APPENDIX C-2

BIOLOGICAL RESOURCES TECH MEMO – REFINED HABITAT DISTURBANCE AREA CALCULATIONS FOR THE MALAKOFF DIGGINS STATE HISTORIC PARK (MDSHP) SEDIMENT CONTROL BMPS PROJECT (October 2022)

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MEMORANDUM

TO:	Mark Naugle, Golder	**FROM:**	Erik Schmidt, Restoration Permitting Specialist, WRA
CC:	Donna Ernst, WSP/Golder	Geoff Smick, WRA	
DATE:	October 18, 2022		
SUBJECT:	Tech Memo – Refined Habitat Disturbance Area Calculations for the Malakoff Diggins State Historic Park (MDSHP) Sediment Control BMPs Project		

California Department of Parks and Recreation (DPR) is conducting environmental review of the proposed Malakoff Diggins State Historic Park (SHP) Sediment Control Best Management Practices Plan (Project). The Project would install and maintain sediment control best management practices (BMPs) in the Malakoff Diggins pit, a former hydraulic mine pit, to control the release of sediment from the pit to downstream receiving waters in compliance with requirements of the Central Valley Regional Water Quality Control Board (RWQCB). WRA prepared a Biological Resources Assessment (BRA)[1] for the Project in support of evaluations needed for compliance with the California Environmental Quality Act (CEQA) and preparation of applications for regulatory approvals associated with the Project.

In the time since WRA's completion of the 2021 BRA and as preparation of the CEQA document and permit applications is ongoing, DPR and Golder have refined the Project design resulting in adjustments to surface disturbance and habitat impact areas as compared to those presented in the 2021 BRA. This memorandum provides updated areal data to supplement the data presented in the 2021 BRA. The changes are non-substantive in that they do not substantively change the impact analysis or conclusions in the BRA and only refine the impact area acreages and reflect the Project as currently proposed. It is anticipated that the 2021 BRA and this supplemental memorandum will be used in combination to provide information and analysis necessary for the Project's CEQA document and permit applications.

The Project area (see Figures 1 and 2) and potential impact areas from Project construction and operation have been refined during several iterations of the Project's design development and

[1] Biological Resources Assessment of Malakoff Diggins State Historic Park Site Characterization and Remediation Project, WRA, Inc., November 2021

CAD/GIS analysis phases of work. Refinements include adjustments to the footprint disturbance areas associated with proposed BMP components in the Pit. These Project refinements are included in the updated disturbance areas and mapping presented herein. Refinements made to the Project since preparation of the 2021 BRA include those listed below, detailed in the tables and/or attachments as noted:

- BMP components: Temporary and permanent disturbance areas and quantities (Tables 1 and 2, Figure 3)
- Biological community impact areas for sensitive and non-sensitive communities based on the refined temporary and permanent disturbance areas (Table 3, Figures 5 and 6)

Table 1. BMP Component Disturbance Areas

Primary Component	Temporary Construction and BMP Disturbance Area (acres)[2]	Permanent Disturbance Area (acres)	Notes
Coarse Sediment Management Component			
Grade Control Structure	*0*	*0.25*	Temporary construction if mats are needed to cross pit; otherwise, cross pit on infiltration bed placed on structure footprint disturbance area.
Brush Barriers (does not include Western pit brush barriers listed below)	*0*	*0.20*	Various areas upgradient of grade control structure; minimal disturbance without vegetation clearing.
Coarse Sediment Settlement Area	*15.63*	*0*	Pit floor area east of grade control structure would naturally fill with sediment to top of grade control structure over an approximately five-year period based on projected sediment accumulation rates. Vegetation will grow through and naturally recruit and establish in the settlement area annually.
Construction/ Maintenance Access	*3.10*[3]	*2.74*	Causeway construction along the west and north sides of pit bottom with turn-outs. Additional temporary access across the pit using

[2] Unless noted otherwise, temporary disturbance quantities are separate from and in addition to permanent disturbance quantities, so impacts within a given location are not accounted for twice.
[3] Of this 3.10 ac., only 0.89 ac. are in addition to permanent impacts. The remaining acreage overlaps with permanent disturbance.

Primary Component	Temporary Construction and BMP Disturbance Area (acres)[2]	Permanent Disturbance Area (acres)	Notes
Causeway with Boardwalk (in Pit)			construction mats is accounted for in Soldier Pile Wall Component, below.
Total Coarse Sediment Management Component	***18.73***	***3.19***	
Interceptor Swale Component			
Drainage Channel/Earthen Berm	*0*	*0.86*	Channel excavated and material used to create adjacent berm.
Total Interceptor Swale Component	***0***	***0.86***	
Soldier Pile Wall Component			
I-Beams and Wall	*0.18*	*0.02*	Temporary disturbance area would include approximately 25 feet cleared on each side of wall alignment.
Rip Rap Scour Protection	*0.08*	*0.04*	To be placed on downgradient side of soldier pile wall.
Construction/ Maintenance Access using Construction Mats (in Pit)	*0.21*[4]	*0*	Access from Construction/ Maintenance Access Causeway south to soldier pile wall.
Total Soldier Pile Wall Component	***0.47***	***0.06***	
Total Primary BMP Components			
Total Primary BMP Components	**19.20**	**4.11**	
Staging Areas			
In-Pit Construction Staging Area	0.69	0	
Boardwalk Staging Area	0.20	0	
Shooting Range Staging Area	0.65	0	

[4] Includes 0.02 ac. of overlap with Interceptor Swale Component permanent impacts of 0.86 ac. (thus accounted for twice in this table).

Primary Component	Temporary Construction and BMP Disturbance Area (acres)[2]	Permanent Disturbance Area (acres)	Notes
Shooting Range Staging Area Access Road	0.17	0.36	
Total Staging Areas	**1.71**	**0.36**	
Supplementary Components			
Soil Stabilizer Application, Eastern Pit (impact area overlaps with Coarse Sediment Settlement Area listed above – should not be used to sum impact areas)	15.63	0	Temporary disturbance involves application areas with limited or no ground disturbance and/or vegetation clearing. Supplementary components would be installed manually or with ATVs, with no additional temporary construction disturbance.
Soil Stabilizer Application, Western Pit	1.50	0	
Interceptor Swale Flocculant Introduction	0	0	
Western Pit Flocculant Introduction	0	0	
Western Pit Brush Barriers	0	0.06	
Total Supplementary Components	**17.13**	**0.06**	
NA = Not Applicable			

Table 2. BMP Component Quantities

BMP Components	Quantity	Units	Notes
Grade Control Structure: Large-diameter rock	700	CY	
Grade Control Structure: Bedding filter layer rock	200	CY	
Interceptor Swale: Drainage channel cut	100	CY	To be used for earthen berm.

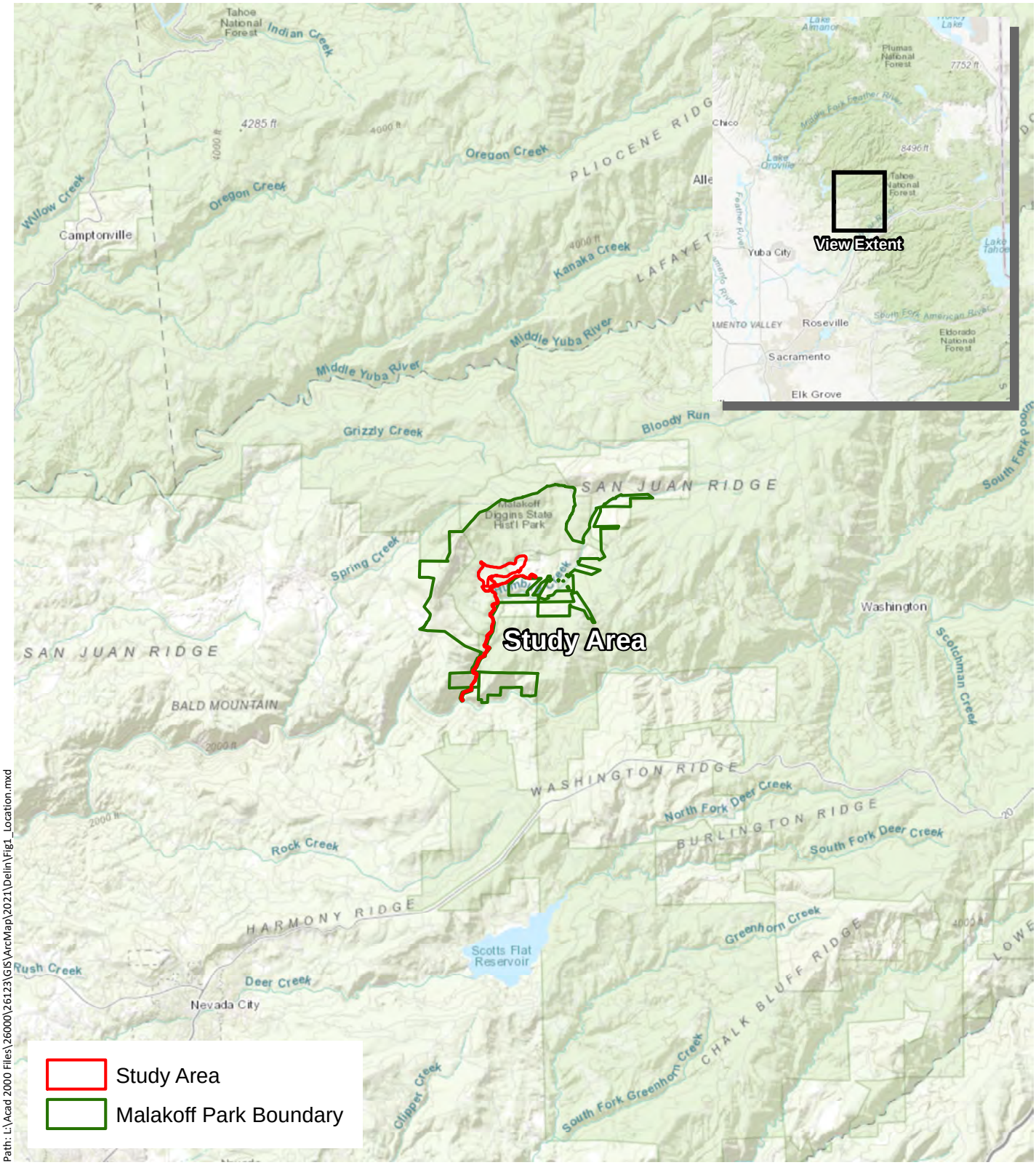
Interceptor Swale: Earthen berm fill	2,450	CY	To be obtained from drainage channel excavation (100 CY), access and other construction-related excavation, and if needed, imported fill from an off-site source.
Soldier Pile Wall: Scour pad rip rap	160	CY	
In-Pit Access Road Causeway: Base and surface gravel	2,400	tons	

Table 3. Biological Community Impact Areas

Biological Community	Impact Type (P – Permanent ; T – Temporary)	Total in Project Area *(acres [linear feet])*	Disturbance Area *(acres [linear feet])*	
			Permanent	Temporary
NON-SENSITIVE COMMUNITIES				
Ponderosa pine forest	Rock wall (P), access route (P), boardwalk (P), brush dams (P), diversion swale (P), soldier pile wall (P), staging area (T)	21.00	0.85	5.47
Developed	Rock wall (P), access route (P), boardwalk (P), brush dams (P), staging area (T)	4.14	0.74	0.26
Rock outcrop/barren	Access route (P), boardwalk (P), brush dams (P)	2.67	0.11	0.06
Whiteleaf manzanita chaparral	Rock wall (P), access route (P), brush dams (P), staging area (T)	1.29	0.11	0.06
	Subtotal	***29.10***	***1.81***	***5.85***
SENSITIVE COMMUNITIES				
Arroyo willow thickets	Access routes (P), brush dams (P), diversion swale (P), soldier pile wall (P), staging area (T), temporary road construction mats (T)	51.17	1.81	2.25
Sandbar willow thickets	Rock wall (P), access routes (P), brush dams (P)	18.04	0.91	11.95
Cattail marsh	Access routes (P), boardwalk (P), staging area (T)	4.94	0.02	0.12
Open water	Staging area (T)	1.88	0.00	<0.01
Intermittent stream	Access routes (P), brush dams (P)	0.21 (677)	<0.01 (22)	0.00

Biological Community	Impact Type (P – Permanent ; T – Temporary)	Total in Project Area *(acres [linear feet])*	Disturbance Area *(acres [linear feet])*	
			Permanent	Temporary
Ephemeral stream	Brush dams (P)	0.06 (486)	<0.01 (17)	0.00
	Subtotal	***76.30 (1,163)***	***2.74 (39)***	***14.19***
	TOTAL	**105.40 (1,163)**	**4.55 (39)**	**20.04**

Attachments: Figures 1-6



Sources: ESRI World Topo, WRA | Prepared By: mrochelle, 10/1/2021

Figure 1. Study Area Regional Location Map

Malakoff Diggins State Park
Wetland Delineation Report
Nevada County, California

0 1.5 3 Miles

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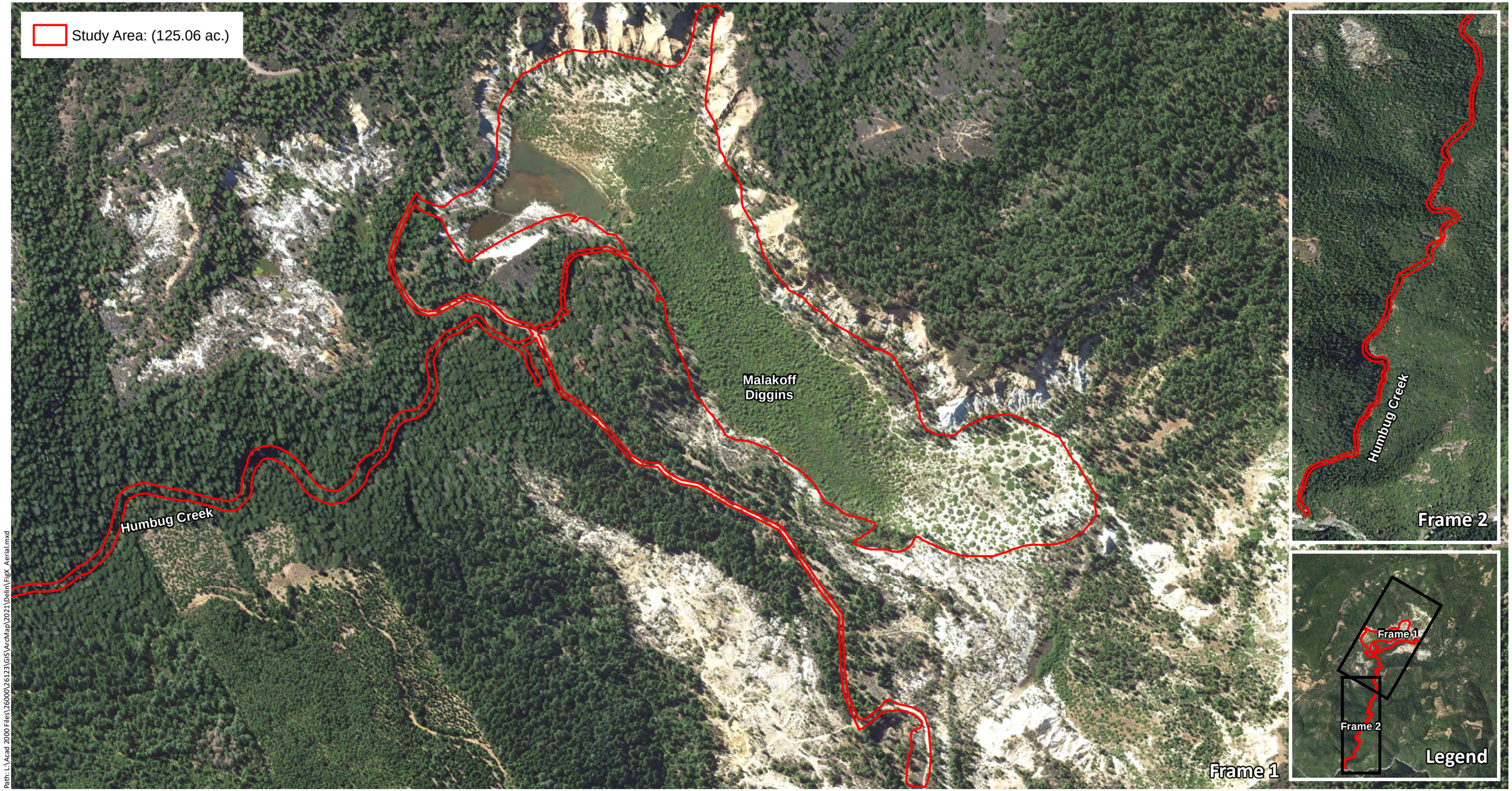

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Sources: State Parks 2019, WRA | Prepared By: mrochelle, 10/13/2021

Figure 2. Study Area Map

Malakoff Diggins State Park
Wetland Delineation Report
Nevada County, California

Frame 1:
0 600 1,200 Feet
1 Inch = 600 Feet

Frame 2:
0 1,500 3,000 Feet
1 Inch = 1,500 Feet

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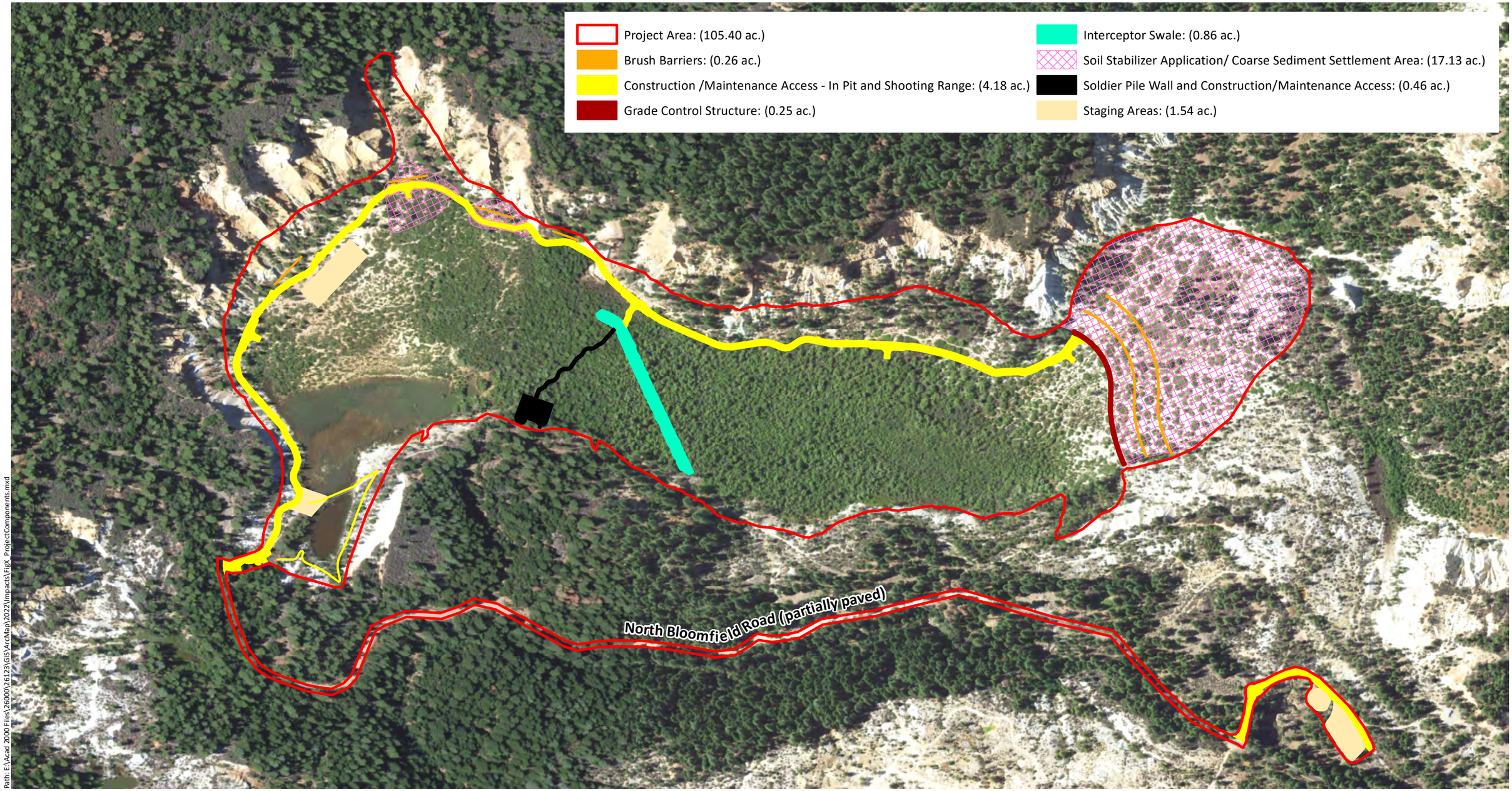

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Sources: State Parks 2019, WRA | Prepared By: mrochelle, 9/21/2022

Figure 3. Project Components

Malakoff Diggins State Park
Biological Resources Assessment
Nevada County, California

0 400 800 Feet
1 Inch = 400 Feet

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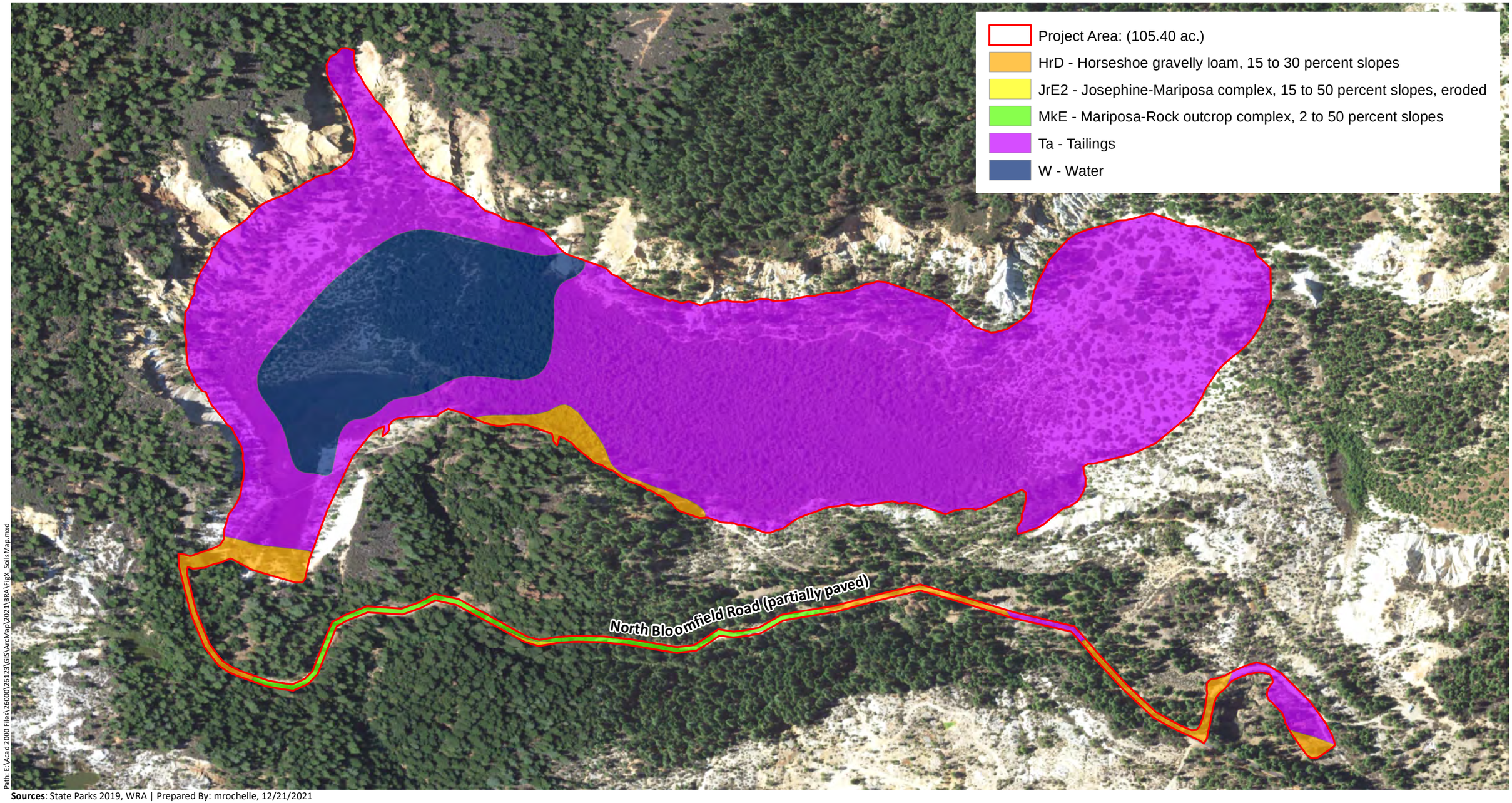

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Sources: State Parks 2019, WRA | Prepared By: mrochelle, 12/21/2021

Figure 4. Soils Map

Malakoff Diggins State Park
Biological Resources Assessment
Nevada County, California

0 400 800 Feet
1 Inch = 400 Feet

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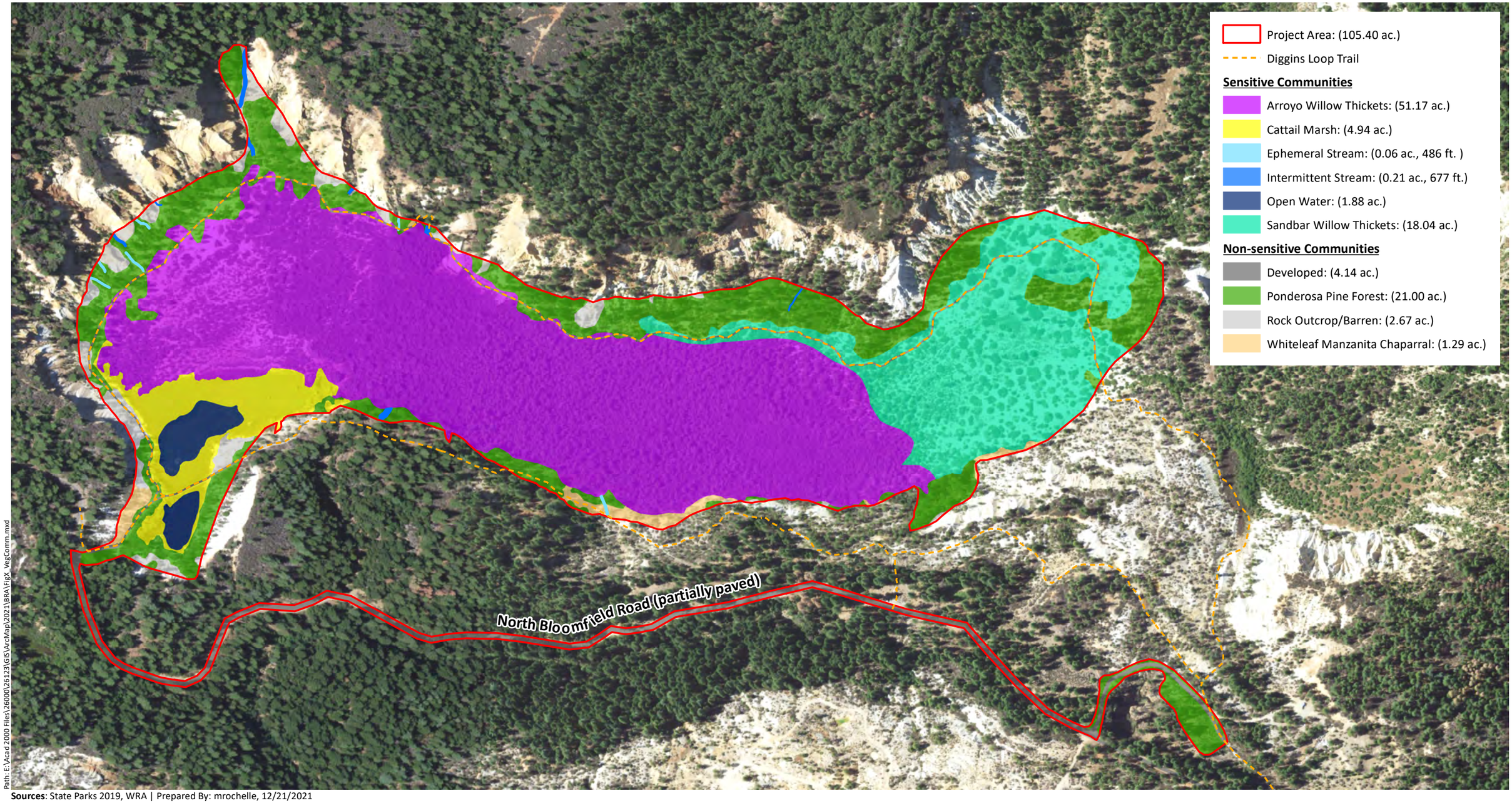

Sources: State Parks 2019, WRA | Prepared By: mrochelle, 12/21/2021

Figure 5. Vegetation Communities

Malakoff Diggins State Park
Biological Resources Assessment
Nevada County, California

0 400 800 Feet
1 Inch = 400 Feet

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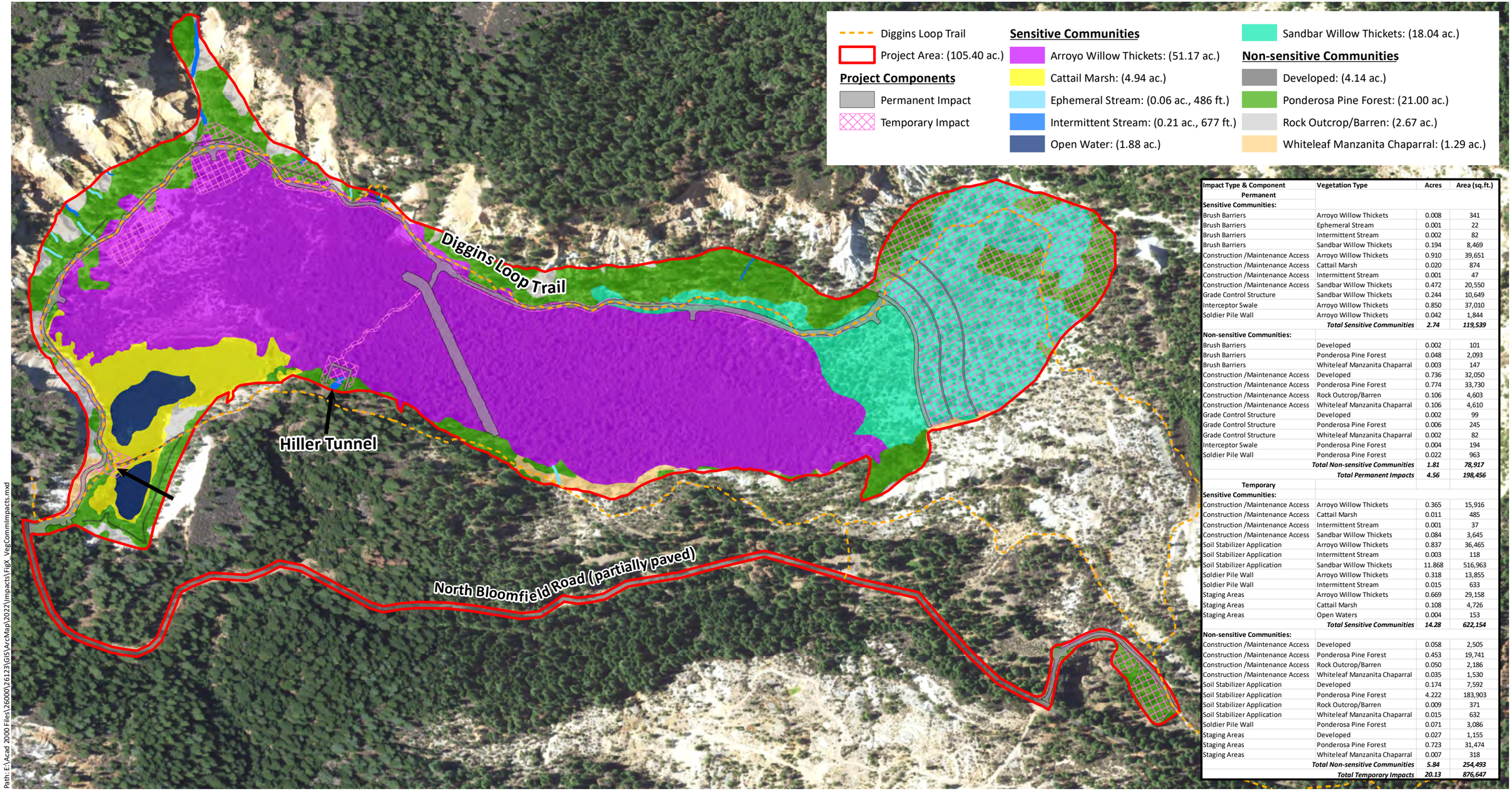

Impact Type & Component	Vegetation Type	Acres	Area (sq.ft.)
Permanent			
Sensitive Communities:			
Brush Barriers	Arroyo Willow Thickets	0.008	341
Brush Barriers	Ephemeral Stream	0.001	22
Brush Barriers	Intermittent Stream	0.002	82
Brush Barriers	Sandbar Willow Thickets	0.194	8,469
Construction /Maintenance Access	Arroyo Willow Thickets	0.910	39,651
Construction /Maintenance Access	Cattail Marsh	0.020	874
Construction /Maintenance Access	Intermittent Stream	0.001	47
Construction /Maintenance Access	Sandbar Willow Thickets	0.472	20,550
Grade Control Structure	Sandbar Willow Thickets	0.244	10,649
Interceptor Swale	Arroyo Willow Thickets	0.850	37,010
Soldier Pile Wall	Arroyo Willow Thickets	0.042	1,844
	Total Sensitive Communities	***2.74***	***119,539***
Non-sensitive Communities:			
Brush Barriers	Developed	0.002	101
Brush Barriers	Ponderosa Pine Forest	0.048	2,093
Brush Barriers	Whiteleaf Manzanita Chaparral	0.003	147
Construction /Maintenance Access	Developed	0.736	32,050
Construction /Maintenance Access	Ponderosa Pine Forest	0.774	33,730
Construction /Maintenance Access	Rock Outcrop/Barren	0.106	4,603
Construction /Maintenance Access	Whiteleaf Manzanita Chaparral	0.106	4,610
Grade Control Structure	Developed	0.002	99
Grade Control Structure	Ponderosa Pine Forest	0.006	245
Grade Control Structure	Whiteleaf Manzanita Chaparral	0.002	82
Interceptor Swale	Ponderosa Pine Forest	0.004	194
Soldier Pile Wall	Ponderosa Pine Forest	0.022	963
	Total Non-sensitive Communities	***1.81***	***78,917***
	Total Permanent Impacts	***4.56***	***198,456***
Temporary			
Sensitive Communities:			
Construction /Maintenance Access	Arroyo Willow Thickets	0.365	15,916
Construction /Maintenance Access	Cattail Marsh	0.011	485
Construction /Maintenance Access	Intermittent Stream	0.001	37
Construction /Maintenance Access	Sandbar Willow Thickets	0.084	3,645
Soil Stabilizer Application	Arroyo Willow Thickets	0.837	36,465
Soil Stabilizer Application	Intermittent Stream	0.003	118
Soil Stabilizer Application	Sandbar Willow Thickets	11.868	516,963
Soldier Pile Wall	Arroyo Willow Thickets	0.318	13,855
Soldier Pile Wall	Intermittent Stream	0.015	633
Staging Areas	Arroyo Willow Thickets	0.669	29,158
Staging Areas	Cattail Marsh	0.108	4,726
Staging Areas	Open Waters	0.004	153
	Total Sensitive Communities	***14.28***	***622,154***
Non-sensitive Communities:			
Construction /Maintenance Access	Developed	0.058	2,505
Construction /Maintenance Access	Ponderosa Pine Forest	0.453	19,741
Construction /Maintenance Access	Rock Outcrop/Barren	0.050	2,186
Construction /Maintenance Access	Whiteleaf Manzanita Chaparral	0.035	1,530
Soil Stabilizer Application	Developed	0.174	7,592
Soil Stabilizer Application	Ponderosa Pine Forest	4.222	183,903
Soil Stabilizer Application	Rock Outcrop/Barren	0.009	371
Soil Stabilizer Application	Whiteleaf Manzanita Chaparral	0.015	632
Soldier Pile Wall	Ponderosa Pine Forest	0.071	3,086
Staging Areas	Developed	0.027	1,155
Staging Areas	Ponderosa Pine Forest	0.723	31,474
Staging Areas	Whiteleaf Manzanita Chaparral	0.007	318
	Total Non-sensitive Communities	***5.84***	***254,493***
	Total Temporary Impacts	***20.13***	***876,647***

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Sources: State Parks 2019, WRA | Prepared By: mrochelle, 9/21/2022

Figure 6. Proposed Impacts to Vegetation Communities

Malakoff Diggins State Park
Biological Resources Assessment
Nevada County, California

0 400 800 Feet
1 Inch = 400 Feet

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