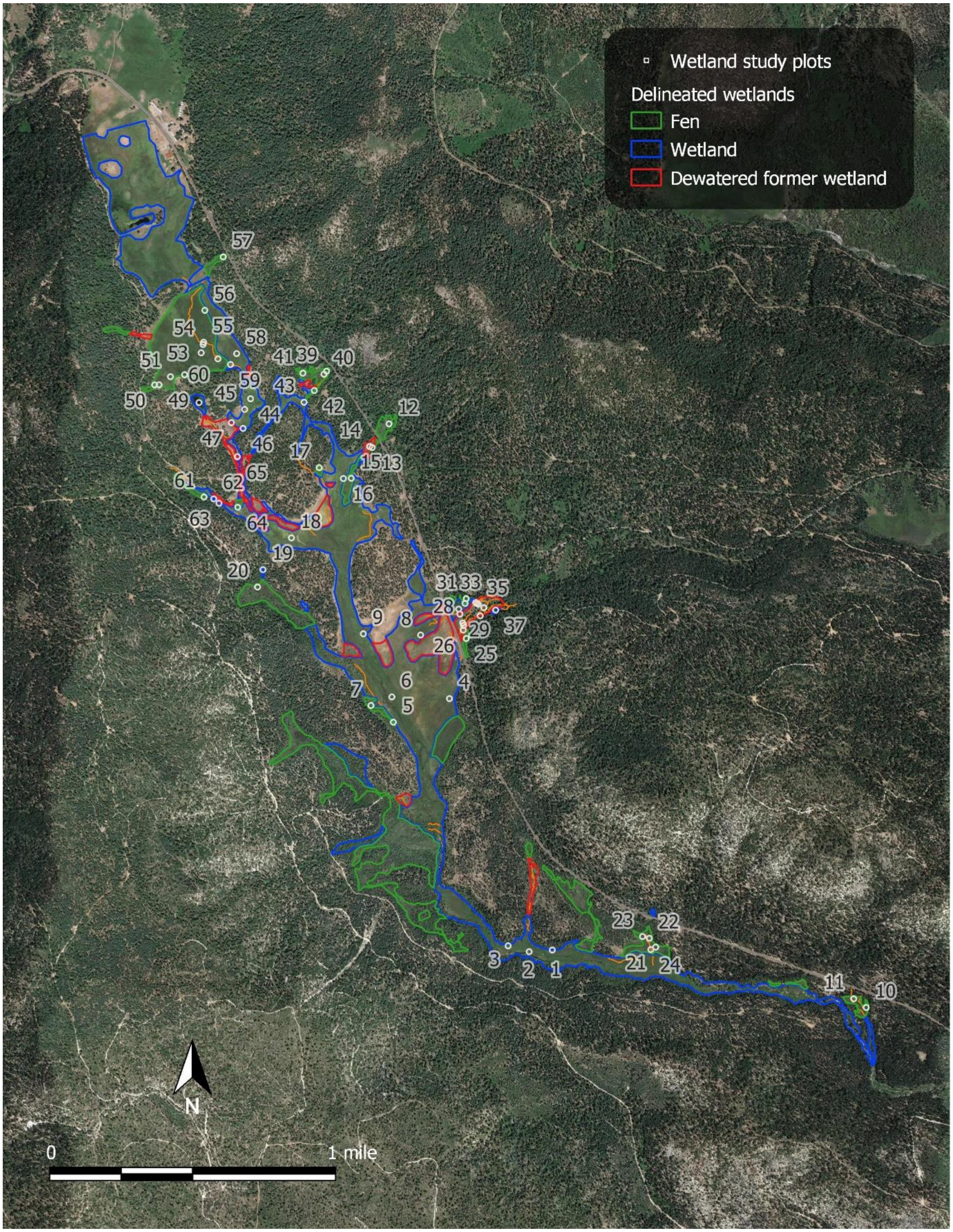

Figure 3. Aerial photograph of Childs Meadow showing the study plots and delineated wetlands. Figures 4-9 show zoomed-in views of segments of the meadow, from north to south.

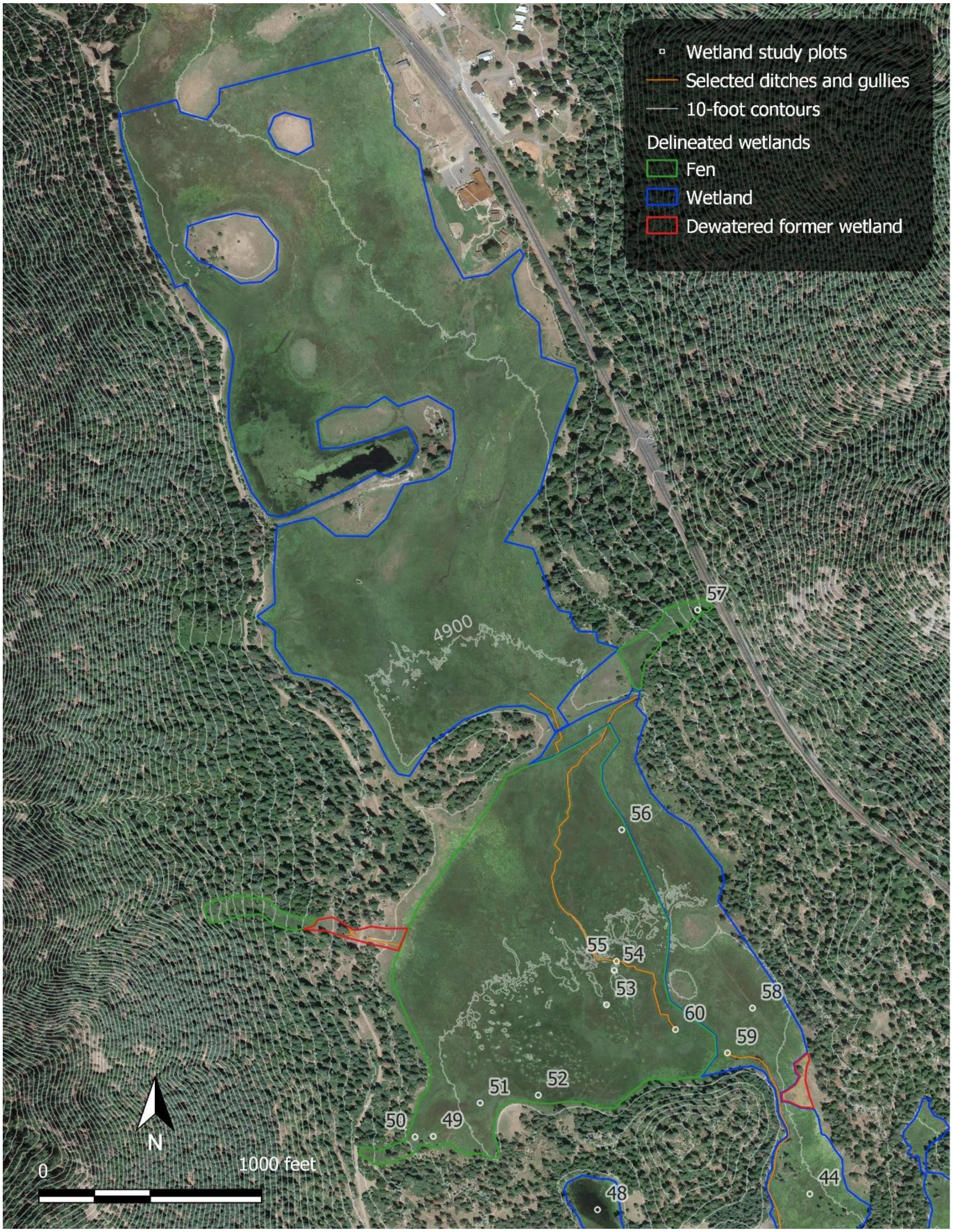

Figure 4. Zoom-in on northernmost section of Childs Meadow showing study plots, delineated wetlands, drainage features and topography. The northernmost wetland is not owned by Collins Pine and was not directly visited. It is likely to be a mosaic of wetland and fen but was conservatively mapped as wetland only. It extends north from the delineated fen at plot 57, and forested peninsula just below elevation 4900.

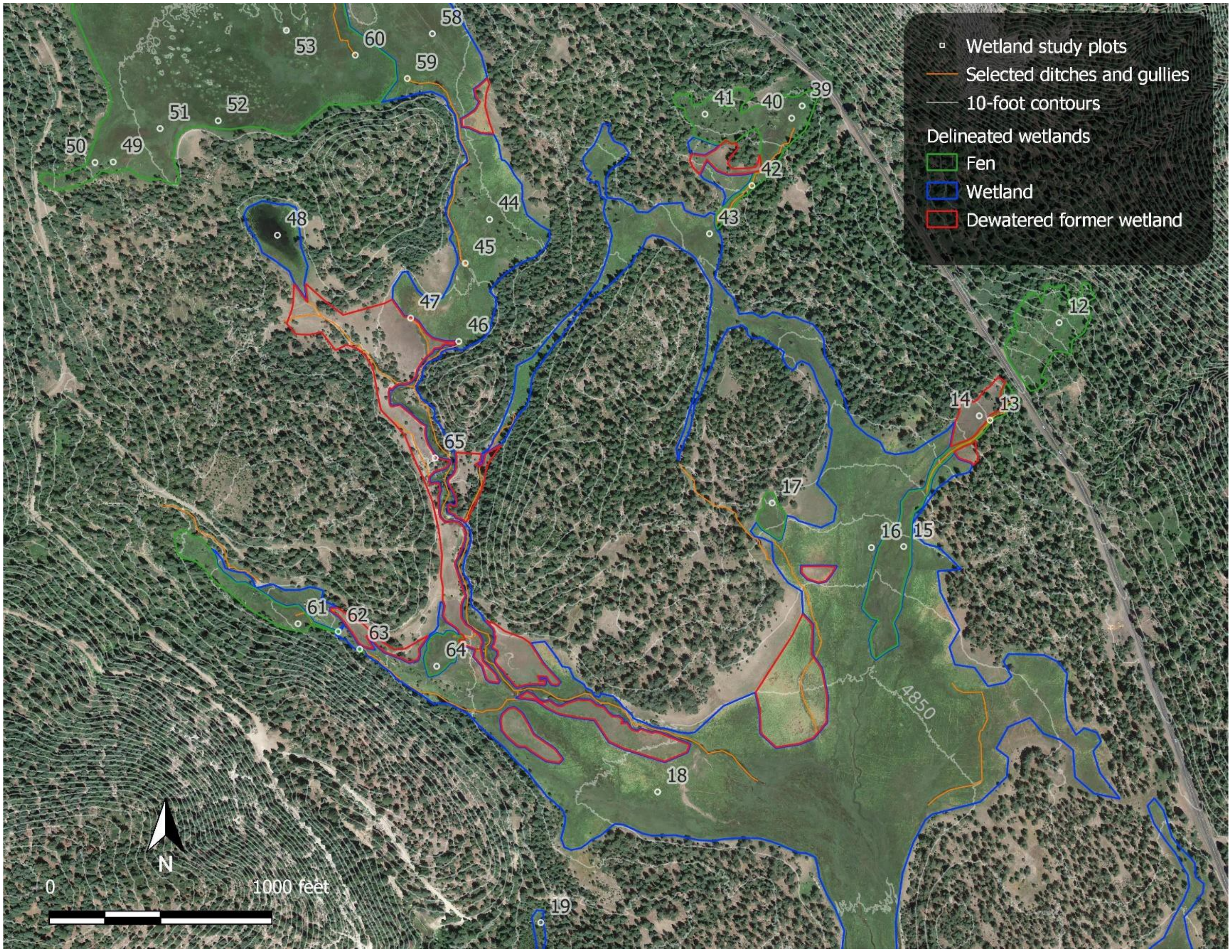

Figure 5. Zoom in on the second from the top section of Childs Meadow. Plots 46 and 47 are located near a large headcut, plot 65 is on a dewatered terrace, and plots 13 and 14 are in and adjacent to a ditch draining a fen.

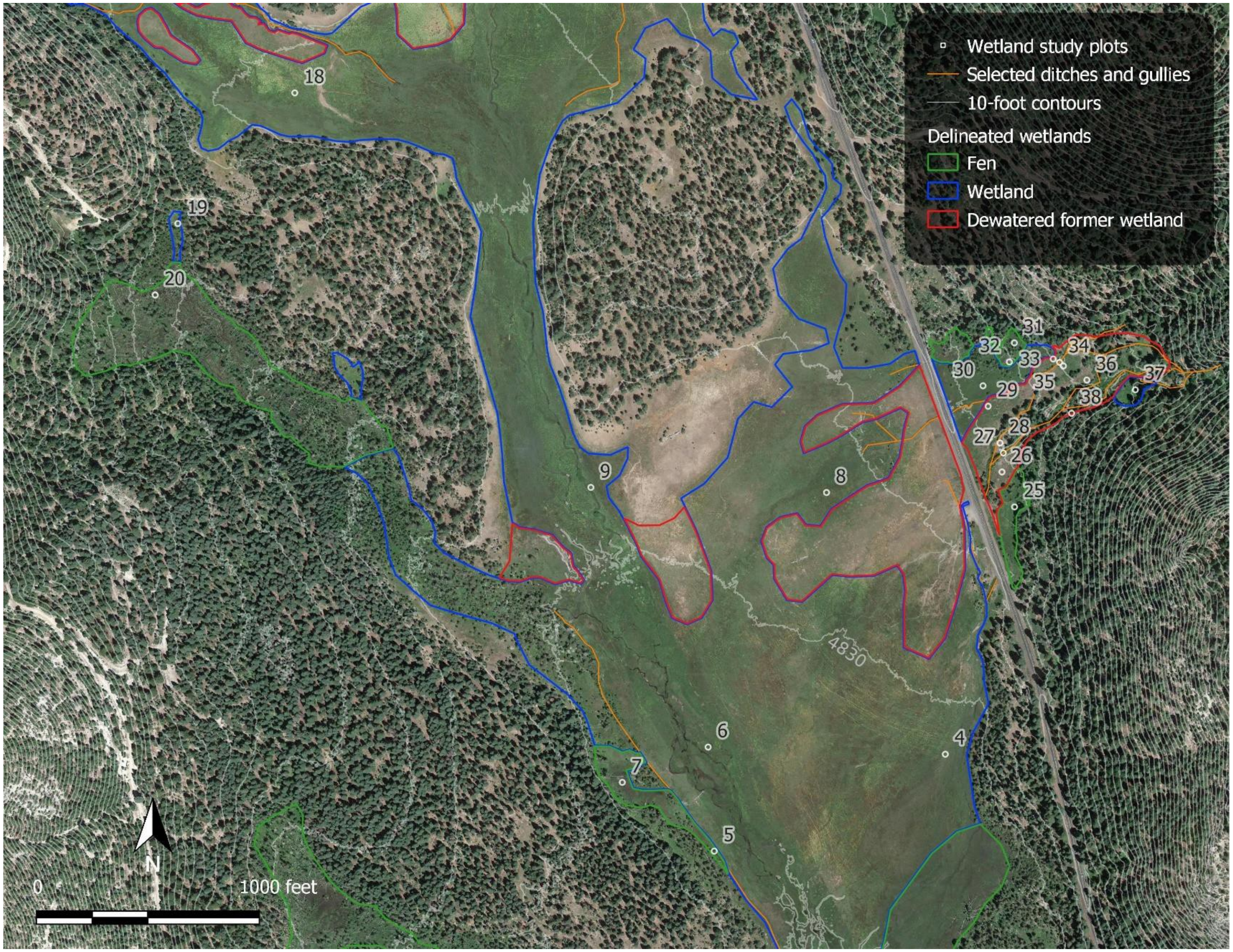

Figure 6. Zoom in on the third from top section of Childs Meadow. Plot 20 is a treed fen, plots 25-37 cover a range from intact fens to deeply gullied and dewatered wetlands. A long ditch runs from north of plot 7 south of plot 5, intercepting groundwater discharge the plot 20 and plot 7 fens and conveying it rapidly downstream.

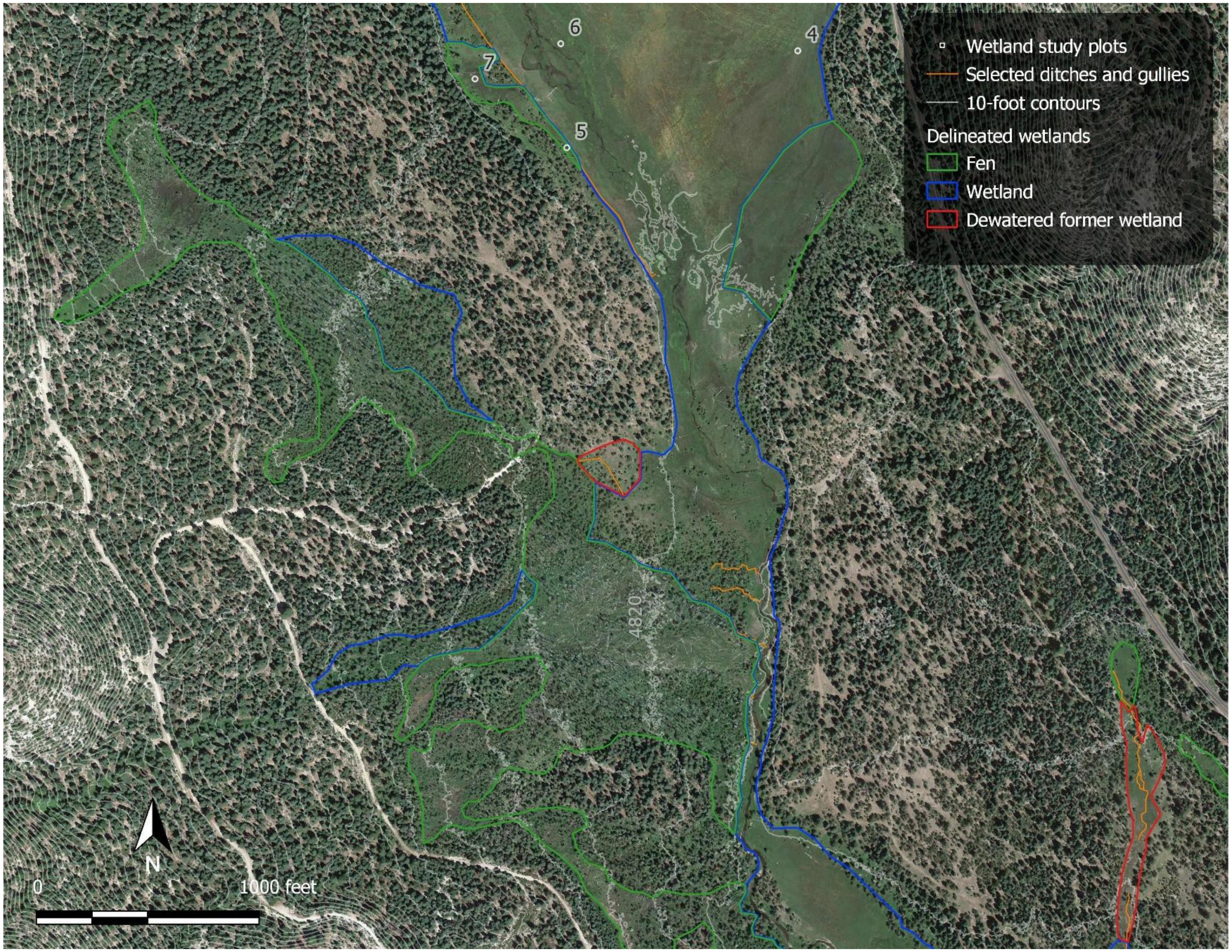

Figure 7. Zoom in on third from the bottom section of Childs Meadow. A large treed fen fed by hillslope discharge dominates the western valley wall in this section.

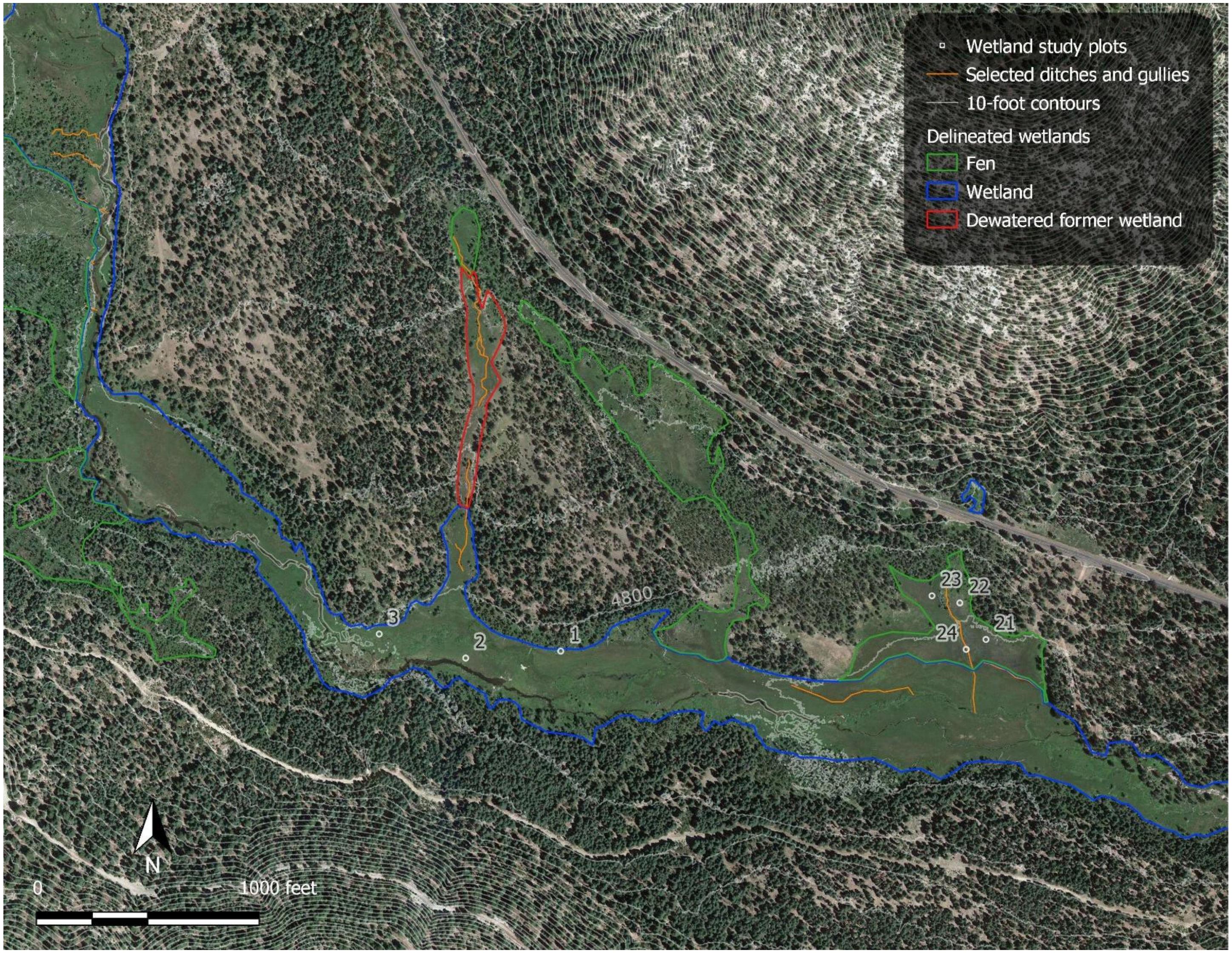

Figure 8. Zoom in on the second from the bottom section of Childs Meadow. Beaver dams up to 4 feet tall and 30 feet long have been observed along the main channel on the valley floor.

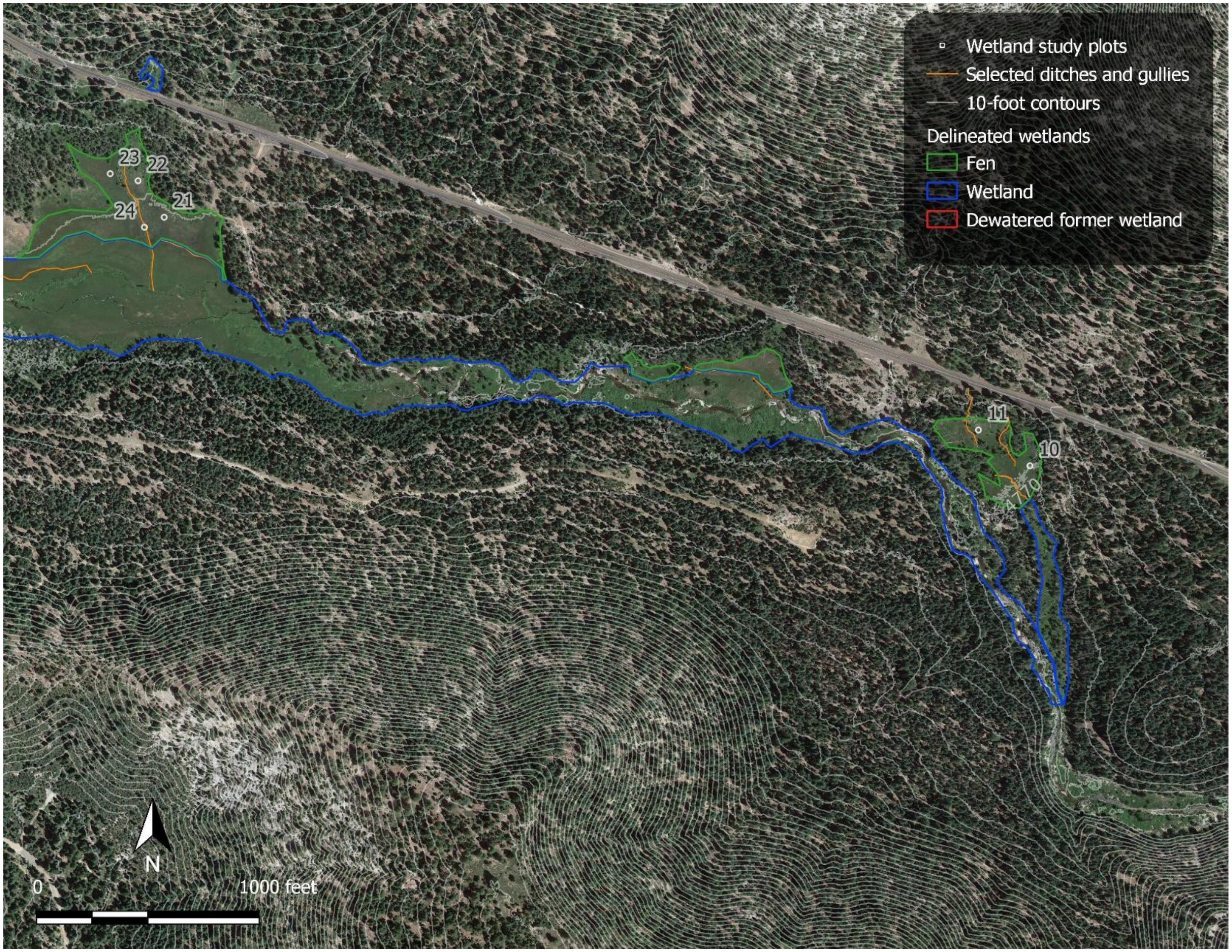

Figure 9. The bottom section of Childs Meadow. The valley is considerably narrower in this reach, but there are still several groundwater supported fens at the toe of the valley wall slopes.

Figure 10. Plot 13, in and adjacent to the ditch at left. Plot 14 is on the dry meadow terrace to the right. Photo is looking west and downslope to the valley floor of Childs Meadow.

Figure 11. Sparse and grazed Carex nebrascensis (green keeled sedge leaves in shovel clod), a wetland obligate species, persisting in dewatered peat at plot 14.

Figure 12. Plot 20, a treed fen with naturally occurring lodgepole pine. Vaccinium shrubs are abundant on small hummocks and at base of trees

Figure 13. Plot 46 in the foreground, above and upstream of the large headcut. Plot 47 is in the middle background in the brown dewatered area. Note the close-cropped vegetation around the headcut from cattle grazing.

Figure 14. Plot 47 to the right of the headcut has wetland soil but lacks wetland hydrology and vegetation. Wetland extends to the left (upstream) of the headcut.

Figure 15. Plot 65, on dry terrace at left, has strongly mottled wetland soils but the 8-foot deep erosion gully to the right has dewatered this terrace and it no longer has wetland hydrology or wetland plants.

Figure 16. Remnant wetland soil visible as dark surface layer to the left, on vertical ditch bank. Plot 65 is to the right.

Figure 17. Plot 57, looking west down a 12.5% sloping fen to the valley floor of Childs Meadow below. Note mid-September flowing spring discharge and cattle hoof punches in foreground.

Table 1. Summary of the wetland soils, hydrology, and vegetation at 65 study plots. The table is divided into four groups of study plots. Each section of the table contains a complete list of the plant species identified across all wetland plots.

Plot type		well	well	well	well	well	well	well	well	well	delin	delin	delin	delin	delin
Plot #		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Wetland soil?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Matrix color 0-12in		10YR 2/2	10YR 2/2	10YR 2/2	10YR 5/1	10YR 2/2	10YR 2/2	--	10YR 3/1	10YR 2/2	--	--	--	--	--
Texture 0-12in		silt	histosol	sandy silt	silt	histosol	peat	peat	silty sand	silt	peat	peat	peat	peat	peat
Redox features 0-12in		15%	10%	10%	25%	10%	10%	--	10%	15%	--	--	--	--	--
Hydric soil indicators		F6	A1	F6	F3	A1	A1	A1	F6	F6	A1	A1	A1	A1	A1
Wetland hydrology?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--
2019Sep water table relative to ground surface (in)		-24	-24	-32	-10	-26	-23	1	-70	-18	1	-2	0	-4	<-16
Wetnad hydrology indicators		A2	A2	A2	A2	A2	A2	A1	A2	A2	A1	A2	A1	A2	--
2019 consecutive days >-30cm water table		30	56	31	150	17	24	107	31	31	--	--	--	--	--
Wetland vegetation?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bare ground areal cover (%)		0	0	0	0	0	0	10	0	0	0	0	0	9	40
Total areal veg cover (%)		100	100	100	100	100	100	90	100	100	100	100	100	91	60
Prevalence index		1.6	1.6	2.1	1.6	1.3	2.8	1.4	2.0	1.5	2.2	2.0	2.1	1.4	2.2
Taxon	Wetland status														
Achillea millefolium	FACU	--	--	--	--	--	--	--	--	--	--	--	--	--	5
Bistorta bistortoides	FACW	10	20	10	--	--	5	--	15	5	--	--	2	--	--
Bromus diandrus	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calocedrus decurrens	UPL	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Camassia quamash	FACW	5	--	--	--	--	15	--	25	5	--	--	--	--	--
Caltha leptosepala	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calyptridium monospermum	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex aurea	FACW	--	--	--	--	--	10	--	--	--	--	--	--	--	--
Carex feta	FACW	--	--	30	--	--	--	--	--	--	--	--	--	--	--
Carex jonesii	OBL	--	--	--	--	--	--	5	--	--	--	--	2	--	--
Carex lenticularis	OBL	--	30	--	--	--	--	--	--	--	--	--	--	--	--
Carex nebrascensis	OBL	40	20	10	40	25	5	25	10	40	--	--	2	5	15
Carex simulata	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex utriculata	OBL	--	--	--	--	--	--	--	--	5	--	--	--	10	--
Collinsia parviflora	UPL	--	--	--	--	--	15	--	--	--	--	--	--	--	--
Deschampsia cespitosa	FACW	--	--	--	--	--	--	--	--	5	10	10	--	--	--
Drosera rotundifolia	OBL	--	--	--	--	2	--	5	--	--	1	1	2	--	--
Eleocharis macrostachya	OBL	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Eleocharis quinqueflora	OBL	--	--	--	--	10	--	--	10	--	--	--	--	--	--
Equisetum arvense	FAC	--	--	--	--	--	--	--	--	--	--	--	29	1	--
Erythranthe guttata	OBL	--	--	--	--	--	--	--	--	--	5	5	2	20	--
Erythranthe primuloides	OBL	--	--	--	--	--	--	10	--	--	--	--	--	10	--
Gayophytum diffusum ssp. *parviflorum*	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gentiana newberryi	FACW	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Hastingsia alba	OBL	--	--	--	--	--	--	--	--	--	--	--	10	--	--
Hypericum anagalloides	OBL	--	--	--	--	5	--	--	--	--	--	--	--	--	--
Hypericum scouleri	FACW	--	--	--	--	1	--	--	--	--	--	--	--	--	--
Juncus ensifolius	FACW	--	--	--	--	--	--	--	--	--	5	5	--	--	--
Juncus mexicanus	FACW	20	15	15	20	13	--	15	25	15	--	25	--	30	20
Juncus nevadensis	FACW	--	--	--	--	--	--	--	--	--	20	20	2	--	--
Kyhosia bolanderi	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lewisia nevadensis	UPL	--	--	--	--	--	--	--	5	--	--	--	--	--	--
Lilium pardalinum ssp. *shastense*	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moss	--	--	--	--	--	29	--	20	--	--	--	--	--	15	10
Muhlenbergia filiformis	FACW	--	--	--	--	--	--	--	--	--	10	10	--	--	--
Oreostemma alpigenum	FAC	--	--	--	--	--	--	--	--	--	25	--	--	--	5
Oxypolis occidentalis	OBL	--	--	--	--	--	--	--	--	--	--	--	25	--	--
Pedicularis attollens	OBL	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Perideridia parishii ssp. *latifolia*	FAC	--	--	--	--	--	10	--	--	--	1	1	--	--	--
Pinus contorta var. *murrayana*	FAC	--	--	--	--	--	--	--	--	--	5	5	--	--	--
Plantago major	FAC	--	--	10	--	--	--	--	--	--	--	--	--	--	--
Platanthera dilatata var. *leucostachys*	FACW	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Poa pratensis	FAC	--	10	15	--	--	--	--	--	--	--	--	--	--	--
Potamogeton natans	OBL	--	--	--	--	--	--	--	--	5	--	--	--	--	--
Primula tetrandra	FACW	--	--	--	--	10	--	5	--	--	--	--	--	--	--
Ranunculus alismifolius var. *alismifolius*	FACW	20	--	--	40	--	20	--	10	10	--	--	--	--	--
Ranunculus aquatilis	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ranunculus orthorhynchus	FACW	--	--	--	--	--	--	--	--	--	--	1	--	--	--
Salix lemmonii	FACW	5	--	--	--	--	--	--	--	5	--	--	--	--	--
Scirpus microcarpus	OBL	--	5	1	--	--	--	--	--	5	1	1	--	--	--
Sisyrinchium elmeri	OBL	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Sorbus scopulina	FACU	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sparganium angustifolium	OBL	--	--	9	--	--	--	--	--	--	--	--	--	--	--
Spiraea douglasii	FACW	--	--	--	--	--	--	--	--	--	1	1	--	--	--
Spiranthes romanzoffiana	FACW	--	--	--	--	--	--	--	--	--	5	5	2	--	--
Stellaria longipes	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Symphyotrichum foliaceum	FACU	--	--	--	--	--	--	--	--	--	--	--	10	--	--
Taraxacum officinale	FACU	--	--	--	--	--	15	--	--	--	--	--	--	--	5
Triantha occidentalis	FACW	--	--	--	--	--	--	--	--	--	--	--	2	--	--
Trifolium wormskioldii	FACW	--	--	--	--	--	5	--	--	--	--	--	--	--	--

Vaccinium uliginosum	FACW	--	--	--	--	--	--	5	--	--	10	10	--	--	--
Veronica americana	OBL	--	--	--	--	5	--	--	--	--	--	--	--	--	--
Veratrum californicum	FAC	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 1, section 2 of 4.

Plot type		delin	delin	delin	delin	delin	delin	delin	delin	delin	delin	delin	delin	delin
Plot #		15	16	17	18	19	20	21, 23	22	24	25	26	27	28
Wetland soil?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--	Yes	--
Matrix color 0-12in		--	10YR 2/2	--	10YR 2/2	10YR 3/1	--	10YR 3/1	--	--	--	--	10YR 3/1	--
Texture 0-12in		peat	histosol	peat	silt	silt w/ OM	peat	10cm peat; silty gravel	peat	peat	peat	silty sand	silty sand	silty sand
Redox features 0-12in		--	5%	--	15%	15%	--	10%	--	--	--	--	10%	--
Hydric soil indicators		A1	A1	A1	F6	F6	A1	F6	A1	A1	A1	--	F6	--
Wetland hydrology?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--	Yes	--
2019Sep water table relative to ground surface (in)		1	-12	1	<-16	-10	-2	<-16	-2	-2	0	<-16	0	<-16
Wetnad hydrology indicators		A1	C3	A1	C3	A2	A2	C3	A2	A2	A1	--	A1	--
2019 consecutive days >-30cm water table		--	--	--	--	--	--	--	--	--	--	--	--	--
Wetland vegetation?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--	Yes	--
Bare ground areal cover (%)		8	0	10	10	0	0	9	10	0	10	60	15	60
Total areal veg cover (%)		92	100	90	90	100	100	91	90	100	90	40	85	40
Prevalence index		1.1	1.4	1.5	1.6	1.4	1.5	2.0	2.1	1.3	1.3	3.1	2.1	3.1
Taxon	Wetland status													
Achillea millefolium	FACU	--	--	5	--	--	--	--	--	--	--	--	--	--
Bistorta bistortoides	FACW	--	--	--	--	5	5	--	--	--	--	--	--	--
Bromus diandrus	UPL	--	--	--	--	--	--	--	--	--	--	10	--	10
Calocedrus decurrens	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Camassia quamash	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Caltha leptosepala	OBL	--	--	--	--	--	1	--	--	--	--	--	--	--
Calyptridium monospermum	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex aurea	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex feta	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex jonesii	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex lenticularis	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Carex nebrascensis	OBL	5	65	10	20	80	30	1	5	10	--	--	--	--
Carex simulata	OBL	--	--	30	--	--	--	--	--	40	--	--	--	--
Carex utriculata	OBL	--	--	10	15	--	--	--	--	--	--	--	--	--
Collinsia parviflora	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Deschampsia cespitosa	FACW	--	30	--	25	--	--	45	5	--	--	--	--	--
Drosera rotundifolia	OBL	--	--	--	--	--	1	--	5	--	--	--	--	--
Eleocharis macrostachya	OBL	40	--	--	--	--	20	--	5	--	--	--	--	--
Eleocharis quinqueflora	OBL	--	--	10	--	--	--	--	--	--	--	--	--	--
Equisetum arvense	FAC	--	--	--	--	--	--	--	--	--	10	--	25	--
Erythranthe guttata	OBL	--	--	--	--	--	--	--	--	10	--	--	--	--
Erythranthe primuloides	OBL	1	--	5	--	--	--	--	--	--	--	--	--	--
Gayophytum diffusum ssp. parviflorum	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Gentiana newberryi	FACW	--	--	--	--	--	--	--	5	--	--	--	--	--
Hastingsia alba	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Hypericum anagalloides	OBL	--	--	5	--	--	--	--	--	--	--	--	--	--
Hypericum scouleri	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Juncus ensifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Juncus mexicanus	FACW	--	5	--	30	5	--	45	40	20	10	--	25	--
Juncus nevadensis	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Kyhosia bolanderi	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Lewisia nevadensis	UPL	--	--	--	--	--	--	--	--	--	--	--	--	--
Lilium pardalinum ssp. shastense	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Moss	--	40	--	--	--	--	--	--	--	--	--	--	--	--
Muhlenbergia filiformis	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Oreostemma alpigenum	FAC	--	--	--	--	--	--	--	--	--	--	--	--	--
Oxypolis occidentalis	OBL	--	--	--	--	--	10	--	--	--	40	--	15	--
Pedicularis attollens	OBL	--	--	--	--	--	1	--	--	--	--	--	--	--
Perideridia parishii ssp. latifolia	FAC	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinus contorta var. murrayana	FAC	--	--	--	--	--	10	--	10	--	--	--	--	--
Plantago major	FAC	--	--	--	--	--	--	--	--	--	--	--	--	--
Platanthera dilatata var. leucostachys	FACW	--	--	--	--	--	--	--	--	5	--	--	--	--
Poa pratensis	FAC	--	--	5	--	--	--	--	--	--	--	--	--	--
Potamogeton natans	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Primula tetrandra	FACW	--	--	--	--	--	5	--	5	--	--	--	--	--
Ranunculus alismifolius var. alismifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Ranunculus aquatilis	OBL	--	--	--	--	--	--	--	--	10	--	--	--	--
Ranunculus orthorhynchus	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Salix lemmonii	FACW	--	--	--	--	--	--	--	--	--	--	--	20	--
Scirpus microcarpus	OBL	--	--	--	--	--	--	--	--	--	30	--	--	--
Sisyrinchium elmeri	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Sorbus scopulina	FACU	--	--	--	--	--	1	--	--	--	--	--	--	--
Sparganium angustifolium	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Spiraea douglasii	FACW	--	--	--	--	--	--	--	--	--	--	--	--	--
Spiranthes romanzoffiana	FACW	1	--	--	--	--	--	--	--	--	--	--	--	--
Stellaria longipes	FACW	--	--	--	--	--	--	--	--	--	--	15	--	15
Symphyotrichum foliaceum	FACU	--	--	--	--	10	--	--	5	--	--	--	--	--
Taraxacum officinale	FACU	--	--	5	--	--	--	--	--	--	--	--	--	--
Triantha occidentalis	FACW	--	--	--	--	--	1	--	--	--	--	--	--	--
Trifolium wormskioldii	FACW	5	--	5	--	--	--	--	--	5	--	--	--	--
Vaccinium uliginosum	FACW	--	--	--	--	--	15	--	5	--	--	--	--	--

Veronica americana	OBL	--	--	--	--	--	--	--	--	--	--	--	--	--
Veratrum californicum	FAC	--	--	--	--	--	--	--	--	--	--	15	--	15

Table 1, section 3 of 4.

Plot type / Plot #	Wetland status	delin 29	delin 30	delin 31, 32	delin 33, 35, 36, 38	delin 34	delin 37	delin 39	delin 40,42	delin 41	delin 43	delin 44	delin 45, 46
Wetland soil?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Matrix color 0-12in		10YR 3/1	10YR 3/1	--	10YR 3/1	10YR 3/1	10YR 3/1	--	--	--	10YR 2/2	10YR 2/2	10YR 3/1
Texture 0-12in		silty sand	silty sand	peat	silty sand	sandy loam	sandy silt	peat	peat	peat	sandy silt	sandy silt	sandy silt
Redox features 0-12in		10%	5%	--	10%	15%	15%	--	--	--	15%	10%	15%
Hydric soil indicators		F6	F6	A1	F6	F6	F6	A1	A1	A1	F6	F6	F6
Wetland hydrology?		--	Yes	Yes	--	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2019Sep water table relative to ground surface (in)		<-16	<-16	0	<-16	2	-10	0	0	1	-12	-12	-2
Wetnad hydrology indicators		--	C3	A1	--	A1	A2	A1	A1	A1	C3	C3	A2
2019 consecutive days >-30cm water table		--	--	--	--	--	--	--	--	--	--	--	--
Wetland vegetation?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bare ground areal cover (%)		35	0	0	35	0	0	0	5	5	10	5	10
Total areal veg cover (%)		65	100	100	65	100	100	100	95	95	90	95	90
Prevalence index		2.8	2.0	2.0	2.8	2.0	1.0	1.4	1.5	1.4	1.9	2.0	1.0
Taxon	Wetland status												
Achillea millefolium	FACU	--	--	--	--	--	--	--	--	--	--	--	--
Bistorta bistortoides	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Bromus diandrus	UPL	10	--	--	10	--	--	--	--	--	--	--	--
Calocedrus decurrens	UPL	--	--	--	--	--	--	--	--	--	--	--	--
Camassia quamash	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Caltha leptosepala	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Calyptridium monospermum	UPL	--	--	--	--	--	--	--	--	--	--	--	--
Carex aurea	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Carex feta	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Carex jonesii	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Carex lenticularis	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Carex nebrascensis	OBL	5	35	--	5	--	--	--	5	--	30	25	30
Carex simulata	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Carex utriculata	OBL	--	--	--	--	--	--	--	--	--	--	--	30
Collinsia parviflora	UPL	--	--	--	--	--	--	--	--	--	--	--	--
Deschampsia cespitosa	FACW	5	35	--	5	--	--	--	--	--	45	50	--
Drosera rotundifolia	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Eleocharis macrostachya	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Eleocharis quinqueflora	OBL	--	--	25	--	--	--	--	30	20	--	--	--
Equisetum arvense	FAC	--	--	15	--	25	--	--	--	--	--	--	--
Erythranthe guttata	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Erythranthe primuloides	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Gayophytum diffusum ssp. parviflorum	UPL	--	--	--	--	--	--	--	--	--	--	--	--
Gentiana newberryi	FACW	--	--	--	--	--	--	--	--	5	--	--	--
Hastingsia alba	OBL	--	--	30	--	--	--	--	--	--	--	--	--
Hypericum anagalloides	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Hypericum scouleri	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Juncus ensifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Juncus mexicanus	FACW	10	15	--	10	25	--	--	--	--	5	5	--
Juncus nevadensis	FACW	--	--	--	--	--	--	10	30	20	--	--	--
Kyhosia bolanderi	UPL	--	--	--	--	--	--	5	--	--	--	--	--
Lewisia nevadensis	UPL	--	--	--	--	--	--	--	--	--	--	--	--
Lilium pardalinum ssp. shastense	FACW	--	--	--	--	--	--	5	--	--	--	--	--
Moss	--	--	--	--	--	--	--	--	20	30	--	--	--
Muhlenbergia filiformis	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Oreostemma alpigenum	FAC	--	--	--	--	--	--	--	--	--	--	--	--
Oxypolis occidentalis	OBL	--	--	--	--	30	40	70	--	10	--	--	--
Pedicularis attollens	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Perideridia parishii ssp. latifolia	FAC	--	--	--	--	--	--	--	--	--	--	--	--
Pinus contorta var. murrayana	FAC	--	--	5	--	--	--	--	--	--	--	--	--
Plantago major	FAC	--	--	--	--	--	--	--	--	--	--	--	--
Platanthera dilatata var. leucostachys	FACW	--	--	--	--	--	--	5	--	--	--	--	--
Poa pratensis	FAC	--	--	--	--	--	--	--	--	--	--	--	--
Potamogeton natans	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Primula tetrandra	FACW	--	--	10	--	--	--	--	--	--	--	--	--
Ranunculus alismifolius var. alismifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Ranunculus aquatilis	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Ranunculus orthorhynchus	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Salix lemmonii	FACW	--	--	--	--	20	--	--	--	--	--	--	--
Scirpus microcarpus	OBL	--	--	--	--	--	60	5	5	10	--	--	30
Sisyrinchium elmeri	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Sorbus scopulina	FACU	--	--	--	--	--	--	--	--	--	--	--	--
Sparganium angustifolium	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Spiraea douglasii	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Spiranthes romanzoffiana	FACW	--	--	--	--	--	--	--	5	--	--	--	--
Stellaria longipes	FACW	15	--	--	15	--	--	--	--	--	--	--	--
Symphyotrichum foliaceum	FACU	5	15	15	5	--	--	--	--	--	10	10	--
Taraxacum officinale	FACU	--	--	--	--	--	--	--	--	--	--	--	--
Triantha occidentalis	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Trifolium wormskioldii	FACW	--	--	--	--	--	--	--	--	--	--	--	--
Vaccinium uliginosum	FACW	--	--	--	--	--	--	--	--	--	--	--	--

Veronica americana	OBL	--	--	--	--	--	--	--	--	--	--	--	--
Veratrum californicum	FAC	15	--	--	15	--	--	--	--	--	--	5	--

Table 1, section 4 of 4

Plot type		delin	delin	delin	delin	delin	delin	delin	delin	delin	delin	delin		
Plot #		47	48	49-51	52	53-56	57	58	59	60	61-64	65		
Wetland soil?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Matrix color 0-12in		10YR 4/2	10YR 2/2	--	--	--	--	10YR 3/1	10YR 2/2	--	10YR 2/2	10YR 3/1		
Texture 0-12in		silty sand	sandy silt	peat	peat	peat	peat	silty gravel	histosol	peat	histosol	silty gravel		
Redox features 0-12in		15%	10%	--	--	--	--	10%	10%	--	10%	10%		
Hydric soil indicators		F3	F6	A1	A1	A1	A1	F6	A1	A1	A1	F6		
Wetland hydrology?		--	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--		
2019Sep water table relative to ground surface (in)		<-16	2	0	2	1	0	<-16	-8	0	-8	<-60		
Wetnad hydrology indicators		--	A1	A1	A1	A1	A1	C3	A2	A1	A2	--		
2019 consecutive days >-30cm water table		--	--	--	--	--	--	--	--	--	--	--		
Wetland vegetation?		--	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--		
Bare ground areal cover (%)		60	0	0	0	0	0	9	0	0	5	80		
Total areal veg cover (%)		40	100	100	100	100	100	91	100	100	95	20		
Prevalence index		5.0	1.5	1.3	1.5	1.3	1.5	2.0	1.4	1.4	1.1	5.0		
Taxon	Wetland status												Ave of all plots	Ave when present
Achillea millefolium	FACU	--	--	--	--	--	--	--	--	--	--	--	0	5
Bistorta bistortoides	FACW	--	--	--	--	--	--	--	--	--	--	--	2	9
Bromus diandrus	UPL	15	--	--	--	--	--	--	--	--	--	--	1	11
Calocedrus decurrens	UPL	--	--	--	--	--	--	--	--	--	--	--	0	2
Camassia quamash	FACW	--	--	--	--	--	--	--	--	--	--	--	1	13
Caltha leptosepala	OBL	--	--	--	--	--	--	--	--	--	--	--	0	1
Calyptridium monospermum	UPL	5	--	--	--	--	--	--	--	--	--	10	0	8
Carex aurea	FACW	--	--	--	--	--	--	--	--	--	--	--	0	10
Carex feta	FACW	--	--	--	--	--	--	--	--	--	--	--	1	30
Carex jonesii	OBL	--	--	--	--	--	--	--	--	--	--	--	0	4
Carex lenticularis	OBL	--	--	--	--	--	--	--	--	--	--	--	1	30
Carex nebrascensis	OBL	--	--	15	--	40	5	1	65	50	65	--	20	24
Carex simulata	OBL	--	--	--	--	--	--	--	--	--	--	--	2	35
Carex utriculata	OBL	--	50	--	50	30	--	--	--	15	5	--	5	22
Collinsia parviflora	UPL	--	--	--	--	--	--	--	--	--	--	--	0	15
Deschampsia cespitosa	FACW	--	--	--	--	--	--	45	30	15	--	--	9	24
Drosera rotundifolia	OBL	--	--	--	--	--	--	--	--	--	--	--	0	2
Eleocharis macrostachya	OBL	--	--	--	--	--	--	--	--	--	--	--	2	17
Eleocharis quinqueflora	OBL	--	--	10	--	--	--	--	--	--	--	--	3	16
Equisetum arvense	FAC	--	--	--	--	--	--	--	--	--	--	--	3	18
Erythranthe guttata	OBL	--	--	10	--	--	--	--	--	--	--	--	1	9
Erythranthe primuloides	OBL	--	--	10	--	--	--	--	--	--	15	--	1	9
Gayophytum diffusum ssp. parviflorum	UPL	20	--	--	--	--	--	--	--	--	--	10	1	15
Gentiana newberryi	FACW	--	--	--	--	--	--	--	--	--	--	--	0	4
Hastingsia alba	OBL	--	--	--	--	--	--	--	--	--	--	--	1	20
Hypericum anagalloides	OBL	--	--	--	--	--	--	--	--	--	--	--	0	5
Hypericum scouleri	FACW	--	--	--	--	--	--	--	--	--	--	--	0	1
Juncus ensifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	0	5
Juncus mexicanus	FACW	--	50	20	50	30	--	45	5	20	10	--	17	21
Juncus nevadensis	FACW	--	--	--	--	--	20	--	--	--	--	--	3	17
Kyhosia bolanderi	UPL	--	--	--	--	--	--	--	--	--	--	--	0	5
Lewisia nevadensis	UPL	--	--	--	--	--	--	--	--	--	--	--	0	5
Lilium pardalinum ssp. shastense	FACW	--	--	--	--	--	--	--	--	--	--	--	0	5
Moss	--	--	--	10	--	--	20	--	--	--	--	--	5	22
Muhlenbergia filiformis	FACW	--	--	--	--	--	--	--	--	--	--	--	0	10
Oreostemma alpigenum	FAC	--	--	--	--	--	--	--	--	--	--	--	1	15
Oxypolis occidentalis	OBL	--	--	--	--	--	20	--	--	--	--	--	6	29
Pedicularis attollens	OBL	--	--	--	--	--	--	--	--	--	--	--	0	2
Perideridia parishii ssp. latifolia	FAC	--	--	--	--	--	--	--	--	--	--	--	0	4
Pinus contorta var. murrayana	FAC	--	--	--	--	--	5	--	--	--	--	--	1	7
Plantago major	FAC	--	--	--	--	--	--	--	--	--	--	--	0	10
Platanthera dilatata var. leucostachys	FACW	--	--	5	--	--	--	--	--	--	--	--	0	4
Poa pratensis	FAC	--	--	--	--	--	--	--	--	--	--	--	1	10
Potamogeton natans	OBL	--	--	--	--	--	--	--	--	--	--	--	0	5
Primula tetrandra	FACW	--	--	--	--	--	--	--	--	--	--	--	1	7
Ranunculus alismifolius var. alismifolius	FACW	--	--	--	--	--	--	--	--	--	--	--	2	20
Ranunculus aquatilis	OBL	--	--	--	--	--	--	--	--	--	--	--	0	10
Ranunculus orthorhynchus	FACW	--	--	--	--	--	--	--	--	--	--	--	0	1
Salix lemmonii	FACW	--	--	--	--	--	--	--	--	--	--	--	1	13
Scirpus microcarpus	OBL	--	--	20	--	--	20	--	--	--	--	--	5	15
Sisyrinchium elmeri	OBL	--	--	--	--	--	--	--	--	--	--	--	0	1
Sorbus scopulina	FACU	--	--	--	--	--	--	--	--	--	--	--	0	1
Sparganium angustifolium	OBL	--	--	--	--	--	--	--	--	--	--	--	0	9
Spiraea douglasii	FACW	--	--	--	--	--	--	--	--	--	--	--	0	1
Spiranthes romanzoffiana	FACW	--	--	--	--	--	5	--	--	--	--	--	1	4
Stellaria longipes	FACW	--	--	--	--	--	--	--	--	--	--	--	1	15
Symphyotrichum foliaceum	FACU	--	--	--	--	--	--	--	--	--	--	--	2	9
Taraxacum officinale	FACU	--	--	--	--	--	--	--	--	--	--	--	1	8
Triantha occidentalis	FACW	--	--	--	--	--	--	--	--	--	--	--	0	2
Trifolium wormskioldii	FACW	--	--	--	--	--	5	--	--	--	--	--	1	5
Vaccinium uliginosum	FACW	--	--	--	--	--	--	--	--	--	--	--	1	9

Veronica americana	OBL	--	--	--	--	--	--	--	--	--	--	--	0	5
Veratrum californicum	FAC	--	--	--	--	--	--	--	--	--	--	--	2	13

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Evaluation of Greenhouse Gas Emissions from the Proposed Childs Meadow Restoration Project

Prepared by Brent R. Campos, Point Blue Conservation Science
March 2, 2021

The net greenhouse gas sequestration from the project is expected to be 28,718 mt CO2e. Montane meadows have the potential to sequester large amounts of carbon when in proper functioning condition (Reed et al. 2020). The previously implemented demonstration project at Childs Meadow tested the impacts of two treatments (cattle exclusion and cattle exclusion plus BDAs) on carbon sequestration (Yarnell et al. 2020). They found that BDAs resulted in a net storage effect of about 70 gCO2-Ceq m-2 per growing season, while the combined effect of the two treatments was a net storage of about 500 gCO2-Ceq m-2 per growing season (Yarnell et al. 2020). The proposed project will increase the scale of BDA treatments and cattle exclusion fencing across the larger meadow complex, thus resulting in net benefits to carbon sequestration. Restoration of the 406-acre Childs Meadow may result in a carbon sequestration benefit of 28,736 mt CO2e based on the CA Air Resources Board, Quantification Methodology for the California Department of Fish and Wildlife. Project construction activities are expected to emit 18 mt CO2e over three years of implementation based on Department of Water Resources GHG Calculator.

Reed, C. C., A. G. Merrill, W. M. Drew, B. Christman, R. A. Hutchinson, L. Keszey, M. Odell, S. Swanson, P. S. J. Verburg, J. Wilcox, S. C. Hart, and B. W. Sullivan (2020). Montane Meadows: A Soil Carbon Sink or Source? Ecosystems. https://doi.org/10.1007/s10021-020-00572-x

Yarnell, S.M., K. Pope, E.C. Wolf, R.D. Burnett, and K. Wilson. 2020. A demonstration of the carbon sequestration and biodiversity benefits of beaver and beaver dam analogue restoration techniques in Childs Meadow, Tehama County, California. Center for Watershed Sciences Technical Report (CWS-2020-01), University of California, Davis. Prepared for CA Department of Fish and Wildlife. pp. 29.

Appendix G: Greenhouse Gas Emissions Calculations Worksheet

Restoring the Headwaters of Deer Creek at Childs Meadow: Implementation

Line	Emissions from Construction Equipment							
	Type of Equipment	Maximum Number per Day	Total Operation Days	Total Operation Hours[1]	Fuel Consumption Per Hour[2]	Total Fuel Consumption (gal. diesel)	CO_2e/gal diesel[3]	Total CO_2 Equivalent Emissions (metric tons)
1	320 Excavator	1	10	80	5.12	410	0.010	4
2	966 Loader	1	10	80	6.76	541	0.010	6
3				0		-	0.010	-
4	TOTAL					**951**		**10**

5 [1] An 8-hour work day is assumed.

6 [2] California Air Resource Board Offroad 2007 Emissions Inventory fuel consumption factors

7 [3] World Resources Institute-Mobile combustion CO_2 emissions tool, June 2003 Version 1.2

8

Line	Emissions from Transportation of Construction Workforce							
10	Average Number of Workers per Day	Total Number of Workdays	Average Distance Travelled (round trip)	Total Miles Travelled	Average Passenger Vehicle Fuel Efficiency[4]	Total Fuel Consumption (gal. gasoline)	CO_2e/gal Gasoline[3]	Total CO_2 Equivalent Emissions (metric tons)
11	10	30	50	18000	20.8	**865.4**	0.009	**8**

12 [4] United States Environmental Protection Agency. 2008. Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2008. [EPA420-R-08-015]

13

Line	Emissions from Transportation of Construction Materials							
15	Trip Type	Total Number of Trips	Average Trip Distance	Total Miles Travelled	Average Semi-truck Fuel Efficiency	Total Fuel Consumption (gal. diesel)	CO_2e/gal Diesel[3]	Total CO_2 Equivalent Emissions (metric tons)
16	Delivery	2	50	100	6	16.66666667	0.010	0.1731896
17	TOTAL							**0.1731896**

18

Line	Construction Electricity Emissions			
20		MWh of electricity	$mtCO2_e$/ MWh[5]	CO_2 e emissions
21	Electricity Needed		0.277	0

22 [5] eGRID2010 Version 1.0 *CAMX-WECC sub-region* .

23

Line			
24	**Total Construction Activity Emissions**	17.8	(from lines 25, 32, 39, and 43)
25	**Total Years of Construction**	3	
26	**Expected Start Date of Construction**	July-22	
27			
28	**Estimated Project Useful life**	25	Years
29	**Average Annual Total GHG Emissions**[7]	0.7139331	**MT CO_2 equivalents**
30	**Max. Year Construction GHG Emissions**[8]	12.650251	**MT CO2 equivalents**

31 [7]short-term construction emissions amortized over life of project

32 [8]Emissions total from single year of construction when emissions peak (for multi-year construction projects)

Appendix H: Hydrology and Water Quality Impacts

Childs Meadow Restoration Project - Hydrology and Water Quality Impacts

February 2021

1. Introduction

The Childs Meadow restoration project is located in Tehama County, California. Childs Meadow is a large, privately owned meadow complex located at 4750-4900 feet elevation, approximately 5 miles south of Lassen Volcanic National Park in California, in the headwaters of Deer Creek, a regionally significant anadromous watershed. Over its 5-mile length, running primarily along Gurnsey Creek, Childs Meadow drops 150 feet in elevation, resulting in an average slope of 0.57%, with locally steeper or shallower gradients. Gurnsey Creek flows into Deer Creek about 4 miles downstream of Childs Meadow. The watershed for Childs Meadow is 8.8 square miles. The valley floor and hillslope wetland complex covers 520 acres, approximately 9% of the Childs Meadow watershed. The wetland complex contains approximately 139 acres of fen, 259 acres of non-fen wetland, 42 acres of dewatered former wetland, as well as 80 acres of mixed wetland/fen on unsurveyed private land at the north end of the Childs Meadow watershed; the Childs Meadow restoration planning area includes the 440-acre portion of the complex downstream of this unsurveyed section.

The primary sources of impact to wetland function within Childs Meadow are over 100 years of cattle grazing, as well as ditching, diversions, and other flow consolidation to accommodate grazing, roads, and timber harvest in adjacent uplands. The Childs Meadow restoration project has an overarching goal of restoring natural hydrological, biological, and geomorphic processes throughout the meadow complex to increase resilience to climate change and other stressors, with benefits to several target resources including, wetland vegetation, carbon-rich soils, Cascades frog, willow flycatcher and other birds, beavers, aquatic macroinvertebrates, and downstream anadromous salmonids. We will achieve this overarching goal by implementing restoration actions specific to the processes associated with the dominant ecosystem types occurring within the meadow complex: floodplain depositional reaches and transport reaches within riparian meadow, fens and discharge slopes, and tributary streams.

2. Proposed Restoration Actions

The 2004 Record of Decision (ROD) from the Sierra Nevada Forest Plan Amendment identifies the applicable desired condition of meadow systems to be:

> “ … hydrologically functional” where “Sites of accelerated erosion, such as gullies and headcuts are stabilized or recovering”. Vegetation roots occur throughout the available soil profile. Meadows with perennial and intermittent streams have the following characteristics: (1) stream energy from high flows is dissipated, reducing erosion and improving water quality, (2) streams filter sediment and capture bedload, aiding floodplain development, (3) meadow conditions enhance floodwater retention and groundwater recharge, and (4) root masses stabilize stream banks against cutting action,” (ROD pg. 43).

The proposed restoration actions for Childs Meadow are composed of three primary activities (see 65% Design document for further details and associated references):

- Installation of beaver dam analogues (BDAs)
- Installation of post-assisted log structures (PALS)
- Channel/ditch fill (for large gullies)

In low gradient riparian meadow reaches historically created and maintained by depositional and beaver-related processes, the proposed actions will increase floodplain connectivity and promote groundwater recharge primarily with the installation of beaver dam analogues (BDAs). BDAs have been shown to raise groundwater tables, attenuate flood flows, and re-invigorate desiccated riparian and wetland areas.

In higher gradient riparian meadow reaches where high flows create sufficient shear stress to mobilize sediment, the proposed actions will promote geomorphic processes such as sediment erosion and deposition that create, maintain, and change diverse habitat within and adjacent to the channel primarily with the installation of post-assisted log structures (PALs). PALs placed adjacent to channel banks accelerate local scour adjacent to the structure and subsequent deposition downstream in low velocity habitats such as eddies and pools. As the channel widens over time due to periodic erosion and deposition, the diversity of in-channel habitats increases. By increasing in-channel hydraulic diversity and mobilizing sediment scoured from the channel banks, the proposed actions aim to increase the sediment moving through these higher gradient reaches over time and supply sediment to the low gradient depositional reaches downstream.

In fens and discharge-slope meadow areas sustained high groundwater levels support the processes of vegetation growth and exclusion of oxygen from soil, which allow for organic matter accumulation and peat formation. A number of roads, ditches, and erosion gullies within Childs Meadow have dewatered fen areas causing a loss of soil carbon that takes centuries to millenia to accumulate and degrading habitat for fen-obligate species. The proposed actions will treat small shallow channel incisions with hand fill and vegetated plugs to reduce drainage and raise groundwater levels. In areas with steep slopes and where the mineral soil is exposed, the proposed actions include removing ditches with backfilling to eliminate the possibility of breached plugs during high-flow events and allow plants to recolonize and further stabilize the ditch. Deep channel incisions and large headcuts where larger volumes of fill are needed will be treated with mechanical backfilling.

Additionally, road modifications will be conducted to reconnect natural flow paths in adjacent tributaries and remove abandoned roads that constrict flow paths.

3. Degree of Potential Effects on Hydrology

3.1 Installation of BDAs and PALS

The construction of BDAs and PALS will require a light-duty truck or ATV to haul materials and equipment from the existing road network to restoration locations. Vehicles will be driven across the meadow while avoiding all cultural sites, areas with rare plants, all fens, and other areas of the meadow where doing so could lead to soil compaction and vegetation degradation. Materials for the construction of BDAs and PALS will be sourced on site in the adjacent uplands. Live non-merchantable conifers up to 12" DBH will be sourced from (1) within the boundaries of the delineated wetland, but only outside of fens, in order to limit conifer encroachement and (2) within non-wetland habitat within 30 m (100 ft) of the mapped wetland boundary of Childs Meadow. Soil, forest duff, and rocks will be sourced with hand tools from upland (non-wetland) habitat within 30 m of the mapped wetland boundary of Childs Meadow, outside of all cultural resource areas. The disturbance footprint will occur in patches no bigger than 4 m^2, digging 30 cm (12 inches) deep, and no more than 4 m^2 will be disturbed from any 20 m^2 area. Any leftover materials will be scattered to cover exposed soil. Potential impacts from mechanical vehicles on the meadow and sourcing of materials adjacent to the meadow will be short-term and temporary during installation only. Following installation, any meadow vegetation impacted by vehicles will be reseeded or replanted, and material source areas will be monitored for potential increased surface erosion.

Within the stream channels where BDAs and PALS will be placed, temporary coffer dams and bypass diversions will be used to allow short-term access to the channel for installation. Coffer dams would be used to control and re-route surface flows around installation areas and will use materials that are free from fines. Localized water re-routing would be minimized in both time and space to the greatest extent possible and only kept in place during active installation. Based on previous observations of BDA installation in the pilot restoration study completed in 2016, the hydrologic impacts of the installations will be almost immediate. BDAs installed in 2016 were fully impounding streamflow within 24-hours of completed installation and creating desired restoration benefits, such as backwatered pools, slowed velocities, and floodplain inundation.

Impacts from the BDA and PALS installation actions will be short-term and less than significant with mitigation such as replanting and reseeding to reduce soil erosion incorporated if needed. The proposed actions are designed to result in a net positive increase in meadow function per the meadow restoration goals, including improved groundwater recharge, increased floodplain connection and flow attenuation, and decreased channel incision. Measures designed to minimize and mitigate potential effects to resources on the travel routes and source areas are detailed during the permitting process and incorporated into the proposed design and monitoring plans. These actions will not violate any water quality standards or degrade surface or groundwater quality per required permits (e.g. 401 permit and other applicable general permits).

3.2 Large channel fill

Due to the large fill volume required in incised channels at least 2 ft wide and 2 ft deep (see 65% design plan), the proposed actions will use mechanical equipment to generate, transport, and place a 50/50 mix of locally-sourced wood chips and mineral soil in the large incised channels. Heavy-duty and light-duty equipment will access each restoration site from the existing road network. Prior to filling the channel, all sod and topsoil from within the channel will be removed and placed adjacent to the channel. After fill material is transported and placed in the channel, the sod and topsoil will be replaced, and the fill will be covered with a natural-fiber (e.g. coir or jute) erosion fabric anchored into the adjacent fen surface. The disturbed area not covered by replaced sod will then be planted with seeds and plugs of native fen sedges, whose roots and rhizomes anchor fen soil. On any steep slopes, periodic permeable fill retainers, such as erosion fabric or coir logs with interlaced wooden stakes hammered into the bed and banks, will be installed to reduce the risk of the saturated fill flowing down the channel before plant roots have a chance to grow and anchor it.

All borrow areas will be located adjacent to the meadow and slightly higher in elevation than flood prone water heights. In a few instances, a portion of the borrow area may be located within the floodplain, but it will be utilized so that the invert elevation (i.e. difference between upslope and downslope edge) remains flat or less than 0.5 feet in height.

Impacts from the large channel fill restoration actions will be short-term and less than significant with mitigation such as replanting, reseeding, and erosion control incorporated if needed. The proposed actions are designed to result in a net positive increase in fen and meadow function per the meadow restoration goals, including improved groundwater recharge, decreased channel incision and erosion, and increased groundwater elevations. Measures designed to minimize and mitigate potential effects to resources on the source areas are detailed during the permitting process and incorporated into the proposed design and monitoring plans. These actions will not violate any water quality standards or degrade surface or groundwater quality per required permits (e.g. 401 permit and other applicable general permits).

3.3 Small channel fill

In incised channels smaller than 2 ft deep and 2 ft wide, any sod within the channel will be salvaged using hand tools and stockpiles adjacent to the channel. Hand-excavated alluvium and wood chips will be transported from their source area to the channel using non-mechanized equipment. The salvaged sod will then be replanted and the fill will be packed to the desired elevation. Jute fabric will be placed and staked similar to the mechanical treatment described for large channel fill, if the area is at high risk of flood flows and erosion.

Impacts from the small channel fill restoration actions will be short-term and less than significant with mitigation such as replanting, reseeding, and erosion control incorporated if needed. The proposed actions are designed to result in a net positive increase in fen and meadow function per the meadow restoration goals, including improved groundwater recharge, decreased channel incision and erosion, and increased groundwater elevations. Measures designed to minimize and mitigate potential effects to resources on the source areas are detailed during the permitting process and incorporated into the proposed design and monitoring plans. These actions will not violate any water quality standards or degrade surface or groundwater quality per required permits (e.g. 401 permit and other applicable general permits).

4. Degree of Potential Effects on Water Quality

The primary water quality concern related to the proposed restoration actions is potential fuel spills from installation equipment, such as vehicles, ATVS, and mechanical post-pounders, working onsite. Protection measures include conducting a daily assessment of equipment function and condition. Fueling areas will be located away from drainages, out of meadows at pre-approved upland sites, and at off- site existing fueling locations. There will be a Spill Prevention and Counter Measure plan in place and on site with a spill remediation kit on site for immediate spill response. The proposed actions also create a potential short-term risk for negative effects from increased sediment and turbidity within the stream channel, primarily during installation of the restoration actions. Coffer dams will be used to slow and divert surface flows during installation, limiting potential downstream sediment movement. The installations will also occur during the low-flow season in late summer when the potential for erosion and fine sediment transport is minimal. There is a small potential risk of downstream sedimentation in the channel if the channel fill activities are destabilized; however, mitigation measures described in section 3 limit this risk. As a result, the impacts from the restoration actions on water quality will be short-term and less than significant with mitigation measures as described in the proposed design and monitoring plans. The proposed actions are designed to result in a net positive effect on water quality over time, including increased filtering of water through wetland soils and decreased water temperatures resulting from increased surface water and groundwater connectivity. These actions will not violate any water quality standards or degrade surface or groundwater quality per required permits (e.g. 401 permit and other applicable general permits).

5. Conclusion

The proposed actions are designed to limit disturbance to the smallest area possible using controlled access, planned source areas, and relatively low impact restoration techniques. During and following implementation, permitted plans will ensure onsite hydrologic impacts and sedimentation will be minimized, controlled, and meet water quality requirements. The proposed restoration actions are designed to result in a net positive effect on meadow function over time. It is therefore concluded that there would be less than significant with mitigation impacts and no irreversible or irretrievable water quality impacts from the proposed restoration actions.

Appendix I: Post Project Maintenance and Monitoring Plan

Following implementation of the Childs Meadow restoration project, some level of maintenance will be required to ensure project durability and achievement of restoration objectives. Our approach for maintenance of the restoration project includes two phases. Most of the maintenance is expected to berequired in the first 3 years following restoration, the first maintenance phase, during the period of the implementation grant funding. Planned maintenance costs in this phase will be covered by the implementation grant. In spring of every year of the first maintenance phase, RCDTC and Point Blue will visit each area of the restoration project to assess maintenance needs. During this phase there will also be intensive monitoring of biological, hydrological, and geological attributes of the project which we willuse to identify maintenance needs. In this first phase, maintenance will be carried out by the RCDTC, Point Blue, and other project partners. The second phase is long-term maintenance after completion of the implementation grant, from 4-25 years after restoration. There will be reduced monitoring during this phase, so we will rely more heavily on the landowner to identify issues with the project and coordinate with the project team to evaluate the need for maintenance. If maintenance is required, we will work with the landowner to identify resources to complete the maintenance. Our project team has significant investment in Childs Meadow and a track record of being engaged for at least the last 7 yearsand in some cases a decade or more. To identify maintenance needs in both phases, we will use qualitative observations of project reaches as well as quantitative measures of progress towards performance measures as defined in the monitoring plan (Campos et al. 2021a). Anticipated maintenance needs of specific project elements are described for each restoration practice in the restoration design document (Campos et al. 2021b).

Campos, B. R., K. L. Pope, S. M. Yarnell, E. C. Wolf, B. Johnson, M. E. Vernon, and R. D. Burnett. 2021a.*Restoring the Headwaters of Deer Creek at Childs Meadow: Monitoring Plan*. Petaluma, CA: Point BlueConservation Science.

Campos, B. R., K. L. Pope, S. M. Yarnell, E. C. Wolf, B. Johnson, M. E. Vernon, and R. D. Burnett. 2021b.*Restoring the Headwaters of Deer Creek at Childs Meadow: 65% Restoration Designs*. Petaluma, CA: Point Blue Conservation Science.

Restoring the Headwaters of Deer Creekat Childs Meadow: Monitoring Plan

Restoring the Headwaters of Deer Creek at Childs Meadow: Monitoring Plan

March 2021

Prepared by

Point Blue Conservation Science

Brent R. Campos

Ryan D. Burnett

Marian E. Vernon

USDA Forest Service Pacific Southwest Research Station

Karen Pope

University of California Davis Center for Watershed Sciences

Sarah Yarnell

Applied Ecohydrology Institute

Evan Wolf

The Collins Company

Bethany Johnson

With funding from

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Cover photo: Childs Meadow sunrise 2018.

Photo credit: Jenny Riek

Introduction

Project Overview

The Childs Meadow restoration planning project builds on an experimental demonstration projectthat used beaver dam analogs (BDAs) and cattle exclosures to restore a small 15-acre portion ofChilds Meadow, in order to increase carbon storage, improve water holding capacity, and increase populations of riparian birds and sensitive meadow-dependent species. We are applying the knowledge and process-based restoration approaches from the demonstration project and others (e.g. Wheaton et al. 2019) to set the larger meadow complex and its tributaries on a sustained restoration trajectory.

We designed the Childs Meadow restoration project to increase hydrologic connectivity lost due to human alterations while allowing for system self-adjustments towards recovery over time by using natural materials and capitalizing on energy within the natural fluvial system (e.g. sedimenttransport, beaver ecosystem engineering) to do some of the work of restoration. We supplemented the in-channel restoration actions with the reduction or elimination of grazing where possible, specific fen-recovery activities to rewet and expand sensitive fen habitats, and climate-smart revegetation plans to increase vegetative diversity and willow cover that will encourage wildlife colonization and persistence into the future, including beaver from the lower meadow complex. Details about the concepts and priorities for Childs Meadow restoration can be found in the Conceptual Plan, and specifics on locations and restoration methods can be found in the 65% Designs.

Given this approach, we developed a monitoring plan to track indicators of the pace and extent of sustainable system recovery. We will monitor hydrologic, geomorphic, and biological changesat multiple scales (habitat to reach to meadow complex) and use the findings to inform project effectiveness, project adjustments, and identify improvements for future meadow restoration projects.

Project Setting and Background

Childs Meadow is a large, privately owned meadow complex located at 4750-4900 feet elevation, approximately 5 miles south of Lassen Volcanic National Park in California, in the headwaters of Deer Creek, a regionally significant anadromous watershed. Over its 5-mile length, running primarily along Gurnsey Creek, Childs Meadow drops 150 feet in elevation, resulting in an average slope of 0.57%, with locally steeper or shallower gradients. Gurnsey Creek flows into Deer Creek about 4 miles downstream of Childs Meadow. The watershed for Childs Meadow is 8.8 square miles. The valley floor and hillslope wetland complex covers 520 acres, approximately9% of the Childs Meadow watershed. The wetland complex contains approximately 139 acres of fen, 259 acres of non-fen wetland, 42 acres of dewatered former wetland, and 80 acres of mixed wetland/fen on unsurveyed private land at the north end of the Childs Meadow watershed; the Childs Meadow restoration planning area includes the 440-acre portion of the complex downstream of this unsurveyed section. Most of the property in the Childs Meadow restoration planning area is owned by The Collins Company and is under a conservation easement held byThe Nature Conservancy. Adjacent lands include the Lassen National Forest and two private resorts upstream of the planning area (Figure 1).

The experimental demonstration project used a modified Before-After-Control-Impact (BACI) design to test the impacts of two restoration treatments on carbon sequestration, hydrology, andsensitive species: cattle exclusion and cattle exclusion with beaver dam analogue installation. Apositive control was located where beaver naturally occupy a portion of the meadow complex, and a negative control was located where cattle grazed at recent historic utilization levels. Two years of pre-restoration data were collected in 2015-2016, and three years of post-restoration data were collected in 2017-2019. Specific project objectives included: (1) quantify and evaluate changes in above and below ground carbon storage following habitat restoration treatments, (2)compare the within meadow carbon results from Childs Meadow to carbon sequestration valuesin existing restored and unrestored mountain meadows across the Cascade and Sierra Nevada range, and (3) measure the response of hydrogeomorphic conditions (e.g. groundwater, temperature, habitat) and two imperiled species (Cascades frog and willow flycatcher) to restorative actions.

The Childs Meadow complex has been grazed by cattle for at least a century. Portions of the lower meadow have been fenced off to prevent cattle grazing since about 2015. A partial cross- valley fence was constructed in 2010 to exclude cattle from 152 acres of meadow wetlands in thedownstream portion of the meadow. A 15-acre parcel was fenced in fall 2015 to prevent grazing near a channelized reach of Gurnsey Creek as part of the controlled experimental demonstrationproject. The 243 acres of unfenced wetland meadow in the upper portion of the complex receive approximately 500 animal unit months (AUMs) of grazing pressure per year.

The primary impacts to wetland function within Childs Meadow are over 100 years of cattle grazing, as well as ditching, diversions, and other flow consolidation to accommodate grazing, roads, and timber harvest in adjacent uplands. Cattle directly consume aboveground vegetation,and damage soil and plant roots by hoof punching. These grazing impacts leave soil more vulnerable to erosion, as evidenced by several large erosion gullies in the meadow complex, some of which are actively headcutting. These gullies form topographic low trenches within an otherwise relatively uniform meadow floodplain that has been influenced by vegetation clearing, grazing, and removal of beaver. Surface and groundwater drain to these incised channels and flow rapidly downstream. Surface water flowing through incised stream channels and intentionally dug ditches can move up to three orders of magnitude faster than groundwater flowing through subsurface soils, resulting in rapidly dewatered meadow conditions (Loheide et al. 2008, Surfleet et al. 2019). The loss of beaver and their dams further exacerbates these impaired conditions as there is little vegetative structure to impede and slow surface water flows.The combination of cattle grazing, beaver removal, channel incision, and ditching has impaired wetland functioning in Childs meadow, resulting in a loss of key wetland habit.

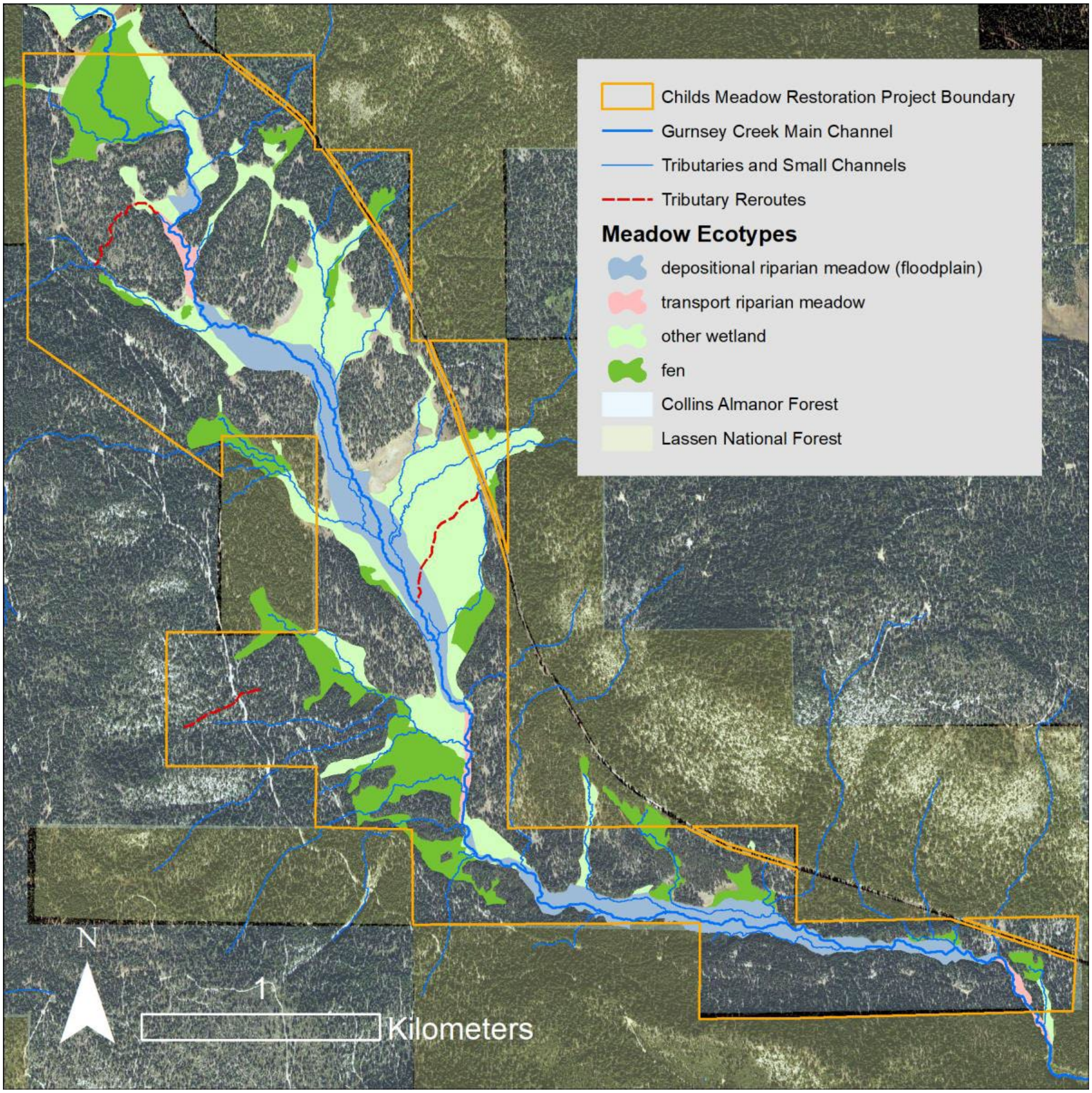

Figure 1. Overview of the Childs Meadow Project Planning area, including Collins Companyownership and US Forest Service boundaries, and Childs Meadow ecosystem types.

Climate Resilience

Embedded within our restoration goal and plans is the concept of climate resilience. We define climate resilience as the ability of the meadow system to absorb disturbance and reorganize in ways that retain essentially the same functions, structures, identities, and feedbacks (Walker et al. 2004). This definition of resilience includes both resistance to change and recovery from change (Timpane-Padgham et al. 2017). We define disturbances as climate-related stochastic events, such as multi-year droughts, wildfires, extreme flood events, and extreme heat events. We define perturbations as climate forcings, such as the gradual increase in global temperature. We provide restoration objectives for resilience for meadow vegetation productivity and for beaver, a keystone ecosystem-engineering species in the Childs Meadow complex.

Purpose of Monitoring

The purpose of the Childs Meadow monitoring plan is to provide a framework to evaluate whether the restoration objectives for multiple ecosystem benefits are achieved and sustained over the next 25 years in the context of climate change and other stressors. Additional objectivesof this monitoring framework are to (a) inform short-term and long-term adaptive management ofthe restoration project through data-driven evaluation to ensure long-term restoration success, and (b) inform a broader audience about the effectiveness of the ecological restoration approachand techniques we used. There is considerable value in efforts to communicate successes in restoration programs as determined through robust monitoring, because it can provide lessons about what has and has not worked (Lindenmeyer 2020). Communication of success, as determined from robust monitoring, also can provide inspiration for others restoring similar ecosystems.

Monitoring Team

The Monitoring Team includes Point Blue Conservation Science, Collins Company, UC Davis Center for Watershed Sciences, USDA Forest Service Pacific Southwest Research Station, and Applied Ecohydrology Institute. The Monitoring Team is a subset of the larger Project Team of partners working on the Childs Meadow restoration project as a whole.

Point Blue Conservation Science (Point Blue) is the current Project's lead and led the development of this monitoring plan. Point Blue is responsible for avian monitoring and a portionof the vegetation and implementation monitoring. Contributing staff from Point Blue include RyanBurnett, Brent Campos, and Marian Vernon.

University of California Davis Center for Watershed Sciences (UCD CWS) led the pilot restoration project at Childs Meadow that started in 2015 and ended in 2019. UCD CWS is responsible for hydrology, geomorphology, and beaver monitoring. Contributing staff from UCDCWS include Sarah Yarnell.

Collins Company (Collins) is the landowner and leaseholder for grazing as of 2021. Collins is responsible for a portion of the amphibian monitoring and obtaining information from the grazinglessee. Contributing staff from Collins include Bethany Johnson.

USDA Forest Service Pacific Southwest Research Station (PSW) has been a Project Teammember since 2015 and was a core Monitoring Team member of the pilot project. PSW is responsible for a portion of the amphibian monitoring and all benthic macroinvertebrate monitoring. Contributing staff from PSW include Karen Pope and Adam Cummings.

Applied Ecohydrology Institute (AEI) has been a Project Team member since 2015 and was acore Monitoring Team member of the pilot project. AEI is responsible for carbon flux and associated vegetation monitoring. Contributing staff from AEI include Evan Wolf.

Framework

Our Monitoring Approach

We developed a WRAMP-compatible, indicator-driven monitoring plan to measure the geomorphologic, hydrologic, and biologic processes and states of the meadow system (Figure 2). First, we developed an overarching restoration goal and process-based subgoals. Next, we formulated monitoring questions and hypotheses for both system-wide and local responses to our proposed restoration actions. From these hypotheses, we developed restoration objectives and selected indicators that represent quantifiable measures of system processes and states. These measures reflect the underlying processes, which we do not directly quantify. The indicators provide information on meadow condition and a way to report and evaluate changes over time relative to a desired (or an undesired) condition as a result of management actions. In this way, indicators provide the connection between statements of intent (e.g., objectives), our underlying conceptual understanding (e.g. hypotheses), and measurable aspects of the meadowsystems.

Our monitoring plan utilizes before-after and before-after-control-impact sample designs to determine the efficacy of individual restoration practices and overall project success. Because the restoration practices (treatments) to achieve each subgoal are variable, our sample strategyfocuses on meadow-wide changes and individual practices to determine their efficacy. We provide criteria against which collected data for each indicator can be compared to evaluate the performance and progress of the restoration project relative to each restoration objective. These evaluations will inform management actions, including on-the-ground adjustments if the restoration project does not meet objectives or additional actions to improve restoration outcomes. Our evaluations are also intended to develop knowledge in the realm of restoration science. Monitoring for most of the indicators will be spatially co-located to better our understanding of the interactions between hydrologic, geomorphic, and biologic processes in achieving desired outcomes in meadow restoration and link the local treatment effects with meadow-wide changes. We chose the indicators carefully because of their importance in determining findings, making decisions, and developing knowledge. A subset of our indicators integrate with Sierra Meadow WRAMP (SM-WRAMP).

Indicators are classified into three levels, following WRAMP guidelines:

- Level 1. Indicators that track general project metrics, uploaded using the Project Trackertool in EcoAtlas.
- Level 2. Indicators derived from CRAM and remote sensing via LANDSAT satellites.
- Level 3. Indicators that measure our success in achieving our restoration objectives using standardized methods, annually to once every three years

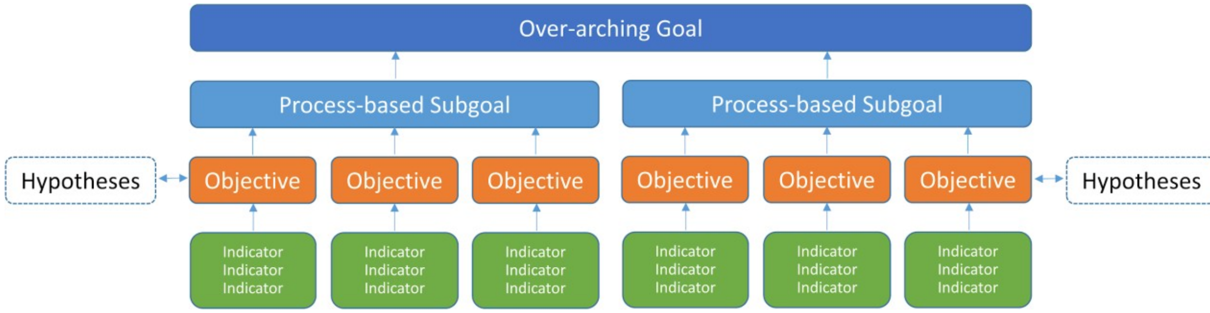

Figure 2. Indicators represent quantifiable measures of system processes and states in Childs Meadow used to inform progress made toward restoration objectives and goals, as well as the underlying hypotheses behind the development of the restoration objectives.

Term of Monitoring

The timeframe of monitoring described in this plan begins two years before restoration and extends to 25 years after the implementation of restoration. We identify the metrics that will be measured under the term of the planning grant (September 1, 2019 – December 31, 2021) that funded the development of this monitoring plan and the collection of additional baseline pre- restoration monitoring and post-restoration monitoring in the pilot project area. Each indicator has a timeline associated with it, such that not all indicators will be monitored through the 25- year monitoring plan. Most indicators phase out within 10 years after restoration. To assess long-term trends, some key indicators will need to be monitored periodically beyond the first decade after restoration, as many of the measures require longer time periods to manifest or to understand trends and resiliency (e.g. channel morphology, some wildlife and their habitat). The Monitoring Team is strongly committed to seeking additional funding to support monitoring and any associated restoration maintenance beyond the term of the planning and implementation grants, as team members have already made a considerable investment in the success of this project.

Project Goals and Restoration Objectives

Project Goals

Overarching Goal: The Childs Meadow restoration project has an overarching goal of restoringnatural hydrological, biological, and geomorphic processes throughout the meadow complex to increase resilience to climate change and other stressors, with benefits to several target resources:

- wetland vegetation,
- carbon-rich soils,
- aquatic macroinvertebrates,
- beavers,
- Cascades frogs,
- willow flycatchers and other birds,
- downstream anadromous salmonids.

This overarching goal will be achieved through restoration actions associated with process- based subgoals specific to four ecosystem types (Figure 1):

Ecosystem Type A: Riparian meadow, depositional floodplain reaches. **Subgoal A**: Increase floodplain connectivity to promote geomorphic processes of sediment deposition, erosion, and channel avulsion that create, maintain, and change diverse patches of aquatic and terrestrial habitat, and increase groundwater recharge to sustain these habitats through seasonal and inter-annual dry periods. Within Ecosystem Type A, we expect net sediment deposition to exceed erosion.

Ecosystem Type B: Riparian meadow, transport reaches. **Subgoal B**: Promote geomorphic processes of sediment erosion and deposition that create, maintain, and change diverse patchesof aquatic and terrestrial habitat within the channel and adjacent overbank areas. Within Ecosystem Type B, we expect net erosion and sediment transport out of the reach to exceed deposition.

Ecosystem Type C: Fens and discharge slope meadows. **Subgoal C**: Increase diffuse non-channelized groundwater discharge through currently or formerly organic-rich soils to reduceaerobic decomposition and increase native wetland plant productivity.

Ecosystem Type D: Tributary streams. **Subgoal D**: Restore natural flow paths of tributary streams to reduce flow through gullies and promote natural hydrologic connections with wetlandecotypes.

Restoration Objectives

In this section, we detail the restoration objectives for the overarching goal and subgoals. Prefixes in front of the objective number refer to the overarching (O) and subgoals (A-D), respectively. Each objective has a hypothesis, indicators, description of monitoring methods, performance measures, and guidance for adaptive management if performance measures are not met over time. We refer to periods 0, 1, 2, and 3 when describing the timing of data collectionfor each indicator. Period 0 is before restoration, period 1 is 1-3 years after restoration, period 2 is 4-10 years after restoration, and period 3 is 11-25 years after restoration. The time-constrainedperformance measures for each objective are intended to gauge progress relative to our expectations of system response. If the system is not responding as expected, we suggest adaptive management actions that may be taken to improve restoration outcomes and in some cases provide guidance for when restoration objectives or the target may need to be adjusted.

Overarching Goal

Objective O1. Expand the quantity and extent of breeding habitat and core summer useareas for Cascades frogs.

Hypothesis: In-channel restoration activities will increase fluvial habitat diversity and slow surface water drainage resulting in increased floodplain connectivity and the amount and locations of slow and still-water habitats. Increased still-water habitats will facilitate the expansionof breeding sites for Cascades frogs within five years of restoration completion. Local areas of fluvial disturbance will also expand potential summer habitat areas for post-metamorphic frogs and encourage expansion of core summer use areas within two years of restoration completion. These conditions will be maintained through the extent of the monitoring period by natural processes and human maintenance of BDAs and PALs.

Indicators: ***Abundance and Distribution of Cascades Frog*** Definition: The number and extent of post-metamorphic Cascades frogs. Timeline: Periods 0-3. ***Abundance and Distribution of Cascades Frog Breeding Sites*** Definition: The number and extent of locationswith Cascades frog eggs and larvae. Timeline: Periods 0-2.

Performance Measures: A 25% increase in the extent of Cascades frogs distribution andbreeding sites within 5 years.

Methods: Conduct systematic summer visual encounter and mark-recapture surveys for Cascades frogs over the entire Childs Meadow complex within the restoration project boundariesto measure number and distribution of post-metamorphic frogs. Supplement visual surveys with eDNA sampling in Gurnsey Creek through Childs Meadow to increase detection probability of dispersing or colonizing frogs. Collect ≥ 3 replicate samples per year prior to restoration and at least every other year after restoration. Collect samples from set locations including two below the split rail fence where frogs are known to occur and three above the splitrail grazing exclusionfence where only a few Cascades frogs have been detected in the decade prior to restoration.
Test eDNA samples using qPCR for Cascades frogs, beaver, and threats to Cascades frogs thatare known to occur at Childs Meadow: brook trout and *Batrachochytrium dendrobatidis* (Bd, the cause of the deadly fungal pathogen Chytridiomycosis).

Conduct annual spring breeding season surveys to map amphibian breeding habitats (locationswith eggs and/or larvae). Breeding season surveys consist of a visual encounter survey of the entire Childs Meadow complex with the restoration project boundaries.

Adaptive Management: Compare abundance and distribution of Cascades frogs collected in thefive years prior to restoration to two and five years post-restoration. If numbers of frogs and arealdistribution do not increase by at least 25%, evaluate whether the reason is because of increased mortality as a result of disease or other factors. If not due to disease, conduct a habitatassessment (used vs. restored) to determine if additional taxa-specific restoration measures should be applied to encourage colonization by the frogs.

After five years, evaluate results of annual surveys to determine if breeding habitat and summer use areas have expanded. If not, evaluate local habitat conditions for frogs and assess the predatory fish and disease data to determine why objectives were not met. If assumed to be habitat based, determine if maintenance adjustments to existing instream structures or additional structures are needed to improve habitat conditions. After making maintenance adjustments, re-
evaluate each year to determine if the local species-based fixes are having the desired effectand adjust as needed.

Objective O2. Increase in the diversity of benthic macroinvertebrates, including increasedlocal community diversity.

Hypothesis: Restoration activities will increase in-channel habitat diversity (e.g., riffle, pool), water temperature diversity, length and number of secondary channels, and off-channel pool habitats. This in turn will result in a consistent increase in the annual abundance, richness, anddiversity of benthic macroinvertebrates (BMI) occurring in the meadow post-restoration compared to before restoration. Community composition of BMI will become more similar to thebeaver-occupied reference reaches of Childs Meadow.

Indicators: ***California Stream Condition Index (CSCI)*** Definition: The California Stream Condition Index (CSCI) is a biological scoring tool that compares the BMI community composition and diversity between observed (e.g. treatment) and expected (e.g. reference) inflowing stream reaches. Timeline: Periods 0-2. ***Diversity of BMI Taxa*** Definition: Taxonomiccomposition of BMI samples. Timeline: Periods 0-2.

Methods: Conduct BMI sampling in floodplain treatment reaches, transport treatment treaches, and beaver-occupied reaches annually before and after restoration. Collect at least five composite 900-cm^2 samples from treated, untreated, and beaver-occupied reaches in grazed and ungrazed sections of Childs Meadow following a modified SWAMP design to account for theshortened reach sections (50-m instead of 150-m). All samples will be processed following the Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT) Standard Taxonomic Effort Level 1a. Compare BMI taxa across available habitat types (pools, channels, backwaters, fens) to determine if increases in habitat diversity result in increases in BMI diversity. NMDS analysis will be used to define communities, which will then be tested for differences in community similarity. CSCI and community structure will be compared pre- and post-treatment.

Performance Measures: CSCI scores in treated riparian meadow floodplain and treated transport reaches of 0.6 within five years, using beaver-occupied reaches as reference sites.

Adaptive Management: If community diversity metrics at treated reaches do consistently increase (CSCI scores at treated stream reaches within 60% similarity index value of control reaches and number of unique communities greater than pre-treatment) within five years, then BMI monitoring is no longer needed unless the meadow experiences severe change due to management or large natural disturbance (e.g., severe flood event or fire). If community diversitymetrics do not consistently increase or become more similar to values found in the beaver reachfor five years following restoration, then review the invertebrate data to find what taxa are missing or over-represented. If taxa more tolerant of poor water quality are consistently found in treated reaches, assess water quality conditions to determine cause. If water quality is deemed acceptable, continue monitoring and revisit after another 5 years to assess improvement. If not acceptable, evaluate and consider additional restoration options to improve water quality (e.g., cattle exclusion) and monitor for another five years to assess improvement.

Objective O3. Reduced stream temperatures contribute improved cold-water habitatwithin and exiting the project area.

Hypothesis: Restoration of lateral floodplain connectivity and reduction in stream channel velocities will promote hyporheic flow exchanges, which in turn will contribute to reduced surfacewater temperatures within and exiting the project area. Increased shading of Gurnsey Creek will reduce solar heating of surface water, further contributing to reduced surface water temperatureswithin the project area.

Indicators: ***Surface Water Temperature*** Definition: Temperature of water within the main channel Timeline: Periods 0-1. ***Groundwater Temperature*** Definition: Temperature of waterwithin the shallow groundwater table Timeline: Periods 0-1.

Methods: Monitor in-channel stream temperatures at the upstream and downstream ends of thepilot study BDA reach, upstream and downstream ends of the beaver-occupied positive-control reach, two additional floodplain treatment reaches, and within 500 m of the Gurnsey Creek exit from the project area. Monitor groundwater temperatures in two fen and discharge slope habitatsthat will be restored to understand the contribution of treatments and groundwater to in-stream temperatures. All water temperature data will be collected using Solnist data loggers set to 30- to60-min recording intervals.

Performance Measures: Any measurable reduction in surface water temperature at thedownstream end of the project boundary within 2 years.

Adaptive Management: If in-channel surface water temperatures in Gurnsey Creek at the downstream end of the project area do not decrease within 1-2 years following restoration actions, determine if surface water is exchanging with groundwater as expected or if other factors may be limiting hyporheic exchange, by comparing groundwater temperature data tosurface water temperatures to understand the potential extent of surface water warming. Determine if additional actions are needed to promote hyporheic exchange with groundwater. Ifhyporheic exchange is occurring, assess if additional vegetative actions are needed to increaseshading and limit warming of surface water. Surface water response to vegetation restoration actions may take several years depending on vegetation growth rates. After conducting any needed actions, continue monitoring to determine if surface water temperatures are decreasingover time, assessing the potential for further restoration actions as needed every 2-3 years.

Objective O4. Increase climate resiliency by reducing meadow sensitivity to climateconditions.

Hypothesis: Restoring floodplain connectivity and hydrologic processes (through increased water table elevations and grazing management) will improve vegetation vigor (NDVI) and vegetation water content (NDWI) in annual seasonally dry periods (July through September) such that the relationship between meadow vegetation vigor and water content from inter-annualvariability in precipitation, including in multi-year droughts, is decoupled.

Indicators: ***Normalized Difference Vegetation Index (NDVI)*** <u>Definition</u>: An index of the density of green vegetation, also known as vegetation vigor. <u>Timeline</u>: Periods 0-3. ***Normalized Difference Water Index (NDWI)*** <u>Definition</u>: An index of the amount of water stored in vegetation. Indicates wetness of a meadow based on how much water the vegetation is holding.

<u>Timeline</u>: Periods 0-3. ***Vegetation Sensitivity to Snowpack*** <u>Definition</u>: Slope of relationshipbetween April 1 snow-water equivalent (SWE) and NDVI or NDWI (Albano et al. 2019).
<u>Timeline</u>: Periods 0, 2, 3

Methods: Use Climate Engine to calculate the monthly and seasonally averaged July through September NDVI and NDWI within the Childs Meadow planning area at spatial extents appropriate to specific monitoring objectives. Climate Engine is a graphical user interface that runs queries in Google Earth Engine. Climate Engine provides a simple methodology to process satellite aerial imagery to calculate vegetation indices that can be tied to climate data (e.g. April 1SWE). Compare the NDVI/NDWI values with April 1 snow water equivalent (SWE) each year for each pre-restoration and post-restoration time frame to determine the slope of a linear fit between vegetative indices and April 1 SWE for each timeframe. Determine if the slope of the relationship decreased from pre- to post-restoration indicating that vegetation composition was less sensitive to climate conditions following restoration.

Performance Measure: Within 10 years post-restoration, the slope of the relationship between April 1 SWE and Jul-Sep NDVI is less than the slope of the relationship between April 1 SWE and Jun-Sep NDVI pre-restoration (2003-2020), and within 25 years the slope of the relationshipbetween April 1 SWE and Jul-Sep NDVI post-restoration is flat.

Adaptive Management: If the slope of the relationship between NDVI/NDWI and April 1 SWE does not decrease post-restoration, determine if other non-climate factors, such as grazing, could be impacting vegetation composition. Assess if additional restoration actions may need tobe taken to improve climate resiliency.

Subgoal A

Objective A1. Increase local groundwater and surface water elevations

Hypothesis: In-channel manipulations (e.g., wood structures, removal of roadbed constrictions)will slow surface water flow and increase floodplain connectivity such that local groundwater andsurface water elevations (in-channel and on the floodplain) increase.

Indicators: ***Groundwater Elevation*** Definition: Elevation of the shallow groundwater tablebelow the meadow surface. Timeline: Periods 0-1. ***Surface Water Elevation*** Definition: Elevation of the water surface in the main stream Timeline: Periods 0-1.

Methods: Groundwater elevation is determined from manual measurements of depth to groundwater in shallow monitoring wells established along transects in each study reach. Depth to groundwater is subtracted from topographic elevation of the ground surface at each well as surveyed by an RTK-GPS in order to calculate groundwater elevation. Survey wells at least monthly (every 2-4 weeks) during the spring and summer season. Measurements will occur for atleast 2 years before restoration and at least 3 years after restoration at established monitoring transects. In-channel water depth measured at staff gages relative to surveyed elevation of the staff gage is similarly used to calculate surface water elevation. Measure surface water depth manually every 2-4 weeks during the spring and summer season. Measurements will occur for atleast 2 years before restoration and at least 3 years after restoration at established stream gages.

Performance Measures: Groundwater elevations at all wells in the reactivated floodplain, as measured by the inundation extent of 2-year pulse flows, meet the US Army Corps of Engineersdefinition of wetland (National Research Council 1995, US Army Corps of Engineers 2005) with depth to groundwater less than 30 cm for more than 14 days within 2 years of BDA installation. The recession rate of surface water elevations in the stream channel throughout the summer dryperiod in the reactivated floodplain reaches are no more than 25% faster than in beaver- occupied reaches within 1 year of BDA installation.

Adaptive Management: If in-channel and near-channel water elevations do not increase in theyear following restoration activities, determine if other non-restoration activities may be influencing water levels, such as vegetation extent, water holding capacity of BDAs, soil conditions, or climate conditions. Determine if additional restoration actions are needed to promote groundwater recharge and increased water table elevations.

Objective A2. Increase lateral hydrologic connectivity between the channel and the meadow floodplain surface.

Hypothesis: In-channel manipulations (e.g., wood structures, removal of roadbed constrictions) will increase lateral hydrologic connectivity, specifically frequency, duration, and extent of surfacewater on the floodplain/meadow surface.

Indicators: *Floodplain Inundation Extent* Definition: Aerial extent of surface water across floodplain. Timeline: Periods 0-1. ***Floodplain Inundation Duration*** Definition: Number of days within a year surface water extends beyond the channel onto the floodplain. Timeline: Periods 0-2.
Floodplain Inundation Frequency Definition: Number of times within a year surface waterextends beyond the channel onto the floodplain. Timeline: Periods 0-2.

Methods: Estimate surface water extent during the spring and late summer using either drone imagery, ground surveys, or timelapse cameras, as determined to be most appropriate. Estimatefrequency of floodplain inundation by determining the number of times stream channel depth exceeded bankfull depth at stream gage locations where data loggers are installed. Solnist level loggers record both water depth and temperature at set time intervals. Estimate seasonal duration of floodplain inundation by comparing spring to summer estimate of floodplain extent.

Performance Measures: Within two years of restoration, double the area of inundation relativeto pre-restoration baseflow conditions and during flows of equivalent magnitude relative to measurements taken pre-restoration. Inundation duration and frequency within 90% of the measures on beaver-occupied positive control reaches within two years of restoration.

Adaptive Management: If floodplain inundation does not increase relative to pre-restoration levels following restoration activities, determine if other non-restoration activities may be influencing lateral floodplain connectivity, such as vegetation extent, water holding capacity of BDAs, or climate conditions. Determine if additional restoration actions are needed to promotefloodplain connectivity and inundation, such as increasing the number or size of the BDAs.

Objective A3. Slow streamflow to increase sediment deposition upstream of BDAs topromote deposition and localized scour, increasing channel habitat diversity.

Hypothesis: In-channel manipulations (e.g., wood structures) will increase sediment depositionupstream of BDAs, increase hydraulic variability, increase local scour and deposition, and increase channel habitat diversity.

Indicators: ***Channel and Meadow Floodplain Topography*** Definition: Spatial variation in elevation within the channel and across the floodplain. Timeline: Periods 0 and 2. ***LongitudinalThalweg Elevation*** Definition: Longitudinal profile of the elevation of the deepest part of the channel. Timeline: Periods 0-2. ***Stream Channel Density*** Definition: Total length of stream channel active per area at baseflow. ***Stream Channel Segment Density*** Definition: Number ofsegments per area active at baseflow, where a segment is defined as a stream length between two stream junctions. Timeline: Periods 0-2.

Methods: At two treatment reaches and two control reaches, use an RTK-GPS to conduct detailed cross sections and longitudinal profiles of the main channels and side channels, beforerestoration and twice within 3 years after restoration. Use cross sectional data to compare post-restoration topography with pre-restoration topography to identify erosional and depositional changes in-channel and across the meadow surface, and calculate change in variation in each.Compare longitudinal channel profiles immediately pre- and post-restoration and over time to determine detailed deposition and erosion in the channel and calculate change in variation in elevation. Use thalweg planform position (as opposed to elevation) data to calculate stream channel and segment density pre- and post-restoration.

Performance Measures: Increase variation in the channel and floodplain topography and thalweg elevation by 10% within 2 years, and 50% within 10 years. Increase stream channel andsegment densities by 10% within 2 years and 50% within 10 years.

Adaptive Management: If restoration activities do not increase local deposition and scour and increase channel and floodplain habitat complexity, determine if non-restoration activities may beimpacting geomorphic processes, such as vegetation extent, soil erodibility, or climate conditions(particularly the frequency of high flow events).

Objective A4. Increased growth and vigor of native vegetation around channels and on thenear-channel meadow surface.

Hypothesis: In-channel manipulations (e.g., wood structures, removal of roadbed constrictions)will increase local groundwater and surface water elevations across the growing season in locations adjacent to the channel, and when coupled with improved grazing management and grazing mitigation actions, will support increased wetland vegetation.

Indicators: ***Bare Ground Cover*** Definition: The percent cover unvegetated areas of the meadow surface. Timeline: Periods 0-2. ***Herbaceous Vegetation Cover and Height*** Definition:The percent cover and average height of herbaceous vegetation, separated out by sedge/rush, grass, and forbs. Timeline: Periods 0-2. ***Riparian Deciduous Shrub Cover and Height*** Definition: The percent cover and average height of riparian deciduous shrubs. Timeline: Periods0-2. ***Riparian Deciduous Shrub Survival*** Definition: The percent of planted shrubs that remainalive. Timeline: Periods 0-2.

Methods: Complete releve-style vegetation surveys annually in July on approximately 20 randomly placed 5-m plots in each treatment reach. Estimate percent cover of bare ground, herbaceous vegetation, and shrubs, and relative cover estimates for sedge and rush, grass, andforb categories in the herbaceous layer and for each species in the shrub layer. A separate survey of willow survival survey will census all planted willows annually in summer or early fall.

Performance Measures: Less than 10% bare ground within the floodplain extent within 3 yearsof restoration. Increase of herbaceous vegetation indicators to within 90% of conditions on beaver-occupied positive-control reaches within 3 years. Increase in riparian deciduous shrub cover, height, and survival in grazed reaches to within 80% of values in ungrazed reaches planted at the same time.

Adaptive Management: If indicators are not meeting performance measures, compare vegetation indicators with local surface and groundwater elevations to determine if water elevations are sufficiently high to support wetland vegetation. If water elevations have not increased as desired, determine what factors may be limiting increased water elevations, such as insufficient restoration actions, soil conditions, or climate conditions. Consider additional restoration actions to promote increased water elevations into the summer season to support wetland vegetation. If water elevations have increased, determine if other non-hydrologic factorsmay be precluding increased wetland vegetation, such as grazing, non-native species interactions, or stochastic disturbance events. To evaluate grazing, compare vegetation indices in grazed and ungrazed areas to evaluate the effect of grazing.

Objective A5. Beavers maintain floodplain connectivity through their dam building activities without the need for human maintenance of BDAs, and are resilient to majordisturbances.

Hypothesis: Creating channel complexity and deep ponded habitat with BDAs, combined withplanting riparian deciduous shrubs and trees, will improve habitat quality for beavers by increasing food and dam-building resources and providing shelter from predation. Beavers willcolonize these areas, expanding their area of occupancy in Childs Meadow. This will result in increased beaver population size, increased habitat quality, and increased habitat extent, suchthat beaver populations will be resilient to large flood events and droughts.

Indicators: ***Number and Distribution of Beaver Dams*** Definition: The number and distributionof beaver dams in a specified unit area, typically a treatment reach. Timeline: Periods 0-3.

Number and Distribution of Beaver Lodges Definition: The number and distribution of beaverlodges in a specified unit area, typically a treatment reach. Timeline: Periods 0-3.

Performance Measures: At least one beaver-constructed dam in each reach within 10 years. No more than a 50% reduction in the number of active beaver lodges in the year following a 10-year flood event or multi-year drought.

Methods: Data collection involves one complete census for beaver dams and lodges in Jul-Sepusing an area search of all floodplain channels in the project area. Data is collected annually in periods 0-2; in period 3, once every five years and any year following winter/spring with flows meeting or exceeding a 10-year flood interval. The location, length, height, status (active/inactive), and integrity (intact, breached, or blown out) is recorded for each dam, and the location and status for each lodge, except in periods 1-2, when only active dams and lodges are recorded.
Adaptive Management: At years 5 and 10 post-restoration, if there are no beaver dams built in a floodplain restoration reach, evaluate the habitat's suitability for beavers and whether the processes that we hypothesized would create suitable habitat, such as increased floodplain inundation, sediment transport, or groundwater recharge, have been restored. If indicators suggest those processes have been restored, yet the site is not trending toward high-quality habitat, consider taking action to accelerate improvements in habitat quality, such as revegetation with more beaver food (willow, cottonwood, and aspen) or increasing BDA height. Ifafter 10 years the site provides high quality beaver habitat, but beavers have not occupied the site, the target timeframe may need to be lengthened and/or the objective of using beavers to maintain the restoration within this ecotype may need to be reconsidered. If more than half of active beaver lodges are lost following a 10-year flood event and do not recover within 2 years, consider interventions to assist beaver recovery across the meadow, such as reinforcing remaining dam structures, building additional BDAs, and maintaining BDAs and beaver dams.

Objective A6. Improve habitat quality for meadow birds and increase meadow birdabundance and richness.

Hypothesis: Our restoration activities, including increased floodplain connectivity, improved grazing management, and revegetation, will result in increased cover of herbaceous and woody wetland plant communities, which will improve habitat quality for focal species over time. Beaver colonization, persistence, and abandonment of riparian floodplain reaches over time will maintainthese benefits and provide a dynamic landscape such that abundance and habitat quality for focal species will increase or plateau over time when averaged over all treatment locations.

Indicators: ***Avian Territory Density*** Definition: The density of breeding territories of a single ormultiple bird species. Timeline: Periods 0-3. ***Avian Nest Survival*** Definition: The proportion of nests that fledge at least one young relative to the total number of nests, or the daily probability of survival based on Mayfield (1975) methods. Timeline: Periods 0-3. ***Avian Relative Abundance and Richness*** Definition: The abundance and presence of a bird species derived from point count data, uncorrected for detection probability. Timeline: Periods 0-3.

Methods: Territory and nest survival data will be collected on several 3-4 ha plots in floodplaintreatment reaches, and beaver-influenced and non-influenced control reaches, with at least 8 visits to each plot from mid-May through mid-July. We will nest search and map territories for asubset of focal species, including Song Sparrow, Yellow Warbler, MacGillivray's Warbler, Wilson's Warbler, Lincoln's Sparrow, Willow Flycatcher, and Warbling Vireo, following Campos etal. (2014). Located nests of each species will be monitored until the nest fails (eggs or young predated) or nestlings fledge (nest successful/survived). We will collect avian relative abundancedata in riparian meadow habitat at sample locations spaced 250-m along the mainstem of Gurnsey Creek from the uppermost to lowermost riparian floodplain reaches. We record every bird species and individual detected with an exact distance estimated to each individual over 2 visits to each sample location in June. Bird data will be collected annually in periods 0 and 1, twoof every five years in period 2, and at an unknown frequency of data collection for period 3.

Performance Measures: Territory density, nest survival, and relative abundance are within 50%of conditions found on beaver-modified positive control reaches within 10 years and to within 90% of conditions on positive control reaches within 20 years.

Adaptive Management: If performance measures are not achieved, evaluate whether indicatorsof structural habitat suitability for birds (i.e. cover of riparian deciduous shrubs and trees, herbaceous cover and height, and water cover) are within 50% and 90% of long-term average measurements on beaver-occupied positive control reaches. If structural habitat suitability indicators meet these criteria, no action is warranted. In this case, the target in this objective mayhave been too high and may need to be lowered. If structural habitat suitability indicators meet these criteria, evaluate whether other process-related factors, such as floodplain connectivity or groundwater elevation may be limiting habitat suitability. If the underlying process indicators suggest the necessary underlying processes have been restored and maintained, yet the site is not trending toward high-suitability habitat, consider taking actions to improve habitat suitability for birds, such as increased revegetation of riparian deciduous shrubs and trees.

Objective A7. Protected headcuts are stable.

Hypothesis: The upstream progression of headcuts will be slowed and stabilized by reducing the head differential with backwater BDAs and exclusion from grazing to promote healthy, deeplyrooted sedges along the headcut rim.

Indicators: ***Annual Rate of Headcut Progression*** Definition: The average distance per yearrate of upstream progression of a headcut. Timeline: Periods 0-3.

Methods: Measure the distance from monuments placed in the meadow surface in the grazing exclusion areas upstream of each protected headcut to the headcut rim in at least 5 separate bearings. Collected annually in periods 0 and 1. Collected once every five years in periods 2 and 3. Where headcuts overlap with topographic RTK-GPS surveys, headcut migration rates can becalculated directly from repeat survey data.

Performance Measures: Upstream progression rate of < 3 inches per year at all stabilizedheadcuts.

Adaptive Management: None identified.

Subgoal B

Objective B1. Increased channel habitat diversity.

Hypothesis: In-channel manipulations with PALS will increase hydraulic variability, increaselocal scour and deposition, and increase channel habitat diversity.

Indicators: ***Channel Topography*** Definition: Spatial variation in elevation within the channel.Timeline: Periods 0-1. ***Longitudinal Thalweg Elevation*** Definition: Longitudinal profile of the elevation of the deepest part of the channel. Timeline: Periods 0-2. ***Channel Sinuosity*** Definition: The ratio of channel thalweg length relative to straight-line valley length between twopoints. Timeline: Periods 0-2.

Methods: At one treatment reach, use an RTK GPS to conduct detailed valley-wide cross sections and longitudinal profiles of the main channel, before restoration, twice within 3 years after restoration, and once at 10 years after restoration. Use cross sectional data to compare post-restoration topography with pre-restoration topography to identify erosional and depositionalchanges in the incised channel and calculate change in variation. Compare longitudinal channel profiles before and after restoration to determine detailed deposition and erosion in the channel and calculate change in variation in elevation. Use planform of thalweg to calculate stream channel sinuosity before and after restoration.

Performance Measures: Increase variation in the channel topography and thalweg elevation by10% within 2 years, and 50% within 10 years. Increase channel sinuosity by 10% within 3 years and 50% within 10 years.

Adaptive Management: If performance measures are not achieved, determine if non-restorationactivities may be impacting geomorphic processes, such as vegetation extent, soil erodibility, or climate conditions (particularly the frequency of high flow events). If non-restoration activities arelimiting scour and erosion, determine if additional actions, such as alternative design structures or additional plantings, may assist in creating scour and deposition.

Subgoal C

Objective C1. Year-round saturation at or near the meadow surface and dense wetland-obligate-dominated plant community combine to produce net carbon neutral or accumulating conditions.

Hypothesis: Filling gullies and ditches through discharge slope and fen habitat, combined with improved grazing management, will restore the following three fen ecosystem processes: (1) Saturation at or near the surface (<30 cm deep) during the growing season, maintaining anaerobic soil conditions and therefore slow carbon decomposition (necessary for #3); (2) Densewetland-obligate-dominated plant community (requires #1) with high productivity that adds carbon to the soil (necessary for #3); (3) Numbers 1 and 2 drive a net-carbon-storing annual carbon dioxide (CO2) flux.

Indicators: ***Groundwater Elevation*** Definition: Elevation of the shallow groundwater table below the meadow surface. Timeline: Periods 0-1. ***Cover of Wetland-Obligate Vegetation*** Definition: The percent cover of plant species with a wetland indicator status of wetland-obligate.Timeline: Periods 0-1. ***Carbon Flux*** Definition: The carbon exchange rate and direction of flow between the atmosphere and the meadow. Timeline: Periods 0-1.

Methods: Groundwater monitoring wells, vegetation, and CO2 gas flux monitoring plots will be co-located. Wells will be installed in pairs spanning the identified ditch or channel impact, with one well of the pair each in the impacted area that is targeted for restoration, and one in the un- impacted reference area. Wells will be installed in homogenous patches of vegetation, hydrology,and geomorphology so that the conditions are similar and representative within an entire 4m radius vegetation plot centered on the well. If possible, multiple plot pairs will be installed at each mapped fen treatment area. Replication of plot pairs will be contingent on the extent of other restoration activities that require monitoring. CO2 flux, vegetation cover by species, and groundwater elevation will be measured at peak growing season. Measurements will occur for atleast 2 years before restoration and at least 3 years after restoration.

Performance Measures: Within 2 years and persisting through 25 years: groundwater elevation <30 cm below meadow surface throughout the growing season; wetland-obligate plant cover >70%; net carbon neutral or accumulating.

Adaptive Management: Because the ditch and channel block restoration treatment will most immediately and directly affect hydrology, effectiveness evaluation and adaptive managementwill center on meeting the criterion of saturation at or near the surface (groundwater elevation <30 cm below surface). Additional restoration measures will be considered if the water tablemeasured in each well is not maintained within 30 cm of ground surface during the growing season.

Objective C2. Reduce grazing disturbances to promote healthy fens.

Hypothesis: Hydrologic restoration of fens and grazing mitigation measures, including reductions in overall utilization, cattle exclusion fencing, and practices to discourage cattle use ofsensitive resources, will result in increased health of vegetative cover in fens habitats with less grazing-induced damage.

Indicators: ***Percent Cover of Bare Ground*** <u>Definition</u>: The percent cover of bare ground. <u>Timeline</u>: Periods 0-3. ***Percent Cover of Hoof Pocks*** <u>Definition</u>: The percent cover of livestockhoof pocks. <u>Timeline</u>: Periods 0-3.

Methods: Estimate the percent cover of bare ground and pock marking from livestock in all fensannually in August or September in Periods 0 and 1, and once every three years thereafter.

Performance Measures: The sum of the percent cover of bare ground and hoof pocks is lessthan 5% in all fens.

Adaptive Management: If performance measures are not achieved, change grazing management, such as discouraging or excluding livestock use of impacted fens, reducing animalunit months, or more pro-actively moving livestock.

<u>Subgoal D</u>

Objective D1. Reconnect tributary stream flow paths, improving habitat quality and waterdelivery to meadow.

Hypothesis: Restoring the natural flow path of two western tributary streams will reduce flow through gullies, improve habitat in reconnected historical stream paths, and promote natural hydrologic connections with recipient wetland ecotypes. Where reconnections are created with historical flow paths, the majority of flow will follow the historical flow path to the meadow andremain the dominant flow path in high and low water conditions.

Indicators: ***Rerouted Flow Paths***. <u>Definition</u>: The length and location of reconnected surfaceflow paths. <u>Timeline</u>: Periods 0-2.

Methods: Use time lapse cameras on existing gully and historical stream bed before and after restoration actions to track flow and stream habitat change, including surface water hydroperiod and riparian vegetation growth.

Performance Measures: Historical flow path becomes the dominant flow path in both high waterand low water conditions immediately following reroute.

Adaptive Management: If flow paths are not rerouted successfully or are no longer the dominant flow path in high and low water conditions at any point within 10 years after reroute,determine reasons and implement new actions accordingly.

Tracking Project Planning and Implementation

Here we present indicators we will measure to track project planning and implementation of theproject. These align with level 1 WRAMP indicators in the description of our monitoring framework.

- Project boundaries and area
- Cost of project planning
- Cost of project implementation
- Cost of monitoring before and after implementation
- Length and location of reconnected surface flow paths
- Number and locations of BDAs installed
- Area affected by BDAs
- Number and locations of PALS installed
- Area affected by PALS
- Area of fen and discharge slope meadows treated
- Number and locations of native shrubs and trees planted
- Area planted with native shrubs and trees
- Length of fencing installed

Conceptual Models

Riparian Meadow Floodplain

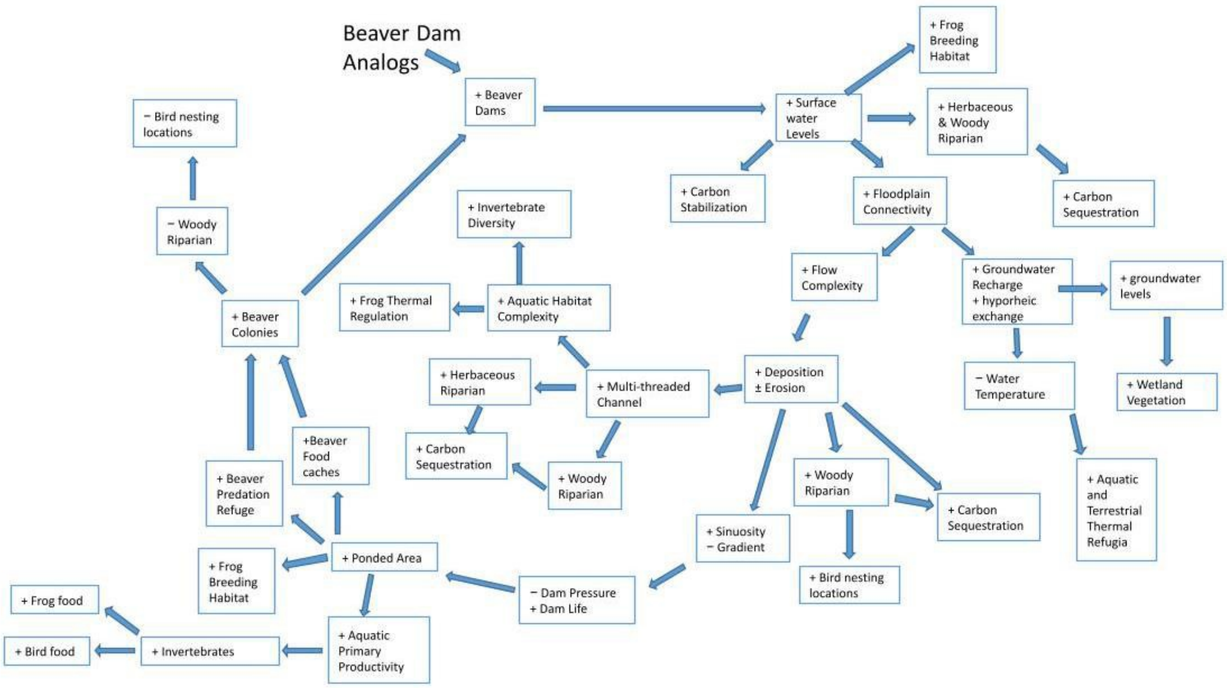

Figure 3. Expected changes following the installation of beaver dam analogs. Adapted andmodified from Bouwes et al. 2016.

Data Quality Control

Each Project Team member will manage and ensure quality control for the data they collect. Alldata will be collected using standardized protocols by personnel extensively trained in the methods used to collect the data. Data will be collected on physical datasheets or digitally via tablets depending on the data type. Datasheets will be reviewed before entering in a database.All raw physical data forms will be scanned and archived on servers. All digitally collected data will be synced to remote servers after field excursions (at least weekly). Data collected on physical datasheets will be entered into online data systems or personal Microsoft Access or Excel databases that are backed up remotely on at least a weekly basis. All data will be qualitycontrolled using scripts of code to query the data for errors and consistency, with summaries reviewed by trained personnel.

Analysis, Reporting, and Dissemination

Point Blue, in collaboration with all project partners, will generate and share Annual Monitoring Reports with relevant stakeholders each year of the project planning period (2020-2021) and each year of the project implementation period (2022-2024). The Annual Monitoring Reports will summarize the previous year's monitoring results, evaluate project progress towards objectives and performance measures, and provide recommendations to inform revision of future management actions as discussed in this plan. These reports will be completed and submitted to the primary project funder (California Department of Fish Wildlife) and landowner (CollinsCompany) by February 28.

It is also expected that the landowner will work with the livestock grazing permittee to providelivestock grazing records for each season, which will be delivered to the Monitoring Team nolater than January 15 to allow for inclusion in the Annual Monitoring Report and to inform the management guidelines for the following year. It is expected that this information will be self- reported by the permittee in coordination with the landowner. The reporting will include, at a minimum, on/off dates with number of animals and animal unit months.

Collected ecological data will be shared with the following databases:

- **EcoAtlas**. A GIS shapefile of the project's boundary, restoration locations, andmonitoring locations will be uploaded to EcoAtlas Project Tracker.
- **CRAM**. California Rapid Assessment Method (CRAM) assessments of meadow areas willbe uploaded to EcoAtlas.
- **CNDDB**. Species observation data of any tracked species shall be reported to the California Natural Diversity Database (CNDDB). This includes all data we collect on thedistribution of qualifying species of plants, frogs, and birds.
- **California Avian Data Center**. Bird data will be uploaded to the California Avian DataCenter.

Collected hydrologic data will be shared with the following databases:

- **CEDEN**. Measurements of Gurnsey Creek streamflow levels and water quality will be uploaded to the California Environmental Data Exchange Network (CEDEN) database.
- **GeoTracker GAMA**. Groundwater data will be uploaded to GeoTracker GAMA database.

The Monitoring Team will also disseminate reports and results via websites (e.g. Sierra Nevada Meadows Data Clearinghouse, Sierra Meadows Partnership website); via presentations at scientific conferences, and to local watershed and stakeholder groups; and via articles in scientific journals. Additionally, the Monitoring Team will share data with several related projects,including the Sierra Hydrology Monitoring Project, Point Blue Conservation Science Bird Database, and the Sierra Meadows Partnership.

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Appendix J: Schematic Drawings

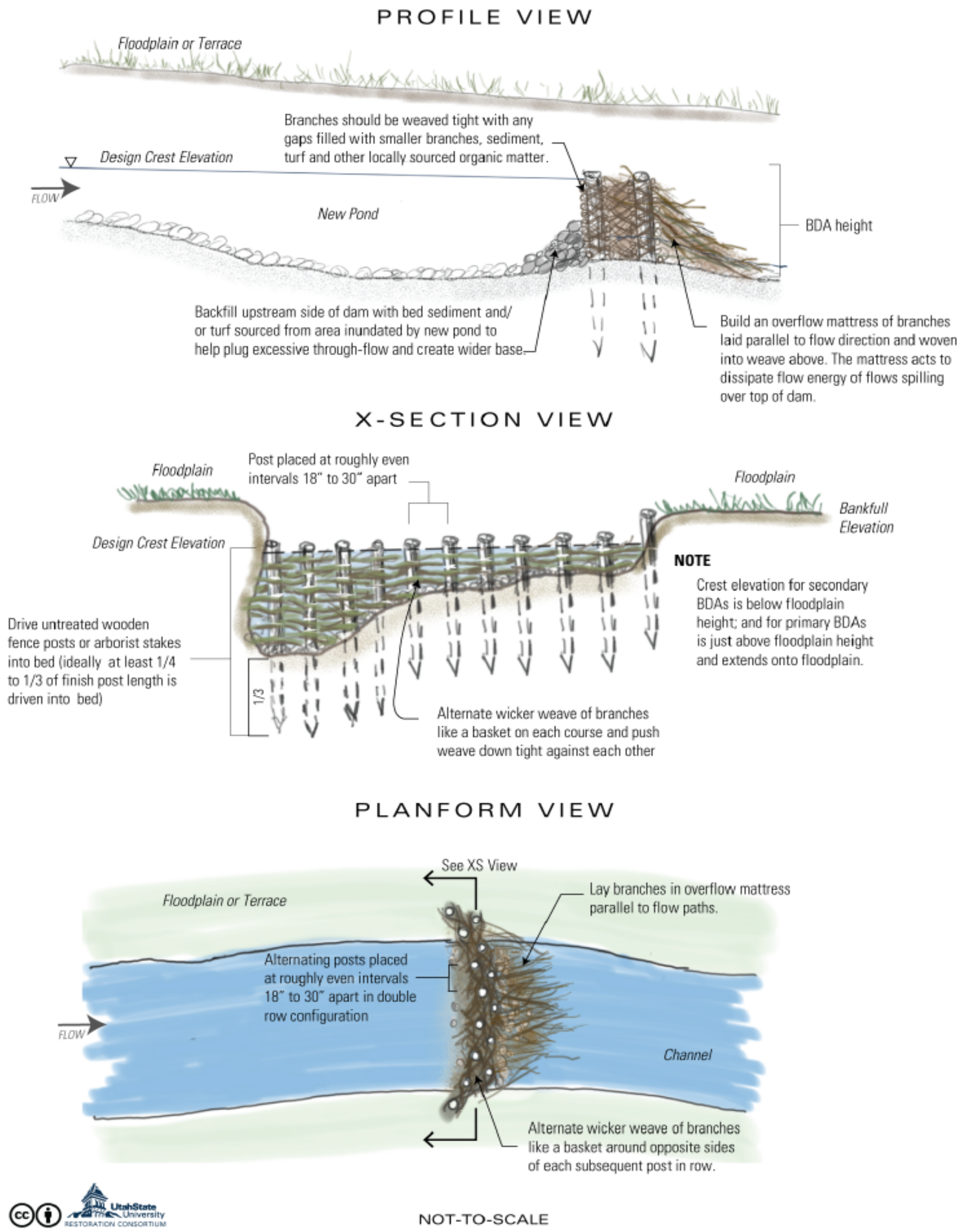


Figure A1. Typical schematic sketches of a modified post-line wicker weave BDA with a double row of alternating posts, a convex crest orientation, and an overflow mattress to dissipate flow over the top of the dam (Wheaton et al. 2019)

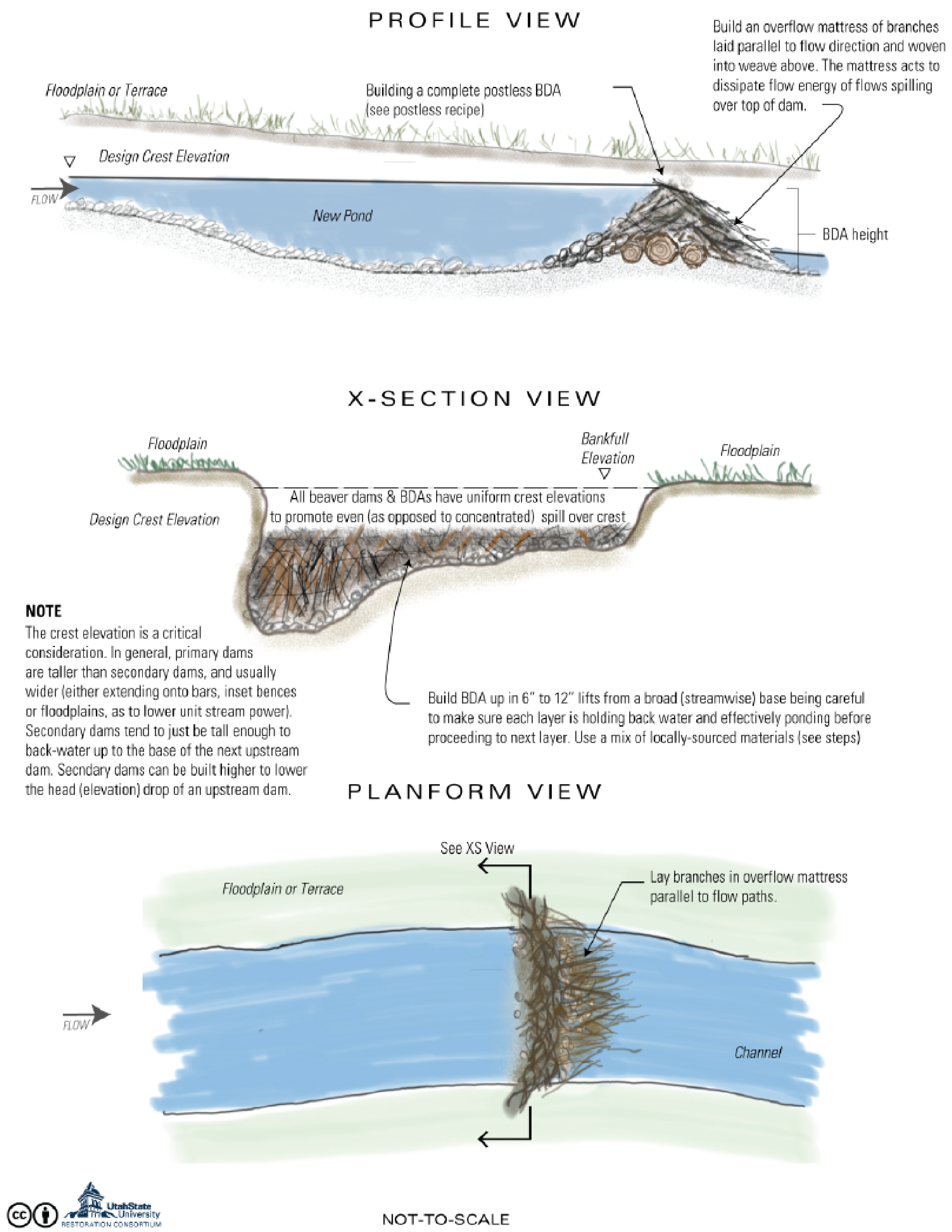


Figure A2. Typical schematic sketches of a postless BDA, showing the pieces used in base, a convex crest orientation, and an overflow mattress to dissipate flow over the top of the dam (Wheaton et al. 2019)

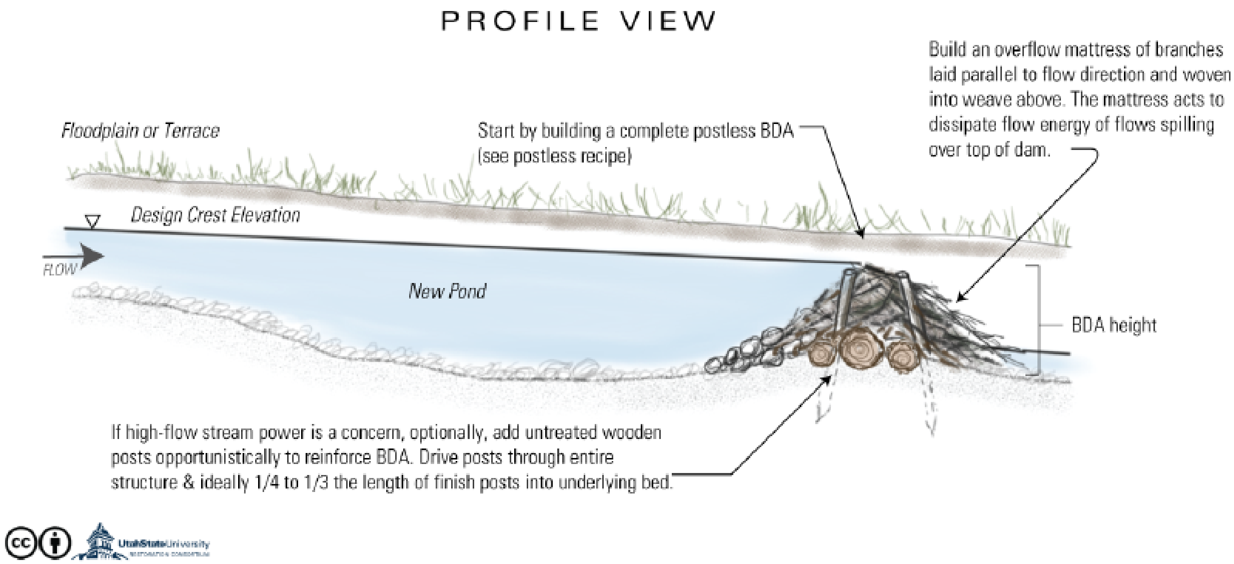


Figure A3. Typical schematic sketches of a post-assisted BDA, showing the pieces used in base, a convex crest orientation, an overflow mattress to dissipate flow over the top of the dam, and posts driven through the structure for reinforcement (Wheaton et al. 2019)

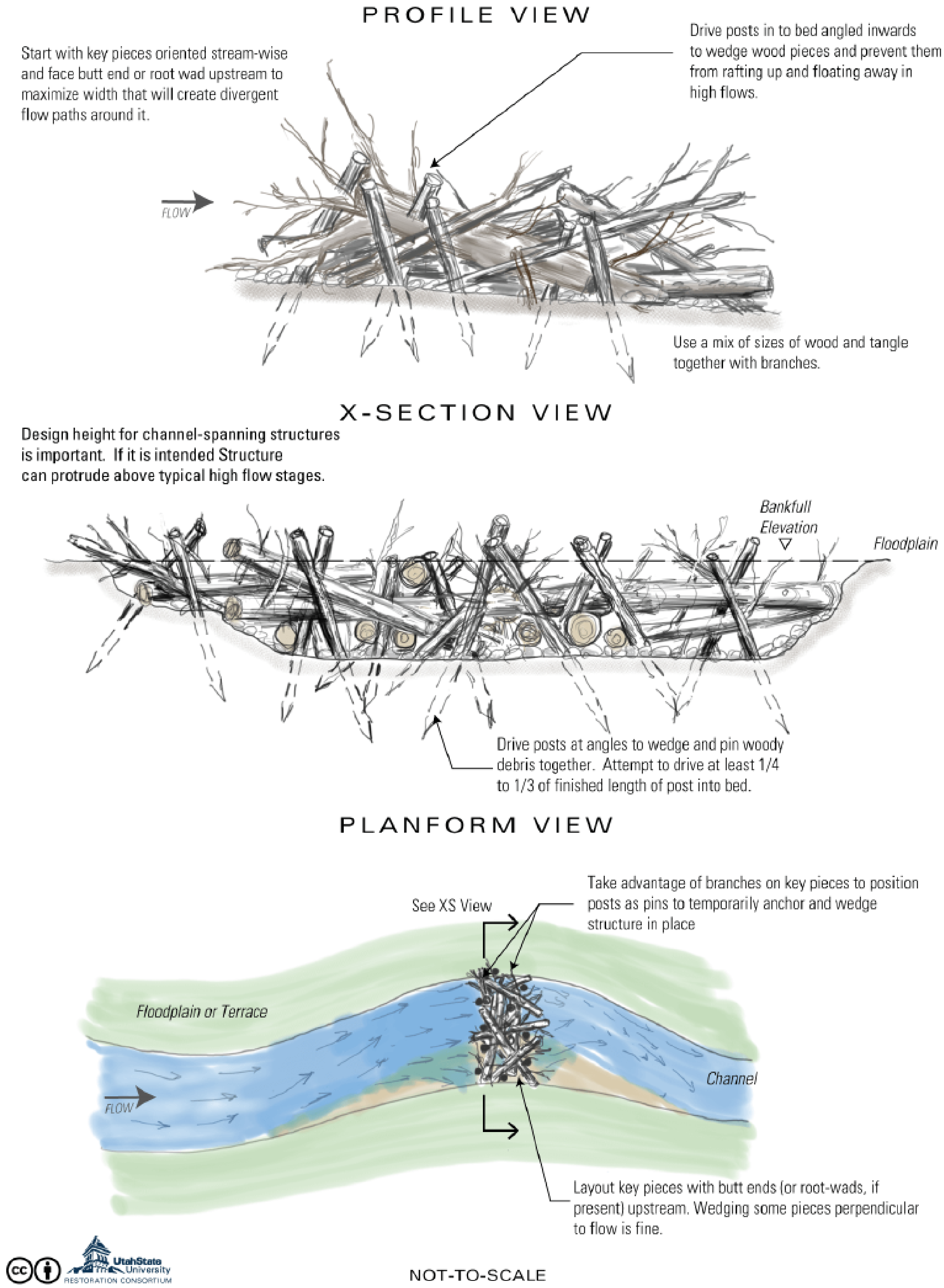


Figure A4. Typical schematic drawings of a channel-spanning PALS (Wheaton et al. 2019)

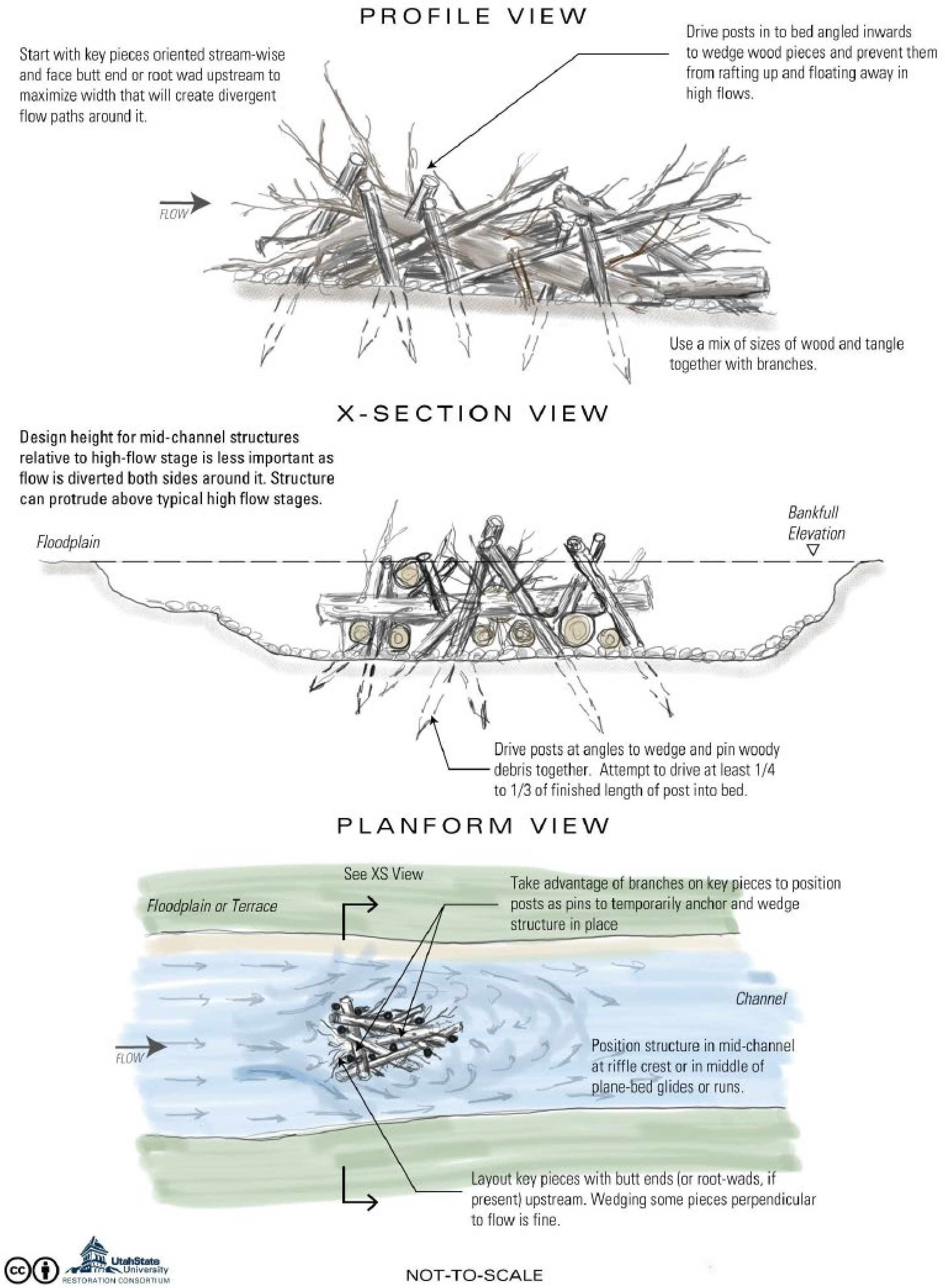


Figure A5. Typical schematic drawings of a mid-channel PALS (Wheaton et al. 2019)

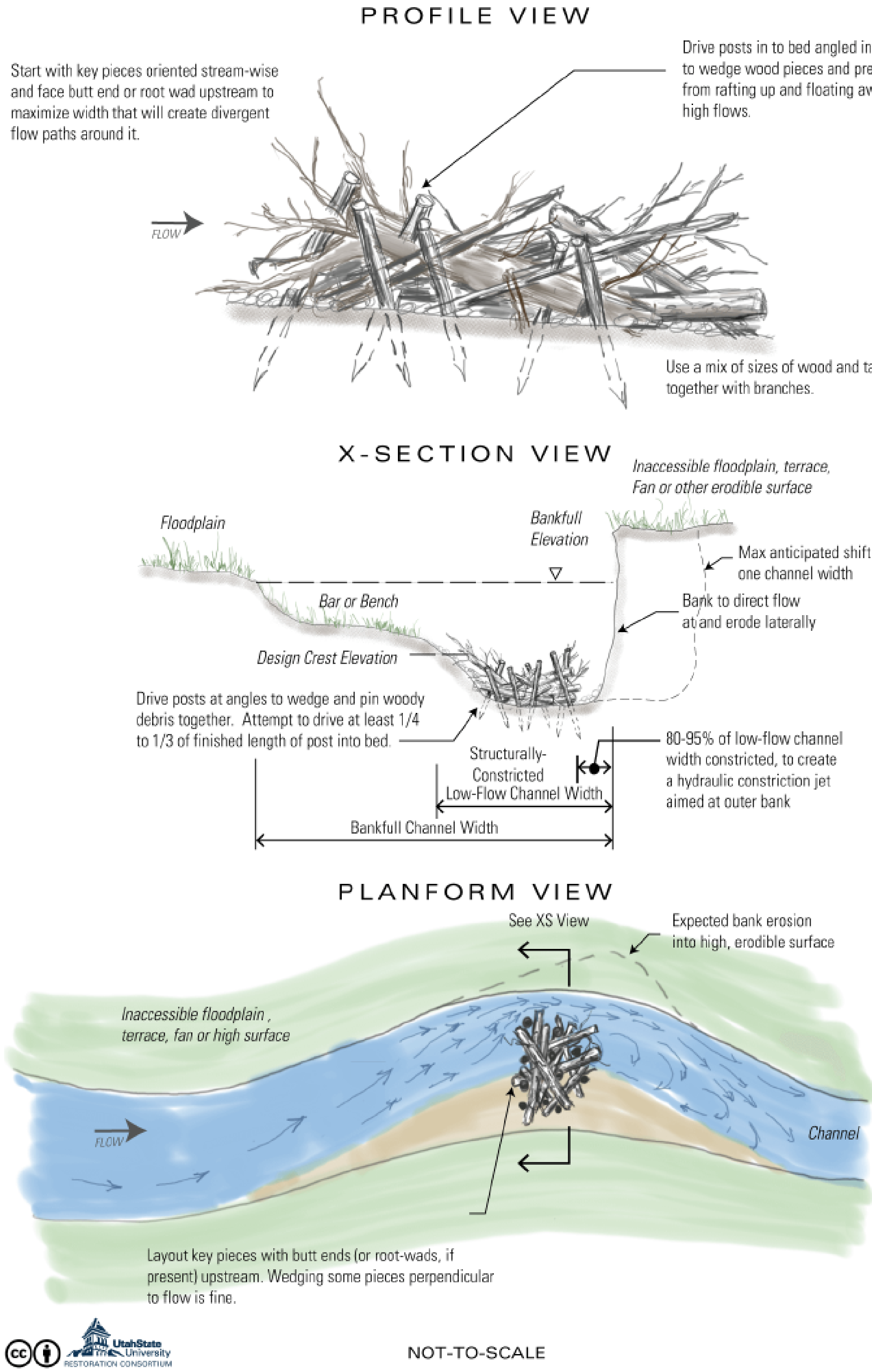


Figure A6. Typical schematic drawings of a bank-blasting PALS to achieve lateral bank reworking and recruitment (Wheaton et al. 2019)

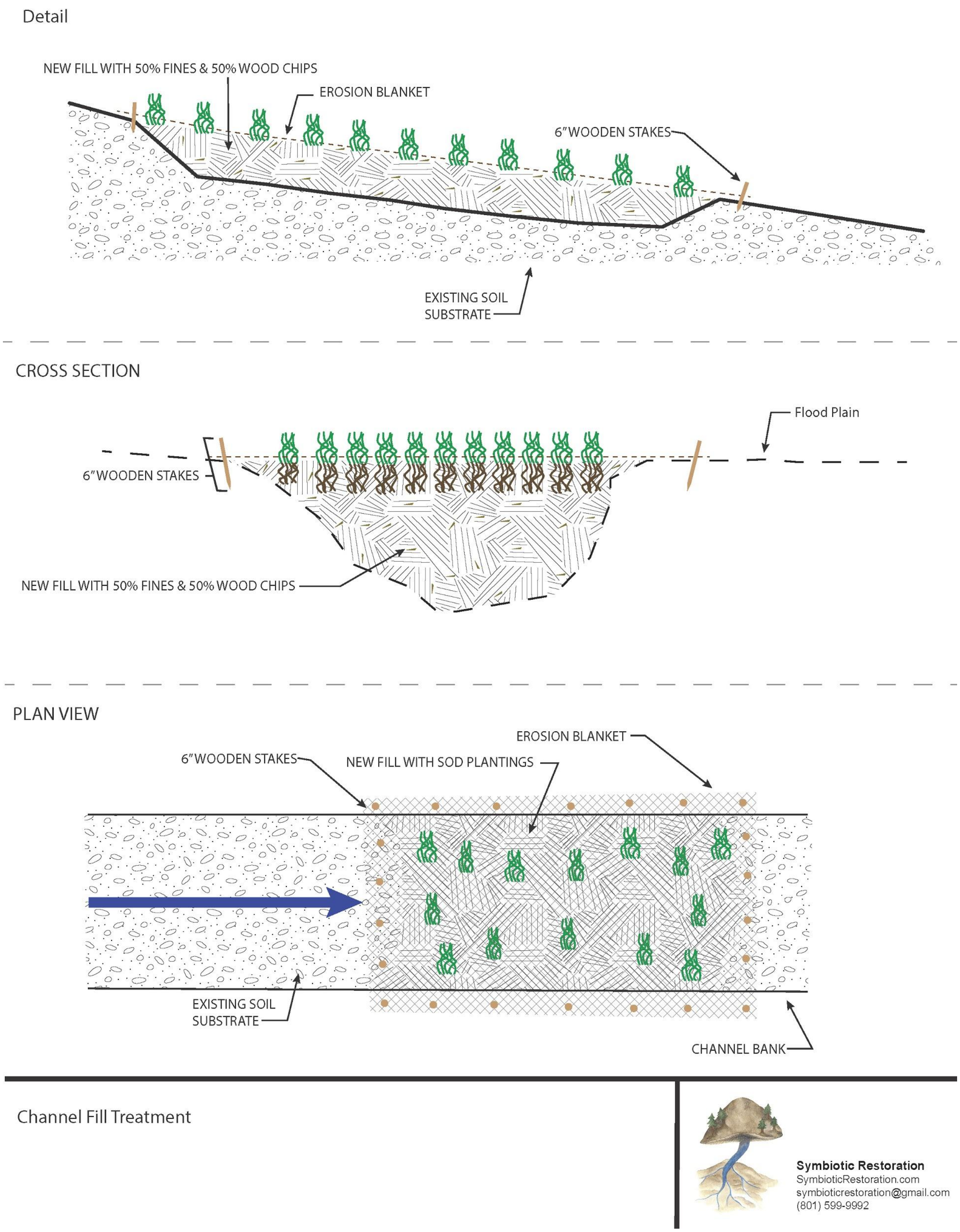


Figure A7. Schematic drawing showing the typical cross-section and plan view for mechanical full channel fill with 50/50 wood chips and soil mix, including plantings and erosion control

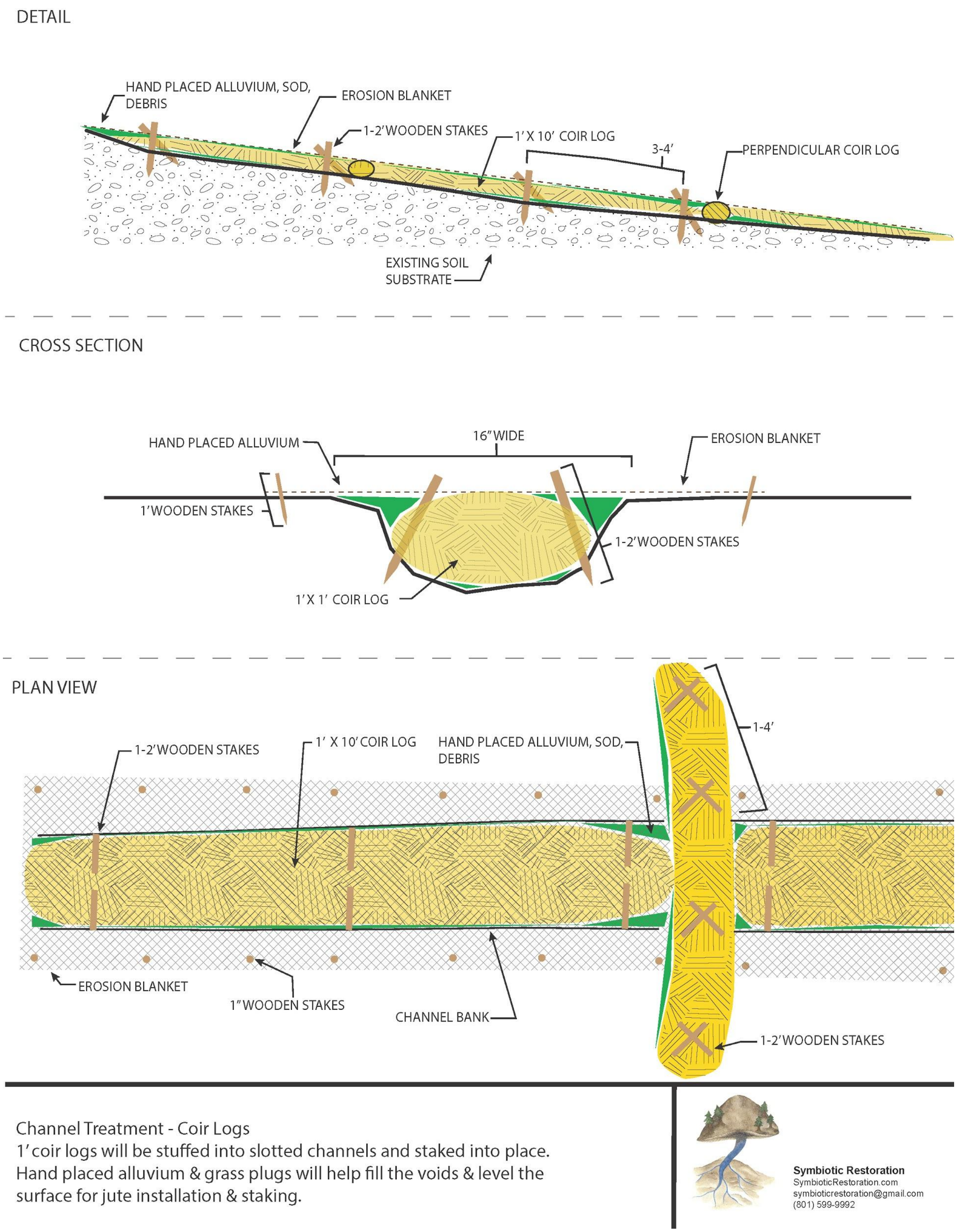


Figure A8. Schematic drawing showing the typical cross-section and plan view for hand-built full channel fill using primarily coir logs, with hand-placed fill, plantings, and erosion control

Appendix K: Cross Sections

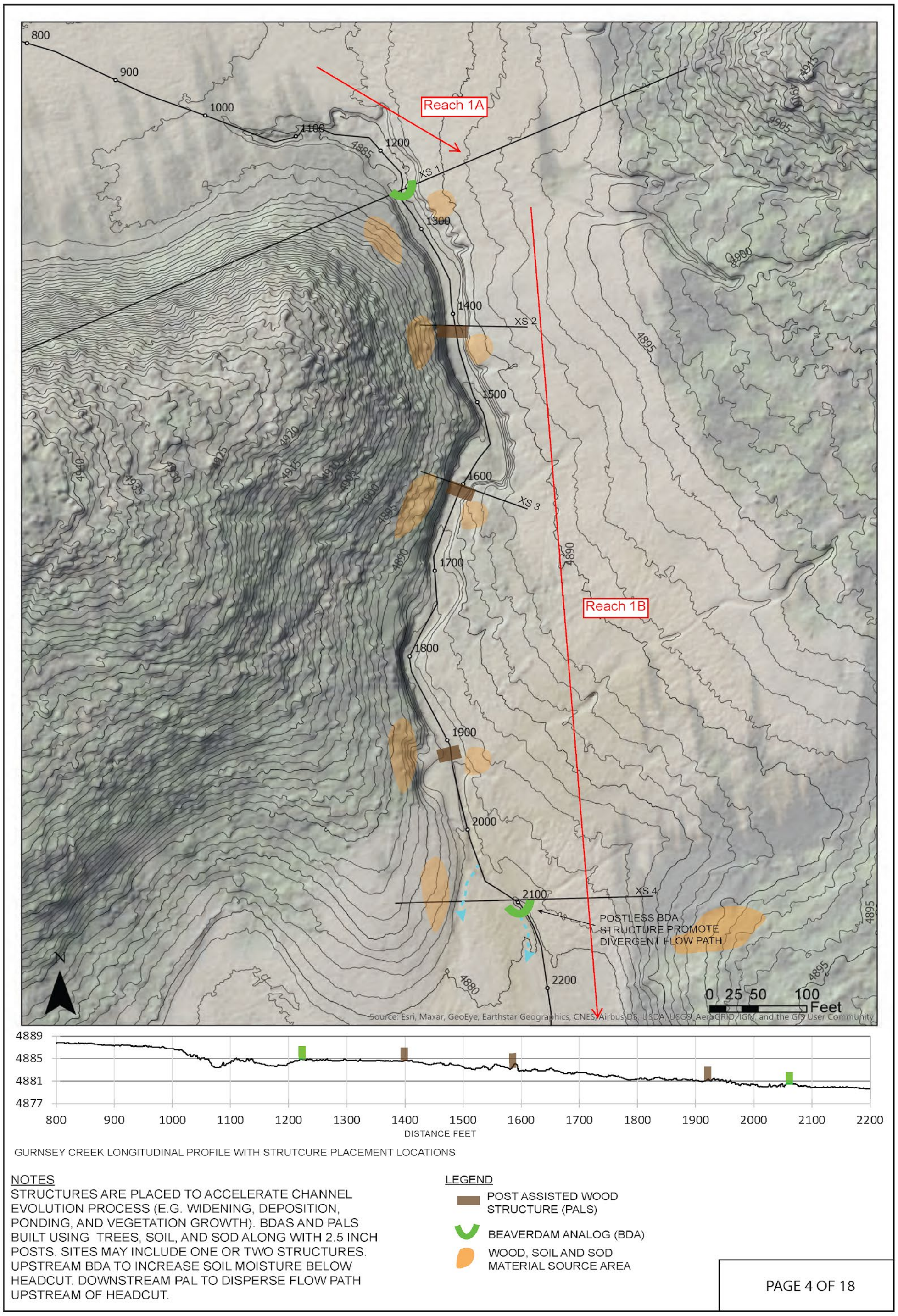


Figure B1. Old plan view for Areas 1A and 1B showing locations of cross sections referenced in Figure B2

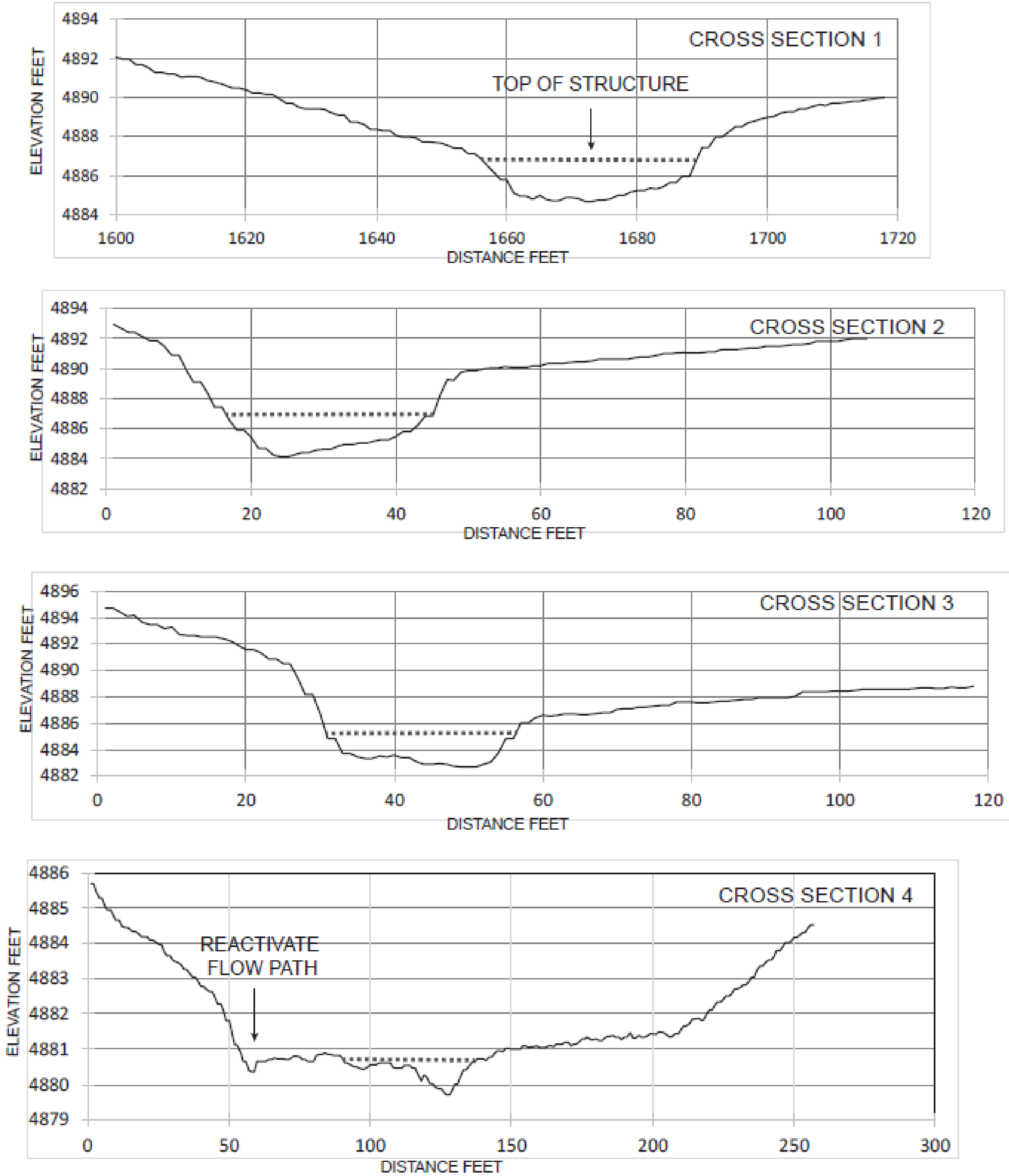


Figure B2. Cross sections 1-4 from Area 1 as shown in Figure B1

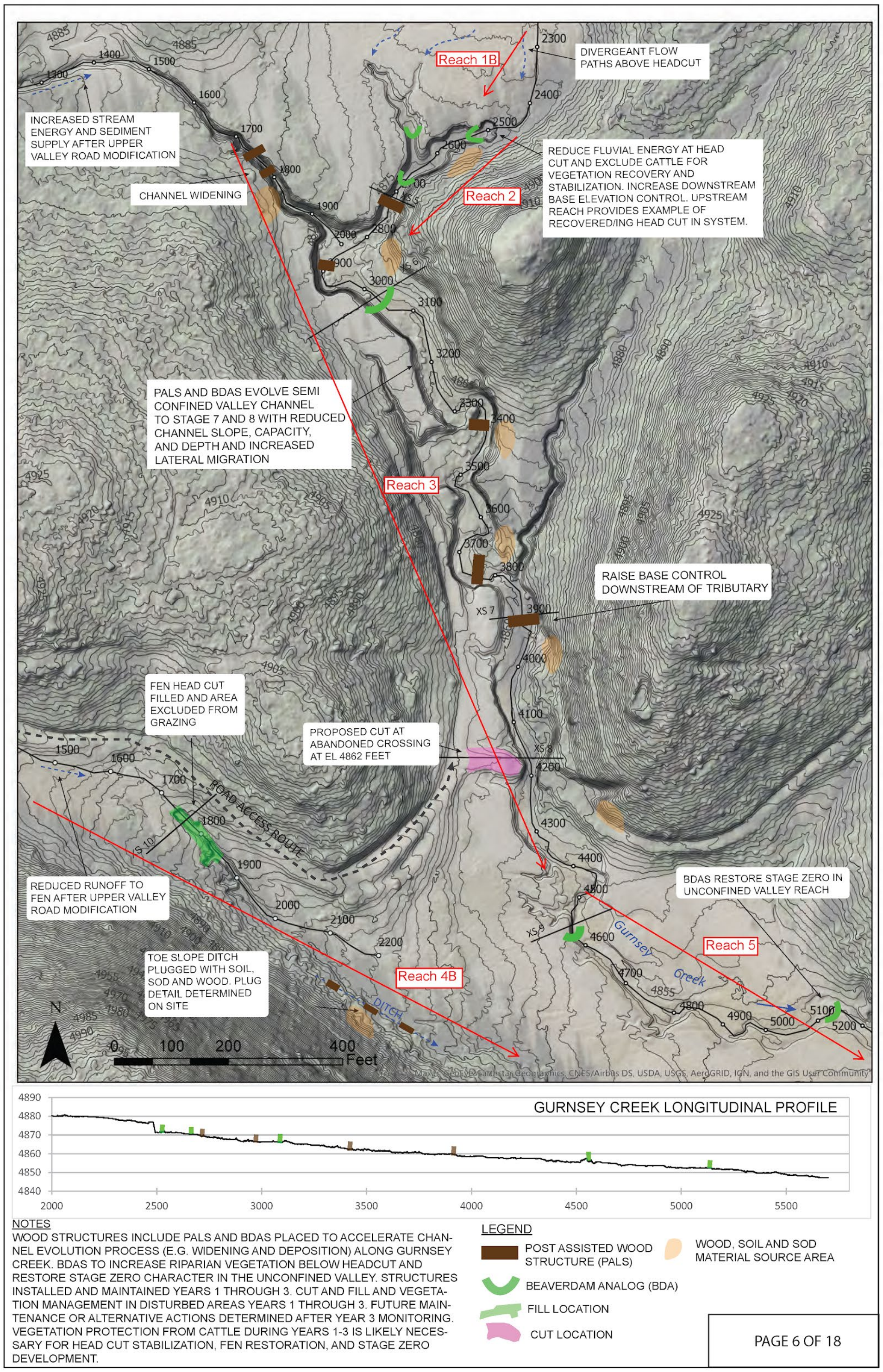


Figure B3. Old plan view for Areas 2, 3, and 5 showing locations of cross sections referenced in Figure B4

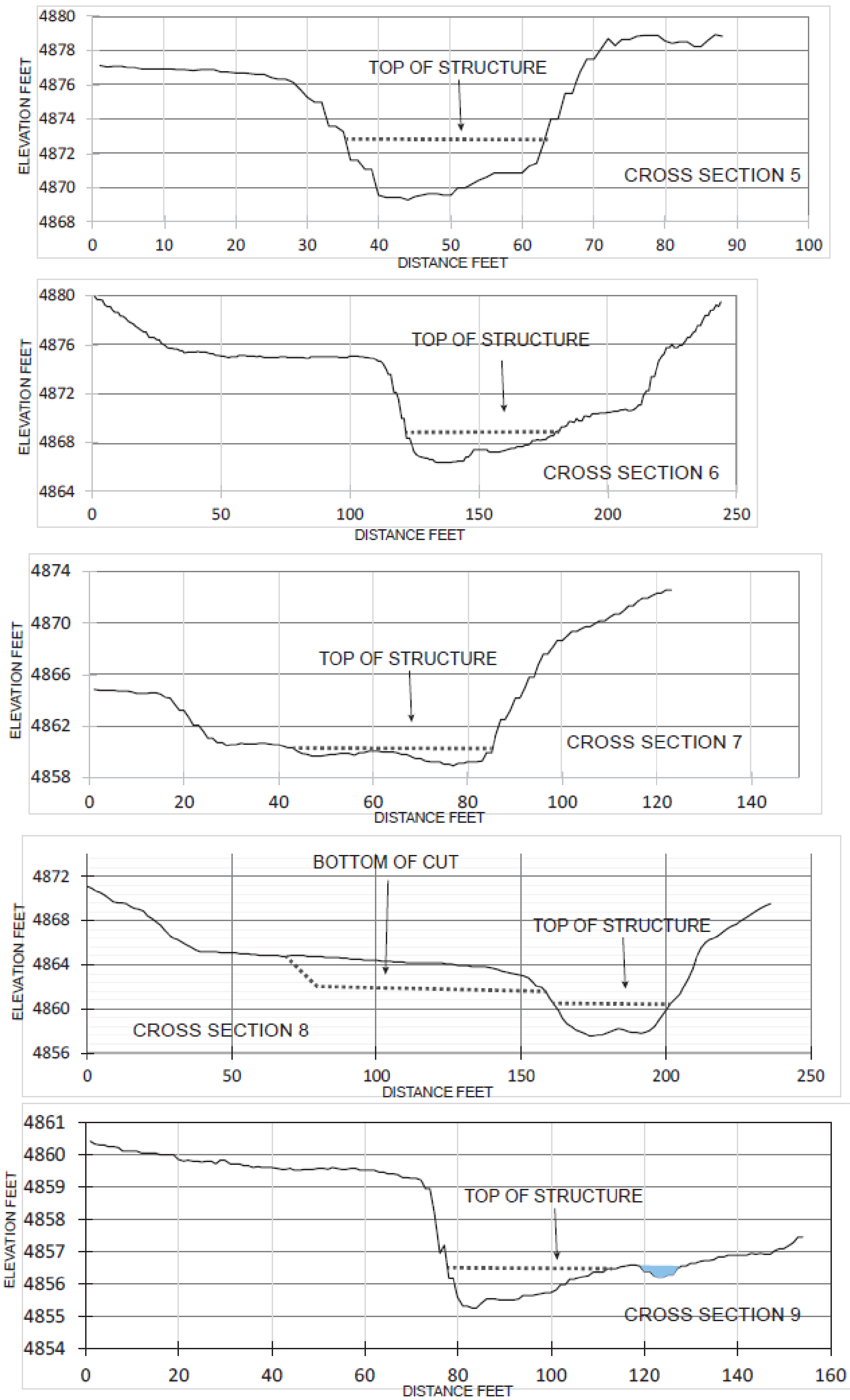


Figure B6. Cross sections 5-9 from Areas 2, 3, and 5 as shown in Figure B3

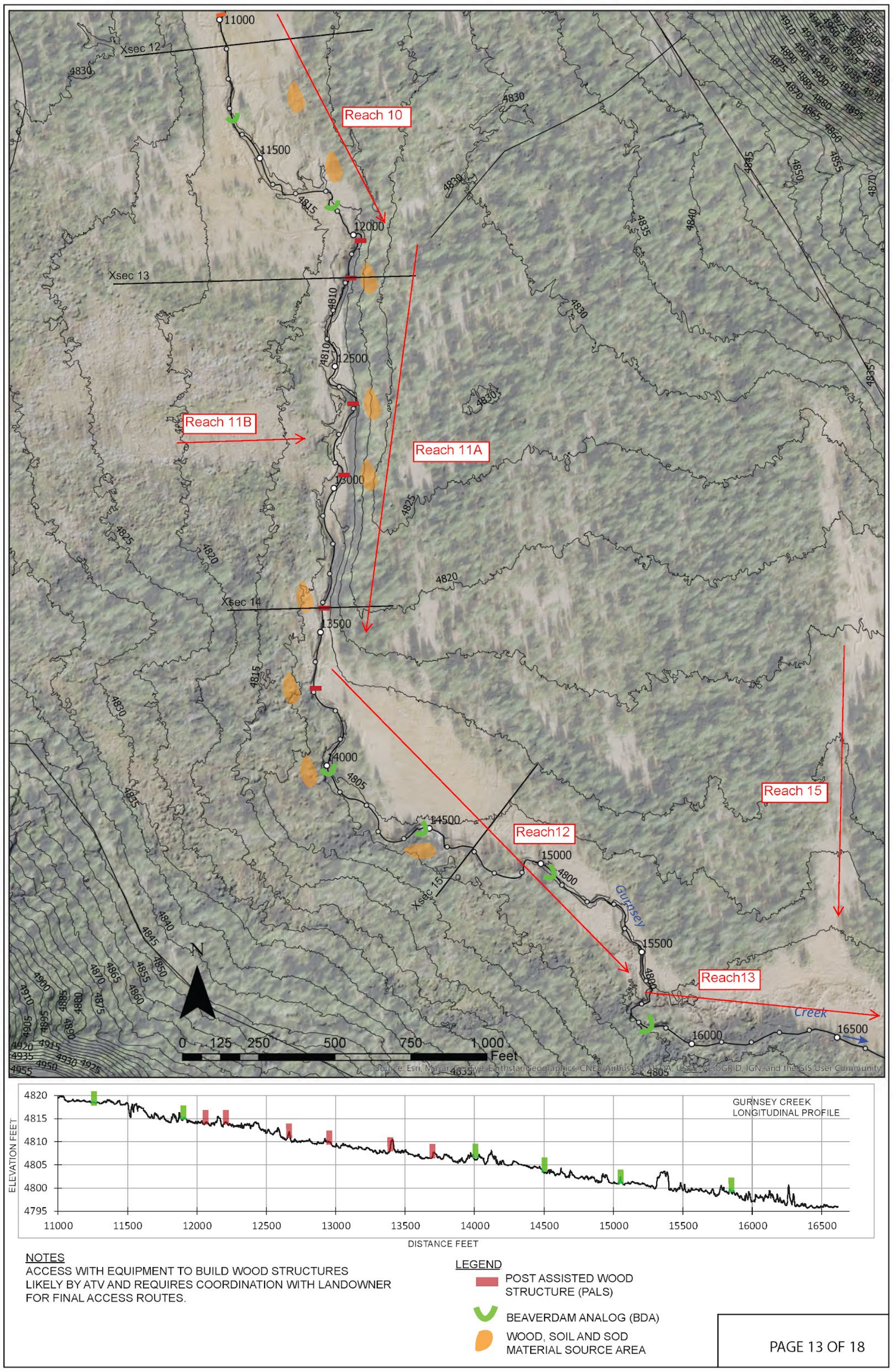


Figure B5. Old plan view for Areas 10, 11, and 12 showing locations of cross sections referenced in Figure B6 and B8

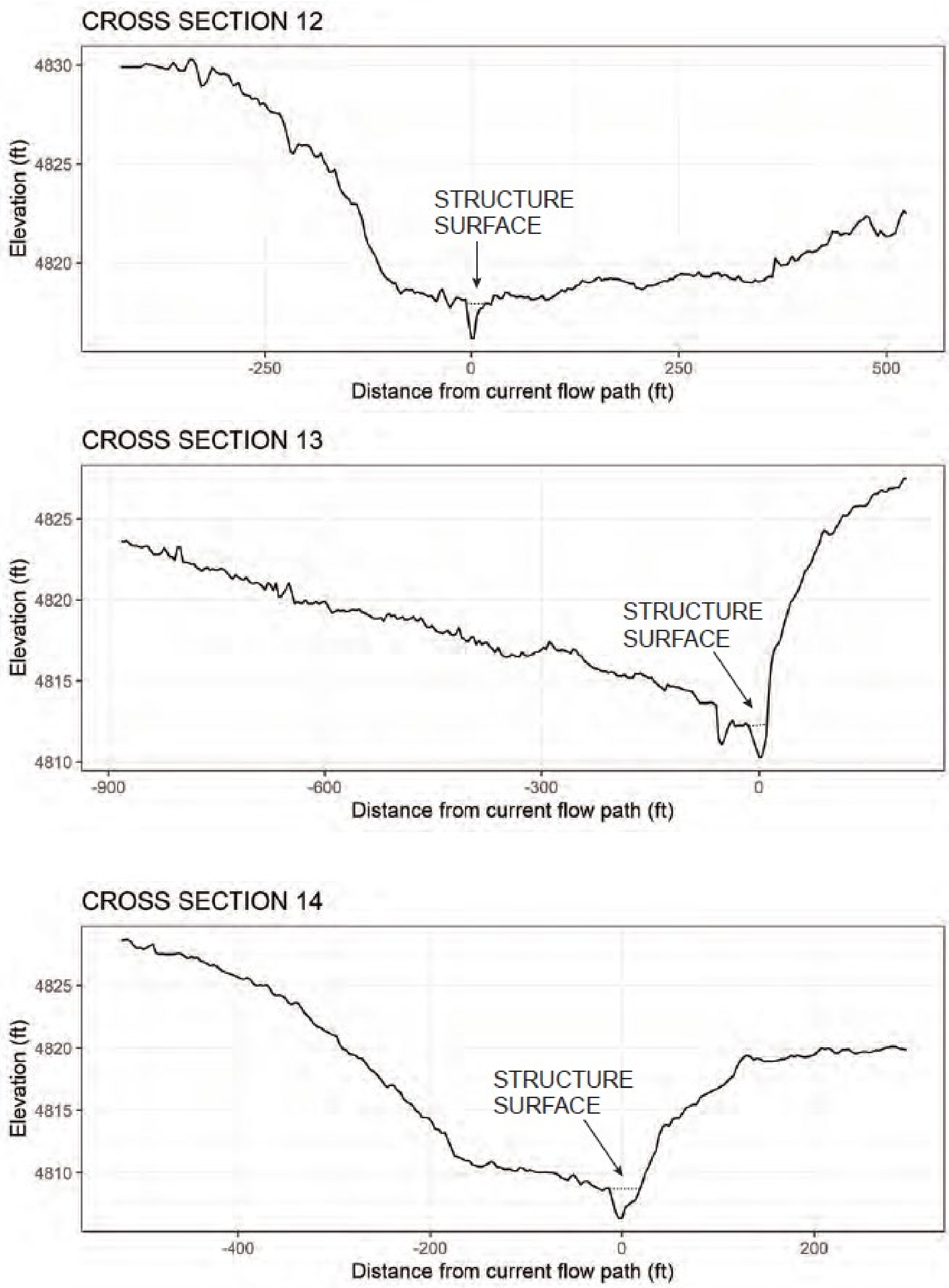


Figure B6. Cross sections 12-14 for Areas 10-11 from Figure B5

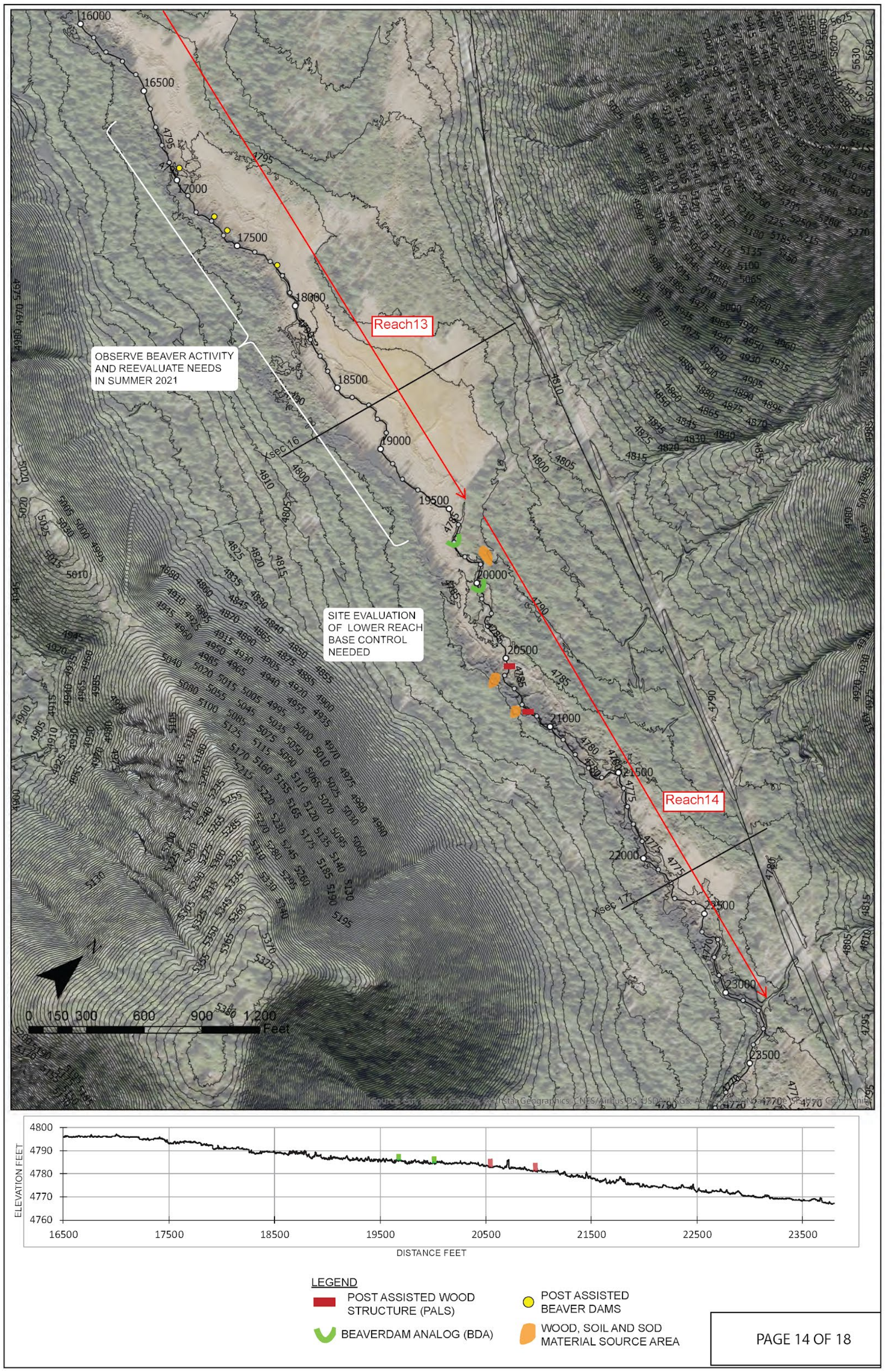


Figure B7. Old plan view and long profiles for Areas 13 and 14 showing locations of cross sections referenced in Figure B8

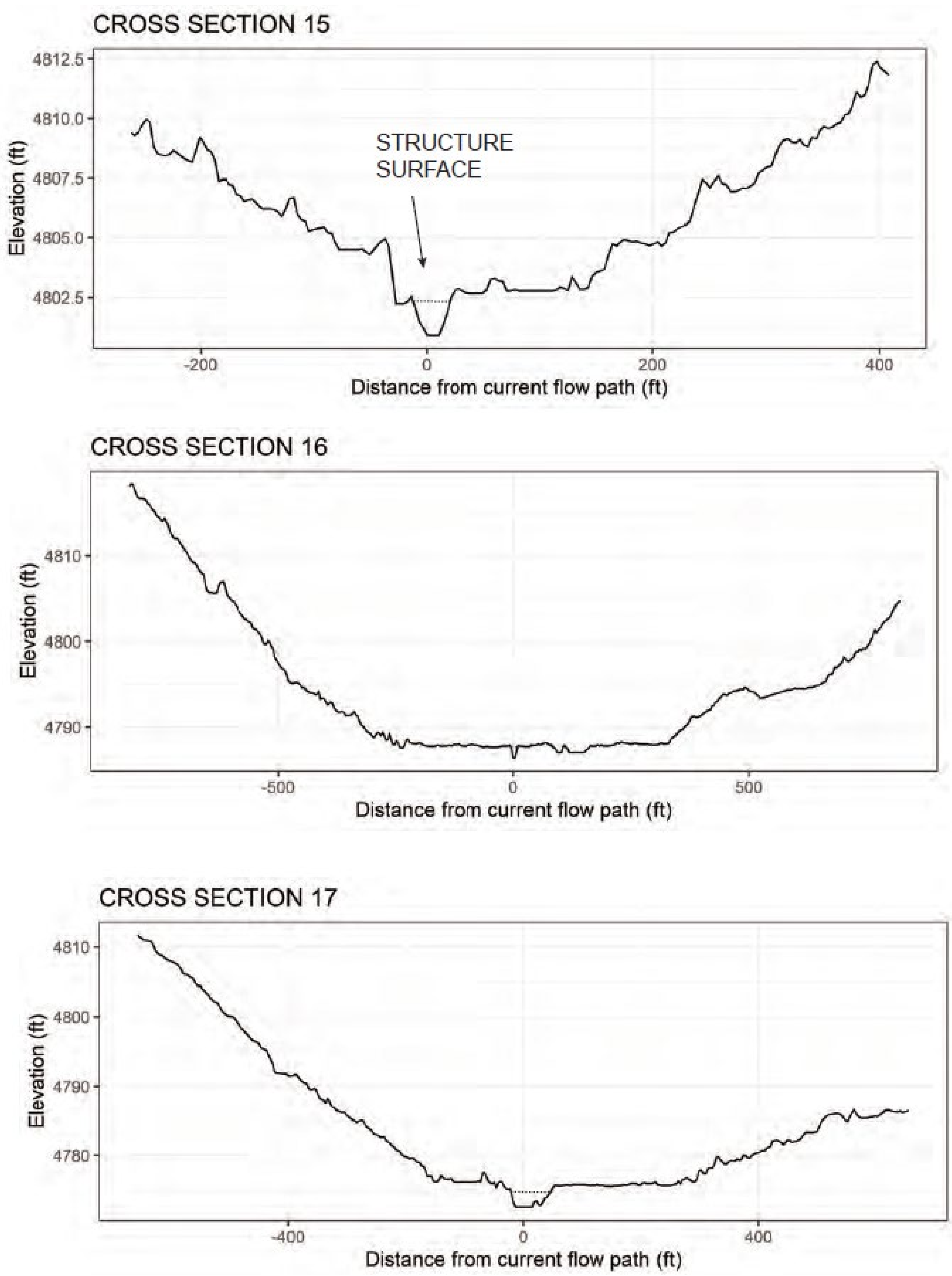


Figure B8. Cross sections 15-17 for Areas 12-14 from Figures B5 and B7

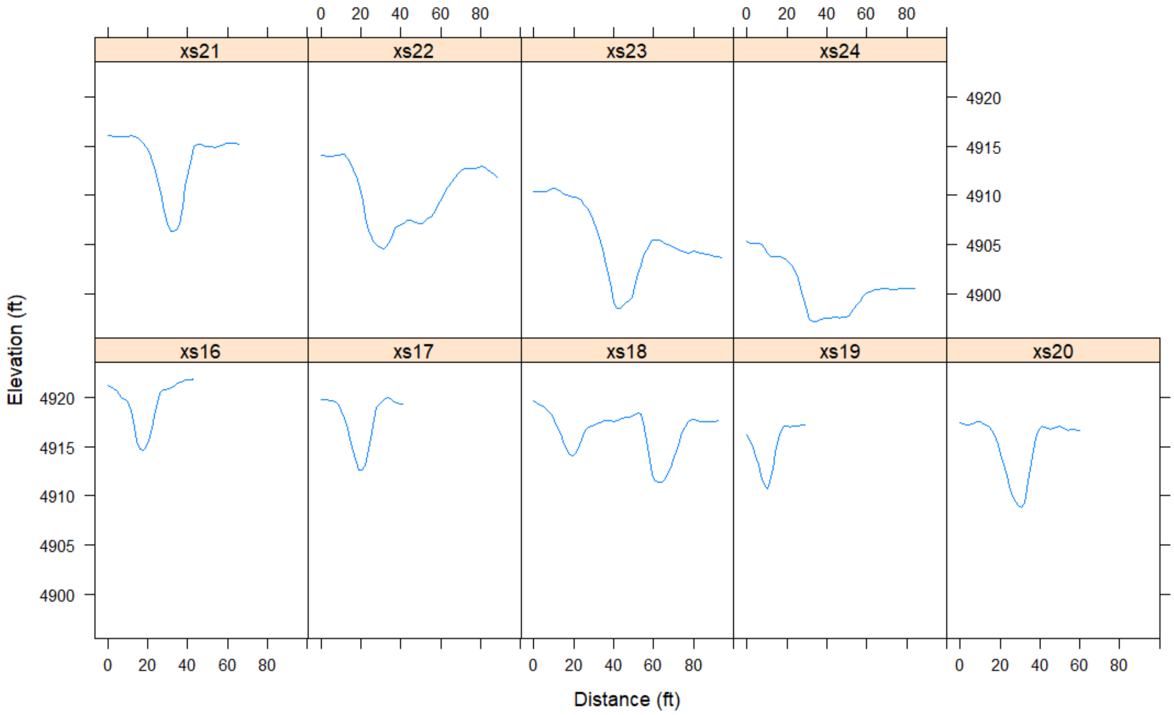
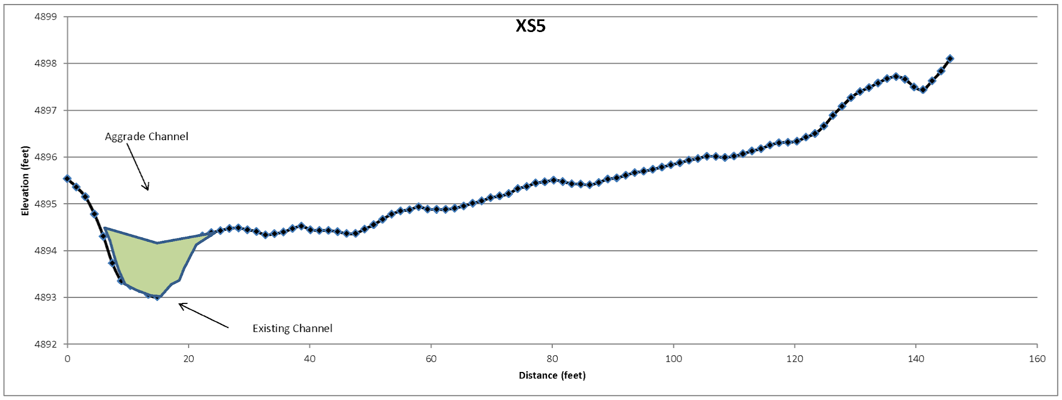
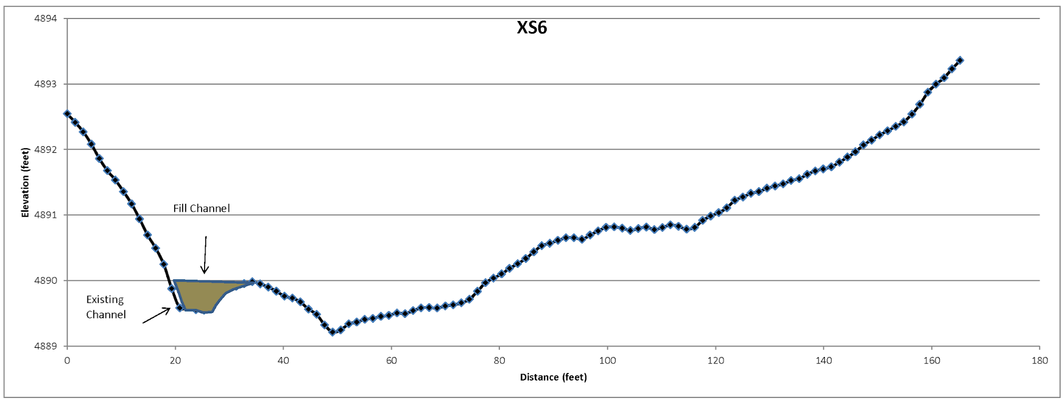


Figure B9. Cross sections plots for channel fill 10 (CF10) in Area 4, Finger Fen, as shown in Figure 5. River left is on the left of the plot. River right is on the right of the plot. Bottom left panel is furthest upstream.





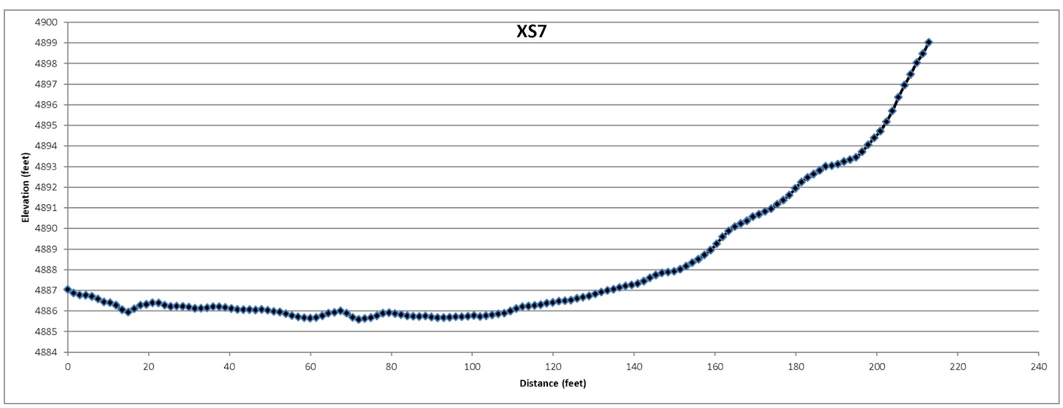


Figure B10. Cross sections 5-7 from Area 4, Finger Fen, as shown in Figure 5

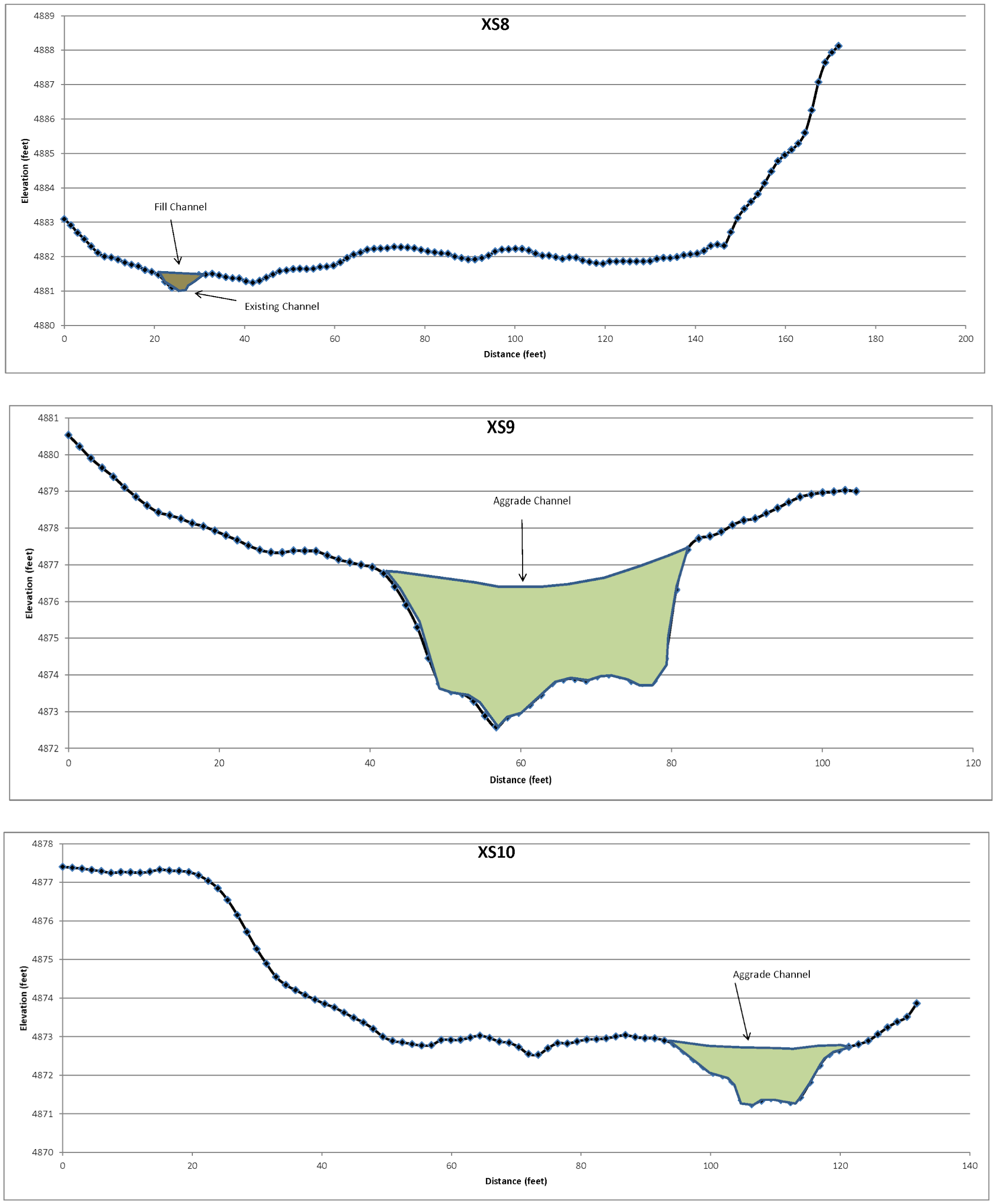


Figure B11. Cross sections 8-10 from Area 4, Finger Fen, as shown in Figure 5

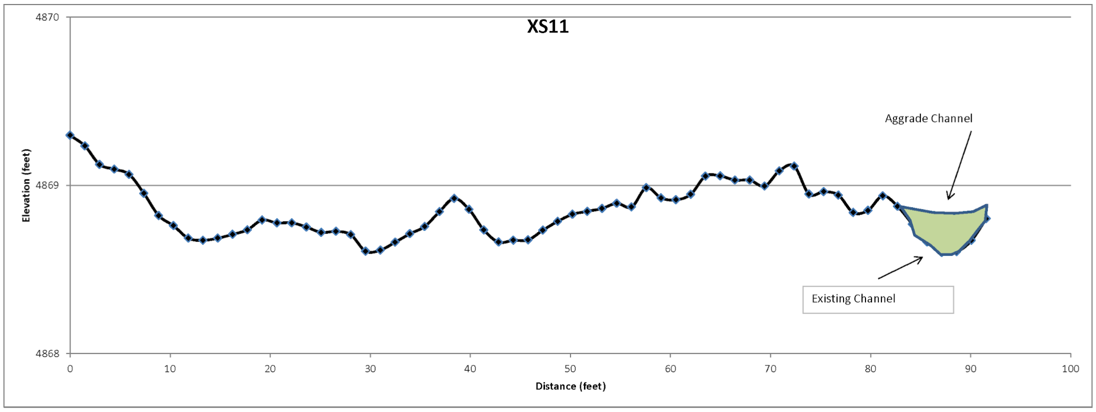


Figure B12. Cross section 11 from Area 4, Finger Fen, as shown in Figure 5

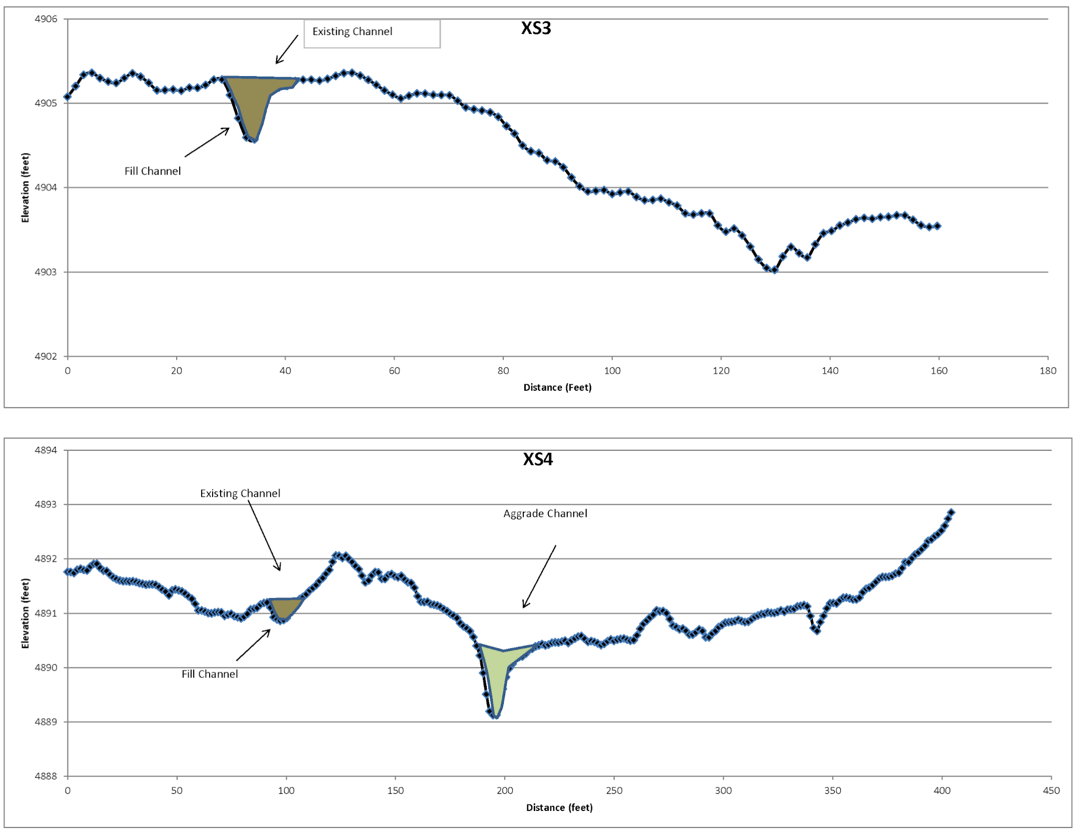


Figure B13. Cross sections 3-4 from Area 6, Poppy's Fen, as shown in Figure 7

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List of Preparers and Contributors

Resource Conservation District of Tehama County 2 Sutter Street Suite D Red Bluff, CA 96080		
Name	**Title**	**Role**
Jon Barrett	RCDTC District Manager /Program Manager	Reviewer
Tom McCubbins	CEQA Projects Manager	Document Preparation, CEQA Compliance, Lead Author
Kathryn Raeder	GrizzlyCorps Fellow	Reviewer
Other Participating Organizations		
Name	**Title**	**Role**
Brent Campos Pt. Blue Conservation Science	Principal Ecologist	Wildlife and Fisheries Specialist Report Author
Sarah Yarnell UC Davis Center for Watershed Science	Research Hydrologist	Hydrologist Report Author
Wendy Boes Consultant	Botanist	Botany Report Author
Gregory White Ph.D. Sub-Terra Heritage Resource Investigations	Archeologist	Cultural Resource Surveys and Report Author Tribal Cultural Resources Report Author
Megan Bradshaw Sub-Terra Heritage Resource Investigations	Archeological Research Assistant	Research Assistance with Cultural and Tribal Resource Reports
Amy Hubberland Northeast Center of the California Historical Resource Information System California State University, Chico	Assistant Coordinator	Cultural Resources, Tribal Cultural Resources

Glen Gerbatz Collins Almanor Forest	Registered Professional Forester	Cultural Resource Surveys