

Appendix A

Supplemental Material

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1 Appendix A Supplemental Material

2 A.1 List of Preparers

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**Table A-1.
Lead NEPA and CEQA Agencies**

Preparers	Agency	Participation
Mitch Hardwick	Corning Water District	Lead CEQA Agency Project Manager
Russ Grimes	Reclamation	Chief, Environmental Compliance and Habitat Conservation
Sheryl Looper	Reclamation	Deputy Regional Resources Manager
Natalie Wolder	Reclamation	Repayment Specialist
Linda Colella	Reclamation	Water Acquisition Program

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**Table A-2.
Consultants**

Name	Qualifications	Background/Expertise	Participation
CDM Smith			
Anusha Kashyap	M.S. Environmental Engineering 7 years experience	Environmental Engineer	Project Manager, Technical Review,
Carrie Buckman, P.E.	M.S. Environmental Engineering 18 years experience	Water Resources Engineer	Technical Review
Laura Lawson	B.S. Environmental Studies: Natural Resource Management and Conservation 2 years experience	Water Resources Planner	Primary Author, Deliverable Support
Gwen Pelletier, ENV SP	M.S. Environmental Studies 16 years experience	Environmental Scientist	Technical Review: Air Quality and Climate Change
Jennifer Jones	M.S. Environmental Science 20 years experience	Environmental Scientist	Technical Review: Biological Resources

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Key:
ENV SP = Envision Sustainability Professional
P.E. = Professional Engineer

1 **A.2 Acronyms**

2	AF	acre-feet
3	APCD	Air Pollution Control District
4	AQAP	Air Quality Attainment Plan
5	AQMD	Air Quality Management District
6	ATCM	Airborne Toxic Control Measure
7	CAAQS	California Ambient Air Quality Standard
8	CARB	California Air Resources Board
9	CCR	California Code of Regulations
10	CDFW	California Department of Fish and Wildlife
11	CEQA	California Environmental Quality Act
12	CFR	Code of Federal Regulations
13	cfs	cubic feet per second
14	CH ₄	methane
15	CO	carbon monoxide
16	CO ₂	carbon dioxide
17	CO ₂ e	carbon dioxide equivalent
18	CVHM	Central Valley Hydrologic Model
19	CVP	Central Valley Project
20	CVPIA	Central Valley Project Improvement Act
21	CWD	Corning Water District
22	dB	decibel
23	dba	A-weighted decibel
24	DWR	Department of Water Resources
25	EA	Environmental Assessment
26	EDD	Employment Development Department
27	EIS/EIR	Environmental Impact Statement/Environmental Impact Report
28	ESA	Endangered Species Acts
29	GHG	greenhouse gas
30	GIS	geographic information system
31	GMP	Groundwater Management Plan
32	GSP	Groundwater Sustainability Plan
33	GWP	global warming potential
34	HCP	Habitat Conservation Plan
35	hp	horsepower
36	ID	Irrigation District
37	IS	Initial Study
38	ITA	Indian Trust Asset

1	Ldn	day-night average sound level
2	MCL	maximum contaminant level
3	mg/L	milligrams per liter
4	N ₂ O	nitrous oxide
5	NAAQS	National Ambient Air Quality Standard
6	NCCP	Natural Community Conservation Plan
7	NEPA	National Environmental Policy Act
8	NMFS	National Marine Fisheries Service
9	NO _x	nitrogen oxides
10	NRCS	Natural Resources Conservation Service
11	O ₃	ozone
12	PM ₁₀	inhalable particulate matter
13	PM _{2.5}	fine particulate matter
14	Reclamation	U.S. Department of the Interior, Bureau of Reclamation
15	ROD	Record of Decision
16	SACFEM2013	Sacramento Valley Groundwater Model
17	SIP	state implementation plan
18	SLDMWA	San Luis & Delta-Mendota Water Authority
19	SRTTG	Sacramento River Temperature Task Group
20	SWP	State Water Project
21	SWRCB	State Water Resources Control Board
22	TCR	The Climate Registry
23	TDS	total dissolved solids
24	USC	United States Code
25	USDA	U.S. Department of Agriculture
26	USEPA	U.S. Environmental Protection Agency
27	USFWS	U.S. Fish and Wildlife Service
28	USGS	U.S. Geological Survey
29	VOC	volatile organic compound
30	WY	water year
31	YSRCP	Yuba-Sutter Regional Conservation Plan

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Appendix B

Special-Status Wildlife Species With Potential to Occur

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Appendix B
Special Status Wildlife Species with Potential to Occur

Special Status Species With Potential to Occur

Common Name Scientific Name	Federal Special Status*	State Special Status*	Distribution	Habitat Association	Seasonal Occurrence	Potential Impact
Invertebrates						
Conservancy fairy shrimp <i>Branchinecta conservation</i>	E, X	--	Northern two-thirds of the Central Valley. It ranges from Vina Plains of Tehama County; Sacramento NWR in Glenn County; Jepson Prairie Preserve and surrounding area east of Travis Air Force Base, Solano County; Mapes Ranch west of Modesto, Stanislaus County.	Inhabits the ephemeral water of swales and vernal pools. It is most commonly found in grass or mud bottomed swales, earth sump, or basalt flow depression pools in unplowed grasslands.	Has been collected from early December to early May.	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	T, X	--	Central Valley and surrounding foothills below 3,000 feet elevation.	Dependent on elderberry shrubs (host plant) as a food source. Potential habitat is shrubs with stems 1 inch in diameter within Central Valley.	Year round for host plant and exitholes; March-June for adults	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	T, X	--	Endemic to the Central Valley, Central Coast Mountains, and South Coast Mountains of California. It ranges from the Stillwater Plain in Shasta County through most of the length of the Central Valley to Paisley in Tulare County, and along the central Coast Range from northern Solano County to Pinnacles National Monument in San Benito County. Disjunct populations were also reported to occur in San Luis Obispo County, Santa Barbara County, and Riverside County	Inhabits the ephemeral water of swales and vernal pools. It is most commonly found in grassed or mud bottomed swales, earth sump, or basalt flow depression pools in unplowed grasslands.	Has been collected from early December to early May.	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action
Vernal pool tadpole shrimp <i>Lepidurus packardi</i>	E, X	--	Endemic to the Central Valley of California, with the majority of the populations occurring in the Sacramento Valley. This species has also been reported from the Sacramento River Delta to the east side of San Francisco Bay, and from a few scattered localities in the San Joaquin Valley from San Joaquin County to Madera County	Found in a variety of natural and artificial seasonally ponded habitat types including: vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, ditches, backhoe pits, and ruts caused by vehicular activities.	Has been collected from early December to early May.	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action
California tiger salamander <i>Ambystoma californiense</i>	T ¹ , E ² , X	CE, SSC	Found in annual grassland habitat, grassy understories of valley-foothill hardwood habitats, and uncommonly along stream courses in valley-foothill riparian habitats. Occurs from near Petaluma, Sonoma Co., east through the Central Valley to Yolo and Sacramento Counties and south to Tulare Co.; and from the vicinity of San Francisco Bay south to Santa Barbara County.	Lives in vacant or mammal-occupied burrows, occasionally other underground retreats, throughout most of the year, in grassland, savanna, or open woodland habitats. Lays eggs on submerged stems and leaves, usually in shallow ephemeral or semi permanent pools and ponds that fill during heavy winter rains, sometimes in permanent ponds; breeding takes place in fish free pools and ponds.	Migrates up to about 2 km between terrestrial habitat and breeding pond. Migrations may occur from November through April.	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.

Corning Water District Contract Amendment
Draft Environmental Assessment/Initial Study

Common Name Scientific Name	Federal Special Status*	State Special Status*	Distribution	Habitat Association	Seasonal Occurrence	Potential Impact
Reptiles						
Giant gartersnake <i>Thamnophis gigas</i>	T	T	Sacramento and San Joaquin Valleys from Butte County in the north to Kern County in the south.	Primarily associated with marshes, sloughs, and irrigation ditches. Generally absent in larger rivers.	Year round	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action
Western pond turtle <i>Actinemys marmorata</i>	Under review	SSC	Ranged from extreme western Washington and British Columbia to northern Baja California, mostly to the west of the Cascade-Sierra crest.	The western pond turtle occupies a wide variety of wetland habitats including rivers and streams (both permanent and intermittent), lakes, ponds, reservoirs, permanent and ephemeral shallow wetlands, abandoned gravel pits, stock ponds, and sewage treatment.	Year round	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action
Birds						
Bald eagle <i>Haliaeetus leucocephalus</i>	D, BGEPA	E	Throughout California.	Riparian areas near coasts, rivers, and lakes. Nesting generally occurs in large old-growth trees in areas with little disturbance.	Year round	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action
Bank swallow <i>Riparia riparia</i>	--	T, SSC	A neotropical migrant found primarily in riparian and other lowland habitats in California west of the deserts during the spring-fall period. Breeding population in California occurs along banks of the Sacramento and Feather rivers in the northern Central Valley.	Requires vertical banks and cliffs with fine-textured or sandy soils near streams, rivers, ponds, lakes, and the ocean for nesting. Feeds primarily over grassland, shrub land, savannah, and open riparian areas during breeding season and over grassland, brushland, wetlands, and cropland during migration.	March-mid-September	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Black-crowned night heron <i>Nycticorax nycticorax</i>	SC	Nesting colonies protected	Resident in lowlands and foothills throughout most of California, including the Salton Sea and Colorado River areas, and very common locally in large nesting colonies.	Feeds along the margins of lacustrine, large riverine, and fresh and saline emergent habitats. Nests and roosts in dense-foliaged trees and dense emergent wetlands.	Year round	Suitable habitat is present within the project area. Any impacts to this species would be positive as refuges would receive increased water supply as a result of the Proposed Action.
Burrowing owl <i>Athene cucularia</i>	--	SSC	Central and southern coastal habitats, Central Valley, Great Basin, and deserts.	Open annual grasslands or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Dependent upon burrowing mammals (especially California ground squirrel) for burrows.	Year round	There is little potential for this species to occur as no scrubland habitat is present within the associated refuges. However impacts to this species would be beneficial because the refuges would be receiving more water supply as a result of the Proposed Action.

Appendix B
Special Status Wildlife Species with Potential to Occur

Common Name Scientific Name	Federal Special Status*	State Special Status*	Distribution	Habitat Association	Seasonal Occurrence	Potential Impact
California black rail <i>Laterallis jamaicensis coturniculus</i>	FP	T	Majority found within the tidal salt marshes of the northern San Francisco Bay region, freshwater marshes in the foothills of the Sierra Nevada, and in the Colorado River Area.	Inhabits freshwater marshes, wet meadows, and shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	Year round	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Great blue heron <i>Ardea herodias</i>	--	Nesting colonies protected	Throughout California	Found in shallow estuaries, fresh and saline emergent wetlands, along riverine and rocky marine shores, in croplands, pastures, salt ponds, and in mountains above foothills. Nests roosts in large trees.	Year round	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action..
Great egret <i>Ardea alba</i>	--	Nesting colonies protected	Throughout California	Feeds and rests in fresh, and saline emergent wetlands, along the margins of estuaries, lakes, and slow-moving streams, on mudflats and salt ponds, and in irrigated croplands and pastures. Nests roosts in large trees.	Year round	Wetlands are present within the project area. Impacts to this species would be beneficial as a result of the Proposed Action.
Greater sandhill crane <i>Grus canadensis tabida</i>	--	T, FP	Breeds only in Siskiyou, Modoc and Lassen counties and in Sierra Valley, Plumas and Sierra counties. Winters primarily in the Sacramento and San Joaquin valleys from Tehama south to Kings Counties.	In summer, this species occurs in and near wet meadow, shallow lacustrine, and fresh emergent wetland habitats. Frequents annual and perennial grassland habitats, moist croplands with rice or corn stubble, and open, emergent wetlands. It prefers relatively treeless plains.	Migration southward is September-October and northward is March-April.	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Mountain plover <i>Charadrius montanus</i>	-	SSC	Breeds in the central United States. Winters in southern portions of California and Arizona, and into Mexico.	Found within short grasslands, freshly plowed fields, and newly sprouting grain fields. Prefers bare ground with short vegetation and flat topography, as well as grazed areas with burrowing rodents.	Wintering populations within California	Suitable habitat is present within the project area. Any impacts to this species would be positive as refuges would receive increased water supply as a result of the Proposed Action.
Northern harrier <i>Circus cyaneus</i>	--	SSC	Throughout lowland California, concentrated in the Central Valley and coastal valleys.	Breeds in annual grasslands and wetlands. Prefers marshes and grasslands for foraging and nesting. Also uses agricultural fields for nesting and foraging, although nests may be destroyed by agricultural activities.	Year round	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.

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Common Name Scientific Name	Federal Special Status*	State Special Status*	Distribution	Habitat Association	Seasonal Occurrence	Potential Impact
Osprey <i>Pandion haliaetus</i>	--	WL	Northern California from Cascade Ranges south to Lake Tahoe, and along the coast south to Marin County.	Associated strictly with large, fish-bearing waters, primarily in ponderosa pine through mixed conifer habitats.	Year round	There is little potential for this species to occur as ponderosa pine habitat is not present within the Sacramento Valley refuges. However, any impacts to this species as a result of this Proposed Action would be beneficial.
Song sparrow ("Modesto" population) <i>Melospiza melodia</i>	-	SSC	Throughout the United States and Canada, this specific population is found within the City of Modesto, California.	Open habitat, including marsh edges, overgrown fields, backyards, desert washes, and forest edges. Song sparrows commonly visit bird feeders and build nests in residential areas.	Year round	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Swainson's hawk <i>Buteo swainsoni</i>	SC, MNBMC	T	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley.	Nests in mature trees, including valley oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain and row crop fields.	Spring and Summer; small wintering population in the Delta	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Tricolored blackbird <i>Agelaius tricolor</i>	--	SSC	A resident in California found throughout the Central Valley and in coastal districts from Sonoma County south.	Breeds near fresh water, preferably in emergent wetlands with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, tall herbs. Feeds in grassland and cropland habitats.	Year round	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Western yellow-billed cuckoo <i>Coccyzus americanus</i>	T	E	Uncommon to rare summer resident in scattered locations throughout California.	Deciduous riparian thickets or forests with dense, low-level or understory foliage, and which abut on slow-moving watercourses, backwaters, or seeps. Willow almost always a dominant component of the vegetation. In Sacramento Valley, also utilizes adjacent orchards, especially of walnut. Nests in sites with some willows, dense low-level or understory foliage, high humidity, and wooded foragingspaces.	Summer migration is from June-September.	There is potential for this species to occur as riparian vegetation is present. However impacts to this species would be beneficial because the refuges would be receiving more water supply as a result of the Proposed Action.
White-faced ibis <i>Plegadis chihi</i>	--	WL	Uncommon summer resident in sections of southern California, a rare visitor in the Central Valley, and is more widespread in migration.	Feeds in fresh emergent wetlands, shallow lacustrine waters, muddy grounds of wet meadows, and irrigated or flooded pastures and croplands. Nests in dense, fresh emergent wetlands.	Present in California from April-October.	Wetlands are present within the project area. Impacts to the species would be positive as a result of the Proposed Action.

Appendix B
Special Status Wildlife Species with Potential to Occur

Common Name Scientific Name	Federal Special Status*	State Special Status*	Distribution	Habitat Association	Seasonal Occurrence	Potential Impact
Mammals						
American badger <i>Taxidea taxus</i>	-	SSC	Found in the majority of the central and western United States, as well as parts of Canada and Mexico.	Drier open stages of shrub, forest, and herbaceous habitats, with friable soil. Requires sufficient foots and open, uncultivated ground. Preys on burrowing rodents.	Year-round	Suitable habitat is present within the Sacramento Valley refuges. Any impact toward the species would be beneficial as a result of the Proposed Action.
Western red bat <i>Lasiurus blossevillii</i>	-	SSC	Found throughout most of California from Shasta County all the way to the Mexican border.	Habitat edges and mosaics with trees that are protected from above and clear below with open areas for foraging. Primarily roosts within trees 2-40 feet above the ground.	Migration between summer (regions of Northern California) and winter ranges (Southern California/Mexico)	There is potential for this species to occur, however any impact to this species as a result of the Proposed Action would be beneficial.
Fish						
Chinook Salmon (Winter-run) <i>Oncorhynchus tshawytscha</i>	E	E	Distributed throughout northern California.	Utilizing both fresh and salt water habitats, this species requires spawning sites within the stream or river where water velocity, depth, and gravel size are optimal for the incubation of developing eggs.	Spawning December - Early August	None. Occurrences have been documented and suitable habitat is present in project area. However, flow reductions as a result of this project would be low and would not affect this species.
Chinook Salmon (Spring-run) <i>Oncorhynchus tshawytscha</i>	T	T	Distributed throughout northern California.	Same as described in Chinook Salmon (Winter-run)	Spawning Late March - September	None. Occurrences have been documented. Suitable habitat is present in project area. However, flow reductions as a result of this project would be low and would not affect this species.
Central Valley Steelhead <i>Oncorhynchus mykiss</i>	T	-	Native to streams along the Pacific coast of North America	Populations inhabit small headwater streams, large rivers, lakes, or reservoirs; often in cool clear lakes and cool swift streams with silt-free substrate. Usually requires a gravel riffle for successful spawning.	Year round	None. Occurrences have been documented. Suitable habitat is present in project area. However, flow reductions as a result of this project would be low and would not affect this species.
Green sturgeon <i>Acipenser medirostris</i>	T	-	Throughout northern and central California; Humboldt Bay, San Francisco Bay and Delta, Monterey Bay, Sacramento, Feather, and Yuba Rivers.	Utilizing both freshwater and saltwater habitat, Green Sturgeon spawn in deep pools, in large turbulent freshwater river mainstems.	Year round	None. No occurrences have been documented. In addition, flow reductions as a result of this project would be low and would not affect this species.

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Hardhead <i>Mylopharodon conocephalus</i>	-	SSC	Widely distributed in streams at low to mid-elevations in the Sacramento-San Joaquin and Russian River drainages.	Found at low to mid-elevations in relatively undisturbed habitats of larger streams with high water quality. In the Sacramento River, however, they are common in both the mainstream and tributaries up to approximately 5,000 feet in elevation.	Year round	None. No occurrences have been documented. Suitable habitat is present in project area. However, flow reductions as a result of this project would be low and would not affect this species.
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	-	SSC	Largely confined to the Delta, Suisun Bay, Suisun Marsh, Napa River, Petaluma River, and other parts of the San Francisco Estuary, while spawning on upstream floodplains and channel edges.	Adapted to estuarine life so they are tolerant of a wide range of salinities and temperatures. Require a rising hydrograph for upstream migration and flooded vegetation for spawning and rearing areas for their early life history stages.	Year round	None. Occurrences have been documented. Suitable habitat is present in project area. However, flow reductions as a result of this project would be low and would not affect this species.
Chinook Salmon (Fall/late-fall run) <i>Oncorhynchus tshawytscha</i>	-	SSC	Found primarily in the Sacramento River.	Same as described in Chinook Salmon (Winter-run)	Spawning in July - December	None. Occurrences have been documented. Suitable habitat is present in project area. However, flow reductions as a result of this project would be low and would not affect this species.

¹Central CA DPS

²Santa Barbara and Sonoma Counties

Green Shading: potential to be affected, further evaluated in Chapter 3

*** Status explanations:**

Federal

E = listed as endangered under the federal Endangered Species Act

T = listed as threatened under the federal Endangered Species Act

C = Candidate for listing as threatened or endangered

SC = species of concern; formerly Category 2 candidate for federal listing

BGEPA = Bald and Golden Eagle Protection Act

MNBMC = Fish and Wildlife Service: Migratory Nongame Birds of Management Concern

-- = no designations

X = critical habitat

PX = potential critical habitat

D = delisted

State

E = listed as endangered under the California Endangered Species Act

T = listed as threatened under the California Endangered Species Act

CE = candidate endangered under the California Endangered Species Act

FP = fully protected under the California Fish and Game Code

SSC = species of special concern

WL = Watch List

-- = no designations

Appendix C

Special-Status Plant Species with Potential to Occur

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Common Name Scientific name	Special Status* (F/S/CNPS)	Distribution	Habitat Association	Blooming Period	Potential Impact
Baker's navarretia <i>Navarretia leucocephala ssp. bakeri</i>	-/-/1B	Dispersed throughout northern California	Meadows and vernal pools	April- July	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Barstow woolly sunflower <i>Eriophyllum mohavense</i>	-/-/1B	Concentrated in the southern regions of California	Chenopod scrub, Mojavean desert scrub, and playas	March- May	There is little potential for this species to occur as no chenopod scrub, desert scrub, and playas habitat are present within the Sacramento Valley refuges. If the species were to occur within the project area, there would be a positive impact as a result of the Proposed Action.
Bent-flowered fiddleneck <i>Amsinckia lunaris</i>	-/-/1B	Western Central Valley and adjacent foothills, Delta region	Coastal bluff scrub, Cismontane woodland, valley and foothill grassland	March-June	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact on this species as a result of the Proposed Action.
Brazilian watermeal <i>Wolffia brasiliensis</i>	-/-/2B	Found within the Sacramento Valley.	Wetland-riparian	April-December	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Brittlescale <i>Atriplex depressa</i>	-/-/1B	Western Central Valley and valleys of adjacent foothills.	Alkali grassland, alkali meadow, alkali scrub, and vernal pools.	April-October	There is a potential for this species to occur within one of the Sacramento Valley refuges. Due to the increase in water supply as a result of the Proposed Action, this species would be positively affected.

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Common Name Scientific name	Special Status* (F/S/CNPS)	Distribution	Habitat Association	Blooming Period	Potential Impact
California alkali grass <i>Puccinellia simplex</i>	-/-/1B	Dispersed throughout the Sacramento and Central Valley. Also in the southern and eastern mountain ranges.	Valley grassland, wetland-riaprian.	March-May	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Caper-fruited tropidocarpum <i>Tropidocarpum capparideum</i>	-/-/1B	Found throughout the Central Valley and coast of California	Valley grassland	March-April	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Colusa grass <i>Neostapfia colusana</i>	T/E/1B	Southern Sacramento Valley, and northern San Joaquin Valley.	Vernal pools.	May-July	There is a potential for this species to occur within one of the Sacramento Valley refuges. Due to the increase in water supply as a result of the Proposed Action, this species would be positively affected.
Colusa layia <i>Layia septentrionalis</i>	-/-/1B	Populations are concentrated in the Sacramento Valley and associated foothills	Sandy, serpentinite soils of chaparral, cismontane woodland, valley, and foothill grasslands.	April-May	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Coulter's goldfields <i>Lasthenia glabrata</i> <i>ssp. coulteri</i>	-/-/1B	Dispersed throughout California, concentrated in the southern coastal ranges and Central Valley of California	Marshes and swamps (coastal salt), playas, and vernal pools.	February- June	Suitable habitat is present within one of the Sacramento Valley refuges. The species will be positively impacted due to the increase in water supply to the refuges as a result of the Proposed Action.

Appendix C
Special-Status Plant Species with Potential to Occur

Common Name Scientific name	Special Status* (F/S/CNPS)	Distribution	Habitat Association	Blooming Period	Potential Impact
Ferris' milk-vetch <i>Astragalus tener</i> var. <i>ferrisae</i>	-/-/1B	Sacramento Valley.	Subalkaline flats and areas around vernal pools.	March-June	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Greene's tuctoria <i>Tuctoria greeni</i>	E/SSC/1B	Butte, Colusa, Fresno, Glenn, Madera, Merced, Modoc, Shasta, San Joaquin, Stanislaus, Tehama, and Tulare Counties.	Vernal pools.	May-July	Suitable habitat is present within one of the Sacramento Valley refuges. The species will be positively impacted due to the increase in water supply to the refuges as a result of the Proposed Action.
Hairy Orcutt grass <i>Orcuttia pilosa</i>	E/E/1B	Northern Sacramento Valley, Pit River Valley; isolated populations in Lake and Sacramento counties.	Vernal pools.	May-September	There is a potential for this species to occur within one of the Sacramento Valley refuges. Due to the increase in water supply as a result of the Proposed Action, this species would be positively affected.
Hartweg's golden sunburst <i>Pseudobahia bahiifolia</i>	E/E/1B	Scattered throughout the Central Valley	Found within clay, often acidic soils of Cismontane woodland, Valley and Foothill grassland	March- April	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Heartscale <i>Atriplex cordulata</i>	-/-/1B	Western Central Valley and valleys of adjacent foothills.	Alkali grasslands, alkali meadows, and alkali scrub.	May-October	Suitable habitat is present within the project area, however any impacts to the species would be positive, as water supplies within the refuges will increase as a result of the Proposed Action.

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Common Name Scientific name	Special Status* (F/S/CNPS)	Distribution	Habitat Association	Blooming Period	Potential Impact
Heckard's pepper-grass <i>Lepidium latipes</i> var. <i>heckardii</i>	-/-1B	Glenn, Solano, and Yolo Counties.	Valley and foothill grassland alkaline flats.	March-May	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Hoover's spurge <i>Chamaesyce hooveri</i>	T/- 1B	Scattered in Glenn, Butte, Colusa, Merced, Stanislaus, Tehama, and Tulare Counties.	Vernal pools.	July-September	There is likely to be a positive impact on this species because of the increased water supply to the Sacramento Valley refuges, as a result of the Proposed Action.
Lesser saltscale <i>Atriplex minuscule</i>	-/-1B	Found within mid to southern portions of the Central Valley	Shadscale Scrub, Valley Grassland, Alkali Sink. Usually occurs in non-wetlands, but occasionally found in wetlands.	May- October	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Palmate-bracted bird's-beak <i>Cordylanthus palmatus</i>	E/E/1B	Found in Glenn and Colusa Counties and within the Central Valley.	Alkali meadow, alkali scrub, valley and grasslands.	May-October	There is a potential for this species to be present as the Sacramento Valley refuges have suitable habitat. There would be a positive impact due to the increase in water supply within the refuges as a result of the Proposed Action.
Pappose tarplant <i>Centromadia parryi</i> ssp. <i>parryi</i>	-/-1B	Found within the Sacramento Valley and Delta	Found within alkaline chaparral, coastal prairie, meadows and seeps, marshes and swamps, and valley and foothill grassland (vernally mesic)	May- November	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Peruvian dodder <i>Cuscuta obtusiflora</i> var. <i>glandulosa</i>	-/-2B	Found scatter throughout the Central Valley	Marshes and swamps (freshwater)	July-October	Suitable habitat is present within one of the Sacramento Valley refuges. The species will be positively impacted due to the increase in water supply to the refuges as a result of the Proposed Action.

Appendix C
Special-Status Plant Species with Potential to Occur

Common Name Scientific name	Special Status* (F/S/CNPS)	Distribution	Habitat Association	Blooming Period	Potential Impact
Pink creamsacs <i>Castilleja rubicundula</i> var. <i>rubicundula</i>	-/-/1B	Found mostly within the Sacramento Valley	Chaparral, Cismontane woodland, meadows and seeps, valley and foothill grasslands	April-June	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Recurved larkspur <i>Delphinium recurvatum</i>	-/-/1B	Disbursed throughout the Sacramento and Central Valley.	Chenopod scrub, cismontane, valley and foothill grasslands (alkali).	March-June	Suitable habitat is present, however the impact would be beneficial as the refuges receive increased water supply as a result of the Proposed Action.
Round-leaved filaree <i>California macrophylla</i>	-/-/1B	Dispersed throughout the coastal regions of California, excluding the most northern counties	Valley grassland, Foothill Woodland	March-May	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
San Joaquin spearscale <i>Atriplex joaquiniana</i>	-/-/1B	Western Central Valley and valleys of adjacent foothills.	Alkali grasslands, and alkali scrub.	April-September	Suitable habitat is present within one of the Sacramento Valley refuges. The species will be positively impacted due to the increase in water supply to the refuges as a result of the Proposed Action.
Sanford's arrowhead <i>Sagittaria sanfordii</i>	-/-/1B	Central Valley.	Freshwater marshes, shallow streams, and ditches.	May-August	There is likely to be a positive impact on this species because of the increased water supply to the Sacramento Valley refuges, as a result of the Proposed Action.
Subtle orache <i>Atriplex subtilis</i>	-/-/ 1B	Found mostly within the southern counties of the Central Valley	Alkaline valley and foothill grasslands	June, August, September, October	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.

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Common Name Scientific name	Special Status* (F/S/CNPS)	Distribution	Habitat Association	Blooming Period	Potential Impact
Veiny monardella <i>Monardella venosa</i>	-/-1B	Found scattered throughout the Sacramento Valley.	Found within heavy clay soils of Cismontane woodlands and Valley/Foothill grasslands	May-July	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Vernal pool smallscale <i>Atriplex persistens</i>	-/-1B	Found dispersed throughout the Central Valley	Alkaline vernal pools	June-October	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Water star-grass <i>Heteranthera dubia</i>	-/-2B	Found scattered throughout the Delta, Sacramento Valley, and Modoc County	Requires a pH of 7 or higher, usually in slightly eutrophic waters. Marshes and swamps (alkaline, still, or slow-moving water)	July -October	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Watershield <i>Brasenia schreberi</i>	-/-2B	Found scattered throughout Northern California	Freshwater marshes and swamps	June-September	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Woolly rose-mallow <i>Hibiscus lasiocarpus</i> <i>var. occidentalis</i>	-/-1B	Found within the northern portion of the Central Valley	Freshwater marshes and swamps, often found within rip rap on sides of levees	June-September	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.
Wright's trichocornis <i>Trichocoronis</i> <i>wrightii var. wrightii</i>	-/-2B	Scattered throughout the Central Valley	Alkaline soils of meadows and seeps, marshes and swamps, riparian forest, and vernal pools	May-September	There is potential for this species to occur within one of the Sacramento Valley refuges, however there will be a positive impact to this species as a result of the Proposed Action.

Source: Calflora 2017

***Status explanations:**

F=Federal

E=Endangered

T=Threatened

SC= Special Concern

S=State

E=Endangered

T=Threatened

SSC=Species of Special Concern

CNPS=California Native Plant Society

1B=Rare, threatened, or endangered in California and elsewhere

2=Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

3=Plants about which we need more information - A review list

Appendix D

Groundwater Existing Conditions

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Appendix D

Groundwater Existing Conditions

This appendix includes the following figures:

1. Statewide groundwater level change Spring 2008 to Spring 2018. This figure was retrieved from DWR's Groundwater Management website: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Maps/Statewide-Groundwater-Level-Change-Maps/DOTMAPS_Spring/DOTMAP_S2018-S2008.pdf
2. Statewide groundwater level change Spring 2015 to Spring 2018. This figure was retrieved from DWR's Groundwater Management website: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Maps/Statewide-Groundwater-Level-Change-Maps/DOTMAPS_Spring/DOTMAP_S2018-S2015.pdf
3. Statewide groundwater level change Spring 2017 to Spring 2018. This figure was retrieved from DWR's Groundwater Management website: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Maps/Statewide-Groundwater-Level-Change-Maps/DOTMAPS_Spring/DOTMAP_S2018-S2017.pdf
4. Spring 2011 to Spring 2017 change in groundwater elevation in shallow (<200 feet bgs) wells. These figures were retrieved from DWR's Groundwater Management website: <https://water.ca.gov/Programs/Groundwater-Management/Data-and-Tools>
5. Spring 2011 to Spring 2017 change in groundwater elevation in intermediate (200-600 feet bgs) wells. These figures were retrieved from DWR's Groundwater Management website: <https://water.ca.gov/Programs/Groundwater-Management/Data-and-Tools>
6. Spring 2011 to Spring 2017 change in groundwater elevation in deep (>600 Feet bgs) wells. These figures were retrieved from DWR's Groundwater Management website: <https://water.ca.gov/Programs/Groundwater-Management/Data-and-Tools>

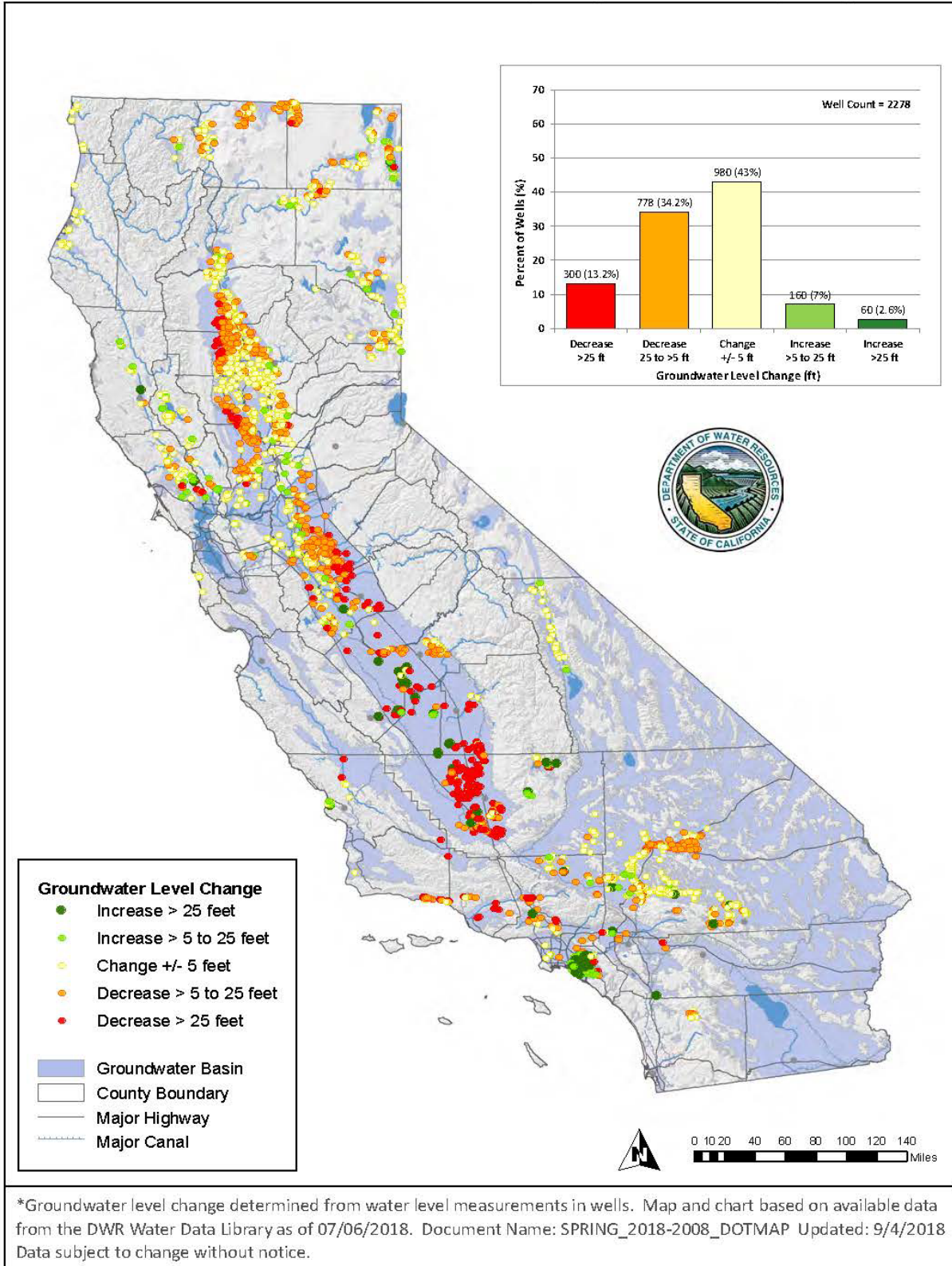
7. Groundwater monitoring data for wells within the seller districts. DWR's CASGEM website and was used to obtain the monitoring data. The process to query out the groundwater level data is explained below.

Direction to manually lookup groundwater level data from DWR's CASGEM website:

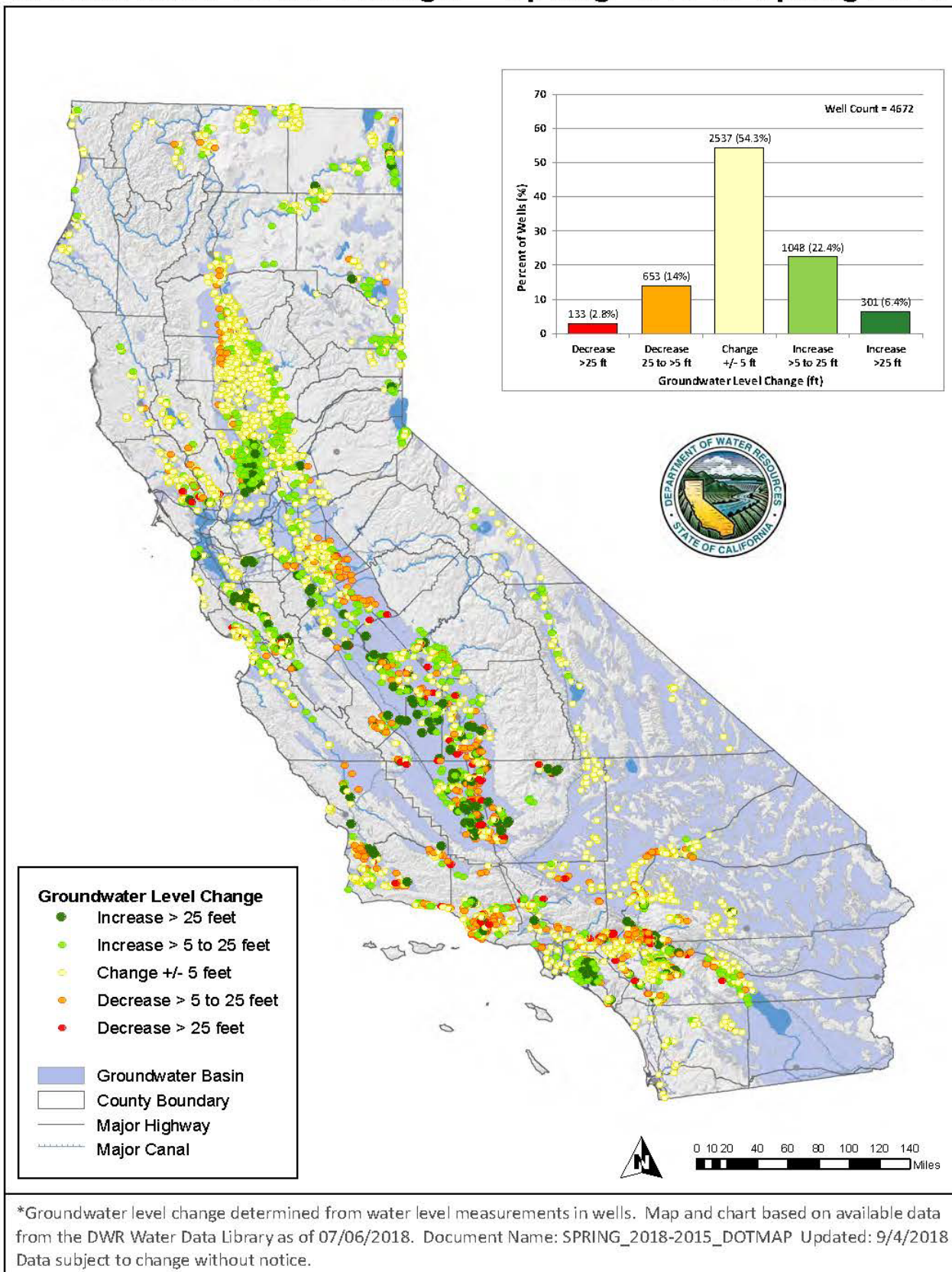
1. Go to CASGEM Public Login website:
[https://www.casgem.water.ca.gov/OSS/\(S\(nbhev0nay0kjolbvugv1x5zx\)\)/Default.aspx?ReturnUrl=%2fOSS%2fPublic%2fSearchWells.aspx](https://www.casgem.water.ca.gov/OSS/(S(nbhev0nay0kjolbvugv1x5zx))/Default.aspx?ReturnUrl=%2fOSS%2fPublic%2fSearchWells.aspx)
(setup login if not previously done)
2. Select Well Information>State Well Number. Input well number.
3. Go to Well Details: View> View Hydrograph

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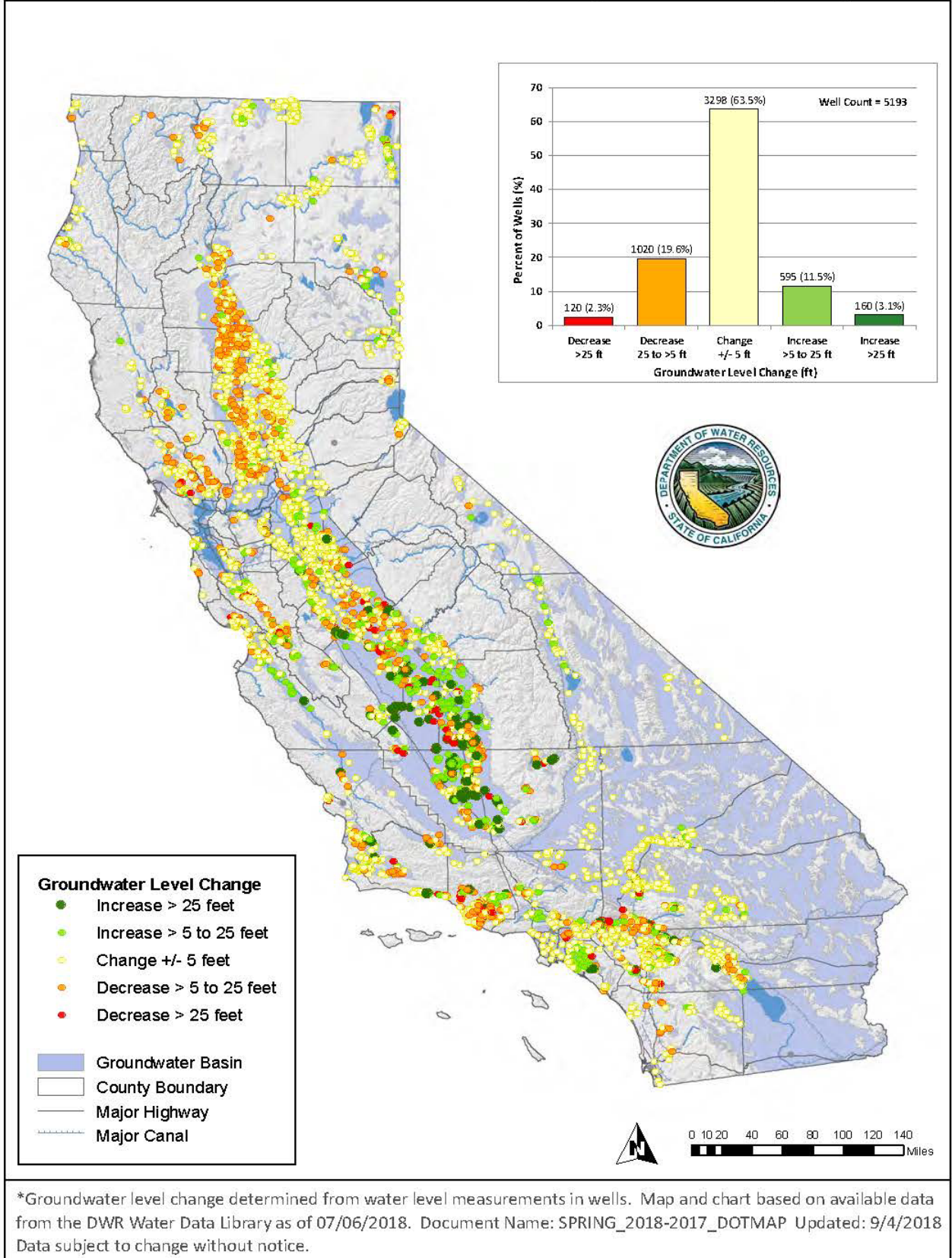
Groundwater Level Change* - Spring 2008 to Spring 2018

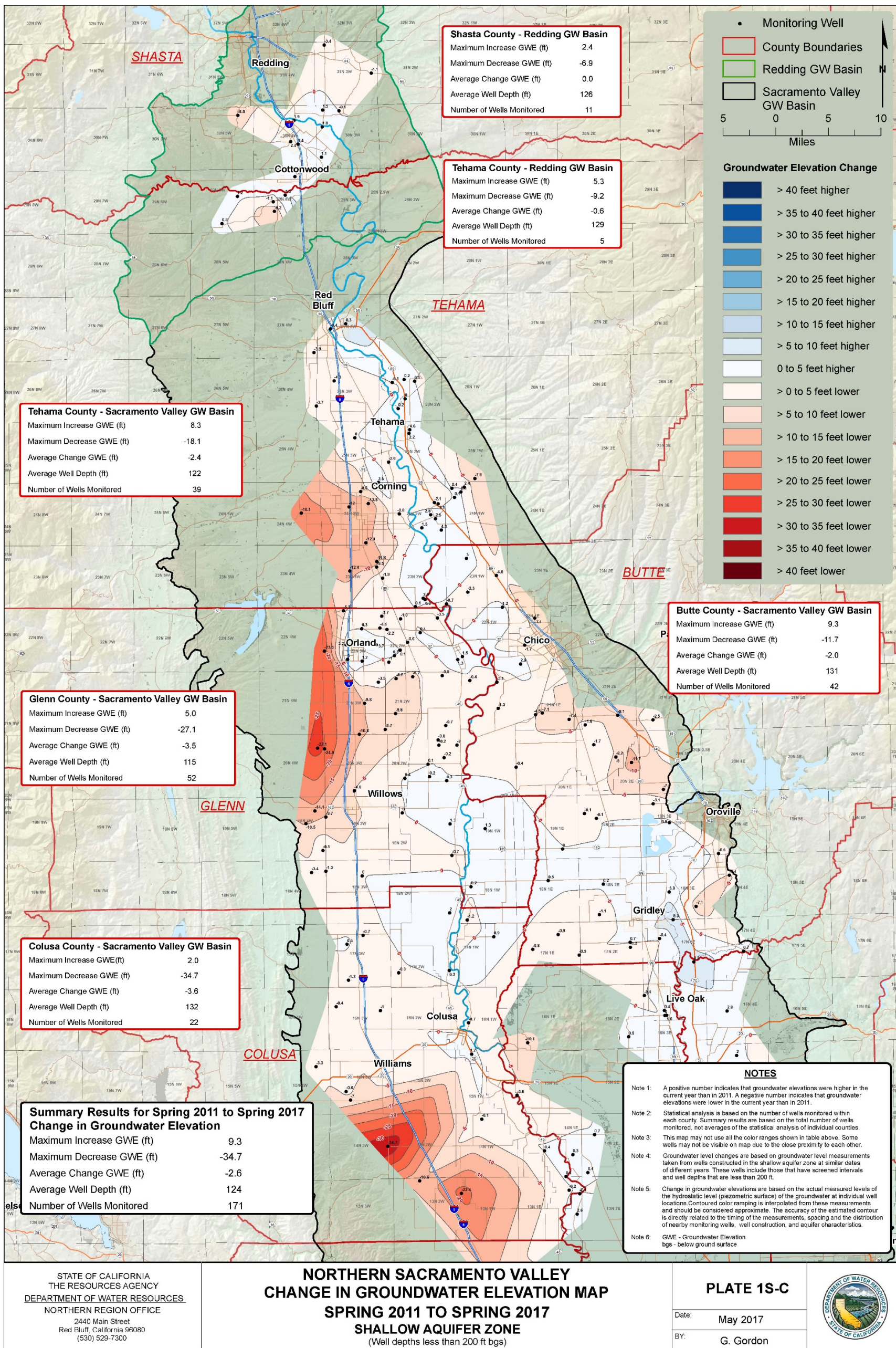


Groundwater Level Change* - Spring 2015 to Spring 2018



Groundwater Level Change* - Spring 2017 to Spring 2018





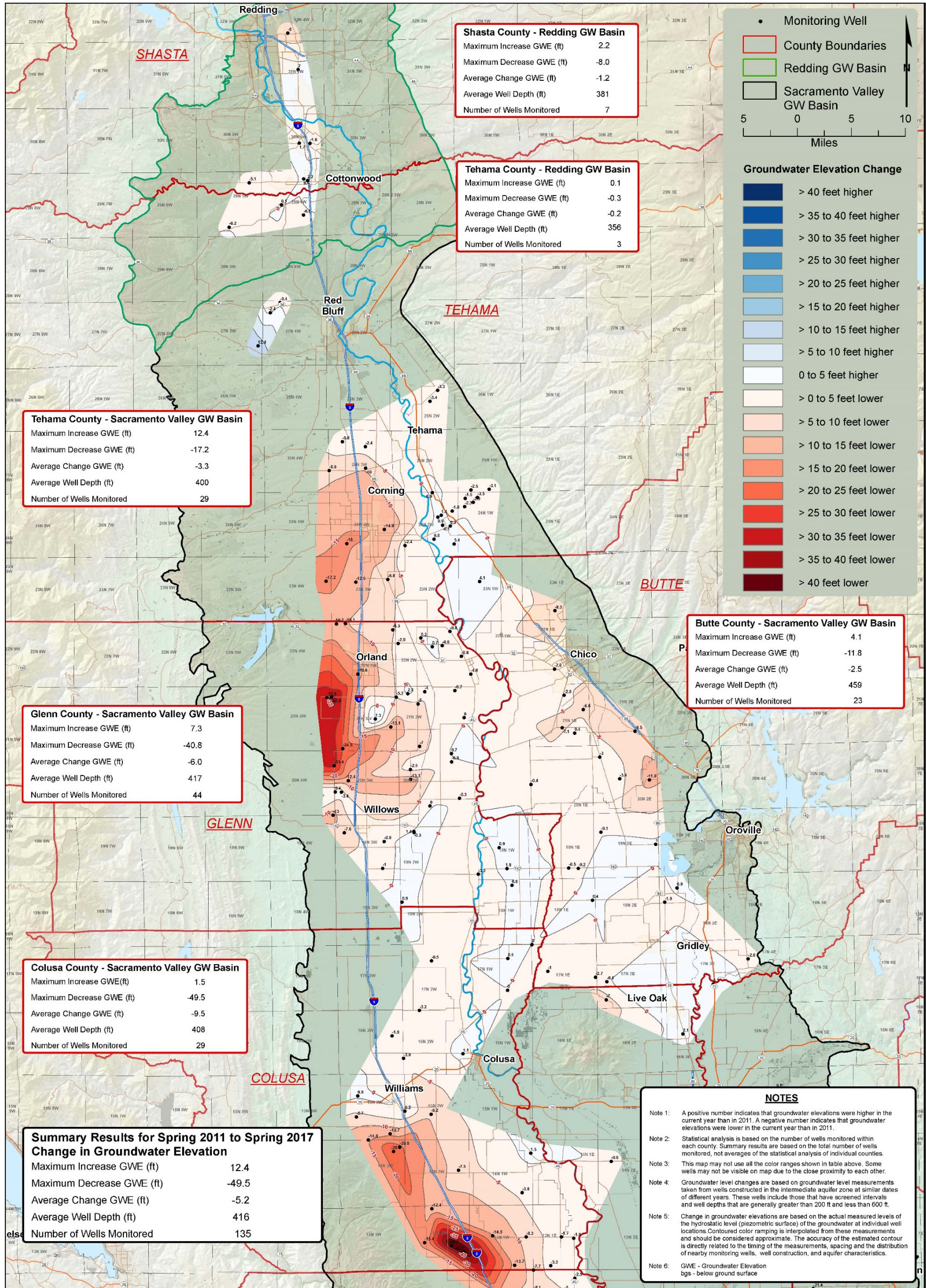
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
NORTHERN REGION OFFICE
2440 Main Street
Red Bluff, California 96080
(530) 529-7300

**NORTHERN SACRAMENTO VALLEY
CHANGE IN GROUNDWATER ELEVATION MAP
SPRING 2011 TO SPRING 2017
SHALLOW AQUIFER ZONE**
(Well depths less than 200 ft bgs)

PLATE 1S-C
Date: May 2017
BY: G. Gordon



http://www.water.ca.gov/groundwater/data_and_monitoring/northern_region/GroundwaterLevel/gw_level_monitoring.cfm



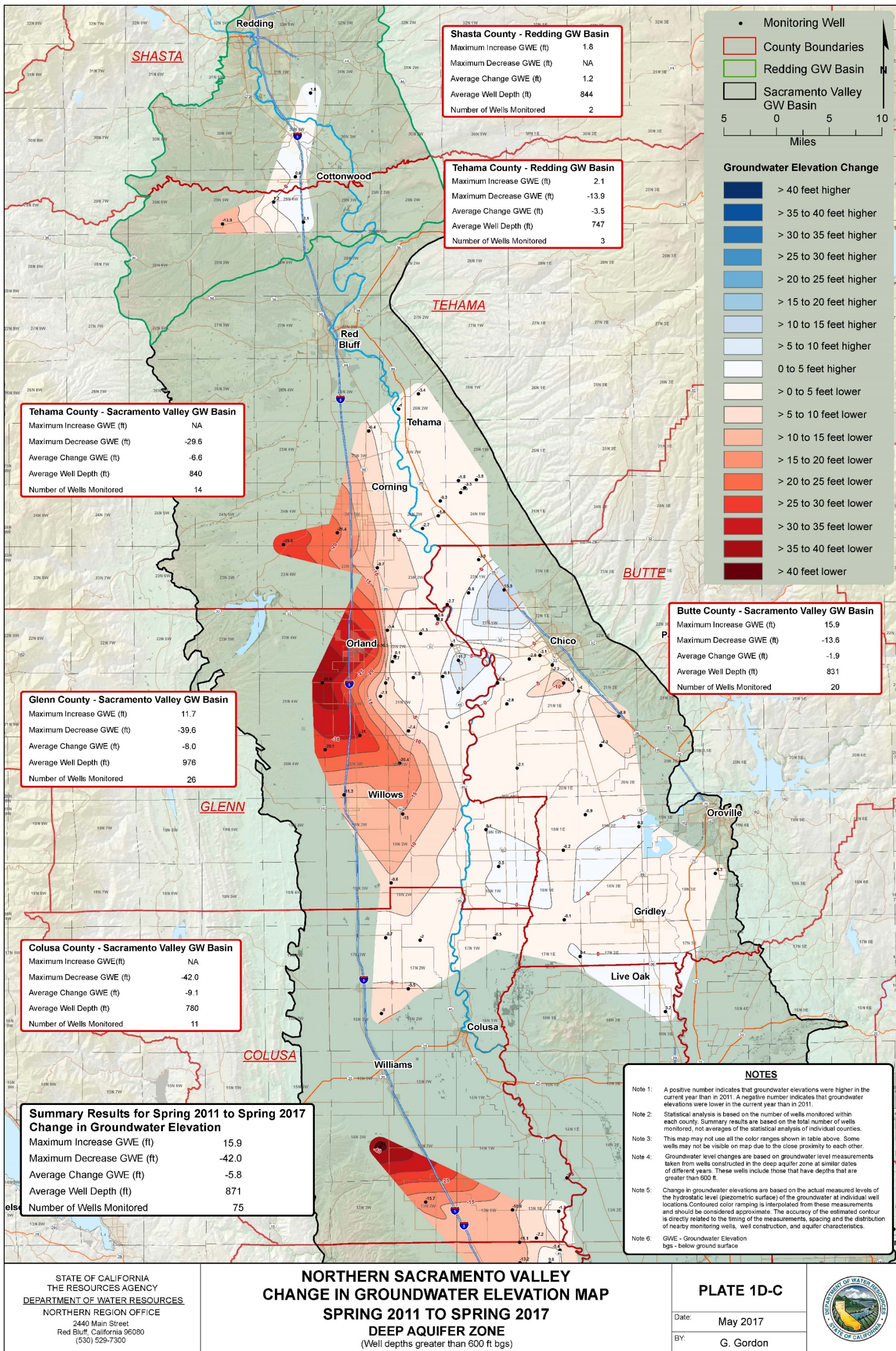
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
NORTHERN REGION OFFICE
2440 Main Street
Red Bluff, California 96080
(530) 529-7300

**NORTHERN SACRAMENTO VALLEY
CHANGE IN GROUNDWATER ELEVATION MAP
SPRING 2011 TO SPRING 2017
INTERMEDIATE AQUIFER ZONE**
(Well depths generally greater than 200 ft and less than 600 ft deep bgs)

PLATE 11-C
Date: May 2017
BY: G. Gordon



http://www.water.ca.gov/groundwater/data_and_monitoring/northern_region/GroundwaterLevel/gw_level_monitoring.cfm



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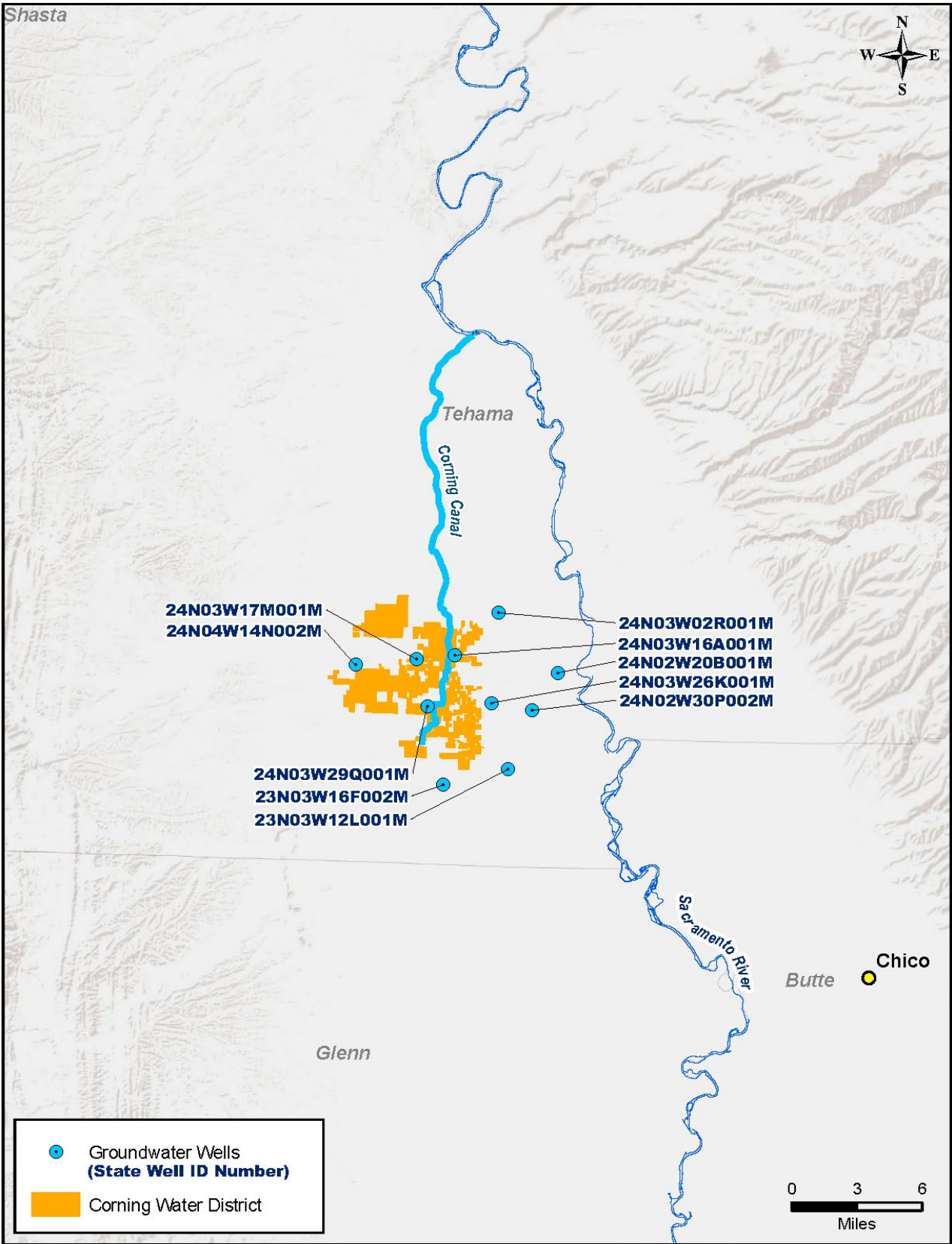
**NORTHERN SACRAMENTO VALLEY
CHANGE IN GROUNDWATER ELEVATION MAP
SPRING 2011 TO SPRING 2017
DEEP AQUIFER ZONE**
(Well depths greater than 600 ft bgs)

PLATE 1D-C

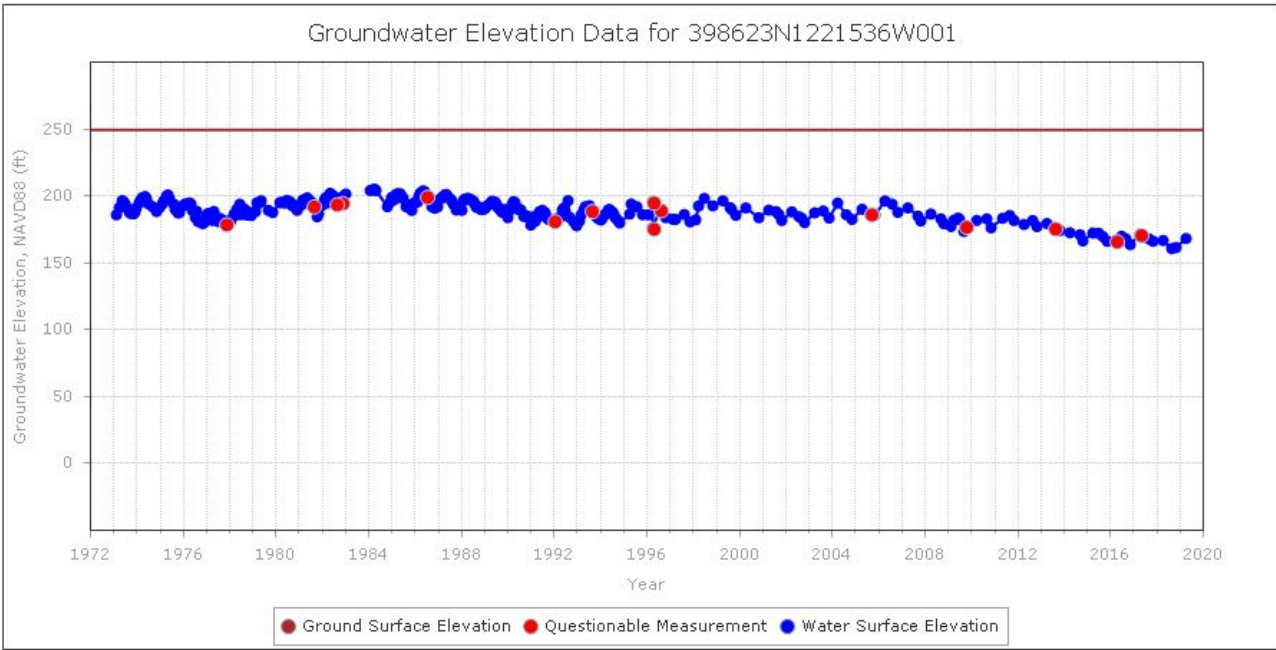
Date: May 2017
BY: G. Gordon



http://www.water.ca.gov/groundwater/data_and_monitoring/northern_region/GroundwaterLevel/gw_level_monitoring.cfm

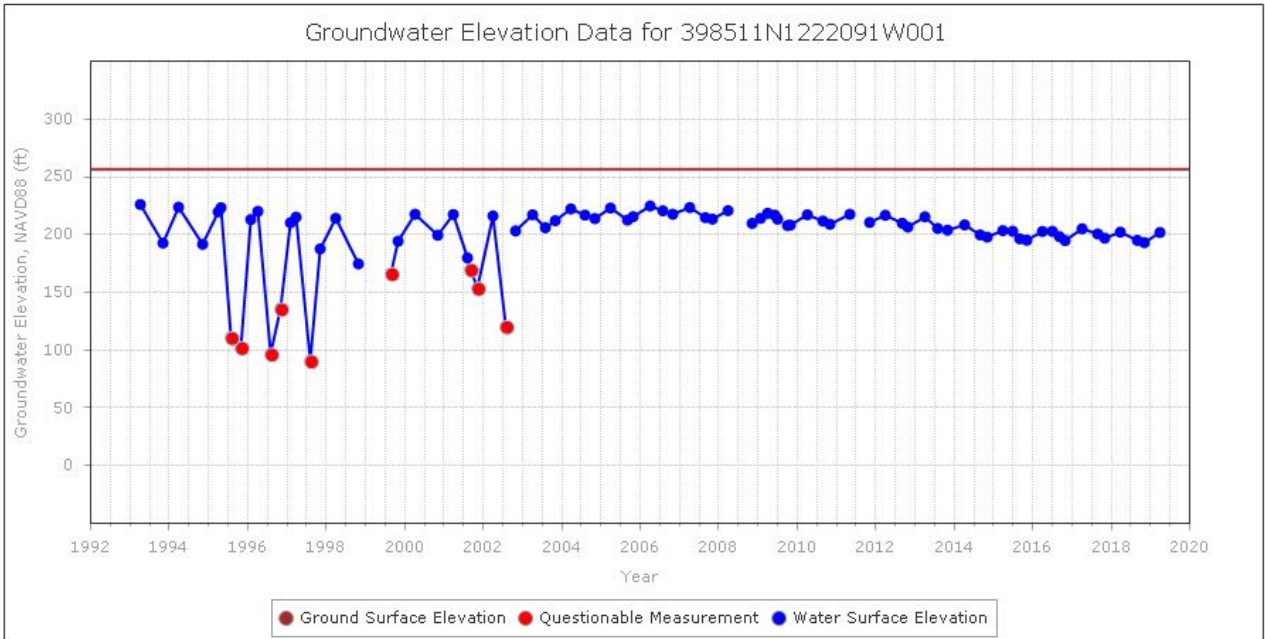


Corning Groundwater Sub-basin
State Well ID 23N03W12L001M



Source: CASGEM

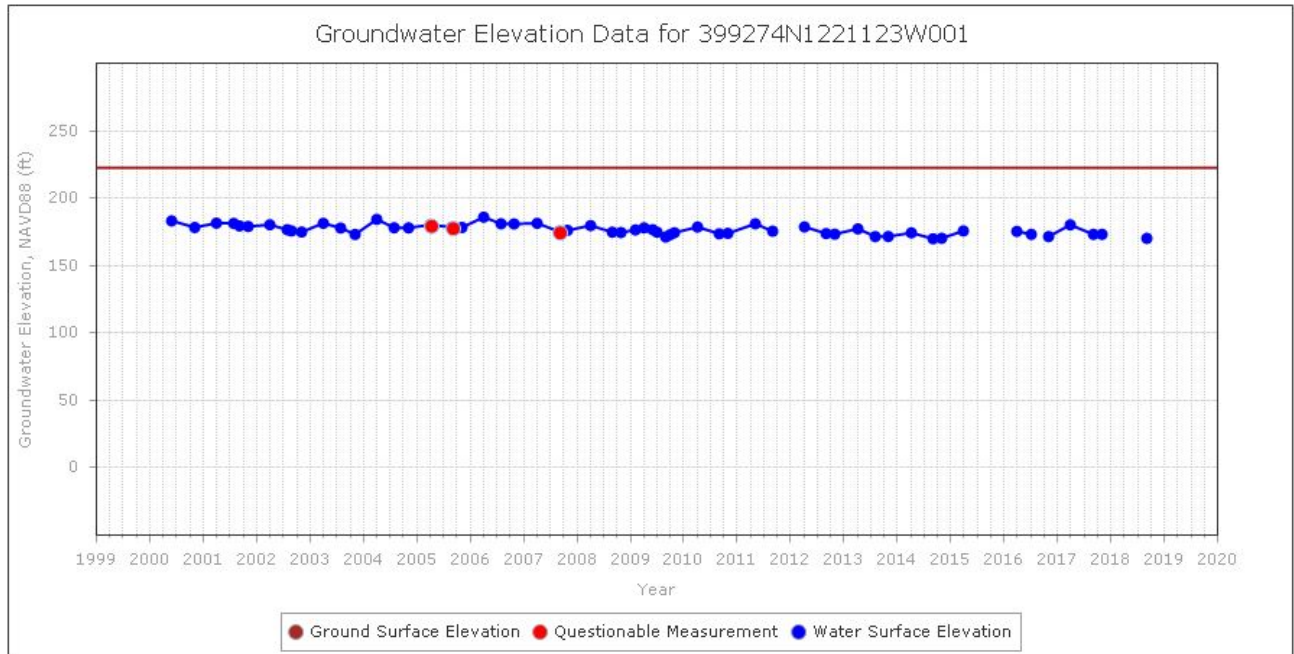
State Well ID 23N03W16F002M



Source: CASGEM

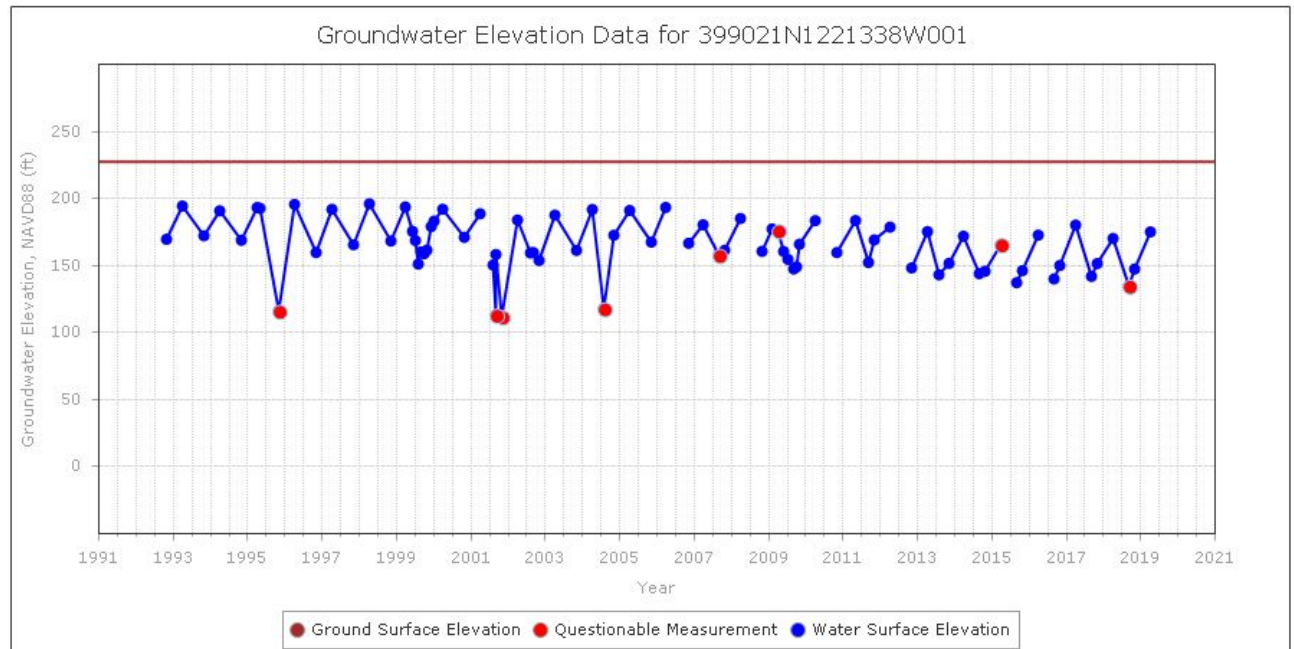
2019 Corning Water District Partial Reallocation
Draft Environmental Assessment/Initial Study

State Well ID 24N02W20B001M



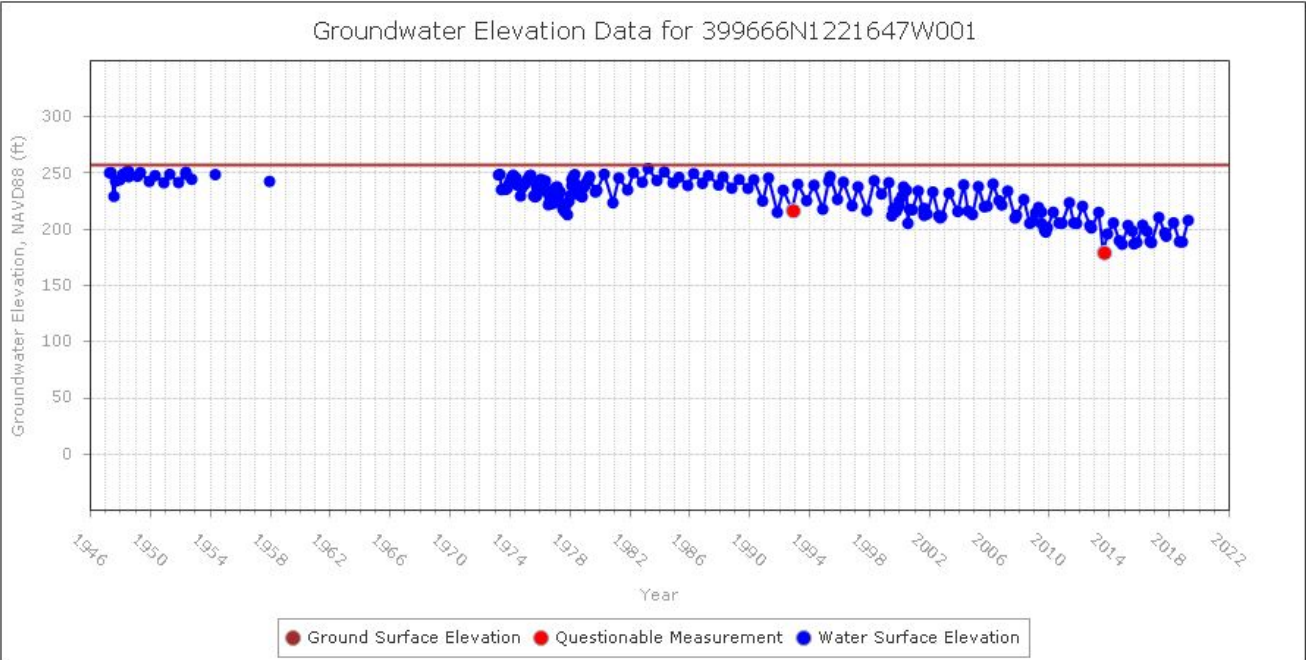
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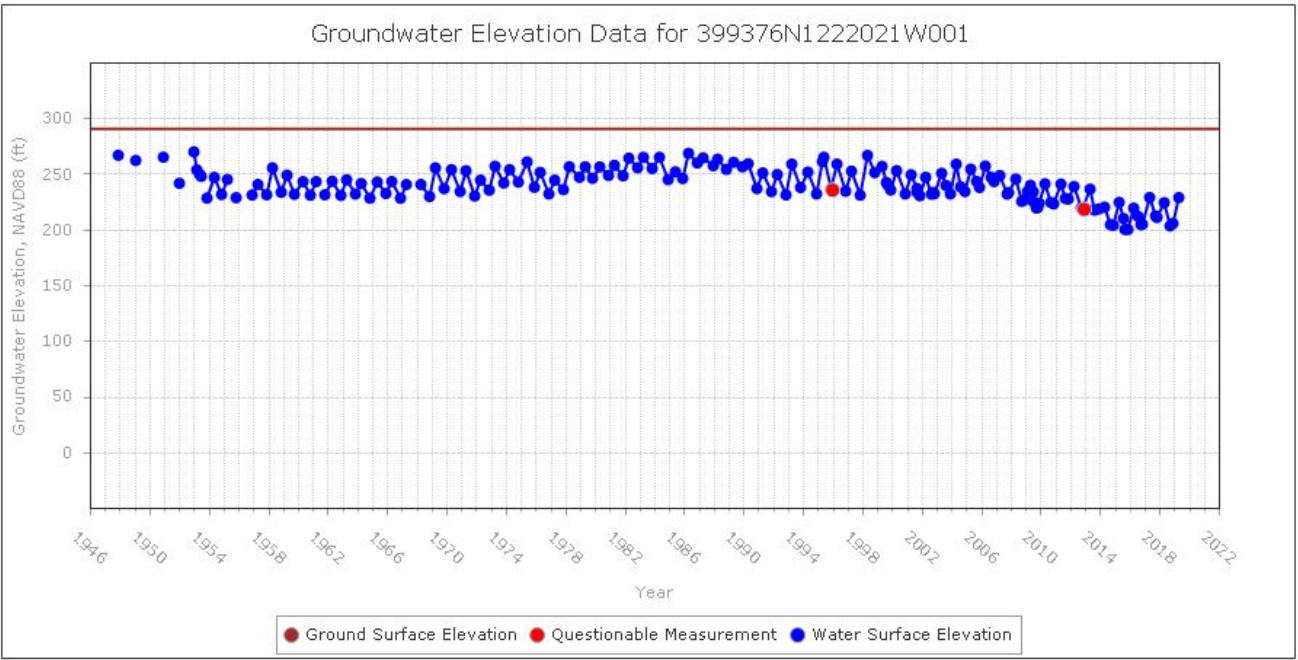
Source: CASGEM

State Well ID 24N03W02R001M



Source: CASGEM

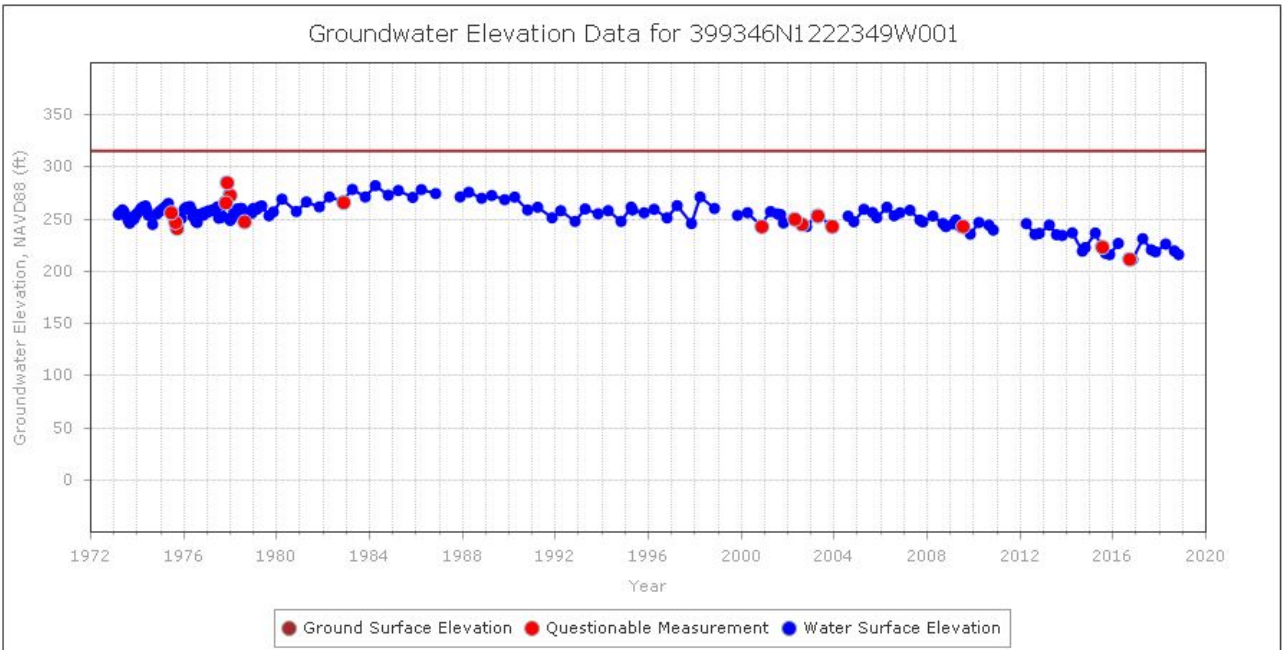
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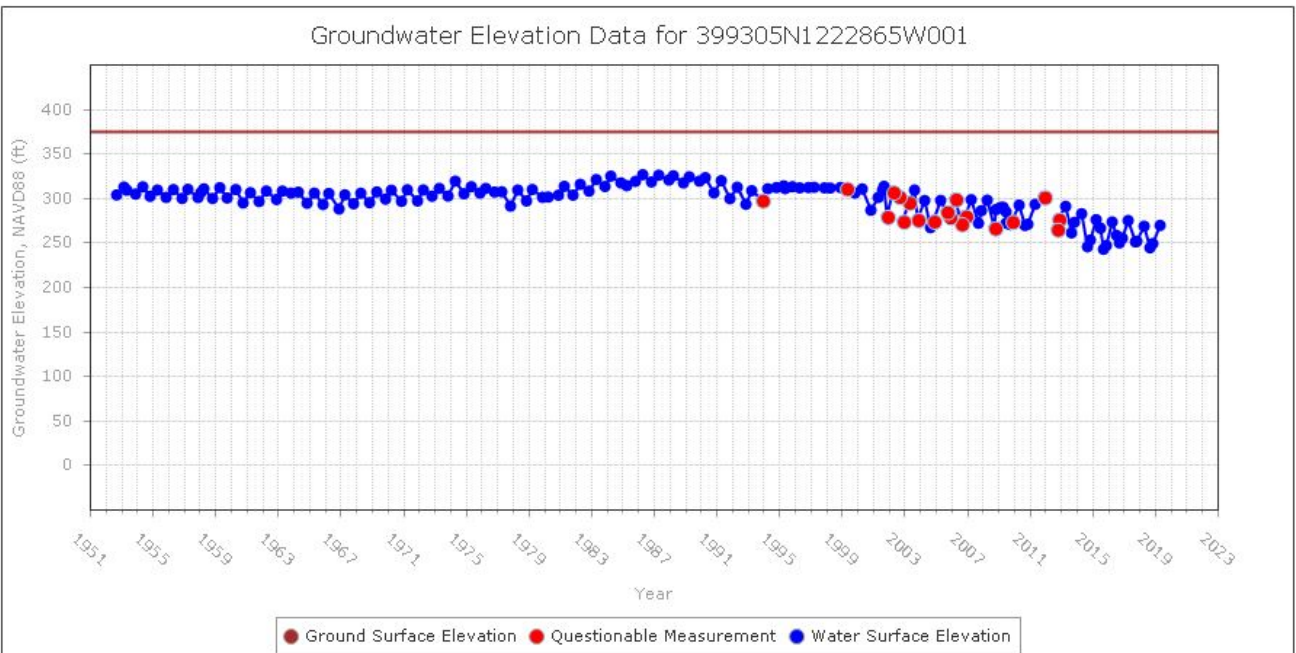
2019 Corning Water District Partial Reallocation
Draft Environmental Assessment/Initial Study

State Well ID 24N03W17M001M



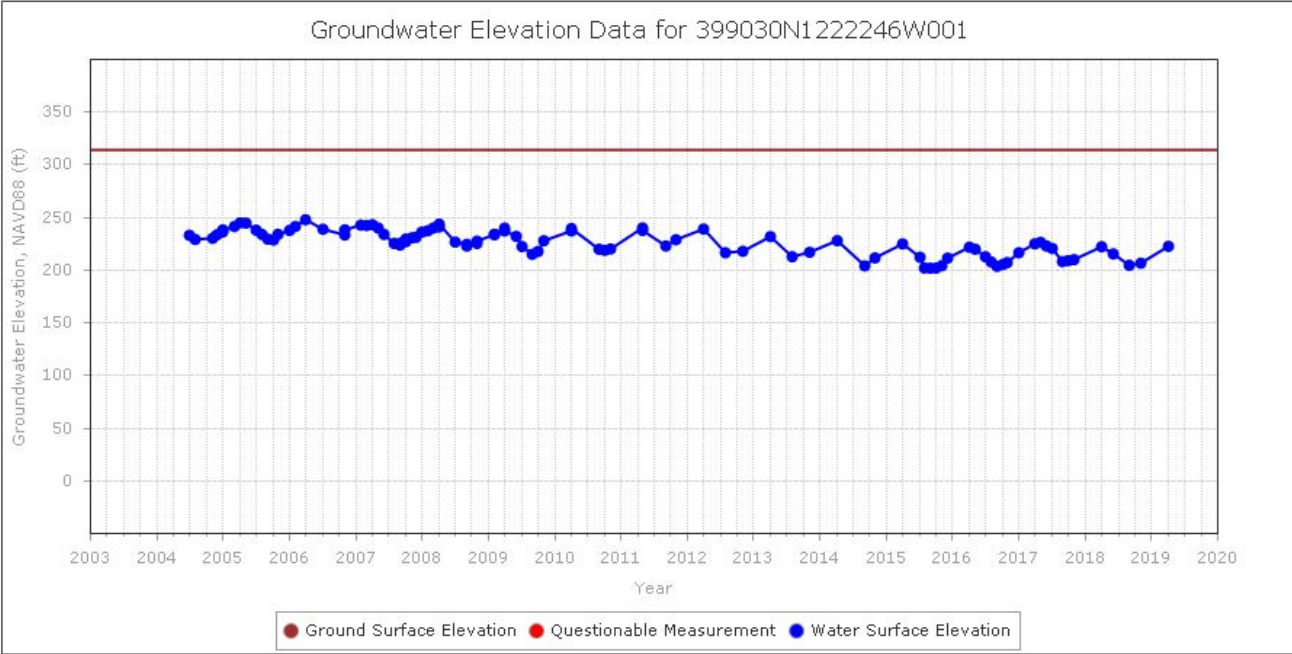
Source: CASGEM

State Well ID 24N04W14N002M



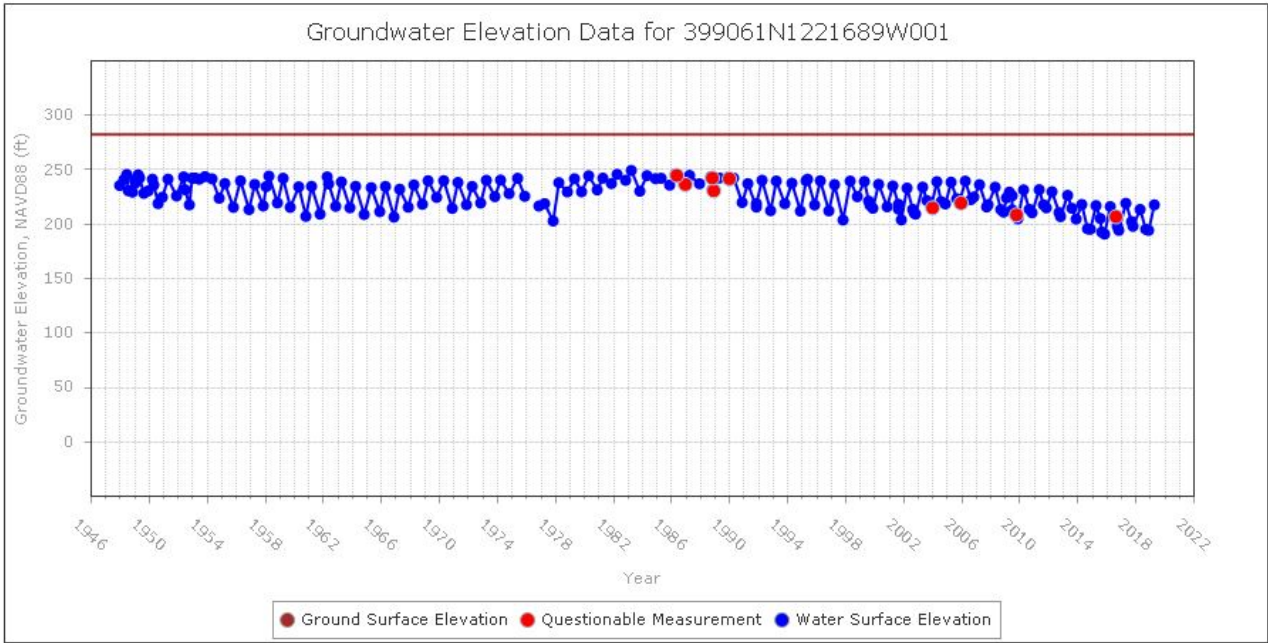
Source: CASGEM

State Well ID 24N03W29Q001M



Source: CASGEM

State Well ID 24N03W26K001M



Source: CASGEM

Appendix E

Detailed Groundwater Pumping Emissions Calculations

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Groundwater Substitution

Transfer Volume

375 acre-feet/project (based on estimates from CWD that 15% of GW pumps are diesel powered and the remaining are electric)
2,500 gallons per minute (estimated)

Engine Size 200 hp (estimated)
Operation 815 hours per project
1 years of project
152 days per year
5 hours per day (assumes 100% water transferred in one year with multiple engines)

Table B-1. Unmitigated Estimated Emissions from Diesel Pump

Pollutant	Emission Factor (g/hp-hr)	Daily Emissions (lbs/day)	Total Emissions (ton/project)	Annual Emissions (tpy)	CEQA Threshold (lbs/day)	Significant?
VOC	0.2	1	0.0	0.0	25	no
NOx	4.7	11	0.8	0.8	25	no
CO	2.6	6	0.5	0.5	n/a	n/a
SOx	0.93	2	0.2	0.2	n/a	n/a
PM10	0.15	0	0.0	0.0	80	no
PM2.5	0.15	0	0.0	0.0	n/a	n/a

Note: 13 California Code of Regulations (CCR) 93115.8(a) (Table 6 of regulation) requires existing stationary diesel-fueled diesel engines used in agricultural emissions greater than or equal to 175 horsepower to meet a particulate matter (PM) emission standard of 0.15 grams per horsepower-hour. Emission standards for other pollutants are equal to the model year and maximum rated power of the engine installed to meet the applicable PM standard. Section 93115.8(b) (Table 7 of regulation) requires engines to meet these emission standards by 2010. Therefore, it was assumed at all diesel engines would meet the emission standards for a Tier 2 engine.

Conversions

453.6 grams per pound
2,000 pounds per ton
325,851 gallons per acre-foot
60 minutes per hour

http://www.water.ca.gov/pubs/dwrnews/california_water_facts_card/waterfactscard.pdf