USGS Water-Year Summary 2025

10336698 THIRD CK NR CRYSTAL BAY, NV

Manuscript for site 10336698 THIRD CK NR CRYSTAL BAY, NV

LOCATION Lat 39°14'26", long 119°56'44" referenced to North American Datum of 1927, in SW 1/4 NE 1/4 sec.22, T.16 N., R.18 E., Washoe County, NV, Hydrologic Unit 16050101, on right bank, 50 ft upstream from culvert on Lakeshore Boulevard, 600 ft upstream from mouth, and 3 mi east of Crystal Bay.

DRAINAGE AREA 6.05 mi^2.

PERIOD OF RECORD October 1969 to September 1973, February to September 1975, and October 1977 to current year.

REVISIONS HISTORY WDR NV-78-1: Drainage area.

GAGE Water-stage recorder. Datum of gage is 6,234.03 ft above NGVD of 1929 and 6,237.59 ft above NAVD of 1988.

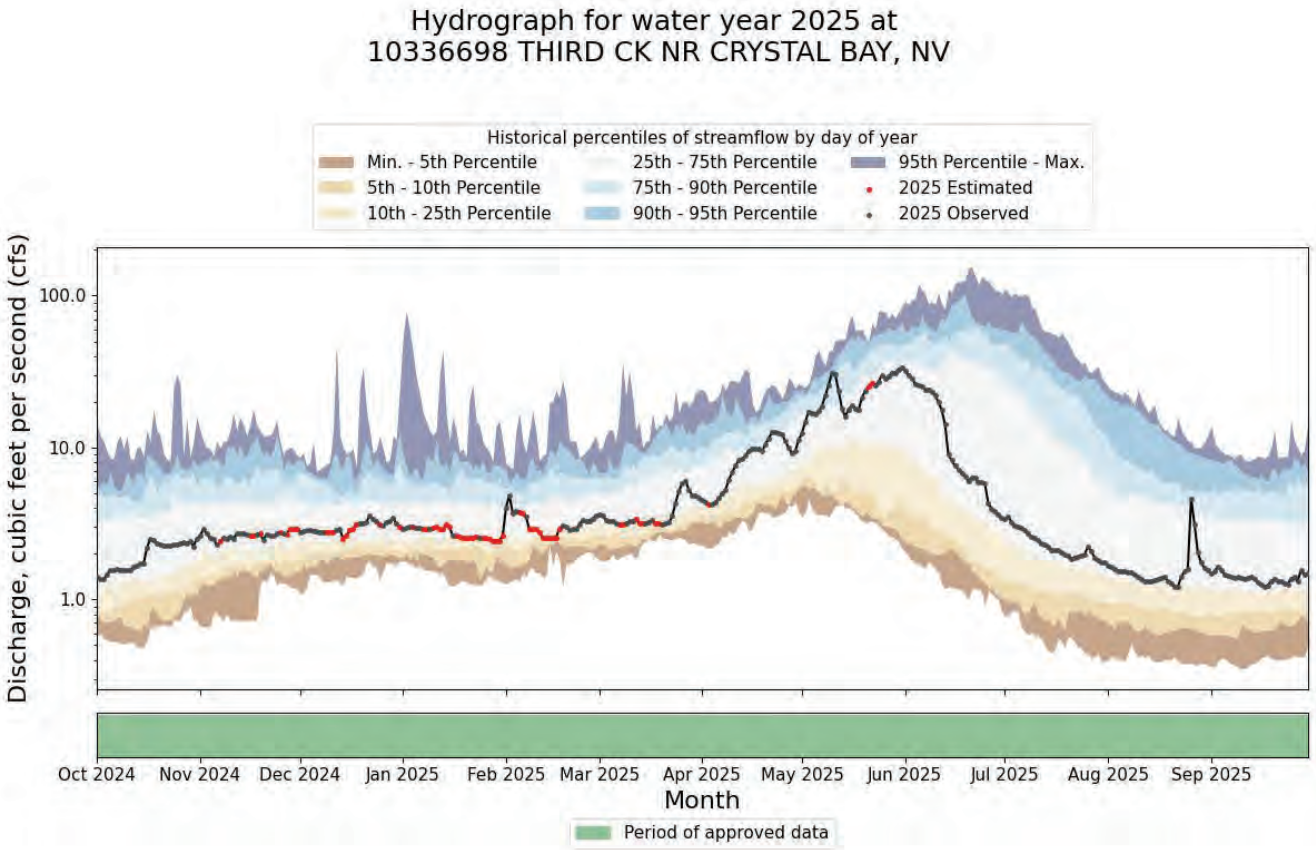
REMARKS One transmountain diversion to Washoe Valley. See schematic diagram of Pyramid and Winnemucca Lakes Basin available from the Nevada Water Science Center and Truckee River Basin available from the California Water Science Center.

EXTREMES FOR PERIOD OF RECORD Maximum discharge, 241 ft^3/s, June 20, 2017, gage height, 3.68 ft, maximum gage height, 3.82 ft, June 16, 2019, backwater; minimum daily, 0.35 ft^3/s, Sept. 10, 11, 2015.

PERIOD OF RECORD (WQ)

DISCRETE WATER-QUALITY DATA: CHEMICAL DATA: Water years 1970-73, 1975, 1978-79, November 1987 to current year. SEDIMENT DATA: Water years January 1980 to 1985.

CONTINUOUS WATER-QUALITY DATA: WATER TEMPERATURE: Water years April 1998 to November 2000, September 2019 to September 2024, October 2025 to current year. TURBIDITY: DISCONTINUED. Active water years September 2019 to current year October 2024. DISSOLVED OXYGEN: October 2024 to current year. SPECIFIC CONDUCTANCE: Water years September 2019 to October 2024.



Plot provided courtesy of the U.S. Geological Survey using the dataretrieval and hyswap python packages

Note: Hydrograph shows **daily values** for the location and water year selected. Color envelopes on the streamflow hydrograph represent flow percentiles for the location and are calculated for each day using all previous flow values measured on that month-day. **Estimated values** appear as red points on the hydrograph. Some percentile estimates may be unavailable due to insufficient historical data. Additionally, water year datasets missing many daily values may appear as incomplete plots and tables below.

Important: Data may be provisional. For some streams, flow statistics may have been computed from mixed regulated and unregulated flows; this can affect depictions of flow conditions. Some locations have multiple daily discharge time series (e.g. upstream and downstream). At this time, the water year summary tool selects one time series per location and uses that time series to determine available water years. It selects the entire time series that has the latest (most recent) timestamp for an approved daily discharge value.

Daily mean values in cubic feet per second for water year 2025

Note: All values are rounded according to average discharge rounding rules. Values in parentheses are estimated. Values with an asterisk are provisional, including summary values. If a month is incomplete, summary statistics will appear as 'Not available.'

Day of the month	Oct 2024	Nov 2024	Dec 2024	Jan 2025	Feb 2025	Mar 2025	Apr 2025	May 2025	Jun 2025	Jul 2025	Aug 2025	Sep 2025
1	1.41	2.62	2.78	2.91	4.03	3.62	4.48	12.5	32.2	3.39	1.68	1.47
2	1.36	2.89	2.81	2.96	4.84	3.56	4.36	14.8	29.9	3.50	1.63	1.52
3	1.36	2.70	2.84	3.02	3.71	3.35	(4.22)	17.2	28.6	3.24	1.59	1.65
4	1.46	2.54	2.84	(3.02)	3.84	3.26	4.23	16.9	26.3	3.08	1.54	1.56
5	1.56	2.50	2.82	2.95	(3.73)	3.26	4.37	16.7	25.6	3.01	1.54	1.46
6	1.55	2.29	2.80	2.95	(3.68)	3.16	4.66	17.3	25.3	2.95	1.53	1.43
7	1.58	(2.40)	2.78	(2.91)	3.51	(3.14)	4.97	18.8	23.9	2.86	1.51	1.41
8	1.57	2.55	2.79	(2.90)	(2.90)	(3.12)	5.26	21.9	24.1	2.74	1.50	1.38
9	1.56	2.52	(2.77)	2.91	(2.90)	3.18	6.15	25.9	23.4	2.60	1.45	1.40
10	1.56	2.60	(2.77)	(2.95)	(2.90)	3.25	6.83	31.1	22.0	2.53	1.41	1.38
11	1.57	2.51	(2.76)	(3.00)	(2.79)	3.28	7.60	30.2	20.0	2.46	1.37	1.37
12	1.63	2.70	2.84	(2.90)	(2.54)	(3.41)	8.28	23.6	17.7	2.35	1.32	1.39
13	1.66	2.72	2.90	(2.90)	(2.54)	(3.15)	8.46	18.1	14.2	2.30	1.31	1.41
14	1.72	2.72	(2.52)	(3.09)	(2.54)	(3.17)	8.82	16.0	8.99	2.22	1.31	1.36
15	1.72	2.67	(2.61)	(3.00)	(2.54)	3.15	9.54	17.8	8.24	2.11	1.35	1.30
16	2.17	(2.62)	(2.87)	2.62	(2.55)	3.24	9.84	18.9	7.57	2.11	1.36	1.25
17	2.49	(2.64)	(2.90)	(2.61)	(2.90)	3.34	9.85	18.1	7.16	2.10	1.39	1.22
18	2.46	2.67	(3.14)	(2.57)	3.06	(3.15)	9.75	17.7	6.79	2.04	1.40	1.23
19	2.33	(2.73)	3.18	(2.55)	3.02	(3.16)	9.42	21.2	6.43	1.96	1.32	1.32
20	2.31	2.47	3.17	(2.54)	2.87	3.13	10.5	23.6	5.99	1.93	1.28	1.37
21	2.27	2.67	3.23	(2.54)	2.90	3.18	11.5	(25.1)	6.37	1.84	1.22	1.32
22	2.25	2.62	3.56	(2.55)	2.92	3.20	12.6	(26.6)	6.36	1.89	1.21	1.32
23	2.26	2.61	3.38	(2.58)	3.09	3.54	12.7	25.8	5.88	1.92	1.41	1.28
24	2.28	2.70	3.28	2.55	3.33	4.32	12.5	27.0	5.94	1.94	1.52	1.26
25	2.28	(2.76)	(3.09)	(2.54)	3.26	5.21	12.2	29.9	5.79	1.98	1.59	1.37
26	2.35	2.70	3.06	(2.54)	3.29	5.78	11.0	28.6	4.28	2.24	4.62	1.40
27	2.37	(2.69)	3.21	(2.48)	3.41	6.05	9.90	29.4	3.96	2.07	3.14	1.31
28	2.34	(2.90)	3.27	(2.43)	3.55	5.23	9.19	31.1	3.79	1.88	2.05	1.55
29	2.40	(2.90)	3.43	(2.43)		4.87	9.56	31.1	3.61	1.80	1.74	1.45
30	2.24	(2.90)	3.16	(2.43)		4.84	11.2	32.8	3.46	1.75	1.61	1.47
31	2.50		(3.02)	(2.62)		4.68		33.4		1.75	1.55	
Total (cfs)	60.6	79.5	92.6	85.0	89.1	116	254	719	414	72.5	50.4	41.6
Mean (cfs)	1.95	2.65	2.99	2.74	3.18	3.74	8.46	23.2	13.8	2.34	1.63	1.39
Maximum (cfs)	2.50	2.90	3.56	3.09	4.84	6.05	12.7	33.4	32.2	3.50	4.62	1.65
Minimum (cfs)	1.36	2.29	2.52	2.43	2.54	3.12	4.22	12.5	3.46	1.75	1.21	1.22
Total (ac-ft)	120	158	184	168	177	230	504	1,426	821	144	100	82.5

Monthly mean statistics in cubic feet per second (1970 - 2025)

Note: Mean, maximum, and minimum values are calculated using average daily discharge values. All values are rounded according to average discharge rounding rules. Water years (WY) in which the monthly min/max occurs are indicated in parentheses. If the selected water year is **incomplete**, it is not included in the monthly summary calculations.

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	2.93	3.72	3.78	3.99	3.99	5.25	8.78	19.0	23.0	9.97	3.37	2.53
Max	9.10	11.0	8.84	17.1	9.03	13.5	20.2	46.9	109	60.6	15.7	8.71
(WY)	(1984)	(1985)	(1996)	(1997)	(1986)	(1986)	(1986)	(2017)	(2017)	(2017)	(1983)	(1999)
Min	0.68	1.42	1.54	1.48	2.02	2.49	3.61	3.84	1.36	0.64	0.40	0.40
(WY)	(2015)	(2015)	(2015)	(2015)	(2014)	(2014)	(2015)	(1988)	(2014)	(2015)	(2015)	(2015)

Annual summary statistics (1970 - 2025)

Note: All values are rounded according to average discharge rounding rules. The date shown in the annual 7-day minimum is the **last** date of the 7-day period. Seven-day minimums, percentiles, and runoff values are calculated using the hyswap python package. Qualifier codes for peak discharge are indicated in parentheses next to the discharge value. If the selected water year is **incomplete**, it is not included in the annual summary calculations.

	Statistic	WY 2025	WY 2025 Date	All WYs	All WYs Date
0	Annual Total (cfs)	2,074			
1	Annual Total (ac-ft)	4,114			
2	Annual Mean (cfs)	5.68		7.56	
3	Highest Annual Mean (cfs)			23.4	2017
4	Lowest Annual Mean (cfs)			2.02	2014
5	Highest Daily Mean (cfs)	33.4	May 31, 2025	154	June 21, 2017
6	Lowest Daily Mean (cfs)	1.21	August 22, 2025	0.35	September 10, 2015
7	Annual 7-Day Minimum (cfs)	1.29	September 20, 2025	0.36	September 13, 2015
8	Maximum Peak Flow (cfs)	40.8	May 25, 2025	241	June 20, 2017
9	Maximum Peak Stage (ft)	2.9	May 21, 2025	3.82 (1)	June 16, 2019
10	Annual Runoff (in)	12.8		16.9	
11	10 percent exceeds (cfs)	17.5		17.7	
12	50 percent exceeds (cfs)	2.90		3.90	
13	90 percent exceeds (cfs)	1.41		1.40	

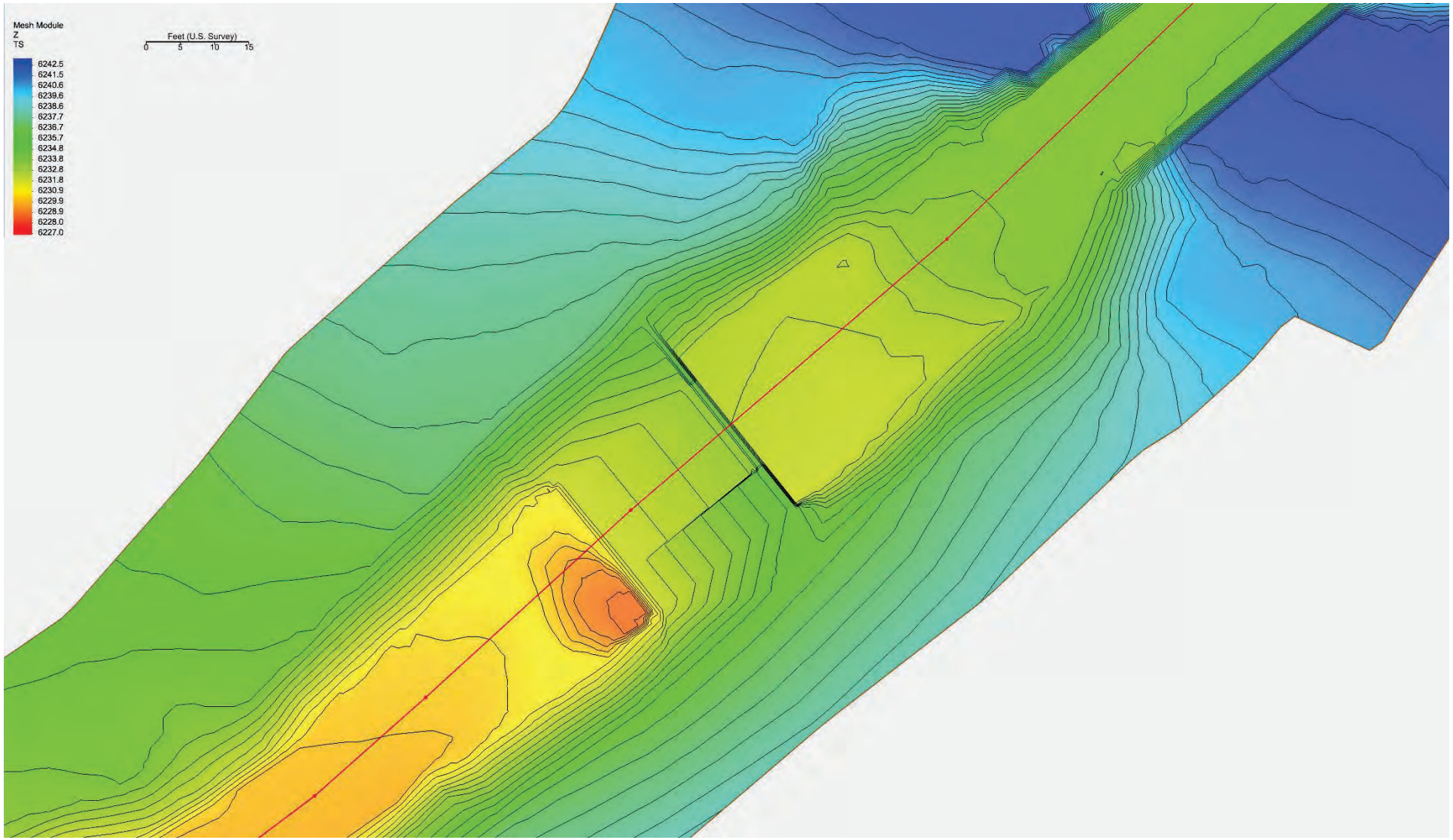
Web service call processed by `dataretrieval` to create plot and tables:

https://waterservices.usgs.gov/nwis/dv?format=json&parameterCd=00060&startDT=1800-01-01&sites=10336698

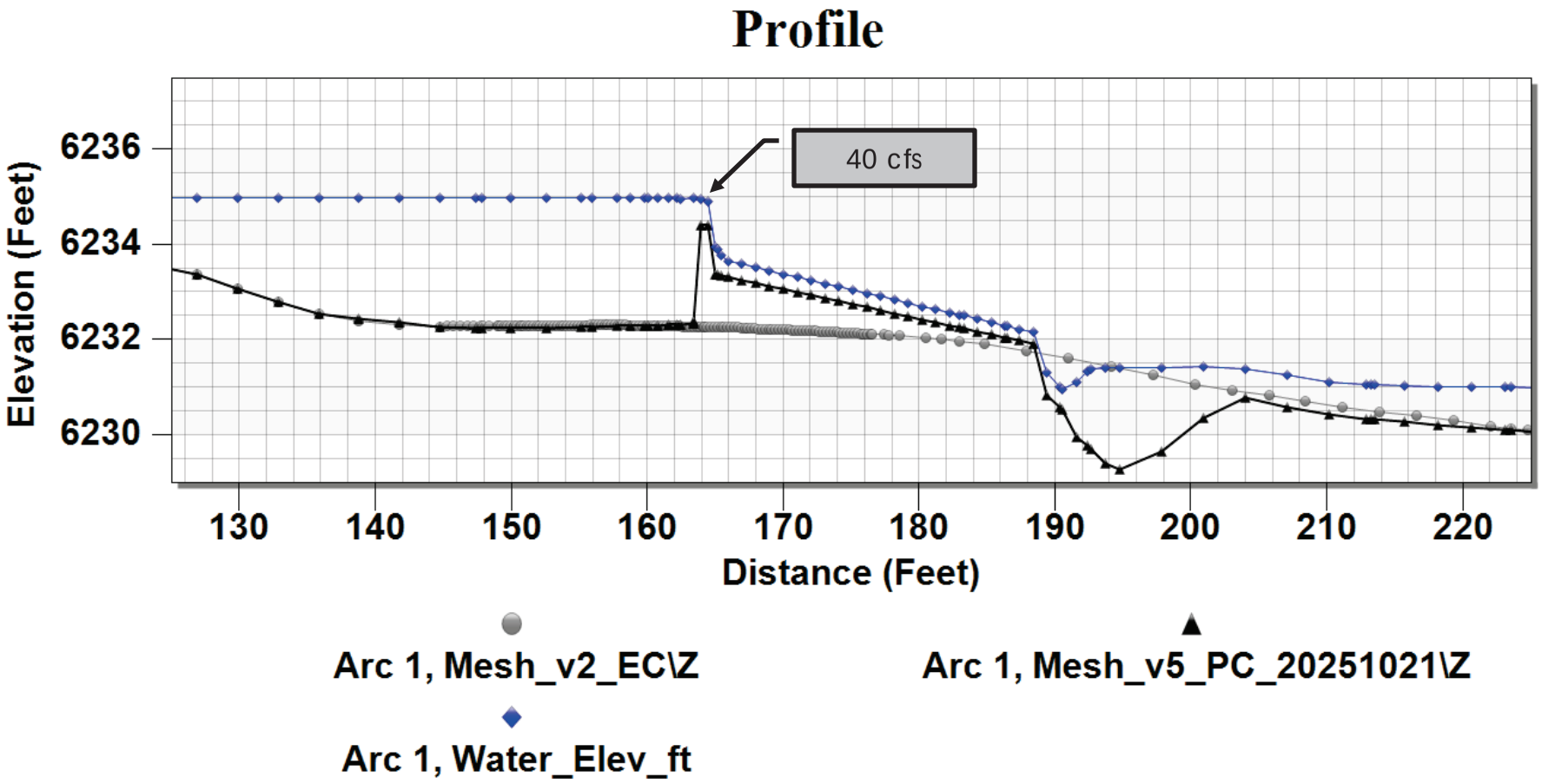
Disclaimer

Although this software program has been used by the U.S. Geological Survey (USGS), no warranty, expressed or implied, is made by the USGS or the U.S. Government as to the accuracy and functioning of the program and related program material nor shall the fact of distribution constitute any such warranty, and no responsibility is assumed by the USGS in connection therewith.

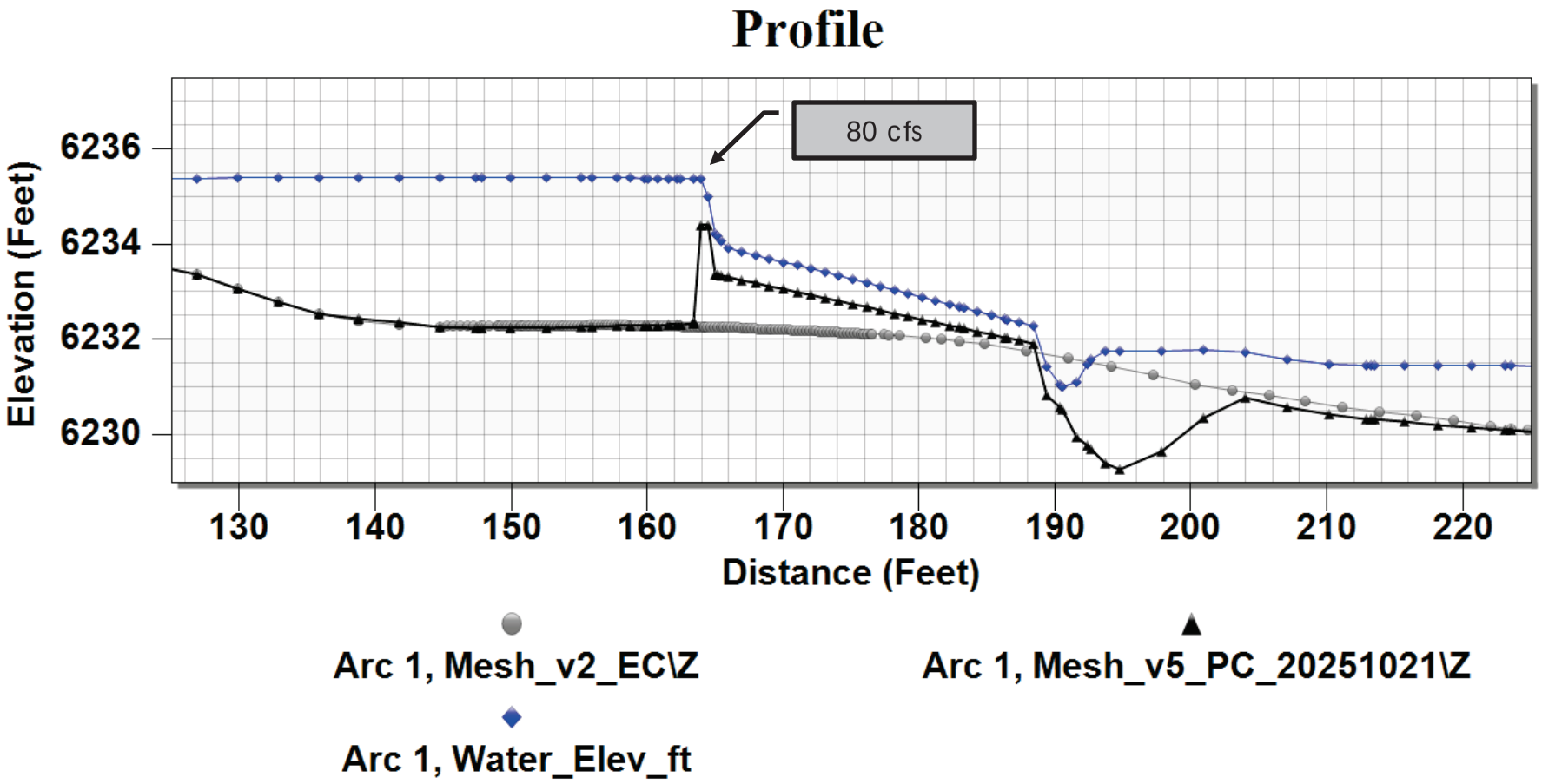
Model Mesh 0.5 ft Contours with Longitudinal Profile Used in Plots



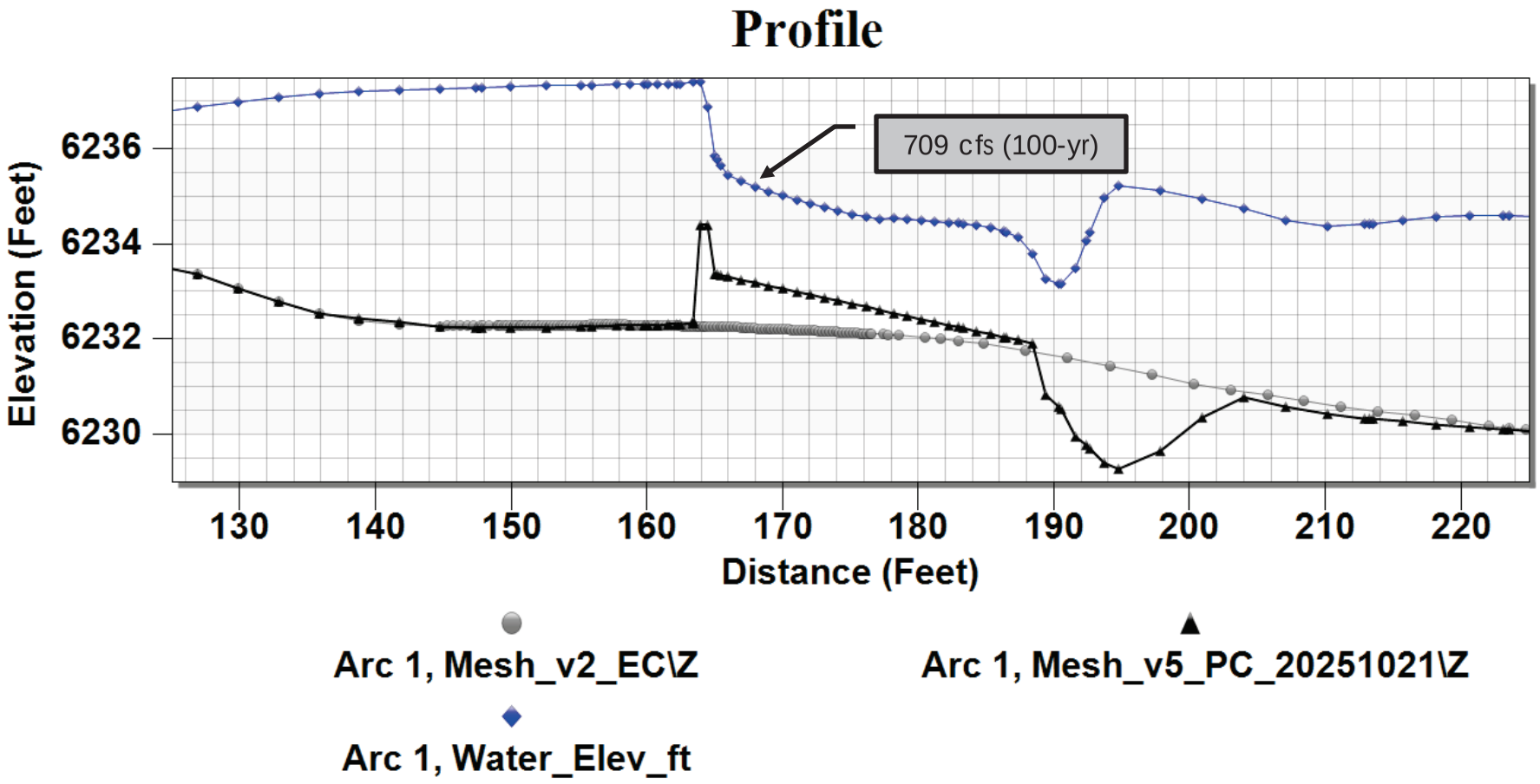
Bed and WSEL Profile 40 cfs



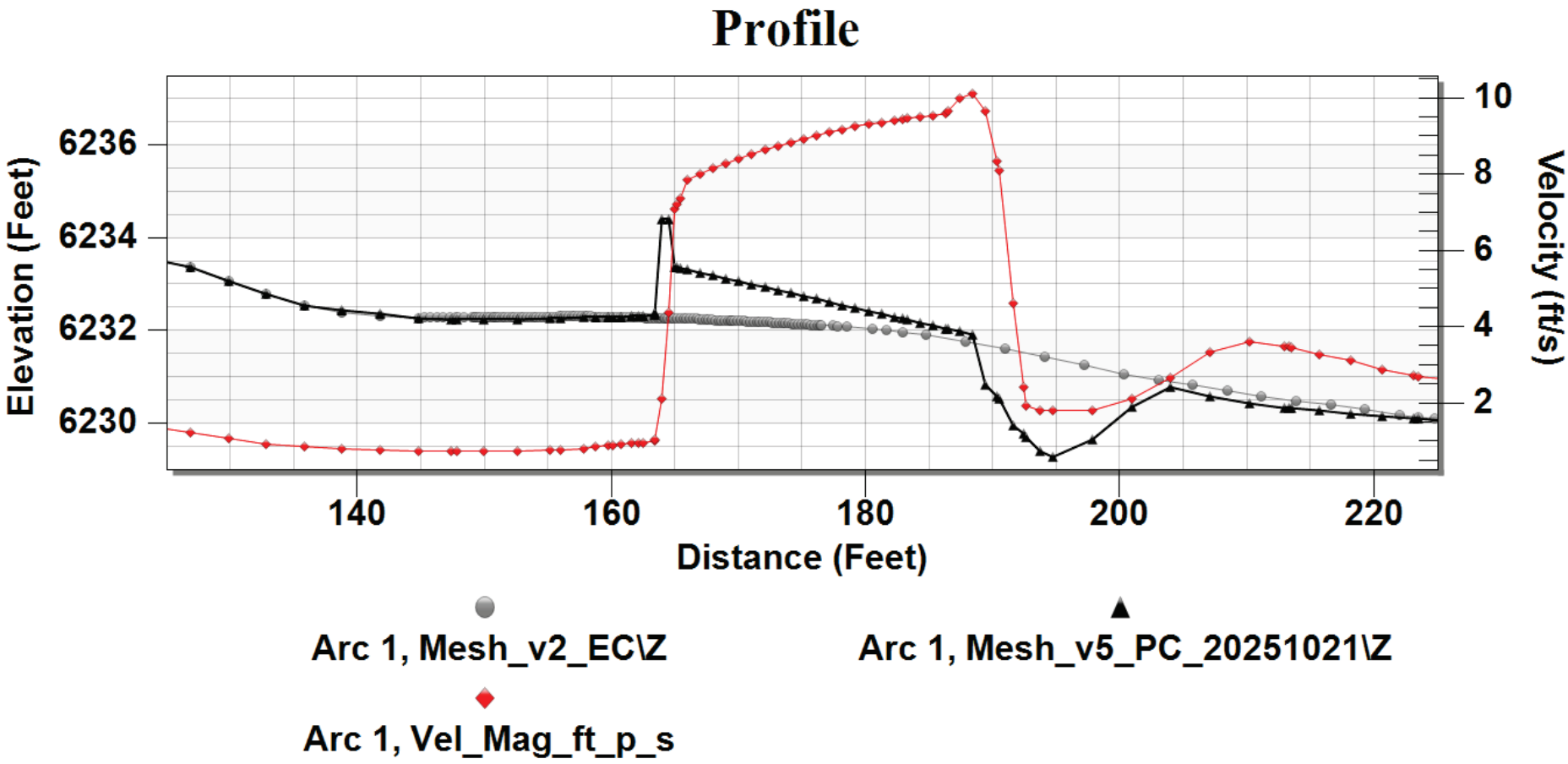
Bed and WSEL Profile 80 cfs



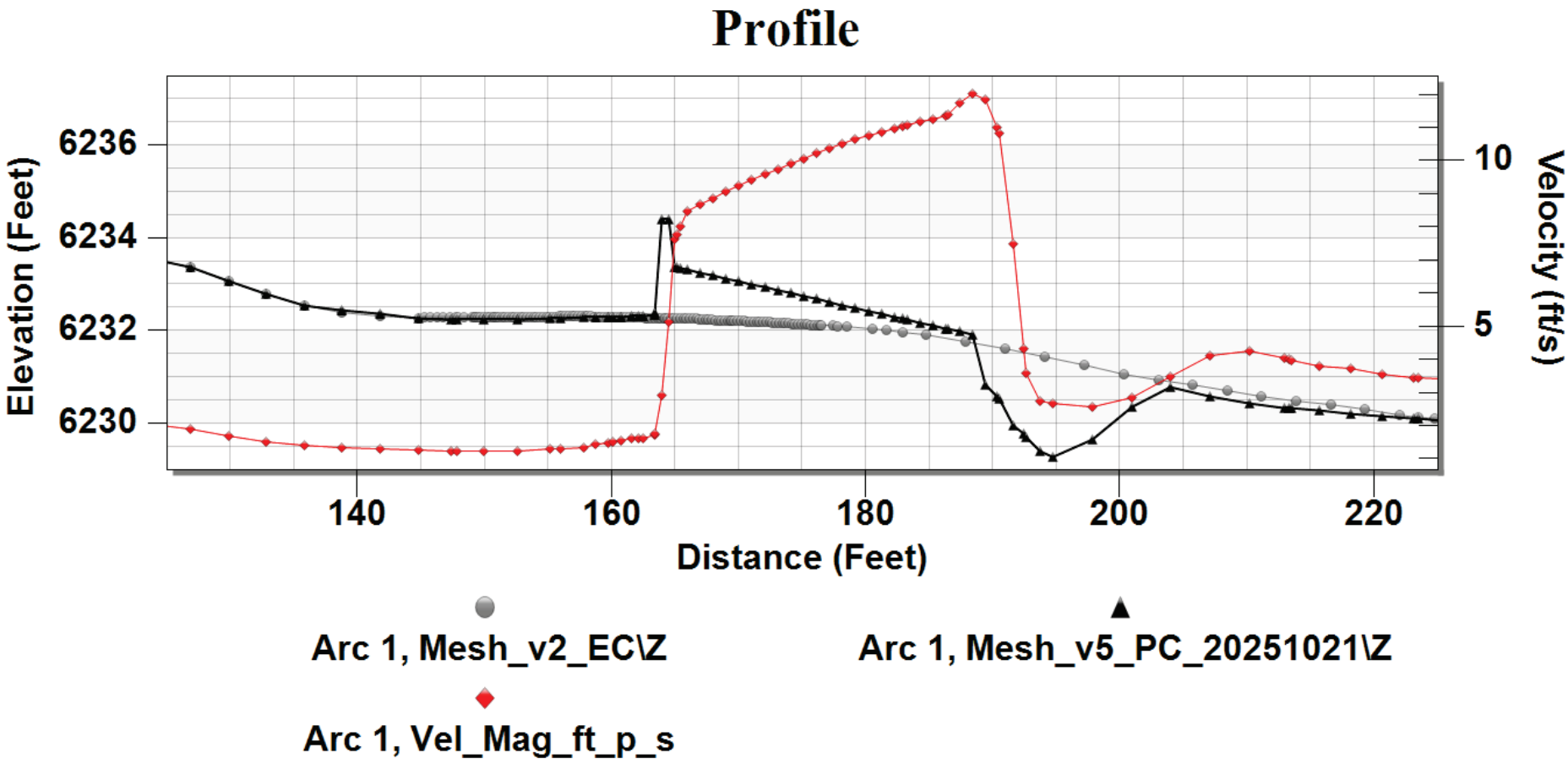
Bed and WSEL Profile 709 cfs (100-yr)



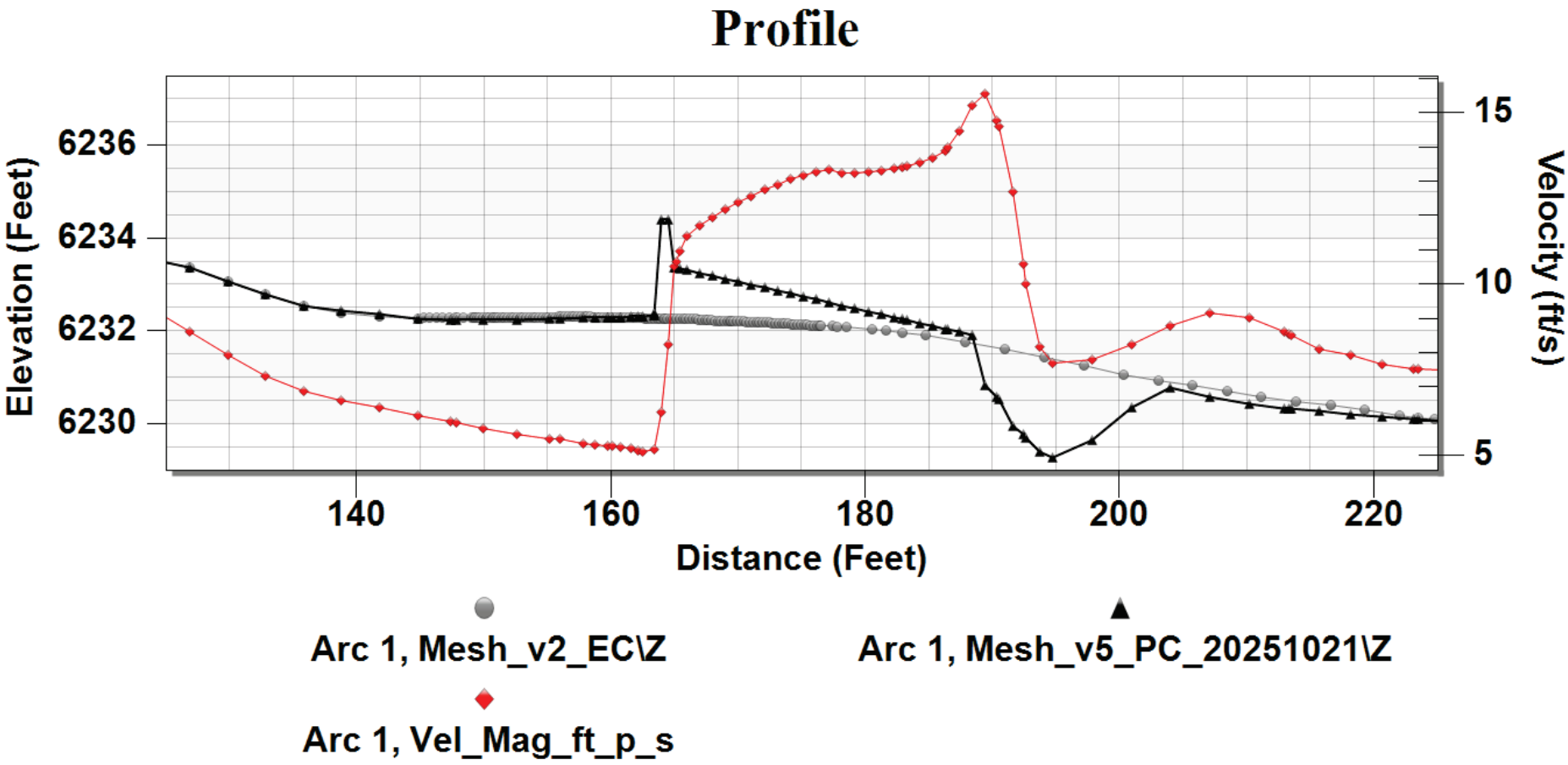
Bed and Velocity Profile 40 cfs



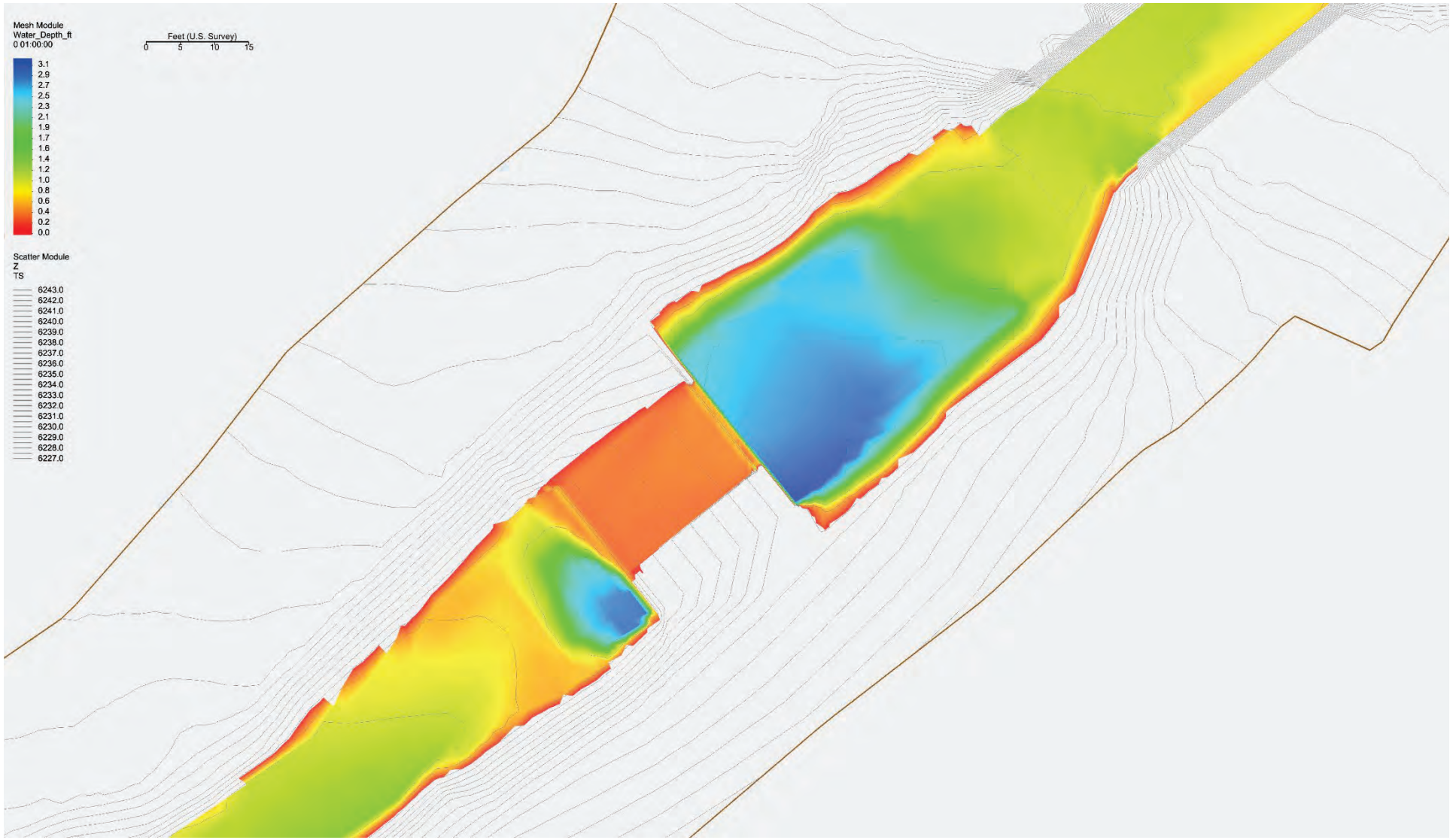
Bed and Velocity Profile 80 cfs



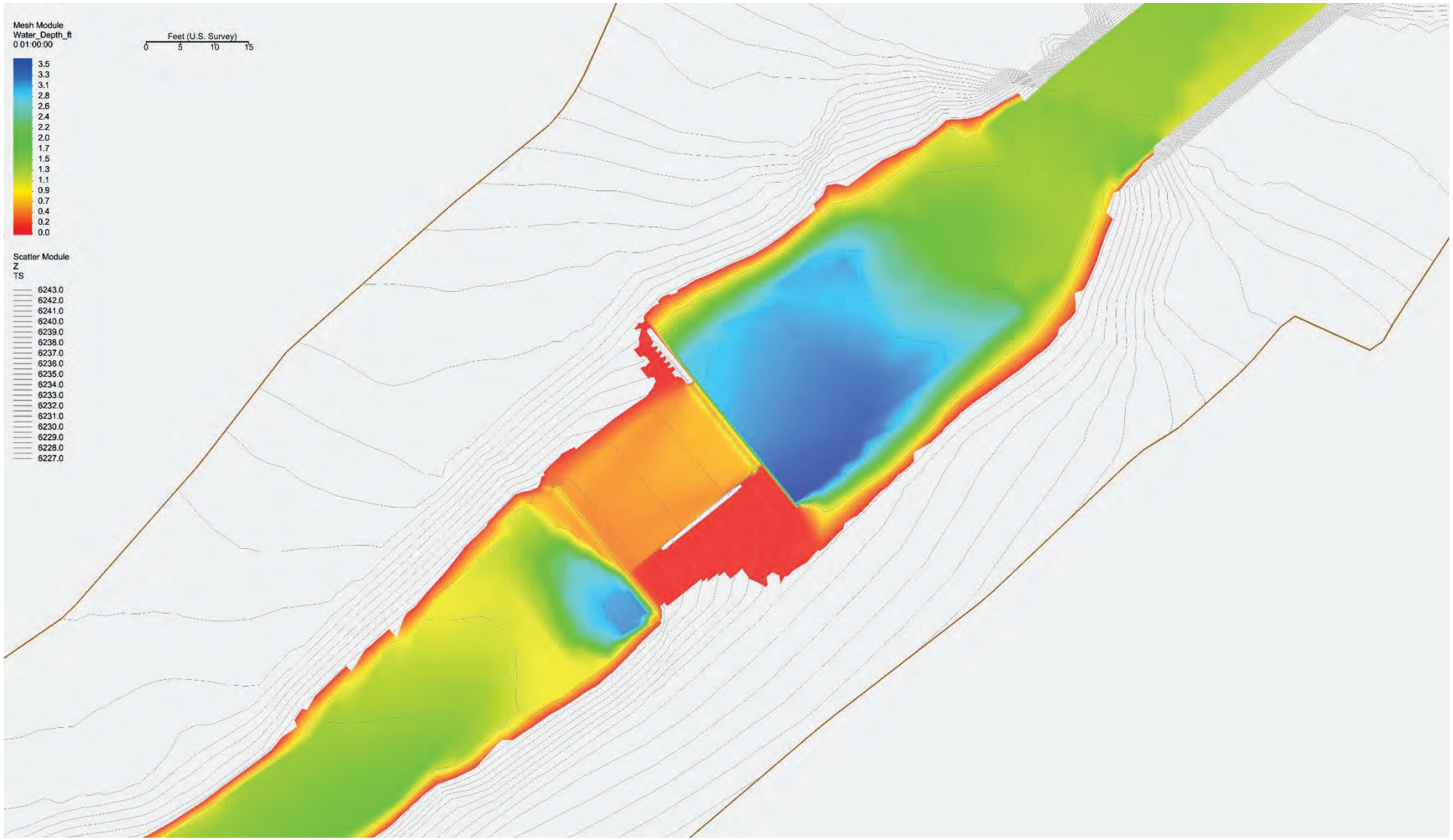
Bed and Velocity Profile 709 cfs (100-yr)



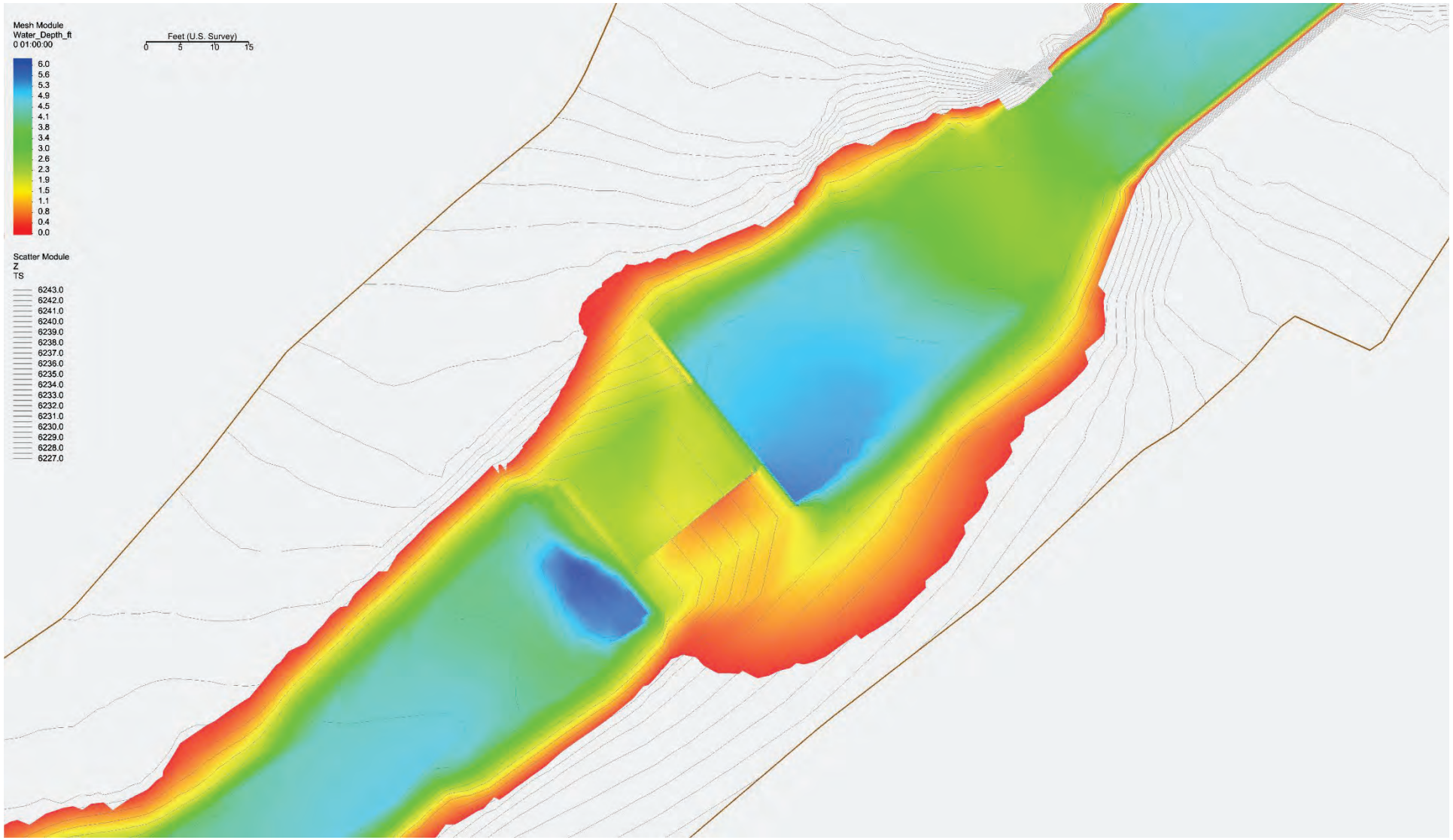
Flow Depth 40 cfs



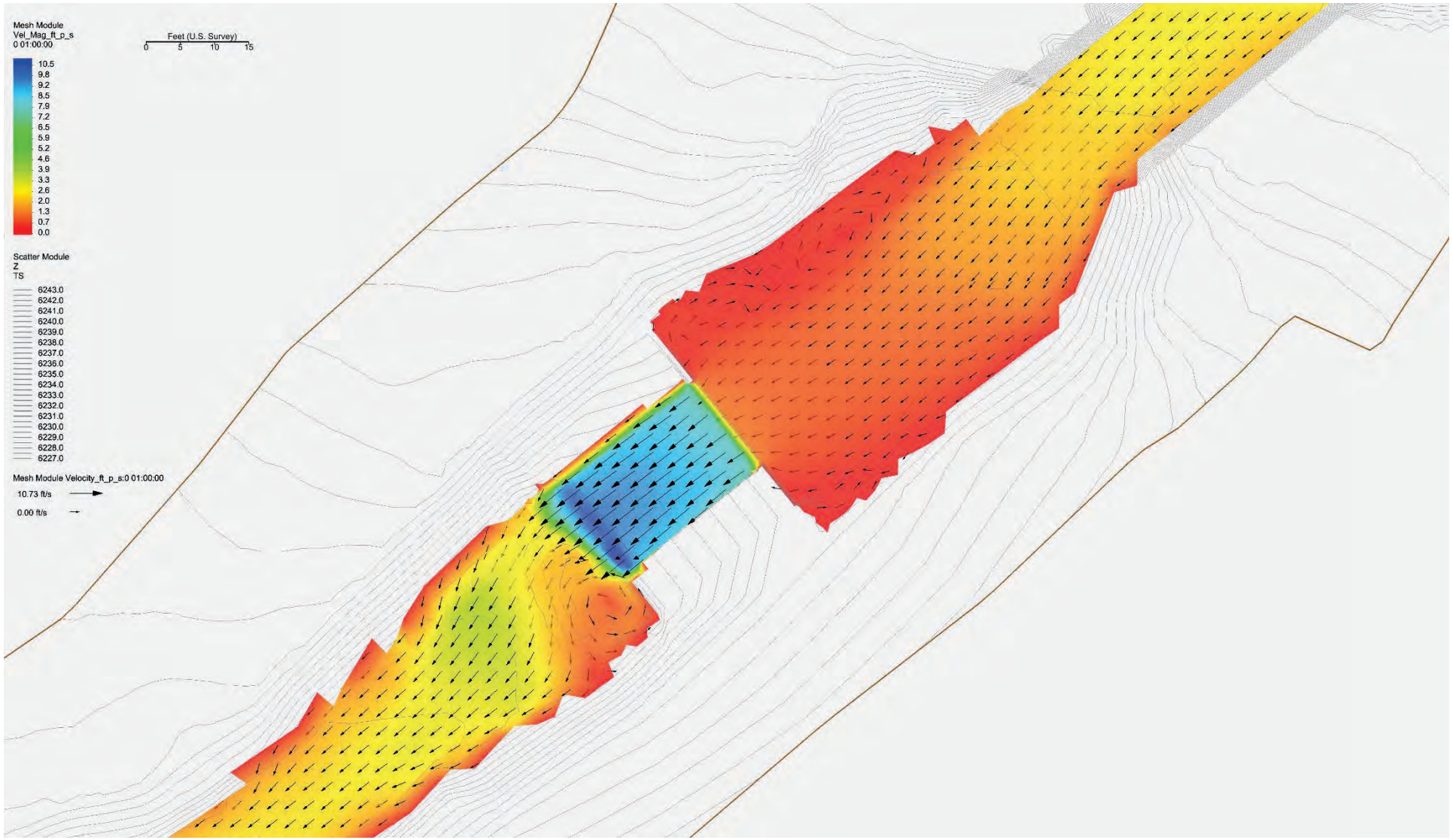
Flow Depth 80 cfs



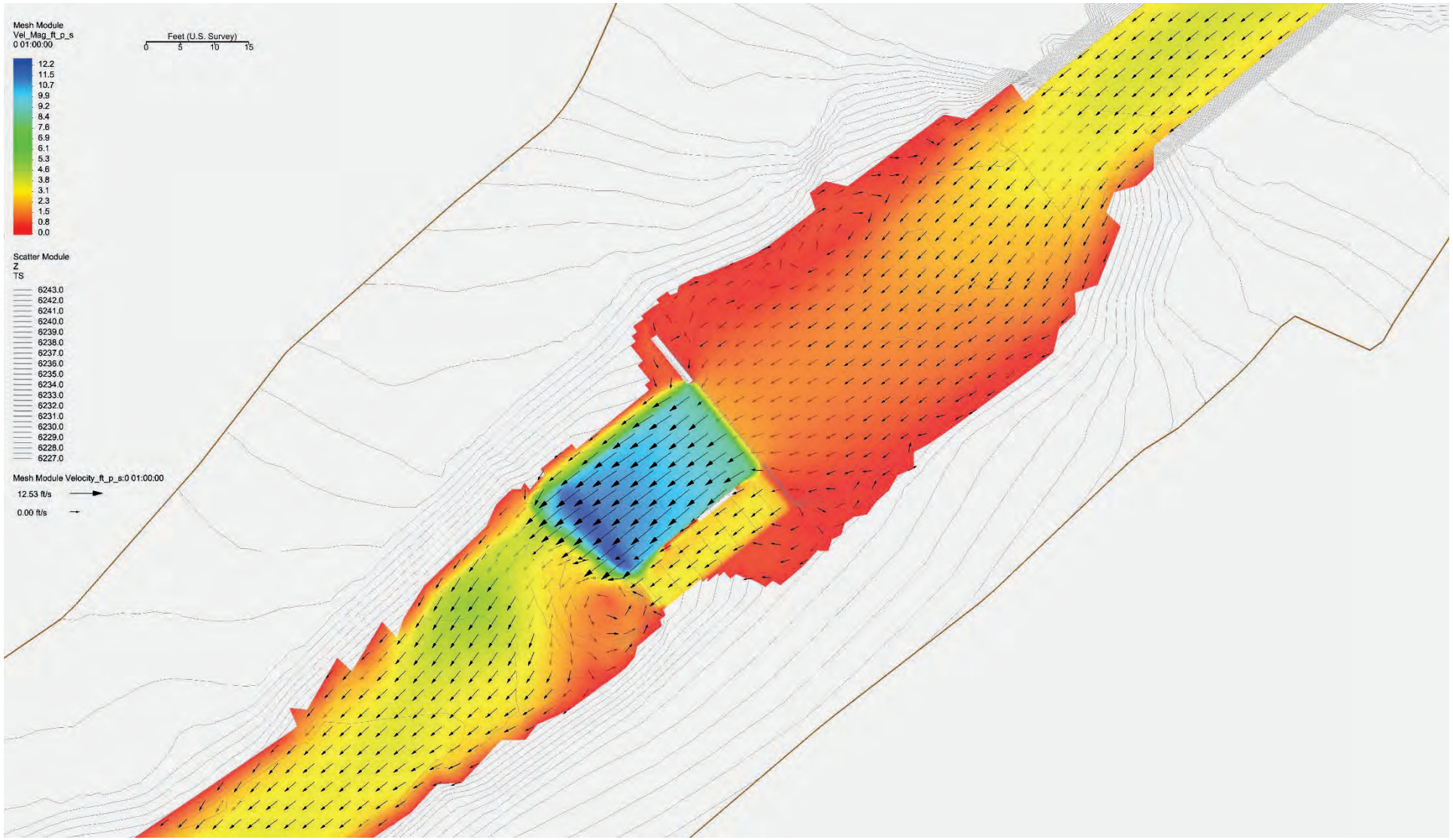
Flow Depth 709 cfs (100-yr)



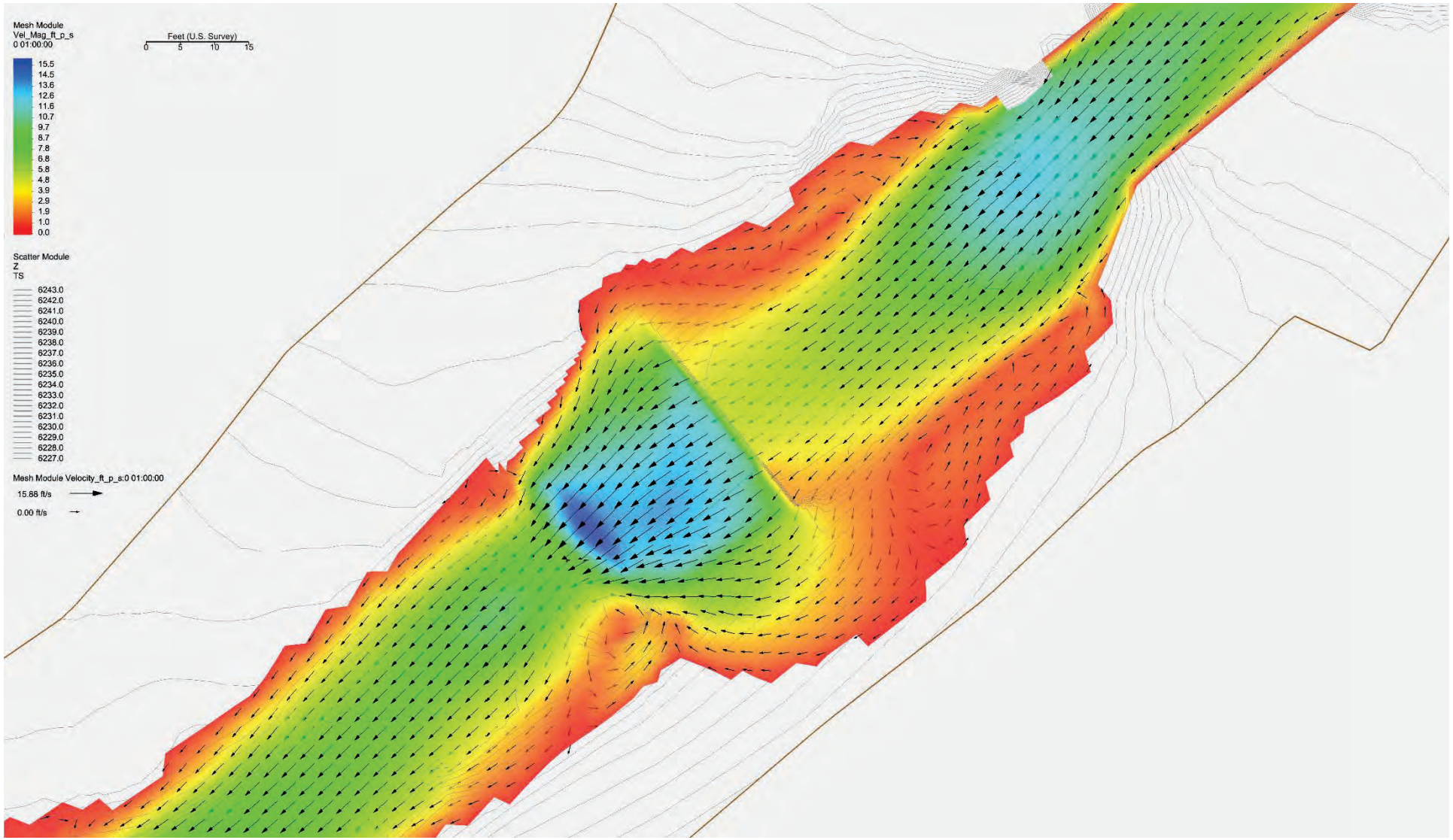
Flow Velocity 40 cfs



Flow Velocity 80 cfs



Flow Velocity 709 cfs (100-yr)



Attachment B NRCS Soils Report (April 2026)

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Tahoe Basin Area, California and Nevada

NDOW Third Creek FMS

April 8, 2026

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

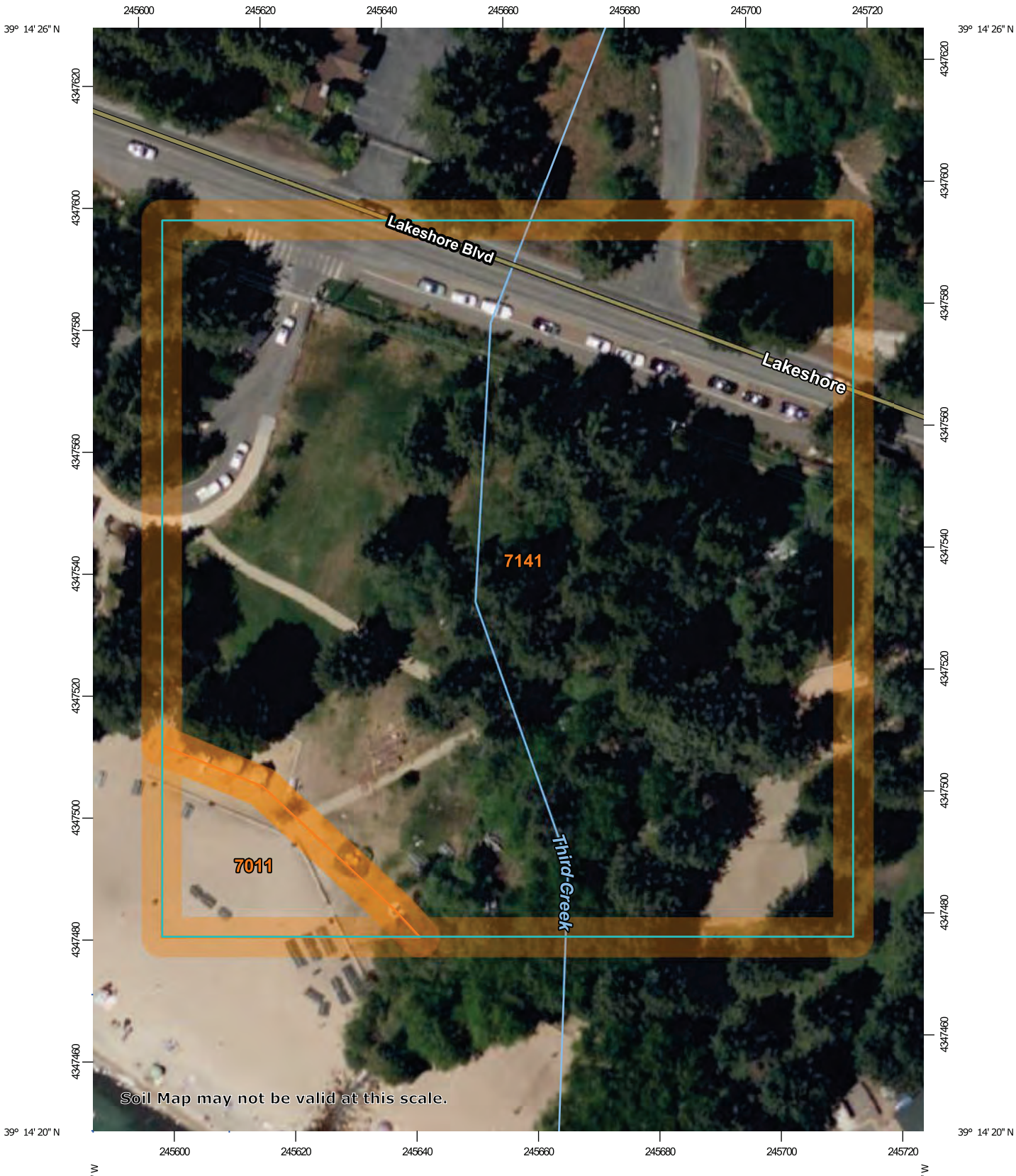
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:882 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 10 20 40 60

Feet
0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Tahoe Basin Area, California and Nevada
Survey Area Data: Version 21, Sep 2, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 10, 2022—Jun 14, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
7011	Beaches	0.2	5.9%
7141	Inville gravelly coarse sandy loam, 2 to 9 percent slopes, stony	3.1	94.1%
Totals for Area of Interest		**3.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Tahoe Basin Area, California and Nevada

7011—Beaches

Map Unit Setting

National map unit symbol: 1sg2r
Landscape: Mountains
Elevation: 6,220 to 6,250 feet
Mean annual precipitation: 21 to 27 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 25 to 75 days
Farmland classification: Not prime farmland

Map Unit Composition

Beaches: 64 percent
Minor components: 36 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beaches

Setting

Landscape: Mountains
Landform: Beaches
Parent material: Beach sand

Typical profile

C - 0 to 79 inches: gravelly coarse sand

Minor Components

Oxyaquic xeropsamments

Percent of map unit: 10 percent
Landform: Barrier beaches
Hydric soil rating: No

Watah

Percent of map unit: 7 percent
Landscape: Mountains
Landform: Valley flats, Flood plains, Fens
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R022AX101CA - Frigid Anastomosed System
Hydric soil rating: Yes

Gefo, barrier beach

Percent of map unit: 6 percent
Landscape: Mountains
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F022AF002CA - Frigid, Sandy, Or Loamy Outwash
Hydric soil rating: No

Marla

Percent of map unit: 5 percent
Landscape: Mountains
Landform: Valley flats, Outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F022AX100CA - Frigid, Sandy, Moist, Outwash Fan
Hydric soil rating: Yes

Tahoe, silt loam

Percent of map unit: 1 percent
Landscape: Mountains
Landform: Valley flats, Flood plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R022AX102CA - Frigid E-C Meadow System
Hydric soil rating: Yes

Toem

Percent of map unit: 1 percent
Landscape: Mountains
Landform: Mountain slopes, Hillslopes
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Mountainflank, nose slope, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Ecological site: F022AF004CA - Frigid, Shallow To Deep, Sandy Mountain Slopes
Hydric soil rating: No

Tahoma

Percent of map unit: 1 percent
Landscape: Mountains
Landform: Mountain slopes, Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Linear
Across-slope shape: Linear, convex
Ecological site: F022AE013CA - Frigid, Loamy, Volcanic Mountain Slopes
Hydric soil rating: No

Jorge, very gravelly sandy loam

Percent of map unit: 1 percent
Landscape: Mountains
Landform: Mountain slopes, Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F022AE013CA - Frigid, Loamy, Volcanic Mountain Slopes
Hydric soil rating: No

Cassenai, gravelly loamy coarse sand

Percent of map unit: 1 percent
Landscape: Mountains
Landform: Mountain slopes, Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F022AF005CA - Frigid, Deep To Very Deep, Sandy-Loamy Mountain Slopes
Hydric soil rating: No

Cagwin

Percent of map unit: 1 percent
Landscape: Mountains
Landform: Mountain slopes, Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F022AF004CA - Frigid, Shallow To Deep, Sandy Mountain Slopes
Hydric soil rating: No

Rock outcrop, granitic

Percent of map unit: 1 percent
Landscape: Mountains
Landform: Mountains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainflank, side slope
Hydric soil rating: No

Dunes

Percent of map unit: 1 percent
Hydric soil rating: No

7141—Inville gravelly coarse sandy loam, 2 to 9 percent slopes, stony

Map Unit Setting

National map unit symbol: 1sg3s
Landscape: Mountains
Elevation: 6,230 to 6,950 feet
Mean annual precipitation: 19 to 33 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 45 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Inville and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Inville

Setting

Landscape: Mountains
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Outwash derived from mixed

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 12 inches: gravelly coarse sandy loam
Bt - 12 to 37 inches: extremely cobbly sandy loam
C - 37 to 56 inches: extremely gravelly loamy coarse sand

Properties and qualities

Slope: 2 to 9 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F022AF002CA - Frigid, Sandy, Or Loamy Outwash
Hydric soil rating: No

Minor Components

Christopher, loamy coarse sand

Percent of map unit: 10 percent
Landscape: Mountains
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F022AF002CA - Frigid, Sandy, Or Loamy Outwash
Hydric soil rating: No

Cassenai, gravelly loamy coarse sand

Percent of map unit: 4 percent
Landscape: Mountains
Landform: Mountain slopes, Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope

Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F022AF005CA - Frigid, Deep To Very Deep, Sandy-Loamy Mountain Slopes
Hydric soil rating: No

Jorge, very gravelly sandy loam

Percent of map unit: 3 percent
Landscape: Mountains
Landform: Mountain slopes, Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F022AE013CA - Frigid, Loamy, Volcanic Mountain Slopes
Hydric soil rating: No

Kingsbeach

Percent of map unit: 2 percent
Landscape: Mountains
Landform: Lake terraces, Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F022AE025CA - Loamy Moist Outwash
Hydric soil rating: No

Aquic xerorthents

Percent of map unit: 1 percent
Landscape: Mountains
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R022AX105CA - Steep Mountain Drainageways
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the following National Soil Survey Handbook link: “National Soil Survey Handbook.”

ABC soil

A soil having an A, a B, and a C horizon.

Ablation till

Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

AC soil

A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil

The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil

Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone

A semiconical type of alluvial fan having very steep slopes. It is higher, narrower, and steeper than a fan and is composed of coarser and thicker layers of material deposited by a combination of alluvial episodes and (to a much lesser degree) landslides (debris flow). The coarsest materials tend to be concentrated at the apex of the cone.

Alluvial fan

A low, outspread mass of loose materials and/or rock material, commonly with gentle slopes. It is shaped like an open fan or a segment of a cone. The material was deposited by a stream at the place where it issues from a narrow mountain valley or upland valley or where a tributary stream is near or at its junction with the main stream. The fan is steepest near its apex, which points upstream, and slopes gently and convexly outward (downstream) with a gradual decrease in gradient.

Alluvium

Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpha,alpha-dipyridyl

A compound that when dissolved in ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction implies reducing conditions and the likely presence of redoximorphic features.

Animal unit month (AUM)

The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions

Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon

A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo

The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in unconsolidated material. It is usually dry but can be transformed into a temporary watercourse or short-lived torrent after heavy rain within the watershed.

Aspect

The direction toward which a slope faces. Also called slope aspect.

Association, soil

A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity)

The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low: 0 to 3
Low: 3 to 6
Moderate: 6 to 9
High: 9 to 12
Very high: More than 12

Backslope

The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp

A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

Badland

A landscape that is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes and narrow interfluves. Badlands develop on surfaces that have little or no vegetative cover overlying unconsolidated or poorly cemented materials (clays, silts, or sandstones) with, in some cases, soluble minerals, such as gypsum or halite.

Bajada

A broad, gently inclined alluvial piedmont slope extending from the base of a mountain range out into a basin and formed by the lateral coalescence of a series of alluvial fans. Typically, it has a broadly undulating transverse profile, parallel to the mountain front, resulting from the convexities of component fans. The term is generally restricted to constructional slopes of intermontane basins.

Basal area

The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation

The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope (geomorphology)

A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding plane

A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology)

from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

Bedding system

A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock

The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography

A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace

A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum

Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout (map symbol)

A saucer-, cup-, or trough-shaped depression formed by wind erosion on a preexisting dune or other sand deposit, especially in an area of shifting sand or loose soil or where protective vegetation is disturbed or destroyed. The adjoining accumulation of sand derived from the depression, where recognizable, is commonly included. Blowouts are commonly small.

Borrow pit (map symbol)

An open excavation from which soil and underlying material have been removed, usually for construction purposes.

Bottom land

An informal term loosely applied to various portions of a flood plain.

Boulders

Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks

A landscape or tract of steep, rough or broken land dissected by ravines and gullies and marking a sudden change in topography.

Breast height

An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management

Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte

An isolated, generally flat-topped hill or mountain with relatively steep slopes and talus or precipitous cliffs and characterized by summit width that is less than the height of bounding escarpments; commonly topped by a caprock of resistant material and representing an erosion remnant carved from flat-lying rocks.

Cable yarding

A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil

A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche

A general term for a prominent zone of secondary carbonate accumulation in surficial materials in warm, subhumid to arid areas. Caliche is formed by both geologic and pedologic processes. Finely crystalline calcium carbonate forms a nearly continuous surface-coating and void-filling medium in geologic (parent) materials. Cementation ranges from weak in nonindurated forms to very strong in indurated forms. Other minerals (e.g., carbonates, silicate, and sulfate) may occur as accessory cements. Most petrocalcic horizons and some calcic horizons are caliche.

California bearing ratio (CBR)

The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy

The leafy crown of trees or shrubs. (See Crown.)

Canyon

A long, deep, narrow valley with high, precipitous walls in an area of high local relief.

Capillary water

Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena

A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.

Cation

An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity

The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps

See Terracettes.

Cement rock

Shaly limestone used in the manufacture of cement.

Channery soil material

Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment

Control of unwanted vegetation through the use of chemicals.

Chiseling

Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cirque

A steep-walled, semicircular or crescent-shaped, half-bowl-like recess or hollow, commonly situated at the head of a glaciated mountain valley or high on the side of a mountain. It was produced by the erosive activity of a mountain glacier. It commonly contains a small round lake (tarn).

Clay

As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions

See Redoximorphic features.

Clay film

A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clay spot (map symbol)

A spot where the surface texture is silty clay or clay in areas where the surface layer of the soils in the surrounding map unit is sandy loam, loam, silt loam, or coarser.

Claypan

A dense, compact subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. The layer restricts the downward movement of water through the soil. A claypan is commonly hard when dry and plastic and sticky when wet.

Climax plant community

The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil

Sand or loamy sand.

Cobble (or cobblestone)

A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material

Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility)

See Linear extensibility.

Colluvium

Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

Complex slope

Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil

A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions

See Redoximorphic features.

Conglomerate

A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system

Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage

A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil

Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping

Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section

The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat)

A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Corrosion (geomorphology)

A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations)

Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop

A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management

Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system

Growing crops according to a planned system of rotation and management practices.

Cross-slope farming

Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown

The upper part of a tree or shrub, including the living branches and their foliage.

Cryoturbate

A mass of soil or other unconsolidated earthy material moved or disturbed by frost action. It is typically coarser than the underlying material.

Cuesta

An asymmetric ridge capped by resistant rock layers of slight or moderate dip (commonly less than 15 percent slopes); a type of homocline produced by differential erosion of interbedded resistant and weak rocks. A cuesta has a long, gentle slope on one side (dip slope) that roughly parallels the inclined beds; on the other side, it has a relatively short and steep or clifflike slope (scarp) that cuts through the tilted rocks.

Culmination of the mean annual increment (CMAI)

The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave

The walls of excavations tend to cave in or slough.

Decreasers

The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing

Postponing grazing or resting grazing land for a prescribed period.

Delta

A body of alluvium having a surface that is fan shaped and nearly flat; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer

A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depression, closed (map symbol)

A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and that does not have a natural outlet for surface drainage.

Depth, soil

Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Desert pavement

A natural, residual concentration or layer of wind-polished, closely packed gravel, boulders, and other rock fragments mantling a desert surface. It forms where wind action and sheetwash have removed all smaller particles or where rock fragments have migrated upward through sediments to the surface. It typically protects the finer grained underlying material from further erosion.

Diatomaceous earth

A geologic deposit of fine, grayish siliceous material composed chiefly or entirely of the remains of diatoms.

Dip slope

A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace)

A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming

A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural)

Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface

Runoff, or surface flow of water, from an area.

Drainageway

A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Draw

A small stream valley that generally is shallower and more open than a ravine or gulch and that has a broader bottom. The present stream channel may appear inadequate to have cut the drainageway that it occupies.

Drift

A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

Drumlin

A low, smooth, elongated oval hill, mound, or ridge of compact till that has a core of bedrock or drift. It commonly has a blunt nose facing the direction from which the ice approached and a gentler slope tapering in the other direction. The longer axis is parallel to the general direction of glacier flow. Drumlins are products of streamline (laminar) flow of glaciers, which molded the subglacial floor through a combination of erosion and deposition.

Duff

A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune

A low mound, ridge, bank, or hill of loose, windblown granular material (generally sand), either barren and capable of movement from place to place or covered and stabilized with vegetation but retaining its characteristic shape.

Earthy fill

See Mine spoil.

Ecological site

An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation

The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation

A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian deposit

Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Ephemeral stream

A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation

A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion

The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (accelerated)

Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion (geologic)

Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion pavement

A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Erosion surface

A land surface shaped by the action of erosion, especially by running water.

Escarpment

A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Escarpment, bedrock (map symbol)

A relatively continuous and steep slope or cliff, produced by erosion or faulting, that breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.

Escarpment, nonbedrock (map symbol)

A relatively continuous and steep slope or cliff, generally produced by erosion but in some places produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.

Esker

A long, narrow, sinuous, steep-sided ridge of stratified sand and gravel deposited as the bed of a stream flowing in an ice tunnel within or below the ice (subglacial) or between ice walls on top of the ice of a wasting glacier and left

behind as high ground when the ice melted. Eskers range in length from less than a kilometer to more than 160 kilometers and in height from 3 to 30 meters.

Extrusive rock

Igneous rock derived from deep-seated molten matter (magma) deposited and cooled on the earth's surface.

Fallow

Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan remnant

A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

Fertility, soil

The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat)

The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity

The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope

A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil

Sandy clay, silty clay, or clay.

Firebreak

An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom

An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.

Flaggy soil material

Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone

A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain

The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms

A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain splay

A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.

Flood-plain step

An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial

Of or pertaining to rivers or streams; produced by stream or river action.

Foothills

A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).

Footslope

The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb

Any herbaceous plant not a grass or a sedge.

Forest cover

All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type

A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan

A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil

The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai

Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glaciofluvial deposits

Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits

Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded or laminated.

Gleyed soil

Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping

Growing crops in strips that grade toward a protected waterway.

Grassed waterway

A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel

Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravel pit (map symbol)

An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel.

Gravelly soil material

Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot (map symbol)

A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area that has less than 15 percent rock fragments.

Green manure crop (agronomy)

A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water

Water filling all the unblocked pores of the material below the water table.

Gully (map symbol)

A small, steep-sided channel caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage whereas a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock

Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim

Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan

A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head slope (geomorphology)

A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat)

Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops

Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill

A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope

A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.

Horizon, soil

A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon: An organic layer of fresh and decaying plant residue.

L horizon: A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

A horizon: The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon: The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon: The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon: The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon: Soft, consolidated bedrock beneath the soil.

R layer: Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

M layer: A root-limiting subsoil layer consisting of nearly continuous, horizontally oriented, human-manufactured materials.

W layer: A layer of water within or beneath the soil.

Humus

The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups

Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock

Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., andesite, basalt, and granite).

Illuviation

The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil

A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers

Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration

The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity

The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate

The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate

The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Very low: Less than 0.2
Low: 0.2 to 0.4
Moderately low: 0.4 to 0.75
Moderate: 0.75 to 1.25
Moderately high: 1.25 to 1.75
High: 1.75 to 2.5
Very high: More than 2.5

Interfluve

A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology)

A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Intermittent stream

A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders

On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions

See Redoximorphic features.

Irrigation

Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin: Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border: Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding: Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation: Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle): Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow: Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler: Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation: Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding: Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame

A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

Karst (topography)

A kind of topography that formed in limestone, gypsum, or other soluble rocks by dissolution and that is characterized by closed depressions, sinkholes, caves, and underground drainage.

Knoll

A small, low, rounded hill rising above adjacent landforms.

Ksat

See Saturated hydraulic conductivity.

Lacustrine deposit

Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain

A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace

A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landfill (map symbol)

An area of accumulated waste products of human habitation, either above or below natural ground level.

Landslide

A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones

Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lava flow (map symbol)

A solidified, commonly lobate body of rock formed through lateral, surface outpouring of molten lava from a vent or fissure.

Leaching

The removal of soluble material from soil or other material by percolating water.

Levee (map symbol)

An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow onto lowlands.

Linear extensibility

Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit

The moisture content at which the soil passes from a plastic to a liquid state.

Loam

Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess

Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength

The soil is not strong enough to support loads.

Low-residue crops

Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Marl

An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under freshwater lacustrine conditions but also formed in more saline environments.

Marsh or swamp (map symbol)

A water-saturated, very poorly drained area that is intermittently or permanently covered by water. Sedges, cattails, and rushes are the dominant vegetation in marshes, and trees or shrubs are the dominant vegetation in swamps. Not used in map units where the named soils are poorly drained or very poorly drained.

Mass movement

A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses

See Redoximorphic features.

Meander belt

The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar

A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Meander scroll

One of a series of long, parallel, close-fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

Mechanical treatment

Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil

Very fine sandy loam, loam, silt loam, or silt.

Mesa

A broad, nearly flat topped and commonly isolated landmass bounded by steep slopes or precipitous cliffs and capped by layers of resistant, nearly horizontal rocky material. The summit width is characteristically greater than the height of the bounding escarpments.

Metamorphic rock

Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth’s crust. Nearly all such rocks are crystalline.

Mine or quarry (map symbol)

An open excavation from which soil and underlying material have been removed and in which bedrock is exposed. Also denotes surface openings to underground mines.

Mine spoil

An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

Mineral soil

Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage

Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area

A kind of map unit that has little or no natural soil and supports little or no vegetation.

Miscellaneous water (map symbol)

Small, constructed bodies of water that are used for industrial, sanitary, or mining applications and that contain water most of the year.

Moderately coarse textured soil

Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil

Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon

A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine

In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, lateral, recessional, and terminal.

Morphology, soil

The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil

Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain

A generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can

occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck

Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mucky peat

See Hemic soil material.

Mudstone

A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation

A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon

A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil

A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules

See Redoximorphic features.

Nose slope (geomorphology)

A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant

Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter

Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low: Less than 0.5 percent
Low: 0.5 to 1.0 percent
Moderately low: 1.0 to 2.0 percent
Moderate: 2.0 to 4.0 percent
High: 4.0 to 8.0 percent
Very high: More than 8.0 percent

Outwash

Stratified and sorted sediments (chiefly sand and gravel) removed or “washed out” from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of a glacier. The coarser material is deposited nearer to the ice.

Outwash plain

An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace

An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan

A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material

The unconsolidated organic and mineral material in which soil forms.

Peat

Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped

An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment

A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is being (or was) transported across a gently sloping erosional surface at the foot of a receding hill or mountain slope.

Pedon

The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation

The movement of water through the soil.

Perennial water (map symbol)

Small, natural or constructed lakes, ponds, or pits that contain water most of the year.

Permafrost

Ground, soil, or rock that remains at or below 0 degrees C for at least 2 years. It is defined on the basis of temperature and is not necessarily frozen.

pH value

A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil

A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping

Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting

Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plastic limit

The moisture content at which a soil changes from semisolid to plastic.

Plasticity index

The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plateau (geomorphology)

A comparatively flat area of great extent and elevation; specifically, an extensive land region that is considerably elevated (more than 100 meters) above the adjacent lower lying terrain, is commonly limited on at least one side by an abrupt descent, and has a flat or nearly level surface. A comparatively large part of a plateau surface is near summit level.

Playa

The generally dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff. Playa deposits are fine grained and may or may not have a high water table and saline conditions.

Plinthite

The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan

A compacted layer formed in the soil directly below the plowed layer.

Ponding

Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded

Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings

See Redoximorphic features.

Potential native plant community

See Climax plant community.

Potential rooting depth (effective rooting depth)

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning

Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil

The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil

A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use

Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and

promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland

Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil

A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid: Less than 3.5
Extremely acid: 3.5 to 4.4
Very strongly acid: 4.5 to 5.0
Strongly acid: 5.1 to 5.5
Moderately acid: 5.6 to 6.0
Slightly acid: 6.1 to 6.5
Neutral: 6.6 to 7.3
Slightly alkaline: 7.4 to 7.8
Moderately alkaline: 7.9 to 8.4
Strongly alkaline: 8.5 to 9.0
Very strongly alkaline: 9.1 and higher

Red beds

Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations

See Redoximorphic features.

Redoximorphic depletions

See Redoximorphic features.

Redoximorphic features

Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
   A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
   B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
   C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
   A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
   B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix

See Redoximorphic features.

Regolith

All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

Relief

The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material)

Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill

A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser

The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut

A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments

Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop (map symbol)

An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where “Rock outcrop” is a named component of the map unit.

Root zone

The part of the soil that can be penetrated by plant roots.

Runoff

The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil

A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Saline spot (map symbol)

An area where the surface layer has an electrical conductivity of 8 mmhos/cm more than the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has an electrical conductivity of 2 mmhos/cm or less.

Sand

As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone

Sedimentary rock containing dominantly sand-sized particles.

Sandy spot (map symbol)

A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils in the surrounding map unit is very fine sandy loam or finer.

Sapric soil material (muck)

The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat)

The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Commonly abbreviated as "Ksat." Terms describing saturated hydraulic conductivity are:

Very high: 100 or more micrometers per second (14.17 or more inches per hour)

High: 10 to 100 micrometers per second (1.417 to 14.17 inches per hour)

Moderately high: 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour)

Moderately low: 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour)

Low: 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour)

Very low: Less than 0.01 micrometer per second (less than 0.001417 inch per hour).

To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

Saturation

Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification

The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock

A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Sequum

A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil

A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Severely eroded spot (map symbol)

An area where, on the average, 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units in which “severely eroded,” “very severely eroded,” or “gullied” is part of the map unit name.

Shale

Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion

The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Short, steep slope (map symbol)

A narrow area of soil having slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.

Shoulder

The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

Shrink-swell

The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Shrub-coppice dune

A small, streamlined dune that forms around brush and clump vegetation.

Side slope (geomorphology)

A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica

A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio

The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt

As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone

An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

Similar soils

Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole (map symbol)

A closed, circular or elliptical depression, commonly funnel shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock (e.g., limestone, gypsum, or salt) or by collapse of underlying caves within bedrock. Complexes of sinkholes in carbonate-rock terrain are the main components of karst topography.

Site index

A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides (pedogenic)

Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

Slide or slip (map symbol)

A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces.

Slope

The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope alluvium

Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill

The slow filling of ponds, resulting from restricted water transmission in the soil.

Slow water movement

Restricted downward movement of water through the soil. See Saturated hydraulic conductivity.

Sodic (alkali) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodic spot (map symbol)

An area where the surface layer has a sodium adsorption ratio that is at least 10 more than that of the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has a sodium adsorption ratio of 5 or less.

Sodicity

The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight: Less than 13:1

Moderate: 13-30:1

Strong: More than 30:1

Sodium adsorption ratio (SAR)

A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock

Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil

A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates

Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand: 2.0 to 1.0
Coarse sand: 1.0 to 0.5
Medium sand: 0.5 to 0.25
Fine sand: 0.25 to 0.10
Very fine sand: 0.10 to 0.05
Silt: 0.05 to 0.002
Clay: Less than 0.002

Solum

The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spoil area (map symbol)

A pile of earthy materials, either smoothed or uneven, resulting from human activity.

Stone line

In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones

Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony

Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stony spot (map symbol)

A spot where 0.01 to 0.1 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surrounding soil has no surface stones.

Strath terrace

A type of stream terrace; formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream terrace

One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping

Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil

The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are:

Platy: Flat and laminated

Prismatic: Vertically elongated and having flat tops

Columnar: Vertically elongated and having rounded tops

Angular blocky: Having faces that intersect at sharp angles (planes)

Subangular blocky: Having subrounded and planar faces (no sharp angles)

Granular: Small structural units with curved or very irregular faces

Structureless soil horizons are defined as follows:

Single grained: Entirely noncoherent (each grain by itself), as in loose sand

Massive: Occurring as a coherent mass

Stubble mulch

Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil

Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling

Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum

The part of the soil below the solum.

Subsurface layer

Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow

The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit

The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer

The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil

The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus

Rock fragments of any size or shape (commonly coarse and angular) derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts

Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine

An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation)

An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field

generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology)

A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Terracettes

Small, irregular steplike forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may be induced or enhanced by trampling of livestock, such as sheep or cattle.

Texture, soil

The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer

Otherwise suitable soil material that is too thin for the specified use.

Till

Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain

An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil

The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope

The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil

The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements

Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread

The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Tuff

A generic term for any consolidated or cemented deposit that is 50 percent or more volcanic ash.

Upland

An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill

The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

Variegation

Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve

A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very stony spot (map symbol)

A spot where 0.1 to 3.0 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surface of the surrounding soil is covered by less than 0.01 percent stones.

Water bars

Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering

All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded

Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wet spot (map symbol)

A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit.

Wilting point (or permanent wilting point)

The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow

The uprooting and tipping over of trees by the wind.

Attachment C Biological Resources – USFWS IPACs Resources List, Letter of Determination (May 2026)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Reno Fish And Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147
Phone: (775) 861-6300 Fax: (775) 861-6301

In Reply Refer To: 05/19/2026 00:15:28 UTC
Project Code: 2026-0080791
Project Name: NDOW Third Creek Fisheries Management Structure

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through IPaC by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see Migratory Bird Permit | What We Do | U.S. Fish & Wildlife Service (fws.gov).

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries

- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Reno Fish And Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147
(775) 861-6300

PROJECT SUMMARY

Project Code: 2026-0080791
Project Name: NDOW Third Creek Fisheries Management Structure
Project Type: Biological Control
Project Description: Nevada Department of Wildlife proposes to install a fisheries management structure on Third Creek in Incline Village, Washoe County, Nevada, between Lakeshore Boulevard and the creek terminus at Lake Tahoe on land owned by the Incline Village General Improvement District (IVGID). Project planning has been supported by an IVGID grant. The fisheries management structure will replace the temporary structures operated and maintained to support NDOW's ongoing management, monitoring and research efforts at the project site since 2014 (i.e., Lake Tahoe Lahontan Cutthroat Trout Feasibility Study, EIP Project #02.02.03.0025) and Lake Tahoe Rainbow Trout Study, EIP Project #). The Third Creek Fisheries Management Structure (Project) will contribute towards Nevada's Biodiversity Initiative with the United States Fish and Wildlife Service (USFWS). Construction period is scheduled for July 31 through October 15, 2026.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.24060795,-119.94639374739052,14z

Counties: Washoe County, Nevada

ENDANGERED SPECIES ACT SPECIES

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Gray Wolf *Canis lupus* Population: U.S.A.: All of AL, AR, CA, CO, CT, DE, FL, GA, IA, IN, IL, KS, KY, LA, MA, MD, ME, MI, MO, MS, NC, ND, NE, NH, NJ, NV, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, and WV; and portions of AZ, NM, OR, UT, and WA. Mexico. There is **final** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/4488 General project design guidelines: https://ipac.ecosphere.fws.gov/project/XFHD4HOCDVH57A5D6NO7QSFJP4/documents/generated/11040.pdf	Endangered
Sierra Nevada Red Fox *Vulpes vulpes necator* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4252	Endangered

BIRDS

NAME	STATUS
California Spotted Owl *Strix occidentalis occidentalis* Population: Sierra Nevada No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7266 General project design guidelines: https://ipac.ecosphere.fws.gov/project/XFHD4HOCDVH57A5D6NO7QSFJP4/documents/generated/11040.pdf	Proposed Threatened

REPTILES

NAME	STATUS
Northwestern Pond Turtle *Actinemys marmorata* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1111 General project design guidelines: https://ipac.ecosphere.fws.gov/project/XFHD4HOCDVH57A5D6NO7QSFJP4/documents/generated/11040.pdf	Proposed Threatened

AMPHIBIANS

NAME	STATUS
Sierra Nevada Yellow-legged Frog *Rana sierrae* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9529	Endangered

FISHES

NAME	STATUS
Lahontan Cutthroat Trout *Oncorhynchus clarkii henshawi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3964 General project design guidelines: https://ipac.ecosphere.fws.gov/project/XFHD4HOCDVH57A5D6NO7QSFJP4/documents/generated/11040.pdf	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743 General project design guidelines: https://ipac.ecosphere.fws.gov/project/XFHD4HOCDVH57A5D6NO7QSFJP4/documents/generated/11040.pdf	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

---

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.

3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper

Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

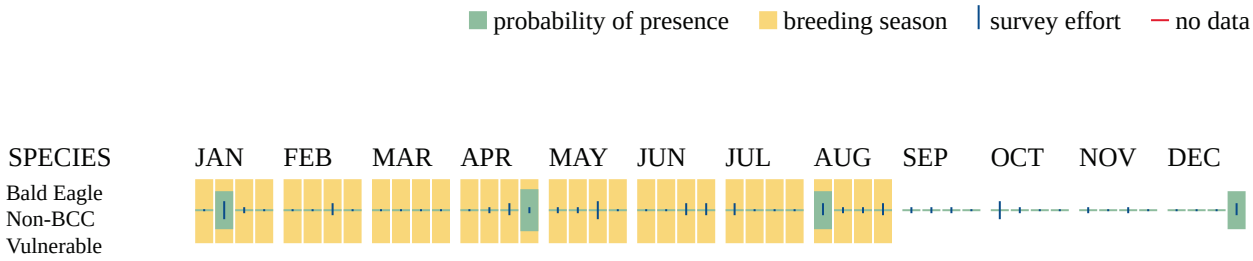
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Dipper *Cinclus mexicanus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11928	Breeds Mar 21 to Aug 21
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Black-throated Gray Warbler *Setophaga nigrescens* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9584	Breeds May 1 to Jul 20
California Gull *Larus californicus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10955	Breeds Mar 1 to Jul 31
Cassin's Finch *Haemorhous cassinii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10575	Breeds Jun 1 to Aug 31
Evening Grosbeak *Coccothraustes vespertinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9465	Breeds May 15 to Aug 10
Flammulated Owl *Psiloscops flammeolus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/7728	Breeds May 10 to Aug 15

NAME	BREEDING SEASON
Hermit Warbler *Setophaga occidentalis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11957	Breeds May 5 to Jul 15
Lewis's Woodpecker *Melanerpes lewis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Western Grebe *Aechmophorus occidentalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

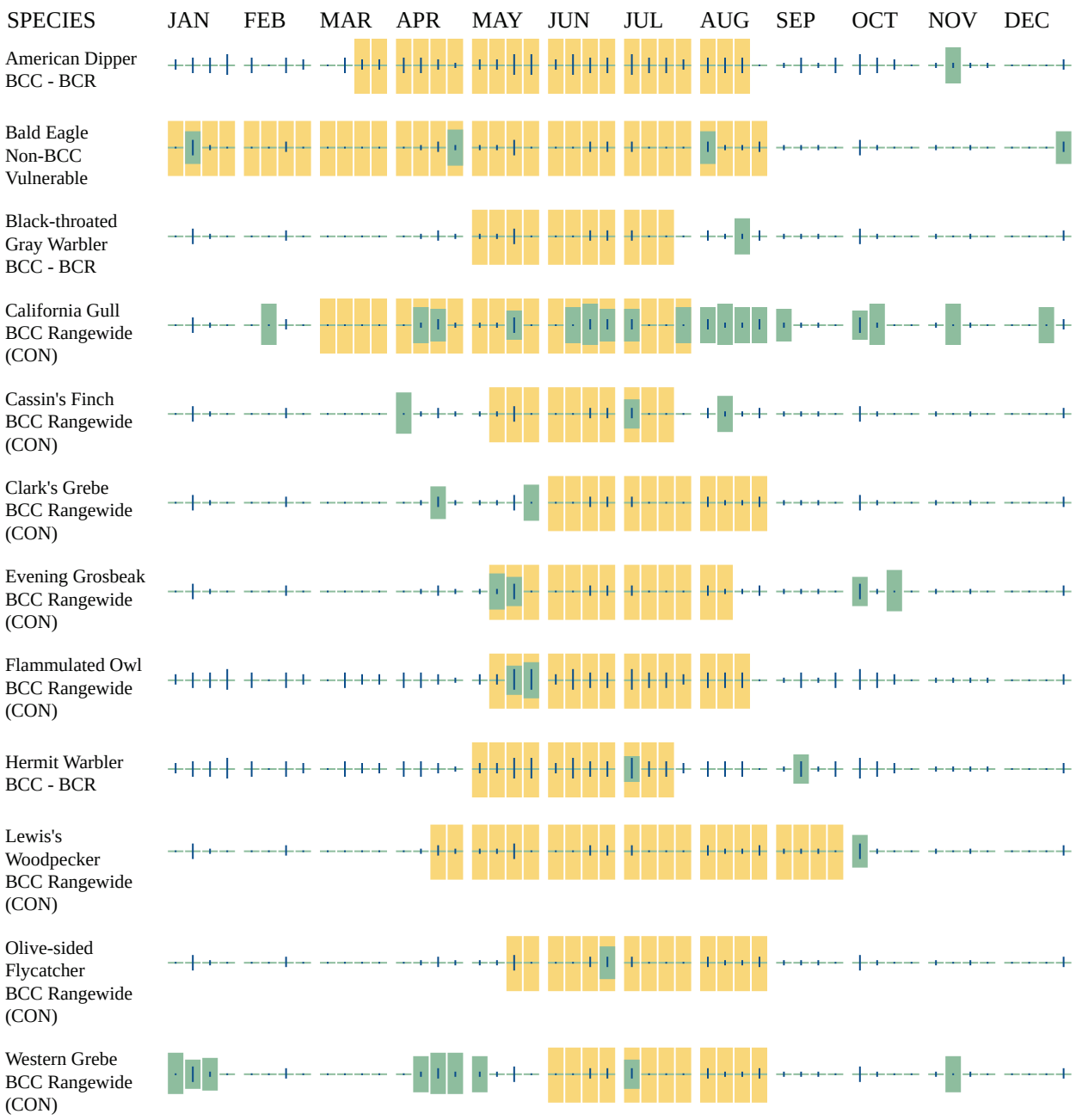
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort – no data



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- R4SBC

IPAC USER CONTACT INFORMATION

Agency:	Nevada Department of Wildlife
Name:	melanie greene
Address:	1100 Valley Road
Address Line 2:	295 US Highway 50 suite 1
City:	Reno
State:	NV
Zip:	89512
Email	melanie.greene@gmail.com
Phone:	7753393328

NDOW THIRD CREEK FISHERIES MANAGEMENT STRUCTURE

BIOLOGICAL ANALYSIS

Prepared using IPaC

Generated by melanie greene (melanie.greene@gmail.com)

May 21, 2026

The purpose of this document is to assess the effects of the proposed project and determine whether the project may affect any federally threatened, endangered, proposed, or candidate species. If appropriate for the project, this document may be used as a biological assessment (BA), as it is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 U.S.C. 1536 (c)).

In this document, any data provided by U.S. Fish and Wildlife Service is based on data as of April 23, 2026.

Prepared using IPaC version 6.128.28-rc0

NDOW THIRD CREEK FISHERIES MANAGEMENT STRUCTURE BIOLOGICAL ASSESSMENT

TABLE OF CONTENTS

1 DESCRIPTION OF THE ACTION

1.1 PROJECT NAME

NDOW Third Creek Fisheries Management Structure

1.2 EXECUTIVE SUMMARY

The USFWS IPaC Official Species List was reviewed to identify federally listed species and designated critical habitat with potential to occur within the project area. Based on the IPaC output, the following species were evaluated for potential effects:

LAHONTAN CUTTHROAT TROUT (*ONCORHYNCHUS CLARKII HENSHAWI*) – THREATENED

DETERMINATION: MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT (NLAA) LAHONTAN CUTTHROAT TROUT (LCT) ARE KNOWN TO OCCUR WITHIN THE LAKE TAHOE BASIN, INCLUDING NEARSHORE AND TRIBUTARY HABITATS. THE PROJECT INVOLVES LIMITED IN-WATER AND SHORELINE ACTIVITIES WITHIN AN ALREADY DISTURBED AND MANAGED SYSTEM. POTENTIAL EFFECTS ARE LIMITED TO SHORT-TERM CONSTRUCTION-RELATED DISTURBANCES (E.G., TURBIDITY, LOCALIZED SUBSTRATE DISTURBANCE). AVOIDANCE AND MINIMIZATION MEASURES INCLUDE IMPLEMENTATION OF BMPS (EROSION AND SEDIMENT CONTROL, TURBIDITY MANAGEMENT), WORK AREA ISOLATION WHERE FEASIBLE, AND ADHERENCE TO APPLICABLE WORK WINDOWS. THE PROJECT DOES NOT RESULT IN LONG-TERM DEGRADATION OF HABITAT SUITABILITY, DOES NOT IMPEDE FISH PASSAGE, AND INCORPORATES DESIGN ELEMENTS THAT MAINTAIN OR IMPROVE AQUATIC HABITAT CONDITIONS POST-CONSTRUCTION. GIVEN THE TEMPORARY AND LOCALIZED NATURE OF EFFECTS AND THE IMPLEMENTATION OF STANDARD USACE AND WATER QUALITY PROTECTION MEASURES, THE PROJECT MAY AFFECT BUT IS NOT LIKELY TO ADVERSELY AFFECT LCT. SIERRA NEVADA YELLOW-LEGGED FROG (*RANA SIERRAE*) – ENDANGERED

DETERMINATION: NO EFFECT SUITABLE HABITAT FOR SIERRA NEVADA YELLOW-LEGGED FROG (SNYLF) IS NOT PRESENT WITHIN THE IMMEDIATE PROJECT FOOTPRINT, WHICH CONSISTS OF DEVELOPED SHORELINE AND HIGHLY DISTURBED NEARSHORE ENVIRONMENT LACKING THE SHALLOW, LOW-PREDATION, MONTANE AQUATIC HABITATS TYPICALLY REQUIRED BY THIS SPECIES. THE PROJECT DOES NOT INVOLVE UPSTREAM TRIBUTARY MODIFICATION, MEADOW HABITAT, OR LENTIC BREEDING AREAS ASSOCIATED WITH SNYLF OCCUPANCY. NO DIRECT, INDIRECT, OR CUMULATIVE IMPACT PATHWAYS ARE PRESENT. ACCORDINGLY, THE PROJECT WILL HAVE NO EFFECT ON SIERRA NEVADA YELLOW-LEGGED FROG.

CRITICAL HABITAT

DETERMINATION: NO ADVERSE MODIFICATION NO DESIGNATED CRITICAL HABITAT IS PRESENT WITHIN THE PROJECT FOOTPRINT, OR WHERE PRESENT IN THE ACTION AREA, THE PROJECT WILL NOT ALTER THE PHYSICAL OR BIOLOGICAL FEATURES NECESSARY TO SUPPORT THE SPECIES' CONSERVATION. PROJECT ACTIVITIES ARE TEMPORARY, LOCALIZED, AND INCORPORATE BMPS THAT MAINTAIN BASELINE HABITAT FUNCTION.

Conclusions

Based on the IPaC review and project-specific impact analysis:

- Species determinations are limited to No Effect and May Affect, Not Likely to Adversely Affect (NLAA);
- No take is anticipated;
- No adverse modification of critical habitat will occur.

The Project therefore qualifies for **informal consultation under ESA Section 7**, and no formal consultation is required.

1.3 EFFECT DETERMINATION SUMMARY

SPECIES (COMMON NAME)	SCIENTIFIC NAME	LISTING STATUS	PRESENT IN ACTION AREA	EFFECT DETERMINATION
California Spotted Owl	Strix occidentalis occidentalis	Proposed Threatened	Excluded from analysis	Excluded from analysis
Gray Wolf	Canis lupus	Endangered	No	NE
Lahontan Cutthroat Trout† **. This species or critical habitat is covered by a DKey.**	Oncorhynchus clarkii henshawi	Threatened		NLAA
Monarch Butterfly	Danaus plexippus	Proposed Threatened	Yes	NE
Northwestern Pond Turtle	Actinemys marmorata	Proposed Threatened	Yes	NLAA
Sierra Nevada Red Fox	Vulpes vulpes necator	Endangered	No	NE
Sierra Nevada Yellow-legged Frog	Rana sierrae	Endangered	Yes	NLAA

† This species or critical habitat has been analyzed through a Determination Key.

1.4 PROJECT DESCRIPTION

1.4.1 LOCATION

LOCATION
Washoe County, Nevada

1.4.2 DESCRIPTION OF PROJECT HABITAT

The Third Creek catchment supports a diverse array of both terrestrial and aquatic habitats, shaped by its location on the eastern slopes of the Sierra Nevada and the influence of perennial stream flow. Terrestrial habitats in the catchment are characterized by riparian corridors lined with willows, alders, and cottonwoods, as well as adjacent upland areas dominated by pine and fir forests. These areas provide important shelter and foraging grounds for wildlife, including birds, small mammals, and deer, while the well-drained granitic soils support a variety of native understory vegetation and help minimize surface runoff. Aquatic habitats within Third Creek are sustained by the creek's stable, perennial flow regime, which supports cold-water fisheries and a variety of macroinvertebrate communities. The stream channel and its associated pools, riffles, and gravel beds provide essential habitat for trout and other native fish species, while consistently good water quality and regular flow patterns help maintain conditions favorable to aquatic life. Seasonal fluctuations in water levels, along with occasional high-flow events, contribute to dynamic habitat structure and support a rich diversity of aquatic organisms. The riparian zones bordering the creek further enhance aquatic habitat quality by providing shade, contributing organic matter, and stabilizing stream banks, which is critical for both erosion control and maintaining water clarity during storm events. Below Lakeshore Boulevard, the riparian corridor continues to support unique habitat features, including dense willow and alder stands that provide shade and shelter for wildlife. This area often experiences increased moisture and cooler microclimates, which foster the growth of specialized understory plants and supports a higher diversity of bird species. Additionally, the proximity to the creek enhances habitat quality for amphibians and aquatic insects, making it an important ecological zone within the lower reaches of Third Creek.

1.4.3 PROJECT PROPONENT INFORMATION

Provide information regarding who is proposing to conduct the project, and their contact information. Please provide details on whether there is a Federal nexus.

REQUESTING AGENCY
Nevada Department of Wildlife

FULL NAME
melanie greene

STREET ADDRESS
1100 Valley Road

295 US Highway 50 suite 1

CITY	STATE	ZIP
Reno	NV	89512

PHONE NUMBER	E-MAIL ADDRESS
7753393328	melanie.greene@gmail.com

LEAD AGENCY
Lead agency is the same as requesting agency

1.4.4 PROJECT PURPOSE

The overall purpose of the project is to replace the need for a temporary management structure and to construct a more permanent fisheries management structure designed to accommodate and respond to Third Creek's flow regime that will allow NDOW to collect wild Rainbow trout eggs annually and work towards the recovery of Lahontan cutthroat trout (LTC) using a realistic and replicable approach. The project need is rooted in the Lake Tahoe Lahontan Cutthroat Trout Feasibility Study and Lake Tahoe Rainbow Trout Study; contributes towards Nevada's Biodiversity Initiative with USFWS, and replacement of the temporary structure maintained since 2014.

1.4.5 PROJECT TYPE AND DECONSTRUCTION

This project is a fisheries management project.

1.4.5.1 PROJECT MAP

LEGEND

Project footprint

Layer 1: Fisheries management structure with in-channel scour protections and downstream grade controls (structure)

1.4.5.2 FISHERIES MANAGEMENT STRUCTURE WITH IN-CHANNEL SCOUR PROTECTIONS AND DOWNSTREAM GRADE CONTROLS

STRUCTURE COMPLETION DATE
October 15, 2026

REMOVAL/DECOMMISSION DATE (IF APPLICABLE)
Not applicable

STRESSORS
This activity is not expected to have any impact on the environment.

DESCRIPTION
Fisheries management structure will occupy 25-linear-feet of Thrid Creek channel, including up-gradient scout controls and down-gradient grade controls the final structure will occupy up to 85-linear-feet of Third Creek channel that will be operated and maintained by NDOW over the long-term through MOU with IVGID (property owner).

1.4.6 ANTICIPATED ENVIRONMENTAL STRESSORS

Describe the anticipated effects of your proposed project on the aspects of the land, air and water that will occur due to the activities above. These should be based on the activity deconstructions done in the previous section and will be used to inform the action area.

1.4.6.1 AQUATIC FEATURES

Bodies of water on the landscape, such as streams, rivers, ponds, wetlands, etc., and their physical characteristics (e.g., depth, current, etc.). This feature includes the groundwater and its characteristics. Water quality attributes (e.g., turbidity, pH, temperature, DO, nutrients, etc.) should be placed in the Environmental Quality Features.

1.4.6.2 MISCELLANEOUS

Miscellaneous should only be used if the created feature does not fit into one of the other categories or if the creator is not sure in which category it should be placed.

1.5 ACTION AREA

LEGEND

Project footprint

Stressor location

1.6 CONSERVATION MEASURES

Describe any proposed measures being implemented as part of the project that are designed to reduce the impacts to the environment and their resulting effects to listed species. To avoid extra verbiage, don't list measures that have no relevance to the species being analyzed.

No conservation measures have been selected for this project.

1.7 PRIOR CONSULTATION HISTORY

SPK-2015-00456

1.8 OTHER AGENCY PARTNERS AND INTERESTED PARTIES

Nevada Department of Environmental Protection

United States Army Corps of Engineers - Sacramento District

Tahoe Regional Planning Agency

Washoe Tribe of Nevada and California

Incline Village General Improvement District

1.9 OTHER REPORTS AND HELPFUL INFORMATION

Contained in permit applications and the Detailed Project Description enclosure provided with packets

2 SPECIES EFFECTS ANALYSIS

This section describes, species by species, the effects of the proposed action on listed, proposed, and candidate species, and the habitat on which they depend. In this document, effects are broken down as direct interactions (something happening directly to the species) or indirect interactions (something happening to the environment on which a species depends that could then result in effects to the species).

These interactions encompass effects that occur both during project construction and those which could be ongoing after the project is finished. All effects, however, should be considered, including effects from direct and indirect interactions and cumulative effects.

2.1 CALIFORNIA SPOTTED OWL

This species has been excluded from analysis in this environmental review document.

RELEVANT DOCUMENTATION

NDOW biologists conduct annual protocol surveys in support of the state monitoring program. NDOW biologists will conduct pre-construction surveys to determine presence/ absence.

JUSTIFICATION FOR EXCLUSION

Project construction will occur following the region's nesting season and the project location near busy summer recreation areas (i.e., Incline Beach) the likelihood of species occurrence is low.

2.2 GRAY WOLF

This species has been excluded from analysis in this environmental review document.

JUSTIFICATION FOR EXCLUSION

Gray Wolf is not likely to occur/occupying the project area even with appropriate habitat. The Work area is adjacent to the busy Incline Beach recreation area and in close proximity to a regional Class I bikeway and Lakeshore Boulevard.

2.3 MONARCH BUTTERFLY

2.3.1 STATUS OF THE SPECIES

This section should provide information on the species' background, its biology and life history that is relevant to the proposed project within the action area that will inform the effects analysis.

2.3.1.1 LEGAL STATUS

The Monarch Butterfly is federally listed as 'Proposed Threatened' and additional information regarding its legal status can be found on the ECOS species profile.

2.3.1.2 RECOVERY PLANS

Available recovery plans for the Monarch Butterfly can be found on the ECOS species profile.

2.3.1.3 LIFE HISTORY INFORMATION

For information on monarch conservation, visit https://www.fws.gov/initiative/pollinators/monarchs, http://www.mafwa.org/?page_id=2347, and, for the West, https://wafwa.org/committees-working-groups/monarch-working-group/.

Adult monarch butterflies are large and conspicuous, with bright orange wings surrounded by a black border and covered with black veins. The black border has a double row of white spots, present on the upper side of the wings. Adult monarchs are sexually dimorphic, with males having narrower wing venation and scent patches. The bright coloring of a monarch serves as a warning to predators that eating them can be toxic.

During the breeding season, monarchs lay their eggs on their obligate milkweed host plant (primarily Asclepias spp.), and larvae emerge after two to five days. Larvae develop through five larval instars (intervals between molts) over a period of 9 to 18 days, feeding on milkweed and sequestering toxic chemicals (cardenolides) as a defense against predators. The larva then pupates into a chrysalis before emerging 6 to 14 days later as an adult butterfly. There are multiple generations of monarchs produced during the breeding season, with most adult butterflies living approximately two to five weeks; overwintering adults enter into reproductive diapause (suspended reproduction) and live six to nine months.

In many regions where monarchs are present, monarchs breed year-round. Individual monarchs in temperate climates, such as eastern and western North America, undergo long-distance migration, and live for an extended period of time. In the fall, in both eastern and western North America, monarchs begin migrating to their respective overwintering sites. This migration can take monarchs distances of over 3,000 km and last for over two months. In early spring (February-March), surviving monarchs break diapause and mate at the overwintering sites before dispersing. The same individuals that undertook the initial southward migration begin flying back through the breeding grounds and their offspring start the cycle of generational migration over again.

IDENTIFIED RESOURCE NEEDS

Natural food sources

Area is less than 5 km2

2.3.1.4 CONSERVATION NEEDS

Not applicable to the Project activities

2.3.2 ENVIRONMENTAL BASELINE

*The environmental baseline describes the species' health **within the action area only** at the time of the consultation, and does not include the effects of the action under*

review. Unlike the species information provided above, the environmental baseline is at the scale of the Action area.

2.3.2.1 SPECIES PRESENCE AND USE

Milkweed is not present in measurable densities, if present. Monarch would be migrating trough the reach if present in August-October 2026.

RELEVANT DOCUMENTATION

2.3.2.2 SPECIES CONSERVATION NEEDS WITHIN THE ACTION AREA

Not applicable to the project acitivities - size and scale of actions

2.3.2.3 HABITAT CONDITION (GENERAL)

Project will result in a net environmental gain to habitat functions

2.3.2.4 INFLUENCES

Not applicable to the Project activities - size and scale of actions

2.3.2.5 ADDITIONAL BASELINE INFORMATION

Not applicable to the Project activities - size and scale of actions

2.3.3 EFFECTS OF THE ACTION

This section considers and discusses all effects on the listed species that are caused by the proposed action and are reasonably certain to occur, including the effects of other activities that would not occur but for the proposed action.

2.3.3.1 INDIRECT INTERACTIONS

Provide a brief overview of what the applicable science has discovered regarding the species and its response to the stressors that each project activity may cause. This should include an explanation of the pathways and mechanisms that have potential to translate environmental change (impact) into response and effects to individuals.

2.3.3.2 DIRECT INTERACTIONS

No direct interactions leading to effects on species are expected to occur from the proposed project.

Justification:

Not applicable to the Project activities - size and scale of actions

2.3.4 CUMULATIVE EFFECTS

Not applicable to the Project activities - size and scale of actions

No direct adverse effects would occur from restoration project activities and thus the project would not make a considerable contribution to potential cumulative adverse effects to the species.

2.3.5 DISCUSSION AND CONCLUSION

DETERMINATION: NE

2.4 NORTHWESTERN POND TURTLE

2.4.1 STATUS OF THE SPECIES

This section should provide information on the species' background, its biology and life history that is relevant to the proposed project within the action area that will inform the effects analysis.

2.4.1.1 LEGAL STATUS

The Northwestern Pond Turtle is federally listed as 'Proposed Threatened' and additional information regarding its legal status can be found on the ECOS species profile.

2.4.1.2 RECOVERY PLANS

Available recovery plans for the Northwestern Pond Turtle can be found on the ECOS species profile.

2.4.1.3 LIFE HISTORY INFORMATION

No description available

IDENTIFIED RESOURCE NEEDS

Channel morphology

Addressed by design of fisheries management structure

Travel corridors

Addressed through fisheries management structure design

2.4.1.4 CONSERVATION NEEDS

Not applicable to the Project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach.

2.4.2 ENVIRONMENTAL BASELINE

*The environmental baseline describes the species' health **within the action area only** at the time of the consultation, and does not include the effects of the action under review. Unlike the species information provided above, the environmental baseline is at the scale of the Action area.*

2.4.2.1 SPECIES PRESENCE AND USE

TBD

RELEVANT DOCUMENTATION

2.4.2.2 SPECIES CONSERVATION NEEDS WITHIN THE ACTION AREA

Not applicable to the Project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach.

2.4.2.3 HABITAT CONDITION (GENERAL)

Not applicable to the Project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach.

2.4.2.4 INFLUENCES

Not applicable to the Project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach.

2.4.2.5 ADDITIONAL BASELINE INFORMATION

Not applicable to the Project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach.

2.4.3 EFFECTS OF THE ACTION

This section considers and discusses all effects on the listed species that are caused by the proposed action and are reasonably certain to occur, including the effects of other activities that would not occur but for the proposed action.

2.4.3.1 INDIRECT INTERACTIONS

Provide a brief overview of what the applicable science has discovered regarding the species and its response to the stressors that each project activity may cause. This should include an explanation of the pathways and mechanisms that have potential to translate environmental change (impact) into response and effects to individuals.

2.4.3.2 DIRECT INTERACTIONS

No direct interactions leading to effects on species are expected to occur from the proposed project.

Justification:

Not applicable to the Project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach. NDOW biologist will conduct pre-construction presence/absence surveys and will implement species relocation protocols if necessary, prior to construction and as needed.

2.4.4 CUMULATIVE EFFECTS

Direct effects will be avoided through relocations if species is present in the Project Area. Project will result in a next environmental gain to habitat function within and in the vicinity of the project reach and would not considerable contribute to adverse cumulative effects.

2.4.5 DISCUSSION AND CONCLUSION

DETERMINATION: NLAA

COMPENSATION MEASURES

Pre-construction presence/absence surveys to be conducted by NDOW biologists with species relocations conducted when species is present.

2.5 SIERRA NEVADA RED FOX

This species has been excluded from analysis in this environmental review document.

RELEVANT DOCUMENTATION

NDOW biologists conduct annual protocol surveys in support of the state monitoring program. NDOW biologists will conduct pre-construction surveys to determine presence/ absence and are trained in and will implement species relocations when necessary.

JUSTIFICATION FOR EXCLUSION

The location of the Project Area in the vicinity of a busy recreation area and residential lake front parcels with security gates and fencing, the likelihood of Sierra Nevada Red Fox presence is extremely low.

2.6 SIERRA NEVADA YELLOW-LEGGED FROG

2.6.1 STATUS OF THE SPECIES

This section should provide information on the species' background, its biology and life history that is relevant to the proposed project within the action area that will inform the effects analysis.

2.6.1.1 LEGAL STATUS

The Sierra Nevada Yellow-legged Frog is federally listed as 'Endangered' and additional information regarding its legal status can be found on the ECOS species profile.

2.6.1.2 RECOVERY PLANS

Available recovery plans for the Sierra Nevada Yellow-legged Frog can be found on the ECOS species profile.

2.6.1.3 LIFE HISTORY INFORMATION

No description available

IDENTIFIED RESOURCE NEEDS

Streamflow

Not applicable to the project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach.

2.6.1.4 CONSERVATION NEEDS

Not applicable to the Project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach.

2.6.2 ENVIRONMENTAL BASELINE

*The environmental baseline describes the species' health **within the action area only** at the time of the consultation, and does not include the effects of the action under review. Unlike the species information provided above, the environmental baseline is at the scale of the Action area.*

2.6.2.1 SPECIES PRESENCE AND USE

NDOW biologists will conduct pre-construction surveys to determine presence/absence and are trained in and will implement species relocations when necessary.

RELEVANT DOCUMENTATION

2.6.2.2 SPECIES CONSERVATION NEEDS WITHIN THE ACTION AREA

Not applicable to the Project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach.

2.6.2.3 HABITAT CONDITION (GENERAL)

Considered in the design of the fisheries management structure

2.6.2.4 INFLUENCES

Not applicable to the Project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach.

2.6.2.5 ADDITIONAL BASELINE INFORMATION

Not applicable to the Project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach.

2.6.3 EFFECTS OF THE ACTION

This section considers and discusses all effects on the listed species that are caused by the proposed action and are reasonably certain to occur, including the effects of other activities that would not occur but for the proposed action.

2.6.3.1 INDIRECT INTERACTIONS

Provide a brief overview of what the applicable science has discovered regarding the species and its response to the stressors that each project activity may cause. This should include an explanation of the pathways and mechanisms that have potential to translate environmental change (impact) into response and effects to individuals.

2.6.3.2 DIRECT INTERACTIONS

No direct interactions leading to effects on species are expected to occur from the proposed project.

Justification:

NDOW biologists will conduct pre-construction presence/absence surveys and will implement species relocations if necessary - avoidance.

2.6.4 CUMULATIVE EFFECTS

Not applicable to the Project activities - size and scale of actions - project will result in a next environmental gain to habitat function within and in the vicinity of the project reach.

Direct impacts to individuals will be avoidance and thus the project will not make considerable contribution to a potentially cumulative adverse effect.

2.6.5 DISCUSSION AND CONCLUSION

DETERMINATION: NLAA

COMPENSATION MEASURES
NDOW biologists will conduct pre-construction surveys for presence/absence and implement specieis relocations if necessary - Avoidance.

3 CRITICAL HABITAT EFFECTS ANALYSIS

No critical habitats intersect with the project action area.

4 SUMMARY DISCUSSION AND CONCLUSION

4.1 SUMMARY DISCUSSION

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) system was used to identify federally listed species, designated critical habitat, and other sensitive resources with the potential to occur within the project area. The IPaC Official Species List and supporting tools were reviewed to evaluate potential effects and determine the appropriate consultation pathway. Based on the IPaC results, the project area contains species and/or habitats with potential to occur; however, project design features, avoidance and minimization measures, and the limited scope and nature of in-water and shoreline activities substantially reduce the potential for adverse effects. The project is confined to previously disturbed areas and developed shorezone environments, and does not introduce permanent changes to habitat function beyond the footprint evaluated.

Construction activities are temporary and will be implemented in accordance with best management practices (BMPs), including erosion and sediment control, turbidity management, and seasonal work windows where applicable. These measures are consistent with standard USACE permit conditions and are incorporated into the project to avoid or minimize potential effects to aquatic and riparian species. Given the project characteristics, the action is expected to result in **no effect** or **may affect, not likely to adversely affect (NLAA)** determinations for federally listed species, as supported by:

- the absence of suitable habitat within the immediate work area for certain listed species,
- the temporary and localized nature of impacts, and
- the implementation of avoidance and minimization measures incorporated into project design and permit conditions (including those identified in ENG Form 4345 submittal materials and associated PCN documentation).

Based on this evaluation, the project qualifies for **informal consultation** under Section 7 of the Endangered Species Act (ESA), as facilitated through IPaC. No adverse modification of designated critical habitat is anticipated, and no formal consultation is expected to be required.

4.2 CONCLUSION

Based on this evaluation, the project qualifies for **informal consultation** under Section 7 of the Endangered Species Act (ESA), as facilitated through IPaC. No adverse modification of designated critical habitat will occur, and no formal consultation is expected to be required.

Attachment D Cultural Resource Documentation (2001, 2015)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Reno Fish and Wildlife office
1340 Financial Boulevard, Suite 234
Reno, Nevada 89502

Standing Analysis for Effects to Lahontan Cutthroat Trout from In-Water Projects in Lake Tahoe

Prepared by

U.S. Fish and Wildlife Service

Reno Fish and Wildlife Field Office

_____

Rachael Youmans, Assistant Field Supervisor

[04/08/2025]

Table of Contents

1 INTRODUCTION

1.1 PURPOSE OF STANDING ANALYSIS

This Standing Analysis (SA) provides the analytical basis for an optional, alternative consultation process for Federal action agencies to address potential effects of future actions, pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act), to the following species: Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*). The U.S. Fish and Wildlife Service (Service) developed this SA to streamline the process of reviewing actions that would result in a "may affect, not likely to adversely affect" (NLAA) determination for the subject species.

This SA provides the analytical basis for consultations conducted for Federal actions that meet the criteria described below as delivered through a Determination Key (DKey) in the Service's Information for Planning and Consultation (IPaC) application. To obtain consultation documents, including concurrence with NLAA determinations, Federal agencies must use the associated DKey in IPaC to answer questions about the proposed action. By screening the project through the DKey, all or part of the SA is adopted by the Federal action agency and used to submit a concurrence request to support their NLAA determination. Consultation under section 7(a)(2) is only required for actions that may affect a listed species or critical habitat; actions which an action agency determines will have no effect on species or critical habitat do not require submittal to the Service.

1.2 BENEFITS OF THE STANDING ANALYSIS

The IPaC DKey based on this SA was designed such that, once the action agency provides the project-specific information required by the DKey, the resulting document contains the required components for informal consultation for qualified projects. Throughout the remainder of this document, statements regarding this SA refer to both the SA and the associated DKey.

The routine nature of the review of many Federal actions (projects) provides an opportunity to comprehensively evaluate the aggregate of their effects on species and critical habitats, as appropriate. The streamlined process facilitated by this SA will reduce the amount of Service staff time necessary to review actions requesting consultation and provide Federal agencies, consultants, and other project proponents a predictable, consistent, and timely response for qualified actions. In addition, development of an SA to assess the impacts of individual projects allows the Service to track and evaluate aggregate effects of multiple independent actions on listed species and/or critical habitat(s).

1.3 ELIGIBILITY FOR USE OF THE STANDING ANALYSIS

The SA describes the scope of activities that it addresses and provides the technical basis for Service concurrence on Federal action agency's NLAA determinations that are consistent with the findings of the SA. The SA may also provide technical information to help agencies identify actions that will have no effects to the listed species or critical habitat(s). For projects that do not

qualify to use the SA, action agencies/project proponents should coordinate directly with the local Ecological Services Field Office (ESFO) and address any consultation requirements, as appropriate.

1.4 Ensuring Accurate Determinations

As is true in all consultation procedures, the Service relies on complete and accurate information provided by Federal action agencies during consultation. To apply this SA to a project, it is the responsibility of the action agency/project proponent to provide information that is truthful and accurate and that fully represents the entire scope of the project in order to comply with the Act.

Where appropriate in our analysis, we make note of which activities are expected to have no effects[1] on a species or critical habitat. This information is provided as technical assistance to action agencies making no effect/may affect determinations.

1.5 Updates to the Standing Analysis

This SA will be reviewed annually and updated as needed to ensure the analysis contains the best scientific and commercial data available. This update process will include regular reviews to ensure that the analysis is accurate and valid, and that the SA still meets the Act's requirements. All updates will also ensure that the logic is sound and determinations are appropriate for covered activities. Updates will be signed under an updated cover.

Projects reviewed under this SA must rely on the version that is current on the date consultation is completed. For reference, both current and previous versions of the SA will be maintained by the lead field office.

2 Covered Area

This SA applies within the area described below, unless otherwise excluded (Section 3.1). In delineating the geographic scope of this SA (coverage area), we determined the appropriate extent based on the species and critical habitat(s) included and the activities covered herein. To qualify to use this SA, a project's action area must fall completely within the covered area.

This SA coverage area is the entire Tahoe Basin in California and Nevada which includes the following counties: Placer County, Eldorado County, Douglas County, and Washoe County. See Figure 1 below for the full covered area of this SA.

[1] A "no effect" determination is only appropriate when either the species is not present in the action area or is not exposed to any possible stressors or impacts from the proposed action.

Figure 1. Tahoe Unit LCT Boundary (Lahontan Cutthroat Trout Coordinating Committee 2019).

3 COVERED ACTION DESCRIPTION

The actions described herein include all activities addressed in this SA. The action description, conservation measures, and covered area inform the SA and describe which specific activities are appropriate for NLAA outcomes for individual projects under this analysis. The description of activities, and their inclusion in the SA, does not imply that said activities always result in effects to the species, nor is it meant to cover activities that fall outside of the prescribed bounds of the analysis as described below. Action agencies are not required to use this SA; they continue to have the option to request individual consultation on a project; however, in most cases, we anticipate use of the SA will substantially decrease consultation timeframes.

Action	Description
Pier, catwalk, dock, boatlift or similar feature	Placement, maintenance, repair, modification, expansion, or removal of a pier, catwalk, dock, boatlift or similar feature where the only disturbance is piling installation or removal
Scientific measuring devices	Placement, maintenance, repair, or removal of water loggers, water filters, or other similar features
Fish habitat mitigation structures	Placement, maintenance, repair, or removal of fish pyramids or crawfish traps
Aquatic invasive species nonchemical management	Placement, maintenance, repair, or removal of benthic barriers or other similar stationary features
Mooring buoy field	Modification, maintenance, expansion, or removal of buoys and their associated anchors occurring in a total project area size of less than 10 acres
Maintenance Dredging	Removal of lakebed sediments through a barge mounted excavator or suction method occurring in a total project area size of less than 1 acre annually up to a maximum of 10 years
Shoreline erosion control activities	Placement, removal, or replacement of shoreline, dynamic, or static revetment occurring in a total project area size of less than 1 acre annually up to a maximum of 10 years
Buoy/Buoys	Placement, maintenance, repair, modification, or removal of a buoy/buoys

3.1 EXCLUSIONS

Actions that include certain activities, occur in certain geographic areas, or meet one or more context-dependent conditions will not be eligible to use the SA. For projects requiring consultation (*i.e.*, that "may affect" listed species or critical habitats) that do not qualify due to one or more of these exclusions, action agencies/project proponents must contact the appropriate ESFO directly to complete their consultation requirements.

3.1.1 Excluded Activities

To receive the Service's concurrence of an action agency's NLAA determination or the Service's concurrence for an NLAA determination, based on this SA, actions and activities may NOT include the following:

1) Projects occurring outside of Lake Tahoe waters.
2) Projects occurring within 1000 feet of a tributary.

3) The placement, maintenance, repair, modification, expansion or removal of a pier, catwalk, dock, boatlift or similar feature with more disturbances than piling installation or removal.
4) The placement, maintenance, repair, or removal of scientific measuring devices that are not water loggers, water filters, or other similar features.
5) The placement, maintenance, repair, or removal of aquatic invasive species nonchemical management that are not benthic barriers or other similar stationary features.
6) Mooring buoy field modification, maintenance, expansion, or removal occurring in a total project area size exceeding 10 acres.
7) Maintenance dredging occurring in a total project area size exceeding 1 acre annually up to a maximum of 10 years.
8) Shoreline erosion control activities occurring in a total project area size exceeding 1 acre annually up to a maximum of 10 years.
9) Projects that include in-water work within Lake Tahoe but do not require a USACE permit.
10) Projects where not all TRPA and/or USACE water-quality and water clarity control measures will be implemented.
11) Projects that do not include in-water activities that could potentially affect Lahontan cutthroat trout.

3.1.2 Excluded Areas

As outlined in the Covered Area section (2.0), this SA will apply broadly where the Lahontan cutthroat trout may be present, except in any area outside of Lake Tahoe waters.

3.1.3 Conditional/Other Exclusions

In addition, the following conditional exclusions are addressed below in the Conservation Measures section.

3.2 CONSERVATION MEASURES

This SA applies conservation measures in the traditional sense of the definition – that is, design features to avoid adverse effects on an individual, population, or species. Projects using this SA to support a determination of NLAA must apply all required conservation measures and incorporate additional recommended conservation measures to the extent practicable. The inability to adopt certain conservation measures may result in a project not qualifying to use this SA.

3.2.1 Permits

The proposed action will require a permit from the Tahoe Regional Planning Agency (TRPA) and the U.S. Army Corps of Engineers (USACE).

3.2.2 Water Quality and Water Clarity

The proposed action will require implementation of all specific water quality and water clarity control measures stipulated in the 401 and/or 404 Water Quality Certification referenced in the USACE permit(s).

4 COVERED SPECIES AND CRITICAL HABITAT

The following section includes a summary of relevant background information on the species used to develop this SA. A complete description of the species can be found on ECOS (https://ecos.fws.gov). This overview is included to inform the reader of the species prior to the analysis of the effects of the action presented below. Species and critical habitats within a project's action area that may be affected by the proposed action, but are not covered by this SA, will require individual consultation with the local ESFO.

Relevant information on the status of LCT, life history traits, population dynamics, habitat requirements, threats, and distribution are further detailed in the Recovery Plan for the Lahontan Cutthroat Trout (Service 1995), Updated Goals and Objectives for the Conservation of Lahontan Cutthroat Trout (Updated Goals and Objectives; Lahontan Cutthroat Trout Coordinating Committee 2019), the Lahontan Cutthroat Trout 5-Year Review (Service 2009) and the Lahontan Cutthroat Trout Status Review (Service 2023). Lahontan cutthroat trout are a threatened species under the Act. Originally listed by the Service as endangered on October 13, 1970 (35 FR 13520), LCT were subsequently reclassified as threatened on July 16, 1975, to facilitate management and allow regulated angling (40 FR 29864). There is no designated critical habitat for LCT (Service 1995).

Lahontan cutthroat trout inhabit lakes and streams but are obligatory stream spawners. Spawning generally occurs from April through July, depending upon stream flow, elevation, and water temperature (McAfee 1966; Lea 1968; Moyle 2002; Rissler *et al* 2006). Small, intermittent, tributary streams and headwater reaches are sometimes used as spawning sites (Coffin 1981). Growth rate is variable for LCT, with faster growth occurring in larger, warmer waters, and particularly where forage fish are utilized (Service 1995). Lahontan cutthroat trout in fluvial (stream) environments generally become sexually mature around year three (Ray *et al* 2007) while LCT in adfluvial (lake) environments become sexually mature between three and four years of age (Rissler *et al* 2006). Distance traveled to spawning sites varies with stream size and strain of LCT (strain refers to locally adapted populations in a particular area or environment). Historically, LCT populations in Pyramid and Winnemucca Lakes migrated as far as 100 miles up the Truckee River into Lake Tahoe and its tributary streams (Sumner 1940; Peacock and Kirchoff 2007). Lake dwelling LCT populations have adapted to a wide variety of lake habitats from oligotrophic (with low nutrient levels and primary productivity) alpine lakes (*e.g.*, Independence Lake) to large, productive desert terminal lakes (*e.g.*, Pyramid Lake). Optimal stream habitat is characterized by clear, cold water with silt-free substrate and a 1:1 pool-riffle ratio. Streams should have a variety of habitats including areas with slow deep water, abundant instream cover (*i.e.,* large woody debris, boulders, undercut banks), and relatively stable streamflow and temperature regimes. Streambanks should be well vegetated to provide cover, shade, and bank stabilization.

Historic overfishing practices, damage to spawning tributaries caused by pollution, logging, water diversions, and the introduction of nonnative species had detrimental effects on LCT, and this species was considered extirpated from Lake Tahoe by the 1930s. Since 2011, LCT have

been stocked intermittently in Lake Tahoe, however, reintroduction efforts in a smaller lake with a similar composition of nonnative fish species found low survival and abundance of LCT due to predation from nonnative fishes (Al-Chokhachy *et al* 2009). In 2019, the Lahontan National Fish Hatchery Complex in Gardnerville, Nevada, began a more dedicated stocking program in Lake Tahoe and by 2022 had reintroduced more than 200,000 Pilot Peak strain LCT. Several genetic analyses confirm that Pilot Peak LCT are the strain most genetically similar to the LCT historically found in Lake Tahoe (Peacock and Kirchoff 2007). Future additional stocking of LCT into Lake Tahoe will be continued, with plans of up to 100,000 fish per year, but is dependent on production numbers, water availability at the hatchery, infrastructure and other regional stocking commitments. Approximately 20 percent of released LCT are tagged to help biologists evaluate the success of the stocking effort along with the growth, survival, and distribution of the fish. Lake Tahoe LCT stocking efforts help achieve updated recovery objectives for the Tahoe Unit (TU) including: TU1 – Manage and minimize threats (*i.e.*, competition, predation) and hybridization risk from non-native trout species to allow for the formation and/or maintenance of the TU LCT population; TU2 – Establish multiple adfluvial recovery populations within the unit, including Lake Tahoe (Lahontan Cutthroat Trout Coordinating Committee 2019).

5 EFFECTS OF COVERED ACTIVITIES

This section covers the effects of the anticipated activities covered in this SA to the covered species and critical habitat (above).

The effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action but that are not part of the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR 402.02).

A project's action area must include all areas affected (i.e., modifications to land, air, or water) by the proposed action, and not merely the immediate area involved in the action. If the activities satisfy the two-part test for causation ("but for" and "reasonably certain to occur"), they should be considered as part of the action. To qualify for use of this SA, a project's action area must be wholly encompassed by the coverage area for this SA as described above and all actives within the proposed action must fit within the scope of the SA.

Qualifying actions typically involve one or more of the stressors addressed below. Proposed projects involving these stressors *may affect, but are not likely to adversely affect* LCT. Our concurrence is based on our expectation that LCT are unlikely to be within the action area during construction and the action agency's (and your applicant's) commitment to implement the special conditions of the applicable required construction permits. These considerations form the basis of our assessment that the nature of anticipated impacts to LCT will be insignificant and

discountable. No critical habitat has been designated for this species; as a result, none will be affected.

5.1 Effects of Suspension of Sediments on LCT

Suspended sediment can affect fish behavior, physiology, embryo survival, and produce habitat alterations which may result in physiological stress and reduced growth and survival (Suttle *et al* 2004). Effects on fish behavior include avoidance of turbid water (Bisson and Bilby 1982), altered territoriality (Berg and Northcote 1985), changes in foraging and predation (Gregory 1993; Gregory and Northcote 1993), and homing and migration (Whitman *et al* 1982). Physiological effects associated with increased levels of suspended sediment or turbidity include gill trauma (Berg and Northcote 1985) and increased plasma cortisol levels indicating stress (Redding *et al* 1987). Survival of salmonid embryos is reduced dramatically as fine sediment increases (Bjornn and Reiser 1991). An increase in turbidity also reduces predation rates for all prey sizes for LCT (Vinyard and Yuan 1996). Common alterations of salmonid habitat from fine sediment deposition are increased embeddedness (the degree to which gravel, cobble and boulders are covered or sunken into the silt, sand or mud of the stream bottom) (Chapman 1988), reduction of habitat complexity and abundance (McIntosh et al 2000), decreased areas for refugia (Poole and Berman 2001), reduced spawning and rearing habitat (Platts et al 1989), and alterations to hyporheic (zone of stream where mixing of shallow groundwater and surface water occurs) inputs (Baxter and Hauer 2000). For these adverse effects to occur, fish must not only be present, but also unable to avoid these adverse effects. The likelihood for LCT to be present in or near the area during project implementation are low as LCT are expected to respond to construction activity by avoiding the area. The large size of Lake Tahoe allows LCT to move away from the action area, therefore, the potential for the adverse effects of suspended sediments is low. The specific water-quality and water clarity control measures stipulated in required construction permits issued by TRPA, your agency, and others for this project will ensure that this project will not result in turbidity levels suspected to result in physical injury to fish. At most, we anticipate that this effect would cause LCT to temporarily move to adjacent habitat outside of the action area. We anticipate that the suspension of sediments due to the mechanical operation of machinery for the covered activities may affect, but is not likely to adversely affect LCT.

5.2 Effects of Injurious Noise on LCT

Sonic impacts (Hastings and Popper 2005) have the potential to result in direct physical injury to fish. Noise from machinery operation during construction can result in the displacement of fish. However, in order for injury to result, fish must not only be present, but also unable to avoid these adverse effects. We generally regard the potential for LCT injury from sonic impacts to be discountable because we regard it as extremely unlikely that the species will be present in or near the action area during project activities. At most, we anticipate that this effect would cause LCT to temporarily move to adjacent habitat outside of the action area. We anticipate that injurious noise impacts due to the mechanical operation of machinery for the covered activities may affect, but is not likely to adversely affect LCT.

5.3 Effects Equipment Operating in and Near the Water on LCT

Lahontan cutthroat trout are expected to respond to construction by avoiding the area. Due to the size of Lake Tahoe, LCT have the ability to move from the action area without impediment to other suitable lake shore habitat. Accidental spills/contamination during construction activities can result in negative affects to fish. However, the specific water-quality and water clarity control measures stipulated in required construction permits issued by TRPA, your agency, and others for the covered activities will ensure that this project will not result in adverse effects. At most, we anticipate that this effect would cause LCT to temporarily move to adjacent habitat outside of the action area.

5.4 Aggregate Effects

Although the consultation process will be applied on an individual project basis, we also considered the potential additive impacts of processing multiple projects under this SA to ensure the effects remain insignificant/discountable/wholly beneficial collectively.

We have reviewed the covered activities addressed by this SA and have determined that habitat effects are not expected to aggregate when combined with similar effects from other consultations covered by this SA in a manner that would result in adverse effects to the species (*e.g.*, these effects would not be significant, measurable, or detectable either individually or collectively).

6 Summary and Conclusion

After considering the relevant information pertaining to the species and critical habitat, reviewing the covered activities and associated required conservation measures, and evaluating their anticipated effects (both individually and in the aggregate), we conclude that the actions subject to this SA, individually and collectively, will support a Federal action agency determination of a section 7(a)(2) determination pursuant to the Act of "may affect, not likely to adversely affect," as appropriate, for the subject species and critical habitat as described above. This SA is based on the consultation provisions of section 7(a)(2) of the Act and the information cited and will undergo review and revision, as needed, if any of the following conditions have been met: 1) If new information reveals the effects of the covered action(s) to the covered species or critical habitat are occurring in a manner or to an extent not considered in this SA based on applied use; or 2) If the species or critical habitat covered by the SA has a change in status.

This SA will be provided through IPaC via a link within the DKey output letter.

7 LITERATURE CITED

Al-Chokhachy, R., Peacock, M., Heki, L. G., & Thiede, G. 2009. Evaluating the reintroduction potential of Lahontan cutthroat trout in Fallen Leaf Lake, California. North American Journal of Fisheries Management, 29(5), 1296-1313.

Baxter, C.V., and F.R. Hauer. 2000. Geomorphology, hyporheic exchange, and selection of spawning habitat by bull trout (*Salvelinus confluentus*). Canadian Journal of Fisheries and Aquatic Sciences 57:1470-1481.

Berg, L., and T.G. Northcote. 1985. Changes in territorial, gill flaring, and feeding behaviour in juvenile coho salmon (*Oncorhynchus kisutch*) following short-term pulses of suspended sediment. Canadian Journal of Fisheries and Aquatic Sciences 42:1410-1417.

Bisson, P.A., and R.E. Bilby. 1982. Avoidance of suspended sediment by juvenile coho salmon. North American Journal of Fisheries Management 4:371-374.

Bjornn, T.C., and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. American Fisheries Society Special Publication 19:83-138.

Chapman, D.W. 1988. Critical review of variables used to define effects of fines in redds of large salmonids. Transactions of the American Fisheries Society 117:1-21.

Coffin, P. 1981. Distribution and life history of the Lahontan/Humboldt cutthroat trout-Humboldt River drainage Basin. Nevada Department of Wildlife, Reno, Nevada. 69 pp.

Gregory, R.S. 1993. The effect of turbidity on the predator avoidance behavior of juvenile Chinook salmon (*Oncorhynchus tshawytscha*) in turbid laboratory conditions. Canadian Journal of Fisheries and Aquatic Sciences 50:241-246.

Gregory, R.S., and T.G. Northcote. 1993. Surface, planktonic, and benthic foraging by juvenile Chinook salmon (*Oncorhynchus tshawytscha*) in turbid laboratory conditions. Canadian Journal of Fisheries and Aquatic Sciences 50:233-240.

Hastings, M.C. and A.N. Popper. 2005. Effects of Sound on Fish. Prepared by Jones and Stokes for the California Department of Transportation, Sacramento, California, dated August 23, 2005.82 pp. Available at: http://www.caltrans.ca.gov/hq/research/researchreports/reports/2005/.

Lahontan Cutthroat Trout Coordinating Committee. 2019. Updated goals and objectives for the conservation of Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*). May 29, 2019. 57 pp.

Lea, T.N. 1968. Ecology of the Lahontan cutthroat trout, Salmo clarki henshawi, in Indpendence Lake, California. Master's Thesis. University of California, Berkely. 95 pp.

McAfee, W.R. 1966. Lahontan cutthroat trout. Pages 225-231 in A. Calhoun, Editor. Inland Fisheries Management. California Department of Fish and Game, Sacramento, California.

McIntosh, B.A., J.R. Sedell, R.F. Thurow, R.C., S.E. Clarke, and G.L. Chandler. 2000. Historical changes in pool habitats in the Columbia River Basin. Ecological Applications 10:1478-1496.

Moyle, P.B. 2002. Inland Fishes of California. University of California Press. Berkeley, California. 502 pp.

Peacock, M.M., and V. Kirchoff. 2007. Analysis of genetic variation and population genetic structure in Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) extant populations. Final Report submitted to the U.S. Fish and Wildlife Service, Reno, Nevada. 109 pp.

Platts, W.S., R.J. Torquemada, M.L. McHenry, and C.K. Graham. 1989. Changes in salmon spawning and rearing habitat from increased delivery of fine sediment to the South Fork Salmon River, Idaho. Transactions of the American Fisheries Society 118:274-283.

Poole, G.C., and C.H. Berman. 2001. An ecological perspective on in-stream temperature: natural heat dynamics and mechanisms of human caused thermal degradation. Environmental Management 27:787-802.

Ray, C., M.M. Peacock, and J.B. Dunham. 2007. Demographic and population dynamics of Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) stream populations in eastern Nevada. Final Report to the U.S. Fish and Wildlife Service, Reno, Nevada. Cooperative Agreement FSW 14-48-0001-95646. 205 pp.

Redding, J.M., C.B. Schreck, and F.H. Everest. 1987. Physiological effects on coho salmon and steelhead exposure to suspended solids. Transactions of the American Fisheries Society 116:737-744.

Rissler, P.H., G.G. Scoppettone, and S. Shea. 2006. Life history, ecology, and population viability analysis of the Independence Lake strain Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi).* Final Report. U.S. Geological Survey, Western Fisheries Research Center, Reno, Nevada. 68 pp.

Sumner, F.H. 1940. The decline of the Pyramid Lake fishery. Transactions of the American Fisheries Society 69:216-224.

Suttle, K.B., M.E. Power, J.M. Levine, and C. McNeely. 2004. How fine sediment in riverbeds impairs growth and survival of juvenile salmonids. Ecological Applications 14:969-974.

U.S. Fish and Wildlife Service (Service). 1995. Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon. 147 pp.

U.S. Fish and Wildlife Service. (Service). 2009. 5-Year Review: Summary and Evaluation. Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*). Region 8, Sacramento, California. March 30, 2009. 199 pp.

U.S. Fish and Wildlife Service (Service). 2023. Status Review: Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi).* Region 8, Sacramento, California. February 23, 2023. 88 pp.

Vinyard, G.L., and A.C. Yuan. 1996. Effects of Turbidity on Feeding Rates of the Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawii*) and Lahontan Redside Shiner (*Richardsonius egregius*). *Great Basin Naturalist* 56 (2): 157–161.

Whitman, R.P., T.P. Quinn, and E.L. Brannon. 1982. Influence of suspended volcanic ash on homing behavior of adult Chinook salmon. Transactions of the American Fisheries Society 111:63-69.

APPENDIX A – STRUCTURED QUESTIONS FOR SCREENING A PROJECT VIA A DKEY TO DETERMINE WHETHER IT IS APPLICABLE FOR USE UNDER THIS SA

1. Does the proposed project include any activities within the Tahoe Basin?
   a. Yes –2
   b. No –NA
2. Does the proposed project include any work waterward of the Ordinary High-Water Mark (6229.1' LTD) of Lake Tahoe?
   a. Yes – 3
   b. No – NA 1
3. Will the proposed project occur within 1000 feet of a tributary?
   a. Yes – NA 1.1
   b. No – 4
4. Is the in-water work limited to the placement, maintenance, repair, modification, expansion or removal of a pier, catwalk, dock, boatlift or similar feature where the only disturbance is piling installation or removal?
   a. Yes – 11
   b. No – 5
5. Is the in-water work limited to the placement, maintenance, repair, or removal of scientific measuring devices (such as water loggers, water filters, or other similar features), fish habitat mitigation structures (such as fish pyramids or crawfish traps), or aquatic invasive species nonchemical management (such as benthic barriers or other similar stationary features)?
   a. Yes – 11
   b. No – 6
6. Is the in-water work limited to the modification, maintenance, expansion, or removal of a mooring buoy field or limited to the placement, maintenance, repair, modification, or removal of a buoy/buoys?
   a. Yes – 7
   b. No – 8
7. Will the project occur in a total project area size of less than 10 acres?
   a. Yes – 11
   b. No – NA 1.2
8. Is the in-water work limited to maintenance dredging?
   a. Yes – 9
   b. No – 10
9. Will the project occur in a total project area size of less than 1 acre annually up to a maximum of 10 years?
   a. Yes – 11
   b. No – NA 1.3
10. Is the in-water work limited to shoreline erosion control activities (such as shoreline, dynamic, or static revetment)?
    a. Yes – 9

b. No – NA 1.4

11. Does the proposed project require a permit from the Tahoe Regional Planning Agency (TRPA)?
    a. Yes – 12
    b. No – 13
12. Will the proposed project include implementation of all specific water-quality and water clarity control measures stipulated in the construction permit issued by the TRPA?
    a. Yes – 13
    b. No – NA 2
13. Does the proposed project require a permit from the U.S. Army Corps of Engineers (USACE)?
    a. Yes – 14
    b. No – NA 4
14. Will the proposed project include implementation of all specific water- quality and water clarity control measures stipulated in the 401 and/or 404 Water Quality Certification references in the USACE permit(s)?
    a. Yes – NLAA
    b. NA 3

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Reno Fish And Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147
Phone: (775) 861-6300 Fax: (775) 861-6301

In Reply Refer To: 04/23/2026 18:54:08 UTC
Project code: 2026-0080791
Project Name: NDOW Third Creek Fisheries Management Structure

Notice: This letter does not constitute formal approval of your project; this letter is meant to facilitate U.S. Army Corps of Engineers' review of your project and consultation with the U.S. Fish and Wildlife Service. Please provide this letter to the U.S. Army Corps of Engineers with your 404 Permit Application.

Subject: Technical Assistance Letter for the Project Named 'NDOW Third Creek Fisheries Management Structure' for the Endangered Lahontan Cutthroat Trout, Pursuant to the Determination Key for In-Water Projects in Lake Tahoe

To Whom It May Concern:

On April 23, 2026, melanie greene used the Determination Key for In-Water Projects in Lake Tahoe, dated April 15, 2025, in the U.S. Fish and Wildlife Service's (Service) online Information for Planning and Consultation (IPaC) tool, to evaluate potential impacts to the federally listed as threatened Lahontan cutthroat trout (LCT, *Oncorhynchus clarkii henshawi*) from a project named 'NDOW Third Creek Fisheries Management Structure' (Project).

melanie greene provided the following project information in IPaC:

Project Details:

Name: NDOW Third Creek Fisheries Management Structure

The following description was provided for the project 'NDOW Third Creek Fisheries Management Structure':

> Nevada Department of Wildlife proposes to install a fisheries management structure on Third Creek in Incline Village, Washoe County, Nevada, between Lakeshore Boulevard and the creek terminus at Lake Tahoe on land owned by the Incline Village General Improvement District (IVGID). Project planning has been supported by an IVGID grant. The fisheries management structure will replace the temporary structures operated and maintained to support NDOW’s ongoing management, monitoring and research efforts at the project site since 2014 (i.e.,

Lake Tahoe Lahontan Cutthroat Trout Feasibility Study, EIP Project #02.02.03.0025) and Lake Tahoe Rainbow Trout Study, EIP Project #). The Third Creek Fisheries Management Structure (Project) will contribute towards Nevada's Biodiversity Initiative with the United States Fish and Wildlife Service (USFWS). Construction period is scheduled for July 31 through October 15, 2026.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.24060795,-119.94639374739052,14z

Qualification Interview:

1. Does the proposed project include any work water-ward of the Ordinary High Water Mark (6229.1' LTD) of Lake Tahoe?

   Yes

2. Will the proposed project occur within 1000 feet of a tributary?

   No

3. Is the in-water work limited to the placement, maintenance, repair, modification, expansion or removal of a pier, catwalk, dock, boatlift or similar feature where the only disturbance is piling installation or removal?

   No

4. Is the in-water work limited to the placement, maintenance, repair, or removal of scientific measuring devices (such as water loggers, water filters, or other similar features), fish habitat mitigation structures (such as fish pyramids or crawfish traps), or aquatic invasive species nonchemical management (such as benthic barriers or other similar stationary features)?

   Yes

5. Does the proposed project require a permit from the Tahoe Regional Planning Agency (TRPA)?

   Yes

6. Will the proposed project include implementation of all specific water-quality and water clarity control measures stipulated in the TRPA?

   Yes

7. Does the proposed project require a permit from the U.S. Army Corps of Engineers (USACE)?

   Yes

8. Will the proposed project include implementation of all specific water-quality and water clarity control measures stipulated in the 401 and/or 404 Water Quality Certification references in the USACE permit(s)?

   Yes

Based on the answers provided, including application of all avoidance and minimization measures specified in the Tahoe Regional Planning Agency construction permit and the U.S. Army Corps of Engineers' (Corps) 404 permit, the proposed project is consistent with a determination of “Not Likely to Adversely Affect” for LCT per the Determination Key for In-Water Projects in Lake Tahoe, dated April 15, 2025.

Please be advised that it is the Corps’ responsibility to make final effect determinations for potential impacts resulting from actions they permit and to confirm that your project is consistent with the aforementioned guidance. The validity of this Not Likely to Adversely Affect determination is contingent upon a representative from the Corps formally requesting concurrence from the Service. Please provide a copy of this letter to the Corps to assist with their determination and their associated consultation with the Service.

If the Proposed Action "may affect" any other federally-listed or proposed species, or any designated critical habitat, additional consultation between the Corps and the Service may be required. Please advise the Corps accordingly.

This key does not address proposed projects outside of Lake Tahoe waters that do not require a Corps permit. It should be noted that such projects in and around Lake Tahoe may still have the potential to adversely affect LCT or other species (*e.g.*, the endangered Sierra Nevada yellow-legged frog, *Rana sierrae*) listed under the Endangered Species Act of 1973, as amended (ESA) (87 Stat. 884; 16 U.S.C. 1531 et seq.). The project proponent is responsible for ensuring any such project near Lake Tahoe complies with the ESA.

IPAC USER CONTACT INFORMATION

Agency:	Nevada Department of Wildlife
Name:	melanie greene
Address:	1100 Valley Road
Address Line 2:	295 US Highway 50 suite 1
City:	Reno
State:	NV
Zip:	89512
Email	melanie.greene@gmail.com
Phone:	7753393328

Third Creek Permanent Fish Management Structure Project

Scope of Work

A. Project Narrative

Third Creek, the largest tributary to Lake Tahoe in Nevada, serves as critical spawning habitat for various game and non-game fish. The Nevada Department of Wildlife (NDOW) has operated studies on Third Creek since 2014, utilizing a temporary weir and fish trap to monitor and manage salmonid populations. This project aims to construct a permanent fish management structure that will enhance fish conservation efforts, particularly for the Lahontan Cutthroat Trout (LCT), while fostering community engagement through educational components. The permanent structure will improve NDOW's capacity to manage fish populations, restore native Lahontan Cutthroat Trout to waters within its historic range, mitigate hybridization risks with Rainbow Trout, and support sustainable fishing practices in the region.

B. Project Objectives and Goals

1. **Establish a Permanent Fish Management Structure**: Construct a durable facility for efficient capture and spawning of Rainbow Trout.
2. **Support Lahontan Cutthroat Trout Recovery**: Facilitate ongoing data collection and management practices to aid LCT reintroduction efforts.
3. **Enhance Community Engagement**: Incorporate educational features and viewing areas to foster public interest in local fisheries.
4. **Improve Fishery Management**: Develop robust monitoring protocols to inform future conservation efforts.

C. Detailed Tasks

1. **Design (Phase 1) – Fully funded, not part of application**
    - Collaborate with Stantec Design Firm to create detailed engineering plans for the fish management structure.
    - Integrate adaptive management principles into the design to ensure long-term effectiveness.
    - This task is in progress with expected design delivered in early 2025.
2. **Permitting (Phase 1) - Fully funded, not part of application**
    - Initiate permitting processes with the Nevada Division of Environmental Protection (NDEP) and the Army Corps of Engineers.

- Ensure compliance with all regulatory requirements during the permitting process.
- This task is in progress with expected design delivered in early 2025.

3. **Consultation (Phase 1) - Fully funded, not part of application**
   - Conduct ongoing consultations with Stantec to refine project execution strategies and timelines.
4. **Construction Phase – Requesting funding**
   - Select and contract with experienced contractor for in-stream construction of engineered design.
   - Execute construction during low-flow periods (late summer) to minimize ecological disruption.
   - Utilize construction equipment, including a 314 E tracked excavator and a loader, to build the structure primarily from the streambank.
   - Assist during construction phase with onsite coordination between design firm (Stantec) and selected contractor.
5. **Best Management Practices (BMPs) and Vegetation Work**
   - Implement BMPs (e.g., straw wattles, stream diversions) during construction to protect the surrounding environment.
   - Collaborate with IVGID to replant any damaged vegetation post-construction.
6. **Monitoring and Evaluation**
   - Conduct pre- and post-construction surveys to assess fish populations and habitat conditions.
   - Develop future operations plan for completed structure that includes:
     1. Seasonal staffing to manage salmonid spawning runs.
     2. Comprehensive tributary management plan for reestablishment of native Lahontan Cutthroat Trout that works toward the ultimate recovery and delisting of the species.
     3. Rainbow Trout broodstock management to allow for harvest of eggs for statewide program.
     4. Annual monitoring plan. Part of State of Nevada Sportfish Restoration program. Reported on annually and funded by Wildlife and Sportfish Restoration Grant.
   - Use findings to develop adaptive future management strategies to assist in the reestablishment and recovery of Lahontan Cutthroat Trout in the Lake Tahoe Basin.
7. **Education and Outreach**
   - In cooperation with IVGID, develop outreach materials and educational signage to raise public awareness about the project and fisheries management.
   - Organize events for local schools, community organizations, and volunteers to promote engagement with the project.

D. Project Deliverables and Products

1. **Design Plans**: Comprehensive engineering and permitting documents from Stantec. Expected 2025
2. **Permits**: Secured permits from regulatory agencies. Expected 2025
3. **Completed Structure**: Full construction of engineered fish management structure.

4. **Monitoring Reports**: Pre- and post-construction fish and habitat surveys.
5. **Educational Materials**: Brochures, signage, and outreach content.
6. **Final Project Report**: Summary of outcomes, methodologies, and recommendations for future fisheries management.

E. Expected Results and Management Implications

- **Increased Ability to Recover and Restore LCT to Historic Habitat**: The permanent structure will improve NDOW's ability to separate native and non-native salmonids to bolster the ability of native LCT to spawn while limiting interaction with non-native Rainbow Trout.
- **Increased Spawning Efficiency**: The permanent structure will enhance the ability to capture and spawn more Rainbow Trout, bolstering the statewide stocking program while minimizing hybridization risk between Rainbow and Lahontan Cutthroat Trout.
- **Better Data Collection**: Improved monitoring capabilities will provide critical data for the management and recovery of Lahontan Cutthroat Trout.
- **Enhanced Community Relationships**: The educational components will foster a deeper understanding of fisheries management, promoting community support for conservation efforts.
- **Development of Management Strategy**: If successful, this project template can and will be used on other tributaries around the Lake Tahoe Basin to bolster recovery potential for Lahontan Cutthroat Trout.

F. Budget Summary

- **Dollar Amount Requested from LT**: $200,000
- **Total Cost of Project**: $730,000 (including Phase 1 funding)
- **Funding Sources**:

Third Creek Management Structure Funding			
Fiscal Year	Source	Phase	Amount
FY23	NDOW Habitat Conservation Fee	Design (1)	$50,000
FY24	NDOW Heritage Trust Account	Design (1)	$80,000
FY25	NDOW Heritage Trust Account	Construction (2)	$100,000
FY25	NDOW Habitat Conservation Fee	Construction (2)	$50,000
	Estimated Total Costs		$730,000
	Acquired		$280,000
	Remaining Need		$450,000

- **Match Funding**: Up to $100,000 can be made available for matching funds if awarded.

Conclusion

This scope of work outlines a comprehensive approach to constructing a permanent fish management structure on Third Creek, enhancing fishery management and community engagement in the Lake Tahoe Basin. Through careful planning, design, and execution, the project aims to establish a sustainable framework for the conservation of a self-sustaining LCT population within Lake Tahoe and the preservation of the ecological integrity of the region.

Lake Tahoe Environmental Improvement Program Project Number: 02.02.03.0025

Prepared By:

Travis Hawks
Western Region Fisheries Supervisor
Nevada Department of Wildlife
thawks@ndow.org

Image 1: Lahontan Cutthroat Trout captured during May 2024 ascending Third Creek, Incline Village, NV

Image 2: Wild adfluvial Rainbow Trout, Third Creek, Incline Village, NV

Image 3: Temporary Fish Management Structure, Third Creek, Incline Village, Nevada

Attachment H TRPA Active Transportation Plan (May 2026)

Project Details

The tool provides initial screening for all project types and more detailed analysis for residential, tourist accommodation unit, and public service projects. All non-screened commercial, recreation, and other projects will need to complete a more detailed transportation analysis. For detailed information on the PIA framework, tool usage, and calculations see the User Guidelines. For detailed information on the PIA framework, tool usage, and calculations select the User Guidelines tab. For questions about the project impact assessment process contact Melanie Sloan (msloan@trpa.gov). For technical issues with the tool contact Reid Haefer (rhaefer@trpa.gov).

Date Submitted

Wed May 6 19:38:54 2026

Report Notes

None

Analysis Type

TRPA

Existing Land Use

Not Applicable

Proposed Project

NDOW's Third Creek Fisheries Management Structure

Public Park

0.35 Acres

$23.75

VMT

Proposed Project Gross VMT - 1

Existing VMT - 0

Mitigated VMT - 0

Project Total Net VMT - 1

Standard of Significance VMT - 0

Mitigation Needed - 0

Mobility Fee - $23.75

Screening

Screened - Yes

Additional Analysis Required?

Mitgation Info

Mitigations - Traffic Calming

Percent - 1.00%

Other Project Details

Zone ID - Zone 71

Zone Average Trip Length - 4.79

ITE Trip Rate (if applicable) - 0.78

Zone VMT Per Capita Standard of Significance - 11.02

Located in Town/Regional Center - Yes

Located in Bonus Unit Eligible Area - Yes

Jurisdiction - Washoe County

Parcel Number (APN) - 130-230-37

Attachment G TRPA Project Impact Analysis (May 2026)

TAHOE REGIONAL PLANNING AGENCY

Mail
PO Box 5310
Stateline, NV 89449-5310

Location
128 Market Street
Stateline, NV 89449

Contact
Phone: 775-588-4547
Fax: 775-588-4527
www.trpa.gov

ACTIVE TRANSPORTATION PLAN CHECKLIST FOR CONSIDERATION OF ACTIVE TRANSPORTATION POLICIES

DIRECTIONS

The following Active Transportation Plan (ATP) checklist is designed to ensure project applicants consider and include active transportation programs and facilities into projects where applicable. Applicants should refer to the online resources and the attached ATP Checklist Reference Sheet, which includes policies and provides examples for implementation. For a complete list of definitions, please refer to the *Linking Tahoe: Active Transportation Plan* Glossary on pages 13-16. Use the blank boxes to add any additional information. If more space is required, please attach separate sheets and reference the question number and letter.

This ATP Checklist must be completed by project applicants if the project-specific application checklist identifies the ATP Checklist as required.

Online Resources: To access the *Linking Tahoe: Active Transportation Plan* and other resources needed to complete this checklist, please visit www.trpa.gov and access the "Applications & Forms" page under "Permitting." Links to the Active Transportation Plan Checklist and the Maintenance Responsibilities Chart and Plan are listed under the "Environmental Documentation" section of that page. Additional resources are linked below:

- Maintenance Responsibilities Chart and Plan
- Linking Tahoe: Active Transportation Plan
- Transportation Web Map
- Complete Street Resource Guide
- California Manual on Uniform Traffic Control Devices
- State Route 28 National Scenic Byway Corridor Signage Master Plan
- Learn more about the Transportation Program

ATP CHECKLIST

I. PROJECT DESCRIPTION:

Project Location/Assessor's Parcel Number (APN): 127-280-01, 127-010-04

Project Name: Third Creek Fisheries Management Structure

County/City: Washoe County, Incline Village

II. FACILITY MAINTENANCE:

a. **Submit your Maintenance Responsibilities Chart and Plan (attach plan to this checklist prior to submission)** *If the project contains active transportation facilities (i.e. bike and pedestrian facilities), you are required to fill out and submit the Maintenance Responsibilities Chart and Plan prior to permit issuance. The plan will clarify roles for annual and capital infrastructure operating and maintenance and identify funding needs and possible sources. This information will be included in issued permits.*

View the Maintenance Responsibilities Chart and Plan online.

☐ Submitted with this checklist

☑ Not submitted

III. MULTI-MODAL CONNECTIONS:

a. **Will the project include facilities that promote and encourage intermodal connectivity? If yes, please describe. Note "intermodal connectivity" is defined as using two or more modes of transportation in a single journey (ex: walking from your house to the bus stop and riding the bus to work).** *Examples of such facilities include first and last mile trip facilities and infrastructure that aim to improve connectivity between all transportation modal options. Please refer to the attached ATP Checklist Reference Sheet, which lists several methods that may be used to satisfy this checklist item under Policy 3.1 in the 2016 Active Transportation Plan.*

☐ Yes

☑ No

IV. PROJECT IMPLEMENTATION:

a. Provide a detailed traffic management plan for alternate routes to detour bike and pedestrian traffic during project construction. *If project construction will impact an active transportation route, projects must adhere to the appropriate Manual on Uniform Traffic Control Devices (MUTCD) requirements. The bike and pedestrian traffic management plan must be included on approved plans. All active transportation routes can be found using the TRPA GIS Transportation Web Map:* http://gis.trpa.org/transportation/

☐ Submitted with this checklist

☑ Not submitted

b. Does the project proposal incorporate constructing segments of the proposed active transportation network? If yes, please describe. *If the project is within the 75-foot buffer of existing and proposed active transportation facilities, please review the TRPA Code of Ordinances, Section 65.3.2 to determine if active transportation requirements apply. Determine if the project is within the 75-foot buffer of existing or proposed active transportation facilities using the TRPA GIS Transportation Web Map:* http://gis.trpa.org/transportation/

If the project is subject to active transportation requirements within the 75-foot buffer, work with your TRPA or local jurisdiction planner to determine how best to adhere to the requirements related to your project.

If the project is not within the 75-foot buffer, but you would still like to include a connection to existing active transportation facilities, contact the TRPA transportation department or the local agency with jurisdiction over the project site for additional instruction. Review the Complete Street Resource Guide for design considerations.

☐ Yes

☑ No

c. If the project includes construction of a shared-use path, does the path include permanent counting equipment? If yes, please describe. Note that "shared-use path" is defined as a paved, off-road facility designed for travel by a variety of nonmotorized users, including bicyclists, pedestrians, skaters, joggers, and others. *Please contact the TRPA transportation department for information on permanent counting equipment.*

☐ Yes

☑ No

d. **Does the project proposal incorporate end-of-trip active transportation facilities? If yes, please describe. Note that "end-of-trip active transportation facilities" are defined as designated places that support bicyclists, joggers, and walkers in using alternative ways to travel to work rather than driving or taking public transit. These types of facilities also benefit people who exercise during their lunch break and might include secure bicycle parking, water fountains, benches, locker facilities, showers, and restrooms.** *A full list of possible end-of-trip active transportation facilities at commercial, tourist, recreational, transit, lodging, and government centers is included in the attached ATP Checklist Reference Sheet page under Policy 4.5 of the 2016 Active Transportation Plan.*

☐ Yes

☑ No

V. EDUCATION, ENCOURAGEMENT, EVALUATION, AND ENFORCEMENT PROGRAMMING:

a. **Does the project include active transportation wayfinding? If yes, please describe. Note that "wayfinding" refers to information systems that guide people through a physical environment and enhance their understanding and experience of the space (ex: visual cues that direct travelers, such as maps and traffic signs).** *If the project site is privately owned and includes or is near a public active transportation facility, contact your local agency to identify the recommended wayfinding signage for the project. If the project site is government-owned and is part of the Tahoe Trail around the lake, contact TRPA transportation department to obtain the appropriate signage information.*

For a general understanding of the Region's wayfinding signage design guidelines, please review pages 77-81 of the Complete Street Resource Guide and the State Route 28 National Scenic Byway Corridor Signage Master Plan.

- Complete Street Resource Guide
- State Route 28 National Scenic Byway Corridor Signage Master Plan

☐ Yes

☑ No

ATP CHECKLIST REFERENCE SHEET

ATP Policy 3.1: *"Create convenient intermodal connectivity which considers first and last mile facility needs and connects all modal options by providing necessary infrastructure and schedule coordination."*

ATP Policy 3.1 Implementation Examples	
Commercial	• Include bus stop facilities such as bus schedules, route maps, bike racks, benches and lighting for safety if a bus stop is within 300 feet of the project location. • Information kiosks that provide real-time bus schedule and route data, such as a monitor that displays bus arrival times. • Incorporate sidewalk planters, trees, or other greenery to encourage walking and separate pedestrians from the street. • Include sidewalks, bike paths, and wayfinding signage in the project to connect users to existing pedestrian and bicycle networks in the Region. • Provide fix-it stations for bicycle rehab such as air pump and hand tools. • Include a bike sharing station on-site if deemed an appropriate location.
Multi-Family	• Include bus stop facilities such as bus schedules, route maps, bike racks, benches and lighting for safety if a bus stop is within 300 feet of the project location. • Include sidewalks, bike paths, and wayfinding signage in the project to connect users to existing pedestrian and bicycle networks in the Region. • Consider unbundling parking with unit rent costs so tenants must pay for a parking permit or an additional monthly parking fee. Include free bus pass, secure indoor bike parking, and on-site fix-it stations with rental unit. • Include a bike sharing station on-site if deemed an appropriate location.
Public Service	• Include bus stop facilities such as bus schedules, route maps, bike racks, benches and lighting for safety if a bus stop is within 300 feet of the project location. • Include sidewalks, bike paths, and wayfinding signage in the project to connect users to existing pedestrian and bicycle networks in the Region. • Provide fix-it stations for bicycle rehab such as air pump and hand tools.
Recreation	• Include bus stop facilities such as bus schedules, route maps, bike racks, benches and lighting for safety if a bus stop is within 300 feet of the project location. • Information kiosks that provide real-time bus schedule and route data, such as a monitor that displays bus arrival times. • Include sidewalks, bike paths, and wayfinding signage in the project to connect users to existing pedestrian and bicycle networks in the Region. • Provide fix-it stations for bicycle rehab such as air pump and hand tools. • Include a bike sharing station on-site if deemed an appropriate location

Tourist Accommodation	• Include bus stop facilities such as bus schedules, route maps, bike racks, benches and lighting for safety if a bus stop is within 300 feet of the project location. • Information kiosks that provide real-time bus schedule and route data, such as a monitor that displays bus arrival times. • Include sidewalks, bike paths, and wayfinding signage in the project to connect users to existing pedestrian and bicycle networks in the Region. • Provide bike rentals on-site for guests. • Incorporate sidewalk planters, trees, or other greenery to encourage walking and separate pedestrians from the street. • Use parking management strategies to reduce the area used for parking at the project site. These could include collaborating with neighboring business owners to implement shared parking spaces; provide limited paid parking at the project site for visitors; collaborate with local government and business owners to provide incentives for visitors and employees to use alternative modes of transportation, such as transit, walking, carpooling, or biking. These incentives may consist of subsidized or free bus passes or free bike rentals. • Include a bike sharing station on-site if deemed an appropriate location.

ATP Policy 4.5: *"During project planning and permit approval, identify and address the need for support and end-of-trip active transportation facilities including bicycle parking, water fountains, benches, and restrooms at commercial, tourist, recreation, transit, lodging, and government centers."*

ATP Policy 4.5 Implementation Examples	
Commercial	• Provide secure covered or indoor bike parking facilities in well-lit areas with high visibility to ensure visitors can safely store their bikes at the project site during their visit. If this is not feasible, consider coordinating with your local government to implement unconventional bike parking infrastructure, such as attaching Cyclehoops to railings, street signs, parking meters, etc. • Provide water fountains, locker rooms, and showers to accommodate employees who commute to work by bike. • Provide fix-it stations for bicycle rehab such as air pump and hand tools. • Information kiosks that provide real-time bus schedule and route data, such as a monitor that displays bus arrival times.
Multi-Family	• Provide secure covered bike parking in well-lit areas with high visibility to ensure residents and visitors can safely store their bikes at the project site. • Provide secure in-door bike parking facility that only residents can access.
Public Service	• Provide secure covered or indoor bike parking facilities in well-lit areas with high visibility to ensure visitors can safely store their bikes at the project site during their visit. If this is not feasible, consider coordinating with your local government to implement unconventional bike parking infrastructure, such as attaching Cyclehoops to railings, street signs, parking meters, etc. • Provide water fountains, locker rooms, and showers to accommodate employees who commute to work by bike. • Provide fix-it stations for bicycle rehab such as air pump and hand tools.

Recreation	• Provide secure bike parking in well-lit areas, with high visibility to ensure visitors can safely store their bikes at the project site while recreating. If this is not feasible, consider coordinating with your local government to implement unconventional bike parking infrastructure, such as attaching Cyclehoops to railings, street signs, parking meters, etc. • Provide water fountains and restrooms. • Provide benches and picnic tables to allow visitors to rest during their visit. • Provide fix-it stations for bicycle rehab such as air pump and hand tools. • Information kiosks that provide real-time bus schedule and route data, such as a monitor that displays bus arrival times.
Tourist Accommodation	• Provide secure covered bike parking in well-lit areas with high visibility to ensure visitors can safely store their bikes at the project site during their visit. If this is not feasible, consider coordinating with your local government to implement unconventional bike parking infrastructure, such as attaching Cyclehoops to railings, street signs, parking meters, etc. • Provide water fountains, benches, and information kiosks at the project site to increase the appeal of biking in the Region to tourists. • Provide water fountains, locker rooms, and showers to accommodate employees who commute to work by bike. • Provide fix-it stations for bicycle rehab such as air pump and hand tools. • Information kiosks that provide real-time bus schedule and route data, such as a monitor that displays bus arrival times.

Attachment I TRPA Initial Environmental Checklist (IEC; May 2026)

TAHOE REGIONAL PLANNING AGENCY

Mail
PO Box 5310
Stateline, NV 89449-5310

Location
128 Market Street
Stateline, NV 89449

Contact
Phone: 775-588-4547
Fax: 775-588-4527
www.trpa.gov

INITIAL ENVIRONMENTAL CHECKLIST FOR DETERMINATION OF ENVIRONMENTAL IMPACT

PROJECT INFORMATION

Project Name: Nevada Department of Wildlife's Third Creek Fisheries Management Structure

Project Assessor's Parcel Number (APN): 127-280-01, 127-010-04

Project Address: 967 Lakeshore Boulevard

County/City: Washoe County, Incline Village, NV 89451

Project Description:

NDOW proposes to install a new fisheries management structure on Third Creek between Lakeshore Boulevard and the creek terminus at Lake Tahoe on land owned by the Incline Village General Improvement District (IVGID). Project planning has been supported by state special reserve accounts (Habitat Conservation Fee the Nevada Wildlife Heritage Trust Account). The fisheries management structure will replace the temporary structures operated and maintained to support NDOW's ongoing management, monitoring, and research efforts at this reach since 2014 (i.e., Lake Tahoe Lahontan Cutthroat Trout Feasibility Study and Lake Tahoe Rainbow Trout Study). The Project will contribute towards Nevada's Biodiversity Initiative with the United States Fish and Wildlife Service (USFWS), specifically Lahontan cutthroat trout (LCT) and rainbow trout populations and has been designed and located to respond to existing channel morphology and flow regimes improving stability in the lotic systems and to address the project objectives that will be discussed at the pre-filing meeting and detailed in the forthcoming application for water quality certification. The fisheries management structure will be comprised of a concrete velocity barrier, weir with removable slide gate (fish collection pool, fish ladder, streambank revetment, grade controls boulders sited down-gradient), and erosion and scour protection measures (i.e., rip rap; boulders sited up-gradient).

Refer to the enclosed Detailed Project Description and Attachments A through J for additional details on construction sequencing, equipment and materials, best management practices (BMPs) and resource protection measures (RPMs), and monitoring and reporting, along with Environmental Improvement Program (EIP) project findings.

The following questionnaire will be completed by the applicant based on evidence submitted with the application. All "Yes" and "No, With Mitigation" answers will require further written comments. Use the blank boxes to add any additional information and reference the question number and letter. If more space is required for additional information, please attached separate sheets and reference the question number and letter.

For information on the status of TRPA environmental thresholds click on the links to the Threshold Dashboard.

I. ENVIRONMENTAL IMPACTS

1. LAND

Current and historic status of soil conservation standards can be found at the links below:

- Impervious Cover
- Stream Environment Zone

Will the proposal result in:	Yes	No	No, with mitigation	Data insufficient
a. Compaction or covering of the soil beyond the limits allowed in the land capability or Individual Parcel Evaluation System (IPES)?	☐	☒	☐	☐
b. A change in the topography or ground surface relief features of site inconsistent with the natural surrounding conditions?	☐	☒	☐	☐
c. Unstable soil conditions during or after completion of the proposal?	☐	☐	☒	☐
d. Changes in the undisturbed soil or native geologic substructures or grading in excess of 5 feet?	☐	☒	☐	☐
e. The continuation of or increase in wind or water erosion of soils, either on or off the site?	☐	☐	☒	☐
f. Changes in deposition or erosion of beach sand, or changes in siltation, deposition or erosion, including natural littoral processes, which may modify the channel of a river or stream or the bed of a lake?	☐	☐	☒	☐
g. Exposure of people or property to geologic hazards such as earthquakes, landslides, backshore erosion, avalanches, mud slides, ground failure, or similar hazards?	☐	☒	☐	☐

Discussion:

1c. Construction disturbance is limited to a defined in-channel work area and temporary access route, with staging on existing pavement. Disturbed soils and streambanks will be backfilled/compacted and stabilized following installation, and final restoration includes stabilization and revegetation of disturbed uplands. Temporary and permanent erosion/sediment controls are installed prior to disturbance and maintained through construction to prevent instability and off-site effects.

1e. Temporary BMPs and RPMs to be implemented prior to ground disturbance and maintained throughout construction (e.g., construction limit fencing, silt barriers, fiber rolls, turf protection mats, good housekeeping, and prompt stabilization/revegetation). Dust control measures (including speed limits, track-out prevention, and sweeping/watering as needed) reduce wind erosion potential during construction.

1f. In-channel work will occur within an isolated work area using temporary diversion and dewatering to maintain dry conditions while directing flows downstream. Water quality protection BMPs are installed prior to excavation/grading, with turbidity monitoring during in-water work and corrective actions/Stop Work if standards are exceeded. Permanent project components (e.g., grade controls, erosion/scour protection, streambank revetment, stream bed mix) are designed to improve long-term channel stability relative to existing temporary facilities.

2. AIR QUALITY

Current and historic status of air quality standards can be found at the links below:

- Carbon Monoxide (CO)
- Nitrate Deposition
- Ozone (O3)
- Regional Visibility
- Respirable and Fine Particulate Matter
- Sub-Regional Visibility

Will the proposal result in:	Yes	No	No, with mitigation	Data insufficient
a. Substantial air pollutant emissions?	☐	☒	☐	☐
b. Deterioration of ambient (existing) air quality?	☐	☒	☐	☐
c. The creation of objectionable odors?	☐	☒	☐	☐
d. Alteration of air movement, moisture or temperature, or any change in climate, either locally or regionally?	☐	☒	☐	☐
e. Increased use of diesel fuel?	☐	☒	☐	☐

Discussion:

Temporary emissions during construction will be managed with appropriate controls. Project creates no permanent emissions sources.

2e. Diesel equipment use will occur during the defined construction period only. The project includes dust control and track-out prevention measures (e.g., vehicle speed limits on exposed surfaces, sweeping/housekeeping) to minimize particulate emissions associated with equipment operation and hauling.

3. WATER QUALITY

Current and historic status of water quality standards can be found at the links below:

- Aquatic Invasive Species
- Deep Water (Pelagic) Lake Tahoe
- Groundwater
- Nearshore (Littoral) Lake Tahoe
- Other Lakes
- Surface Runoff
- Tributaries
- Load Reductions

Will the proposal result in:	Yes	No	No, with mitigation	Data insufficient
a. Changes in currents, or the course or direction of water movements?	☐	☐	☒	☐
b. Changes in absorption rates, drainage patterns, or the rate and amount of surface water runoff so that a 20 yr. 1 hr. storm runoff (approximately 1 inch per hour) cannot be contained on the site?	☐	☒	☐	☐
c. Alterations to the course or flow of 100-yearflood waters?	☐	☐	☒	☐
d. Change in the amount of surface water in any water body?	☐	☒	☐	☐
e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen or turbidity?	☐	☐	☒	☐
f. Alteration of the direction or rate of flow of ground water?	☐	☐	☒	☐
g. Change in the quantity of groundwater, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?	☐	☒	☐	☐
h. Substantial reduction in the amount of water otherwise available for public water supplies?	☐	☒	☐	☐
i. Exposure of people or property to water related hazards such as flooding and/or wave action from 100-year storm occurrence or seiches?	☐	☒	☐	☐
j. The potential discharge of contaminants to the groundwater or any alteration of groundwater quality?	☐	☐	☒	☐
k. Is the project located within 600 feet of a drinking water source?	☐	☒	☐	☐

Discussion:

The Project incorporates strategies to prevent sedimentation and reduce the risk of pollutants entering the creek. BMPs for stormwater handling will be applied to protect the aquatic environment.

3a. Temporary diversion structures with velocity controls will be used during construction to reroute baseline flow around the work area and maintain downstream flow continuity. Upon completion, diversion and dewatering systems will be removed and streamflow restored. The permanent structure is designed to accommodate Third Creek's flow regime while maintaining channel function.

3c. Construction methods maintain flow continuity through diversion/dewatering and do not propose permanent impoundment. The permanent structure is described as designed to respond to Third Creek flow regimes and includes stabilization features (grade controls, scour protection) intended to maintain channel stability.

3e. Dewatering/diversion is required and will be implemented with turbidity controls and monitoring. The project specifies a turbidity standard of 10 NTU or baseline/background, whichever is higher, with baseline turbidity measured prior to construction. Monitoring will occur upstream and downstream during in-water work, with Stop Work and corrective actions if exceedances occur.

3f. Localized groundwater seepage may be anticipated; contingency localized dewatering would be implemented using portable pumps and containment/filtration prior to any release. Dewatering would be restricted to the immediate work zone and managed to prevent discharge of turbid or contaminated water to Third Creek or adjacent areas.

3j. Spill prevention and response measures are required (refer to RPM-3), including maintaining spill kits onsite, training personnel, prompt containment/cleanup, and prohibiting discharge of petroleum products and waste to Lake Tahoe Basin surface waters (including Third Creek). Materials management and housekeeping measures reduce the potential for contaminant release during construction.

4. VEGETATION

Current and historic status of vegetation preservation standards can be found at the links below:

- Common Vegetation
- Late Seral/Old Growth Ecosystems
- Sensitive Plants
- Uncommon Plant Communities

Will the proposal result in:	Yes	No	No, with mitigation	Data insufficient
a. Removal of native vegetation in excess of the area utilized for the actual development permitted by the land capability/IPES system?	☐	X	☐	☐
b. Removal of riparian vegetation or other vegetation associated with critical wildlife habitat, either through direct removal or indirect lowering of the groundwater table?	☐	X	☐	☐
c. Introduction of new vegetation that will require excessive fertilizer or water, or will provide a barrier to the normal replenishment of existing species?	☐	X	☐	☐
d. Change in the diversity or distribution of species, or number of any species of plants (including trees, shrubs, grass, crops, micro flora, and aquatic plants)?	☐	X	☐	☐
e. Reduction of the numbers of any unique, rare, or endangered species of plants?	☐	X	☐	☐
f. Removal of stream bank and/or backshore vegetation, including woody vegetation such as willows?	☐	☐	X	☐
g. Removal of any native live, dead or dying trees 30 inches or greater in diameter at breast height (dbh) within TRPA's Conservation or Recreation land use classifications?	☐	X	☐	☐
h. A change in the natural functioning of an old growth ecosystem?	☐	X	☐	☐

Discussion:

Native fish populations are expected to benefit from improved passage and habitat conditions. The Project design includes measures to minimize potential impacts on non-target species.

4f. Where vegetation conflicts occur within construction limits, the project specifies minimizing disturbance and protecting vegetation to the extent feasible, including use of fencing and controlled access. Any disturbed areas will be stabilized and revegetated, and work is confined to the defined reach and access/staging areas.

5. WILDLIFE

Current and historic status of special interest species standards can be found at the links below:

- Special Interest Species

Current and historic status of the fisheries standards can be found at the links below:

- Instream Flow
- Lake Habitat
- Stream Habitat

Will the proposal result in:	Yes	No	No, with mitigation	Data insufficient
a. Change in the diversity or distribution of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms, insects, mammals, amphibians or microfauna)?	☐	☐	☒	☐
b. Reduction of the number of any unique, rare or endangered species of animals?	☐	☒	☐	☐
c. Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?	☐	☒	☐	☐
d. Deterioration of existing fish or wildlife habitat quantity or quality?	☐	☒	☐	☐

Discussion:
The Project's approach to wildlife avoidance and minimization includes construction timing during low flow periods, isolating work areas, using diversion and dewatering methods, and implementing BMPs to reduce impacts on aquatic species during construction. Pre- and post-construction surveys, as well as ongoing monitoring by NDOW biologists, will ensure that potential adverse effects on special status and endangered species are identified and addressed, with additional measures such as fish relocations and resource protection commitments outlined in the Detailed Project Description.

5a. Short-term effects could include temporary disturbance/displacement of aquatic species within the isolated work area during construction. The Project uses work area isolation, diversion/dewatering, and BMPs to minimize impacts, and includes NDOW pre- and post-construction surveys and long-term monitoring of fisheries and habitat function.

5b. A no adverse effect determination may be concluded based on the purpose and need of the proposed project and the USFWS IPACs documentation provided in the Detailed Project Description **Attachment C**. Potential impacts during construction will be avoided and minimized through pre-construction survey commitments, fish relocations, and monitoring conducted by NDOW biologists throughout the construction period. Refer to Detailed Project Description, Sections 1.4.6, Special status Species, and 2.5, Resource Protection Measures and Best management Practices.

5c. The Project does not introduce new animal species. Temporary construction barriers are limited to the Work Area and removed after construction; post-construction, the facility includes fish passage components (fish ladder) and is intended to support ongoing fisheries management without creating a permanent barrier

to movement.

5d. Temporary impacts will be confined to the defined construction footprint and will be restored following completion (removal of diversion structures, stabilization/revegetation). Permanent features (grade controls, erosion/scour protection, streambank revetment, streambed mix) are intended to improve long-term channel stability and aquatic habitat function relative to existing temporary facilities.

6. NOISE

Current and historic status of the noise standards can be found at the links below:

- Cumulative Noise Events
- Single Noise Events

Will the proposal result in:	Yes	No	No, with mitigation	Data insufficient
a. Increases in existing Community Noise Equivalency Levels (CNEL) beyond those permitted in the applicable Area Plan, Plan Area Statement, Community Plan or Master Plan?	☐	☒	☐	☐
b. Exposure of people to severe noise levels?	☐	☒	☐	☐
c. Single event noise levels greater than those set forth in the TRPA Noise Environmental Threshold?	☐	☒	☐	☐
d. The placement of residential or tourist accommodation uses in areas where the existing CNEL exceeds 60 dBA or is otherwise incompatible?	☐	☒	☐	☐
e. The placement of uses that would generate an incompatible noise level in close proximity to existing residential or tourist accommodation uses?	☐	☒	☐	☐
f. Exposure of existing structures to levels of ground vibration that could result in structural damage?	☐	☒	☐	☐

Discussion:
Construction noise will occur during the defined construction window and is limited to weekday work hours (8:00 AM–6:30 PM) unless otherwise approved). Noise exposure is temporary and localized to the work area/staging areas. Noise-generating activities are limited to standard construction equipment during daytime hours and a defined period. The Project does not introduce a long-term noise source; temporary construction noise is managed through work hour limits and controlled access/staging.

7. LIGHT AND GLARE

Will the proposal:	Yes	No	No, with mitigation	Data insufficient
a. Include new or modified sources of exterior lighting?	☐	☒	☐	☐
b. Create new illumination which is more substantial than other lighting, if any, within the surrounding area?	☐	☒	☐	☐
c. Cause light from exterior sources to be cast off -site or onto public lands?	☐	☒	☐	☐
d. Create new sources of glare through the siting of the improvements or through the use of reflective materials?	☐	☒	☐	☐

Discussion:
None; no lighting or source of glare proposed.

8. LAND USE

Will the proposal:	Yes	No	No, with mitigation	Data insufficient
a. Include uses which are not listed as permissible uses in the applicable Area Plan, Plan Area Statement, adopted Community Plan, or Master Plan?	☐	☒	☐	☐
b. Expand or intensify an existing non-conforming use?	☐	☒	☐	☐

Discussion:

The fisheries management structure is compatible with the area's designated use for conservation and recreation. No conflicts with existing land uses have been identified.

9. NATURAL RESOURCES

Will the proposal result in:	Yes	No	No, with mitigation	Data insufficient
a. A substantial increase in the rate of use of any natural resources?	☐	☒	☐	☐
b. Substantial depletion of any non-renewable natural resource?	☐	☒	☐	☐

Discussion:

10. RISK OF UPSET

Will the proposal:	Yes	No	No, with mitigation	Data insufficient
a. Involve a risk of an explosion or the release of hazardous substances including, but not limited to, oil, pesticides, chemicals, or radiation in the event of an accident or upset conditions?	☐	☐	☒	☐
b. Involve possible interference with an emergency evacuation plan?	☐	☒	☐	☐

Discussion:

10a. Construction equipment use presents a potential for accidental spills (fuel/lubricants). The project requires spill prevention and response (spill kits onsite, trained personnel, immediate containment/cleanup, proper disposal) and prohibits discharge of petroleum products, construction waste, or earthen materials to surface waters of the Lake Tahoe Basin (including Third Creek).

11. POPULATION

Will the proposal:	Yes	No	No, with mitigation	Data insufficient
a. Alter the location, distribution, density, or growth rate of the human population planned for the Region?	☐	☒	☐	☐
b. Include or result in the temporary or permanent displacement of residents?	☐	☒	☐	☐

Discussion:
None; Project will have no impact to population.

12. HOUSING

Will the proposal:	Yes	No	No, with mitigation	Data insufficient
a. Affect existing housing, or create a demand for additional housing?				
To determine if the proposal will affect existing housing or create a demand for additional housing, please answer the following questions:				
1. Will the proposal decrease the amount of housing in the Tahoe Region?	☐	☒	☐	☐
2. Will the proposal decrease the amount of housing in the Tahoe Region historically or currently being rented at rates affordable by lower and very-low-income households?	☐	☒	☐	☐

Discussion:

13. TRANSPORTATION / CIRCULATION

Will the proposal result in:	Yes	No	No, with mitigation	Data insufficient
a. Generation of 650 or more new average daily Vehicle Miles Travelled?	☐	☒	☐	☐
b. Changes to existing parking facilities, or demand for new parking?	☐	☒	☐	☐
c. Substantial impact upon existing transportation systems, including highway, transit, bicycle or pedestrian facilities?	☐	☒	☐	☐
d. Alterations to present patterns of circulation or movement of people and/or goods?	☐	☒	☐	☐
e. Alterations to waterborne, rail or air traffic?	☐	☒	☐	☐
f. Increase in traffic hazards to motor vehicles, bicyclists, or pedestrians?	☐	☒	☐	☐

Discussion:

13c. The Project includes staging and storage within an existing paved parking area and requires traffic control measures to manage pedestrians/cyclists near the work area. Construction fencing, defined access routes, and traffic control measures are included to maintain public safety and minimize disruption**.**

13d. Short-term circulation changes may occur during mobilization and active construction due to staging, deliveries, and controlled access routes. These effects are temporary and managed through delineated staging, fencing, and traffic control measures.

14. PUBLIC SERVICES

Will the proposal have an unplanned effect upon, or result in a need for new or altered governmental services in any of the following areas?:	Yes	No	No, with mitigation	Data insufficient
a. Fire protection?	☐	☒	☐	☐
b. Police protection?	☐	☒	☐	☐
c. Schools?	☐	☒	☐	☐
d. Parks or other recreational facilities?	☐	☒	☐	☐
e. Maintenance of public facilities, including roads?	☐	☒	☐	☐
f. Other governmental services?	☐	☒	☐	☐

Discussion:
Construction activities include equipment use and staging; the project includes dust control, materials management, and spill prevention measures, and requires coordination/controls to maintain public safety. Temporary construction fencing and controlled staging reduce risk of incidental ignition sources and support safe operations.

15. ENERGY

Will the proposal result in:	Yes	No	No, with mitigation	Data insufficient
a. Use of substantial amounts of fuel or energy?	☐	☒	☐	☐
b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?	☐	☒	☐	☐

Discussion:

16. UTILITIES

Except for planned improvements, will the proposal result in a need for new systems, or substantial alterations to the following utilities:	Yes	No	No, with mitigation	Data insufficient
a. Power or natural gas?	☐	☒	☐	☐
b. Communication systems?	☐	☒	☐	☐
c. Utilize additional water which amount will exceed the maximum permitted capacity of the service provider?	☐	☒	☐	☐
d. Utilize additional sewage treatment capacity which amount will exceed the maximum permitted capacity of the sewage treatment provider?	☐	☒	☐	☐
e. Storm water drainage?	☐	☒	☐	☐
f. Solid waste and disposal?	☐	☐	☒	☐

Discussion:

16f. Construction will generate waste and debris associated with removal of the existing structure and installation activities. The Project requires good housekeeping and proper off-site disposal of surplus materials/waste and prohibits discharge of construction waste/litter to surface waters.

17. HUMAN HEALTH

Will the proposal result in:	Yes	No	No, with mitigation	Data insufficient
a. Creation of any health hazard or potential health hazard (excluding mental health)?	☐	☒	☐	☐
b. Exposure of people to potential health hazards?	☐	☒	☐	☐

Discussion:

Temporary construction hazards (equipment operation, open excavations, materials staging) are controlled through construction limit fencing, delineated access, traffic control measures, spill prevention, dust control,

and BMP implementation prior to disturbance. Public exposure is minimized through construction fencing and traffic control measures in areas with pedestrian use, combined with spill prevention/response and dust control requirements. Construction hours are limited to daytime weekday windows unless otherwise approved.

18. SCENIC RESOURCES / COMMUNITY DESIGN

Current and historic status of the scenic resources standards can be found at the links below:

- Built Environment
- Other Areas
- Roadway and Shoreline Units

Will the proposal:	Yes	No	No, with mitigation	Data insufficient
a. Be visible from any state or federal highway, Pioneer Trail or from Lake Tahoe?	☐	☒	☐	☐
b. Be visible from any public recreation area or TRPA designated bicycle trail?	☐	☒	☐	☐
c. Block or modify an existing view of Lake Tahoe or other scenic vista seen from a public road or other public area?	☐	☒	☐	☐
d. Be inconsistent with the height and design standards required by the applicable ordinance, Community Plan, or Area Plan?	☐	☒	☐	☐
e. Be inconsistent with the TRPA Scenic Quality Improvement Program (SQIP) or Design Review Guidelines?	☐	☒	☐	☐

Discussion:

18b. Temporary fencing, staging, and construction activity may be visible from adjacent recreation areas during construction. Visual effects are short-term and associated with safety controls (construction fencing, traffic control) and staging on existing pavement.

19. RECREATION

Current and historic status of the recreation standards can be found at the links below:

- Fair Share Distribution of Recreation Capacity
- Quality of Recreation Experience and Access to Recreational Opportunities

Will the proposal:	Yes	No	No, with mitigation	Data insufficient
a. Create additional demand for recreation facilities?	☐	☒	☐	☐
b. Create additional recreation capacity?	☐	☒	☐	☐
c. Have the potential to create conflicts between recreation uses, either existing or proposed?	☐	☐	☒	☐
d. Result in a decrease or loss of public access to any lake, waterway, or public lands?	☐	☒	☐	☐

Discussion:

19c. Short-term conflicts could occur due to construction activity adjacent to pedestrian use areas. The Project includes construction fencing, delineated access routes, and traffic control measures to manage pedestrian/bicycle movement and maintain public safety during construction.

20. ARCHAEOLOGICAL / HISTORICAL

Will the proposal result in:

	Yes	No	No, with mitigation	Data insufficient
a. An alteration of or adverse physical or aesthetic effect to a significant archaeological or historical site, structure, object or building?	☐	☐	☒	☐
b. Is the proposed project located on a property with any known cultural, historical, and/or archaeological resources, including resources on TRPA or other regulatory official maps or records?	☐	☒	☐	☐
c. Is the property associated with any historically significant events and/or sites or persons?	☐	☒	☐	☐
d. Does the proposal have the potential to cause a physical change which would affect unique ethnic cultural values?	☐	☒	☐	☐
e. Will the proposal restrict historic or pre-historic religious or sacred uses within the potential impact area?	☐	☒	☐	☐

Discussion:

20a. Ground-disturbing work carries an inadvertent discovery risk. The Project includes cultural/tribal resource protection measures requiring work to stop and appropriate notifications if previously unidentified artifacts or sites are discovered (NDOW Project Manager, Washoe Tribe, SHPO, coroner as appropriate).

20b-20e. Impact conclusion supported by cultural inventories and assessments presented in **Appendix D**, Cultural Resource Documentation, of the Detailed Project Description.

II. FINDINGS OF SIGNIFICANCE

	Yes	No	No, with mitigation	Data insufficient
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, 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 or Nevada history or prehistory?	☐	☐	☒	☐
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time, while long-term impacts will endure well into the future.)	☐	☒	☐	☐
c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environmental is significant?)	☐	☒	☐	☐
d. Does the project have environmental impacts which will cause substantial adverse effects on human being, either directly or indirectly?	☐	☐	☒	☐

Discussion:

II.a Temporary construction effects are limited in extent and duration and are confined to a defined in-channel work area, temporary access route, and staging on existing pavement. Construction activities will incorporate work area isolation, temporary diversion and dewatering to maintain dry conditions, and installation of water quality protection BMPs prior to disturbance. These measures include erosion and sediment controls, spill prevention and response, dust control, and materials management practices designed to prevent discharge of pollutants to surface or groundwater. Turbidity monitoring will be conducted upstream and downstream during in-water work, consistent with the project standard of 10 NTU above background or baseline conditions (whichever is greater), with immediate corrective actions and Stop Work provisions if exceedances occur.

Disturbed soils and streambanks will be backfilled, compacted, stabilized, and revegetated with native species following completion, and temporary diversion and control features will be removed to restore natural flow conditions. Permanent project elements (e.g., grade controls, scour protection, streambed material, and channel stabilization features) are designed to improve long-term channel stability and aquatic habitat function relative to existing temporary or degraded conditions.

The Project purpose is fisheries management and habitat improvement, supporting recovery and long-term sustainability objectives. Post-construction conditions are anticipated to provide equal or improved habitat suitability through enhanced channel stability, reduced erosion potential, and maintained connectivity for aquatic species (including fish passage). NDOW will conduct pre- and post-construction monitoring, including fisheries and habitat assessments, to verify performance, confirm habitat function, and ensure project objectives are achieved over time.

Based on these design features, mitigation measures, monitoring requirements, and the habitat improvement objectives documented in the Detailed Project Description, the Project will not degrade environmental quality, reduce fish habitat below self-sustaining levels, threaten plant or animal communities, or eliminate important examples of the natural or cultural environment. Impacts are temporary, localized, and controlled, and long-term conditions are expected to be neutral to beneficial.

II.d. Potential construction-related risks (public interface, equipment operation, noise, dust, and accidental spills) are addressed through a comprehensive set of avoidance and minimization measures consistent with the project description and controls identified in iR7. Construction activities will be confined to a defined work area with controlled access, utilizing construction fencing, delineation, and traffic control measures (e.g., signage, flagging, and barriers) to separate the public from active work zones and maintain safe circulation for vehicles, pedestrians, and cyclists.

Equipment operation and site activity will be limited to a defined construction window (typically daytime weekday hours), which reduces the duration and intensity of potential noise and human exposure. Noise-generating activities will be temporary and localized, and no long-term operational noise sources are introduced. Dust control measures, including vehicle speed limits, track-out prevention, and application of water or other suppression methods as needed, will be implemented to minimize particulate exposure to nearby receptors.

Spill prevention and response protocols will be in place throughout construction, including availability of spill kits, trained personnel, and immediate containment and cleanup procedures. Material storage, fueling, and equipment maintenance will be conducted in a manner that minimizes the potential for release of hazardous substances, and discharges of petroleum products, construction waste, or other contaminants to surface waters or surrounding areas are prohibited.
Additional best management practices (BMPs), including erosion and sediment controls, good housekeeping, and proper waste handling and disposal, will be implemented prior to and throughout construction to further reduce risks to human health and safety.

Public exposure will be further minimized through clear delineation of staging areas, use of existing paved access for construction activities, and maintaining separation between construction operations and adjacent public-use areas. Any temporary access restrictions will be limited to the immediate work area and duration of active construction.

Based on the incorporation of these controls and standard construction safety practices identified in iR7, potential direct or indirect impacts to human beings are short-term, localized, and adequately mitigated. Implementation of these measures reduces the risk of substantial adverse effects to a less-than-significant level.

III. DECLARATION:

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Signature:

Melanie Greene	At Douglas County	05/20/2026
Person preparing application	**County**	**Date**

Applicant Written Comments: (Attach additional sheets if necessary)

IV. DETERMINATION:

On the basis of this evaluation:

a. The proposed project could not have a significant effect on the environment and a finding of no significant effect shall be prepared in accordance with TRPA's Rules of Procedure	X **YES**	☐ NO
b. The proposed project could have a significant effect on the environment, but due to the listed mitigation measures which have been added to the project, could have no significant effect on the environment and a mitigated finding of no significant effect shall be prepared in accordance with TRPA's Rules and Procedures.	☐ YES	☒ NO
c. The proposed project may have a significant effect on the environment and an environmental impact statement shall be prepared in accordance with this chapter and TRPA's Rules of Procedures.	☐ YES	X NO

Melanie Greene

Date 05/20/2026

Signature of Evaluator

Melanie Greene, AICP, CPESC, QSD/P
Senior Environmental Planner - Stantec

Title of Evaluator

Attachment J Project Agreements and Regulatory Requests for Review / Approval / Authorization

Clean Water Act Section 401 Water Quality Certification Application

Please refer to the "Clean Water Act Section 401 Water Quality Certification Application Guidance" document for assistance with completing this application.

A. Pre-Filing Meeting	
Please provide the date that a pre-filing meeting was requested from Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning (BWQP). *Note: If a pre-filing meeting has not been requested, please schedule a pre-filing meeting with NDEP BWQP.*	Pre-filing meeting request was submitted on April 8, 2026, with the pre-filing meeting held with NDEP and USACE staff on April 23, 2026, from 0900 to 1000

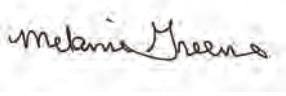
B. Contact Information			
Project Proponent Information			
Company Name: Nevada Department of Wildlife		Address: 1100 Valley Road	
Applicant Name: Sam Sedillo, Fisheries Biologist		City: Reno	
Phone: 775.688.1882	Fax:	State: Nevada	
Email: Samuel.sedillo@ndow.org		Zip Code: 89512	
Agent Information			
Company Name: Stantec		Address: PO BOX 1533	
Agent Name: Melanie Greene, Senior Envir Planner		City: Zephyr Cove	
Phone: 775.339.3328	Fax:	State: Nevada	
Email: melanie.greene@stantec.com		Zip Code: 89948	

C. Project General Information			
Project Location			
Project/Site Name: **Third Creek Fisheries Management Structure**		Name of receiving waterbody: Third Creek, Lake Tahoe downstream	
Address: 967 Lakeshore Boulevard		Type of waterbody present at project location (*select all that apply*): ☒ Perennial River or Stream ☐ Intermittent River or Stream ☐ Ephemeral River or Stream ☐ Lake/Pond/Reservoir ☐ Wetland ☐ Other: _____	
City: Incline Village			
County: Washoe			
State: Nevada			
Zip Code: 89451			
Latitude (UTM or Dec/Deg): 39.239742		Longitude (UTM or Dec/Deg): -119.94660	
Township: T16N	Range: R18E	Section: S22	¼ Section: --

Project Details	
Project purpose:	The purpose of the Project is to remove the existing structure and construct a fisheries management structure designed to accommodate and respond to Third Creek's flow regime that will allow NDOW to collect wild Rainbow trout eggs annually and work towards the recovery of Lahontan cutthroat trout (LTC) using a realistic and replicable approach. The Project will implement Tahoe Regional Planning Agency (TRPA) Environmental Improvement Program (EIP) projects 02.02.03.0024 - Lahontan Cutthroat Trout Priority Tributary Management and 02.02.03.0025 - Lake Tahoe Lahontan Cutthroat Trout Feasibility Study.
Describe current site conditions: Attachments can include, but are not limited to, relevant site data, photographs that represent current site conditions, or other relevant documentation.	Refer to: Detailed Project Description, Section 1.4, Existing Site Conditions, and **Attachment E**, Site Condition Photos
Describe the proposed activity including methodology of each project element:	Refer to enclosure: Detailed Project Description, Section 2
Estimate the nature, specific location, and number of discharge(s) expected to be authorized by the proposed activity:	Diversion of creek flows and controlled discharge (1 discharge point) is proposed to establish and maintain a dry work environment.
Provide the date(s) on which the proposed activity is planned to begin and end and the approximate date(s) when any discharge(s) may commence:	August 1, 2026, through October 15, 2026
Provide a list of the federal permit(s) or license(s) required to conduct the activity which may result in a discharge into regulated waters (see mandatory attachments):	Request for Authorization under Regional General Permit (RGP) 16, Aquatic Habitat Restoration and Enhancement Activities submitted concurrently through the Regulatory Registration System (RRS); refer to **Attachment J**, Project Agreements and Regulatory Requests for Review / Approval / Authorization
Provide a list of all other federal, state, interstate, tribal, territorial, or local agency authorizations required for the proposed activity and the current status of each authorization:	Refer to **Attachment J**: TRPA – EIP Project Review Application (EIPC2026-0005; $TBD fee) IVGID – MOA for use of APNs 127-280-01 and 127-010-004 Temporary Working in Waters Permit (NDEP BWPC; $250 fee) – To be applied for
Total area of impact to regulated waterbodies (acres):	Refer to Detailed Project Description **Table 2:** Up to 0.26-acres temporary disturbance, 0.10-acre of temporary fill (i.e., diversion system components) up to 40 cubic yards within bed and bank of Third Creek, with permanent fill and discharge (i.e., fisheries management structure and streambed materials) estimated at up to 0.08-acre and 430 cubic yards.
Total distance of impact to regulated waterbodies (linear feet):	Fisheries management structure will be installed (up to 280-linear feet of temporary disturbance) and then operated and maintained within up to 65-linear-feet of Third Creek channel. The Lake Tahoe shoreline is approximately 350 feet down stream.

Amount excavation and/or fill discharged within regulated waters (acres, linear feet, and cubic yards): **Refer to Detailed Project Description Table 2**	Temporary: 0.26-acre 280-linear-feet (total length of channel altered by diversion system) 40-cubic yards (coffer dam, sediment dams, discharge dissipator)	Permanent: 0.08-acre 65-linear-feet 430-cubic yards (fisheries management structure and new streambed components)
Amount of dredge material discharged within regulated waters (acres, linear feet, and cubic yards): **Refer to Detailed Project Description Table 2**	Temporary: 0.26-acre 280-linear-feet 100-cubic yards (salvaged streambed materials)	Permanent: 0.06-acre 65-linear-feet 100-cubic yards (salvaged streambed materials)
Describe the reason(s) why avoidance of temporary fill in regulated waters is not practicable (if applicable):	Refer to: Detailed Project Description Section 2,4,2, Diversion and Contingency Dewatering and **Attachment A, Sheet DW-1.** Temporary fill (40 cubic yards) is necessary to create and maintain dry work conditions to install and operate the project's diversion system during construction of the fisheries management structure and stream bed grade. Temporary fill is associated with cofferdam, sediment dams, and discharge dissipator device and will be removed with completion of construction. Fill used for scour protection and grade control materials will remain as permanent fill to stabilize the channel and protect the fisheries management structure.	
Describe the Best Management Practices (BMPs) to be implemented to avoid and/or minimize impacts to regulated waters: Examples include sediment and erosion control measures, habitat preservation, flow diversions, dewatering, hazardous materials management, water quality monitoring, equipment or plans to treat, control, or manage discharges, etc.	Refer to: Detailed Project Description, Section 2.5, Resource Protection Measures and Best Management Practices.	
Describe how the activity has been designed to avoid and/or minimize adverse effects, both temporary and permanent, to regulated waters:	The activity has been designed to avoid and minimize temporary and permanent adverse effects to regulated waters by restricting construction to the minimum area necessary within the existing bed and bank, sequencing work during the low-flow construction window, and isolating the active work area with a temporary diversion and dewatering system to maintain dry conditions during structure installation. Temporary disturbance and temporary fill have been limited to the quantities necessary to install the cofferdam, sediment control measures, and discharge dissipator, thereby minimizing sediment mobilization, turbidity, and the potential for downstream water quality degradation. Upon completion of construction, all temporary diversion components, temporary fill, and accumulated construction-related materials will be removed from regulated waters, and the disturbed channel margins will be restored and stabilized. Permanent fill has been limited to the minimum volume required for the fisheries management structure, associated grade control, and scour protection necessary to maintain channel stability, structural integrity, and compatibility	

	with Third Creek flow conditions. By siting the facility within an already managed reach and incorporating durable channel stabilization features, the design reduces the likelihood of future emergency repairs, repeated in-water disturbance, and long-term effects on aquatic habitat and downstream beneficial uses.
Describe any compensatory mitigation planned for this project (if applicable):	No compensatory mitigation is proposed. Refer to Detailed Project Description, Section 3.3, compensatory Mitigation.

D. Signature		
Name and Title (Print): Melanie Greene	Phone Number: 775.339.3328	Date: May 20, 2026
X  Signature of Responsible Offic...		

Mandatory Attachments:

- **Federal Permit or License Application** - A copy of the federal permit or license application and any readily available water quality-related materials that informed the development of the federal license or permit application.
- **Site Map** - A map or diagram of the proposed project site including project boundaries in relation to regulated waters, local streets, roads, and highways.
- **Engineered Drawings** - Engineered drawings are preferred to be submitted at the 70% design level. If only conceptual designs are available at the time of application, plans for construction should be submitted prior to the start of the project. Specific locations of the proposed activities and details of specific work elements planned for the project should be identified (e.g., staging areas, concrete washouts, perimeter controls, water diversions, or other BMPs).

Submit the completed application materials to NDEP (ndep401@ndep.nv.gov) with the appropriate U.S. Army Corps of Engineers Regulatory Office copied on the communication (http://www.spk.usace.army.mil/Missions/Regulatory/Contacts/Contact-Your-Local-Office/).

TAHOE REGIONAL PLANNING AGENCY

Mail
PO Box 5310
Stateline, NV 89449-5310

Location
128 Market Street
Stateline, NV 89449

Contact
Phone: 775-588-4547
Fax: 775-588-4527
trpa.gov

ENVIRONMENTAL IMPROVEMENT PROGRAM PROJECT INFORMATION PACKET

I. OVERVIEW

The Lake Tahoe Environmental Improvement Program (EIP) is an unparalleled partnership working to achieve the environmental goals of the region. Local, state, and federal government agencies, private entities, scientists, and the Washoe Tribe of Nevada and California have collaborated for more than 20 years to restore the environmental health of Lake Tahoe.

EIP projects are those projects that directly contribute to environmental thresholds in the region such as water quality, transportation, wildlife, ecosystem conservation, and scenic resources. These projects are typically publicly funded.

This information packet is for recognized EIP projects that require TRPA review and approval. To streamline the permitting process, the Tahoe Regional Planning Agency (TRPA) has entered into agreements with Tahoe Basin agencies and land managers to carry out environmental review on our behalf.

Under the MOUs, utility and land management agencies are given authority to review certain projects for conformance with TRPA standards on their own, thus streamlining protection standards in the Basin and increasing efficiency. Each MOU will include both Exempt Activities and Qualified Exempt Activities. Exempt Activities listed within an MOU and carried out by that agency do not require an application submitted to TRPA.

Visit the TRPA Where to Apply webpage to view MOUs currently in effect with partner agencies. To learn more about the EIP, visit the EIP page on LakeTahoeInfo.org.

For any questions regarding information within this packet, please call 775-589-5333 or email TRPA@trpa.gov to speak with a permitting technician.

II. EIP PROJECT CHECKLIST ITEMS

To submit an online EIP Project Application, click here. The following section contains a checklist of items to be submitted with your application.

- X **Completed and signed application form.**
- X **Detailed project description.**

X **Fire protection agency pre-approval.** To determine the property's fire district, visit the Parcel Tracker and search the property address. -***Detailed Project Description, Attachment J***

N/A ~~**Verified land capability or IPES score, if applicable, and land coverage.** Visit the Parcel Tracker and use the location address to determine if the land capability has been verified on the property.~~

N/A ~~**Results of a historic determination if the structure is greater than 50 years of age.**~~

N/A ~~**Results of a soils-hydrologic determination if excavating deeper than five feet.**~~

X **Applicable findings with explanation and rationale.** -***Detailed Project Description Section 6***

X **Initial Environmental Checklist.** – ***Detailed Project Description Attachment I***

X **Photographs of existing development.** -***Detailed Project Description Attachment E***

X **Exported results of the Project Impact Analysis to assess Vehicle Miles Traveled (VMT) and mobility mitigation.** ***Detailed Project Description Attachment g***

X **Active Transportation Plan Checklist.** -***Detailed Project Description Attachment H***

X **List of affected parcels by Assessor Parcel Number(s).** - ***EIP Application Form Item provided***

X **Existing and proposed site plan (minimum size 24" x 36") showing the following:** (Sample plans are available online.***)*** -***Detailed Project Description Attachment A***

a. Property lines, easements, building setbacks, parcel area in square feet.
b. Map scale and north arrow.
c. Assessor's Parcel Number (APN), property address and property owner(s) name(s).
~~d. Driveway, driveway slope, and edge of pavement at street.~~
e. Verified land capability districts or IPES score summary.
~~f. Verified backshore and Stream Environment Zones (SEZ) boundaries and setback(s) boundary and high/low water lines. (for lakefront only)~~
g. Limits of 100-year floodplain, if applicable.
~~h. All existing and proposed development including overhang coverage reductions at 3:1.~~
~~i. Coverage calculations (existing, proposed, allowable) broken down by land capability district and type. (i.e. buildings, decks, walks, etc.)~~
~~j. Area of modified floor area covered by a roof. (in square footage)~~
k. Trees greater than 14" dbh and rock outcrops.
l. Existing and proposed topographic contour lines at two-foot intervals.
m. Construction staging area.
n. Existing and proposed development rights associated with the property.
~~o. Parking space calculations. (if applicable)~~
~~p. Location of existing and proposed signage. (if applicable)~~

N/A ~~**Existing and proposed building elevations showing the following:** (Sample plans are available online.)~~

~~a. Finish floor elevations with respect to contour elevations on site plan.~~
~~b. Drawing scale and view aspect.~~
~~c. Roof pitch of each roof plane and the slope across the building site. (if more than one roof pitch, provide a roof plan)~~
~~d. Allowed and proposed height calculations.~~
~~e. Elevation of the highest roof ridge and lowest elevation of foundation wall at natural grade.~~

f. Elevation of the bottom of foundation or support footing. (if new)

g. Outline of existing grade vs. finished grade.

N/A **Existing and proposed floor plans showing the following:** (Sample plans are available online.)

a. Scaled dimensions.

b. All exterior entrances/exits.

c. Existing and proposed development rights associated with the property

d. TRPA-approved wood stove, fireplace, space and water heaters

X **Best Management Practices (BMP) plan:** (Sample plans are available online.) ***Detailed Project Description Section 3.4 and Attachment A, Sheets BMP-1, D-1, D-2***

a. BMP calculation spreadsheet (in color and in excel format) matching the permanent BMPs shown on the site plan.
b. Existing and proposed BMPs.
c. Temporary construction BMPs.
d. Engineered stamp for any retaining wall exceeding three feet.

X **Grading Plan:** (Sample plans are available online.) ***Detailed Project Description Attachment A, Sheets SD-1 through SD-5 inform the total cut and fill volumes reported and maximum depth of excavations***

a. Total cut and fill in cubic yards, indicate the maximum depth of excavation.
b. Location of all existing and proposed utilities.
c. Results of a soils hydrologic assessment. (For excavation greater than five feet.)

N/A **Restoration plan if project includes coverage relocation or removal.**

N/A **NEW CONSTRUCTION OR NEW UNIT OF USE ONLY:**

a. Evidence that a building allocation has been issued by the local jurisdiction or a Residential Unit of Use will be transferred to the site and/or converted.

b. Exported results of the Project Impact Analysis to assess Vehicle Miles Traveled (VMT) and mobility mitigation.

N/A **PROJECTS VISIBLE FROM SCENIC RESOURCE AREA ONLY (STATE OR FEDERAL HIGHWAYS, RECREATION AREAS, ETC.):**

Sample plans are available online. For more information on scenic considerations, review information online.

Scenic information:

a. Photos taken from the scenic resource area.
b. Color and material samples for all structures, labeled with the corresponding Munsell color numbers.
c. Landscape plan.

Scenic Impact Assessment.

N/A **LAKEFRONT PROPERTIES ONLY**

Sample plans are available online. For more information on scenic considerations, review information online.

Scenic information:

a. Items listed above for projects visible from scenic resource area.
b. Scenic Assessment contrast rating score worksheet/spreadsheet.
c. Elevation drawings of all existing structures (buildings, walls, fences, etc.) for any façade

~~facing Lake Tahoe. Include level of review, proposed contrast rating score, allowed visible area, and proposed visible area on the plans.~~

d. ~~Elevation outline or equivalent~~.

~~**PROJECTS REQUIRING NOTICING OR HEARING ONLY – approval by the Hearings Officer may be required for approval of modifications within a channel/SEZ**~~

~~Noticing materials for Hearings Officer, Governing Board, or Enhanced Staff Review. (i.e. special use, historic resources, etc.) See TRPA Code of Ordinances section 2.2.2 for projects requiring review and **approval by a Hearings Officer** or Governing Board. See TRPA Rules of Procedure section 12.14 for projects requiring public noticing.~~

~~q. List of names, addresses, and APNs of property owners within 300' of the project area perimeter.~~

~~r. Stamped, addressed envelopes to the same (mailing addresses) with no return address.~~

~~s. An 8 ½ x 11" plan reduction of site plan, elevations, and floor plans.~~

X TECHNICAL REPORTS

The following technical reports may or may not be required for this project. EIP planners can assist you in determining if any of these reports are needed.

a. Biology Report including information regarding existing vegetation communities and animal species, potential for special-status species, and TRPA critical habitat. – ***Detailed Project Description Attachment C***
b. Noxious Weed Risk Assessment, with recommendations. – ***Detailed Project Description Section 3.4***
c. Wetland Delineation. ***Not Applicable***
d. Archaeology Report, including letters from federal agency and/or state historic preservation offices. ***Detailed Project Description Section 1.3.7 and Attachment D***
e. Geotechnical Report including information on seismicity, topography, geology, soils, slope stability, and/or stream conditions. ***Detailed Project Description, Attachment A, Engineering Drawings; Attachment B, NRCS Soils Report***
f. Hydrology Report including information on groundwater, watersheds, drainage areas and features, infiltration, and/or precipitation. ***Detailed Project Description Section 1.4.3***
g. Noise Study. – ***Not applicable beyond construction period, no new stationary noise sources will result***
h. Tree Removal Plan. ***Not applicable, no tree removal or stem and root removal proposed –Branch limbing and willow trimming for work area access may be necessary***
i. Revegetation Plan. ***Detailed Project Description Section 2.6***
j. Monitoring Plan. ***Detailed Project Description Attachment F***
k. Maintenance Plan. ***Detailed Project Description Section 4.1 and Attachment J***

TAHOE REGIONAL PLANNING AGENCY
Mail
PO Box 5310
Stateline, NV 89449-5310
Location
128 Market Street
Stateline, NV 89449
Contact
Phone: 775-588-4547
Fax: 775-588-4527
trpa.gov

ENVIRONMENTAL IMPROVEMENT PROGRAM PROJECT APPLICATION

Applications to TRPA can be submitted online through Accela Citizen Access. For assistance submitting a form or application online, please call 775-589-5333 or visit the TRPA front lobby.

EIP Project Number: 02.02.03.0024 & -0025

Project Name: Third Creek Fisheries Management Structure

Applicant/Project Implementer Nevada Department of Wildlife (NDOW)

Mailing Address 1100 Valley Road City Reno State NV

Zip Code 89512 Email samuel.sedillo@ndow.org Phone 775.688.1882

Representative or Agent Melanie Greene, Senior Environmental Planner (Stantec)

Mailing Address PO BOX 1533 City Zephyr Cove State NV

Zip Code 89448 Email melanie.greene@stantec.com Phone 775.338.3928

Owner Incline Village General Improvement District (IVGID) ☐ **Same as Applicant**

Mailing Address 893 Southwood Boulevard City Incline Village State NV

Zip Code 89451 Email info@ivgid.org Phone 775.832.1100

Primary Project Location/Assessor's Parcel Number (APN): 127-280-01

Street Address 967 Lakeshore Boulevard Incline Village, NV 89451

County Washoe County Previous APN(s) _____

Other affected APNs: 127-010-04 (IVGID paved parking area to be used for staging and storage)

Is this property visible from a designated TRPA Scenic Resource Area? ☐ **YES** ■ **NO**

Roadway Unit # N/A - Lakeshore Boulevard ☐ **Attainment** ☐ **Non-attainment**

Scenic Unit # 23 Cystal Bay – Project Site not visible ☐ **Attainment** ■ **Non-attainment**

Bicycle and Pedestrian Facilities: Are there existing or proposed public bicycle or pedestrian path(s) within 75 feet of the project area (bike paths, lanes, routes, or sidewalks)? ■ **YES** ☐ **NO**

Project Description/Proposal:

NDOW proposes to install a new fisheries management structure on Third Creek between Lakeshore Boulevard and the creek terminus at Lake Tahoe on land owned by the Incline Village General Improvement District (IVGID). Project planning has been supported by state special reserve accounts (Habitat Conservation Fee the Nevada Wildlife Heritage Trust Account). The fisheries management structure will replace the temporary structures operated and maintained to support NDOW's ongoing management, monitoring, and research efforts at this reach since 2014 (i.e., Lake Tahoe Lahontan Cutthroat Trout Feasibility Study and Lake Tahoe Rainbow Trout Study). The Project will contribute towards Nevada's Biodiversity Initiative with the United States Fish and Wildlife Service (USFWS), specifically Lahontan cutthroat trout (LCT) and rainbow trout populations and has been designed and located to respond to existing channel morphology and flow regimes improving stability in the lotic systems and to address the project objectives that will be discussed at the pre-filing meeting and detailed in the forthcoming application for water quality certification. The fisheries management structure will be comprised of a concrete velocity barrier, weir with removable slide gate (fish collection pool, fish ladder, streambank revetment, grade controls boulders sited down-gradient), and erosion and scour protection measures (i.e., rip rap; boulders sited up-gradient).

Refer to the attached Detailed Project Description and attachments for additional details on construction sequencing, equipment and materials, best management practices (BMPs) and resource protection measures (RPMs), and monitoring and reporting, along with Environmental Improvement Program (EIP) project findings.

Application Continues on Next Page

SIGNATURES

DECLARATION

I hereby declare under penalty of perjury that this application and all information submitted as part of this application is true and accurate to the best of my knowledge. I am the owner of the subject property or have been authorized in writing by the owner(s) of the subject property to represent this application, and I have obtained authorization to submit this application from any other necessary parties holding an interest in the subject property. I understand it is my obligation to obtain such authorization, and I further understand that TRPA accepts no responsibility for informing these parties or obtaining their authorization. By submitting this application, I agree to all TRPA regulations regarding Project Review as stated in Article 5 of the TRPA Rules of Procedure and other TRPA regulatory documents, including the TRPA application fee refund policy. I acknowledge that once the application is submitted, if I withdraw it for any reason, I will not be entitled to a full refund, and the amount of any refund will be determined by TRPA.

I understand that should any information or representation submitted in connection with this application be inaccurate, erroneous, or incomplete, TRPA may rescind any approval or take other appropriate action. I hereby authorize TRPA to access the property for the purpose of site visits. I understand that additional information may be required by TRPA to review this project.

Signature:

Melanie Greene At Douglas County Date: 5/11/26

Owner or Person Preparing Declaration Form **County**

AUTHORIZATION FOR REPRESENTATION

Complete this section only if an agent or consultant is submitting this application on behalf of the property owner.

The following person(s) own the subject property **(Assessor's Parcel Number(s)** 127-280-01, 127-010-04 **)** or have sufficient interest therein (such as a power of attorney) to make application to TRPA:

Print Owner(s) Name(s): Incline Village General Improvement District (IVGID

I/We authorize Samual Sedillo (NDOW) and Melanie Greene (Stantec) to act as my/our representative in connection with this application to TRPA for the subject property and agree to be bound by said representative. I understand that additional information may be required by TRPA beyond that submitted by my representative, to review this project. Any cancellation of this authorization shall not be effective until receipt of written notification of same by TRPA. I also understand that should any information or representation submitted in connection with this application be incorrect or untrue, TRPA may rescind any approval or take other appropriate action. I further accept that if this project is approved, I, as the permittee, will be held responsible for any and all permit conditions.

Owner(s) Signature(s):

Robert Harrison, General Manager Date: 05/21/2026

Robert William Harrison

MEMORANDUM OF UNDERSTANDING BETWEEN THE NEVADA DEPARTMENT OF WILDLIFE AND THE INCLINE VILLAGE GENERAL IMPROVEMENT DISTRICT REGARDING CONSTRUCTION ACCESS TO THIRD CREEK FISH MANAGEMENT STRUCTURE

This Memorandum of Understanding (hereinafter the "MOU") is entered into between the Incline Village General Improvement District, a general improvement district of the State of Nevada (hereinafter "IVGID") and the State of Nevada, by and through the Nevada Department of Wildlife (hereinafter "NDOW"). IVGID and NDOW may be referred to individually as a "Party" or collectively as "the Parties."

This MOU is intended to set forth the understanding of the Parties regarding NDOW's contractor access across IVGID-managed property commonly known as Ski Beach, for the construction of a permanent fish management structure in Third Creek.

RECITALS

WHEREAS, IVGID is responsible for providing NDOW and its contractor access to conduct the management and maintenance of public access areas including Overflow Parking and Incline Beach in Incline Village, Nevada;

WHEREAS, NDOW proposes to construct a permanent fish management structure in Third Creek for the purposes of habitat and aquatic species management;

WHEREAS, NDOW has contracted with third-party professionals to undertake construction activities necessary for installation of the structure;

WHEREAS, access to the project site requires temporary passage across IVGID-managed property and Washoe County ROW by NDOW contractors and equipment;

WHEREAS, the Parties wish to cooperate in a way that ensures safe, temporary access while protecting public property and resources.

NOW, THEREFORE, the Parties hereto express the following understanding regarding temporary construction access and related responsibilities:

1. Definitions. The following definitions shall apply to this MOU:

   A. Access Route: The designated path across IVGID's Overflow Parking Facility AND Incline Beach property by which NDOW contractors may pass to reach the project site at Third Creek.

   B. Fish Management Structure: The permanent structure to be constructed in Third Creek under the direction of NDOW.

2. IVGID Functions.

   A. Grant NDOW and its contractors non-exclusive, temporary access across the

Access Route; Access Route to include required construction passage across the IVGID Overflow Parking and Incline Beach Properties.

B. Collaborate with NDOW on timing and method of access to minimize public impact.

C. Retain the right to inspect the site before, during, and after the access period.

D. Report any observed damages or non-compliance to NDOW for correction.

E. Communicate project timelines with members of the public who utilize the Overflow Parking and Incline Beach Properties

3. NDOW Functions.

A. Coordinate all construction activities including scheduling and contractor access.

B. Ensure contractors carry adequate insurance and follow safety/environmental regulations.

C. IVGID to be added as additional insured on the Contractors insurance policy

D. Repair any damage to IVGID property resulting from the construction access.

E. Restore disturbed areas to pre-access conditions upon project completion.

4. General Provisions.

A. Future Contracts. The Parties may enter into subsequent binding agreements to address matters not covered in this MOU.

B. Interpretation. This MOU is not a contract and does not confer enforceable rights. It is a non-binding agreement to cooperate on matters of mutual interest.

5. Term. This MOU shall become effective upon final signature and remain in effect for one (1) year unless extended by written agreement.

This MOU is approved by the signatories hereto.

NEVADA DEPARTMENT OF WILDLIFE:

By: _____

Its: Director Alan Jenne.

Date: 3/17/2026

INCLINE VILLAGE GENERAL IMPROVEMENT DISTRICT:

By: _____

Name: HUDSON KLEIN

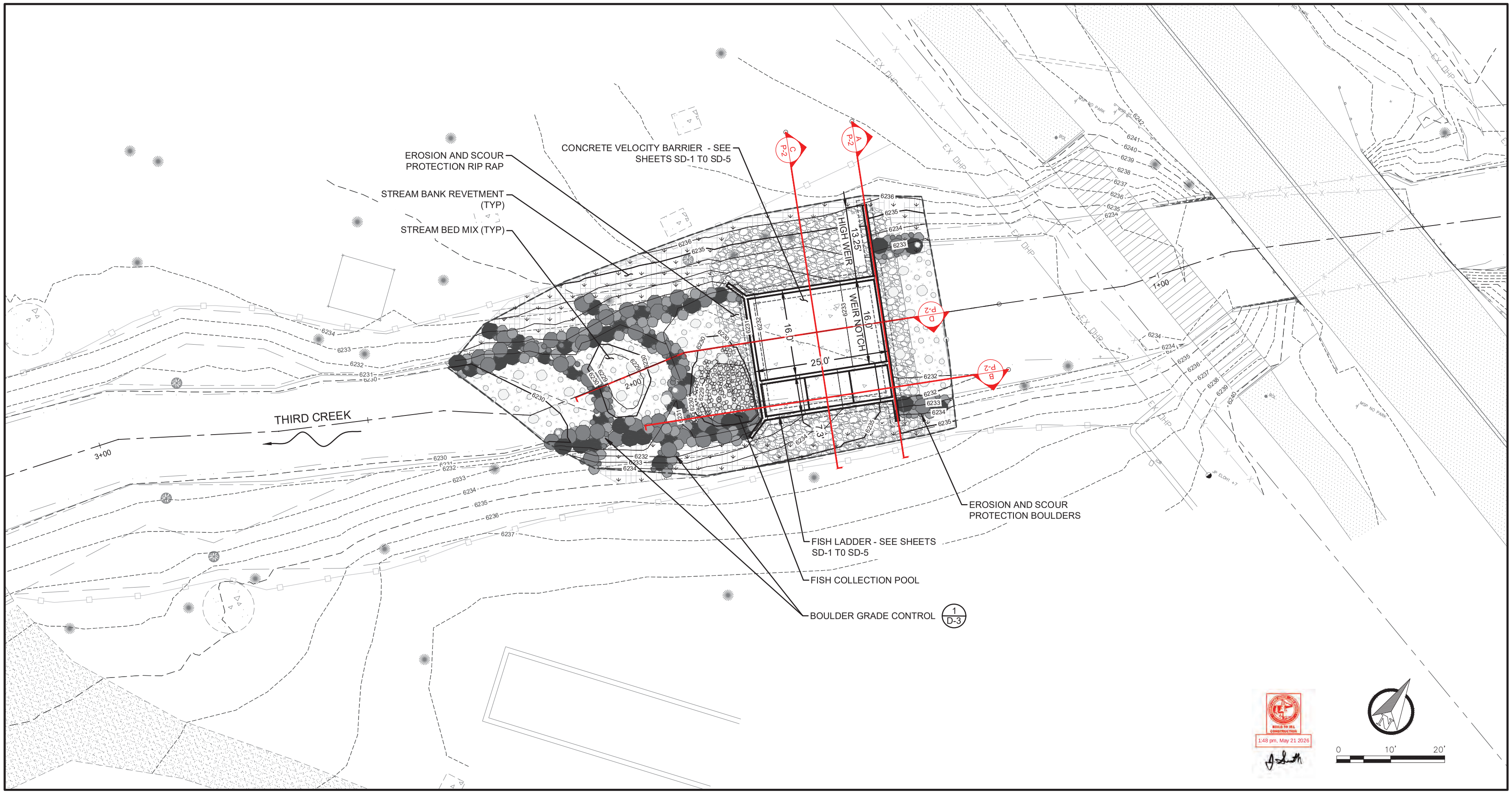
Title: ACTING DIRECTOR OF PUBLIC WORKS

Date: 3/26/26

I agree to review all information submitted to the USACE on my behalf by my agent and certify that any information submitted on my behalf is true and correct.

13. SIGNATURE of APPLICANT or REQUESTOR	14. DATE
Paul R Fabbi	5/22/2026

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.



VELOCITY BARRIER AND FISH LADDER

PLAN VIEW

HORIZONTAL SCALE: 1" = 10'

LEGEND:

EXISTING CONTOUR (MAJOR)	PROPOSED CONTOUR (MAJOR)
EXISTING CONTOUR (MINOR)	PROPOSED CONTOUR (MINOR)
EXISTING WOOD FENCE	
EXISTING FENCE	
EXISTING ASPHALT PAVEMENT	
EXISTING DIRT TRAIL	
EXISTING TREE (30"C)	
EXISTING OVERHEAD POWER (EX OHP)	

** CALL BEFORE YOU DIG **

CONTACT UNDERGROUND SERVICE ALERT (USA)
1-800-227-2600
PRIOR TO ANY CONSTRUCTION WORK

Stantec
Stantec
5390 Kietzke Lane Ste 103
Reno, NV 89511
Tel: +1.775.850.0777
www.stantec.com

Consultant

Revision | By | Appd | YYYY.MM.DD

Issued | By | Appd | YYYY.MM.DD

Permit/Seal

90% PLANS NOT FOR CONSTRUCTION

Client/Project
NEVADA DEPARTMENT OF WILDLIFE
THIRD CREEK FISHERIES MANAGEMENT STRUCTURE
INCLINE VILLAGE, NEVADA

Project No.: 185706712
File Name: plan
Scale: 1" = 10'

IT	IT	JD	2026.05.05
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
PLAN LAYOUT

Revision: 0 Sheet: 6 of 16
Drawing No.
P-1

ORIGINAL SHEET - ANSI D