

**Implementation Plan for
Summer 2005 Assessment of Wetlands in
Lassen Volcanic National Park**

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1.0 Introduction

This Implementation Plan proposes procedures for use during OSU's summer 2005 assessment of wetlands in Lassen Volcanic National Park (LAVO). A general background on the project and its goals was provided in our July 2004 proposal. In brief, the two main questions being addressed by this project are:

- What are the rates of omission and commission in existing maps of LAVO wetlands?
- What is the relative functional capacity and ecological condition of LAVO wetlands? (as required to

The second question should be a key component of the NPS's Watershed Condition Assessment effort (Resource Stewardship & Watershed Planning) as well as helping to define Desired Future Condition for GPRA (Government Performance Results Act) requirements.

The primary focus of this document is on the field component. Project components dealing with GIS, function modeling, and statistical analysis are described briefly; additional detail may be found in the original project proposal. The descriptions below, although generally consistent with the proposal, should be interpreted as superceding previous descriptions. The procedures have been designed to provide an overall characterization of each visited wetland rather than provide intensive (i.e., not "vital signs" level) data for only a few of its resources. The data collection procedures and data forms proposed herein should be considered preliminary until final testing during the first week of field season.

2.0 Preparatory Tasks

2.1 Using GIS to Profile the Wetland Resource

As part of this project, an inventory of existing sources of digital spatial data pertaining to natural resources was completed by Andrew Duff, a cooperator working with the NPS Klamath Network Office. The inventory identified the themes and sources shown in Table 1, and all these layers now reside in the Klamath Network Office.

Table 1. Inventory of pertinent digital spatial data available for Lassen Volcanic National Park

Theme	Source	Description
Elevation (DEM)	NPS-NHD	10m vertical resolution
Wetlands	USFWS National Wetlands Inventory (NWI)	new (December 2004)
Water Bodies	NPS-NHD	lakes, ponds, streams, springs, seeps
Lakes and Ponds	NPS-LAVO	
Watershed boundaries	NPS-NHD	
Groundwater & stream levels	NPS-LAVO	point locations of wells & gauging stations
Geology	USGS	50+ categories including Lakes
Precipitation	Climate Source, Inc.	annual precipitation for 2-km grid cells
Soil (coarse-level STATSGO only)	NRCS	very coarse (5 categories)
Land Cover	CalVeg 2000	Wet Grass/Herb, Alder, Cottonwood, Water

Theme	Source	Description
Land Cover	NPS-LAVO	Wet Meadow, Riparian/Alder, Water
Historical Vegetation (1936)	NPS-LAVO	
Fire History (burn year & extent)	NPS	also fuel load, crown cover
Roads & Trails	NPS	
Aerial imagery – Digital orthophotoquad	USGS	
Aerial imagery – LANDSAT	USGS	from 2002; only a limited portion of LAVO
Aerial imagery – NDVI	USGS	
Aerial imagery – natural color	NPS	1998; scale = 1:15,840; scanned & georeferenced
Aerial imagery – color infrared	NPS	1988; only for a portion of LAVO; scale= 1:20,000
Aerial imagery – black & white	NPS	1941; scale ~ 1:20,000

Using GIS, we queried the above layers, yielding several informative cross-tabulations. The resulting statistical profile of LAVO wetlands will be published in the final project report.

2.2 Predicting Wetlands

Wetland maps from the National Wetland Inventory have not been prepared and/or digitized for many national parks. Consequently these parks have few clues about the extent and distribution of their wetlands, and inspecting all potential wetlands in the field is clearly infeasible in most parks. However, recent technological advances in GIS-based terrain analysis (e.g., the ArcHydro extension) combined with use of powerful statistical algorithms may allow for preliminary modeling of wetland locations and probability-based estimates of wetland extent in many parks.

To test this concept in LAVO, we selected approximately 1000 points mapped as palustrine wetland by NWI, and 1000 non-wetland points. The points in each group were selected as a spatially-distributed random sample using the GRTS¹ algorithm (see next section). Only palustrine wetlands were selected because they are the most likely to be missed by mapping efforts, and are more likely than lacustrine wetlands to be predicted by localized terrain characteristics. Some lacustrine and riverine wetlands will, however, be assessed in the field.

Using the GIS, at each point we determined the geologic type, elevation, annual precipitation, stream presence/absence, and several topographic variables (slope, compound topographic index, curvature, plan curvature, profile curvature). Operating under the hypothesis that the NWI digital map contains no errors of omission or commission, we used two approaches to develop models for predicting wetland presence/absence in LAVO. One approach employed Logistic Regression and the other used a recursive-partitioning (“tree”) algorithm called CHAID (Chi-square Automatic Interaction Detection). Both yielded models that explained 70-80% of the variance, but the CHAID model was far more informative. It yielded a series of 16 decision rules that were easily converted to GIS queries of the spatial data. For example, one of the 16 rules stated the following:

“If SLOPE is greater than or equal to 0 and is less than 0.93 and ANNUAL PRECIPITATION is greater than or equal to 1171 and is less than or equal to 3164 then there is a 92.5926 percent chance that the point is a WETLAND.”

As a result of applying the statistically-derived decision rules with the GIS, we determined that 24% of our random points that NWI did not map as wetlands might, in fact, be wetlands. During the 2005 field season, at least 25 of these points will be visited to see if they are wetlands, and an equal number

¹ Generalized Random Tessellation Stratified (Stevens 1997, Stevens & Olsen 1999, 2003, 2004)

of points that were not predicted to be wetlands by the CHAID-generated rules will also be visited. This will inform us of the accuracy and confidence intervals of the models generated for LAVO, and along with field data described below, will provide an estimate of LAVO wetland extent that is more accurate than that compiled solely from NWI maps and field data.

2.3 Selecting the Survey Sites

Wetlands to be assessed in the field were chosen using two strategies, one random and the other non-random (selective). The random strategy featured the use of GRTS (Stevens 1997, Stevens & Olsen 1999, 2003, 2004), a state-of-the-art statistical algorithm being used by several state and federal resource agencies, and applied to our data by its developer, Dr. Donald Stevens at Oregon State University. GRTS selected a statistically-random sample of spatially-distributed points. Use of GRTS minimizes problems associated with spatial autocorrelation, which otherwise limits making valid statistical inferences from site-level data to an entire park. The GRTS application resulted in a list of 939 points, one for each NWI wetland polygon plus 1000 located outside such polygons. Of course, not all points can be visited, so they will be visited in the order specified by GRTS to maintain statistical integrity.

We complemented the GRTS-based random strategy with a selective (non-random) strategy. Querying the GIS layers, we compared attributes of the first 50 GRTS points (i.e., the random sites that are priorities for assessment this summer) with attributes of all 900+ GRTS points in wetlands that were not identified as priorities for a site visit this summer. A few geologic types were found to be lacking among the wetlands we planned to visit this summer, so the first one of the non-selected wetlands that had the missing type was added to the list of wetlands to be visited. We then ran a cluster analysis on the complete GRTS wetland data set to determine if wetlands having unusual *combinations* of attributes were lacking among the 50 wetlands we planned to visit. Attributes used in the cluster analysis were the same used in the modeling to predict wetland presence: geologic type, elevation, annual precipitation, stream presence/absence, slope, compound topographic index, curvature, plan curvature, and profile curvature – all of which could be determined from existing spatial data. The cluster analysis, together with the queries of single attributes, identified about 25 additional wetlands that should be assessed and these “non-random” (NR) wetlands were added to the agenda for the field season.

3.0 Field Component

3.1 Schedule and Level of Effort

Our intent is to visit at least 50 wetlands once, using at least one crew of two persons, between the period June 13 and September 30, 2005. There are potentially 80 available work-days during this period, and on the average one wetland can be visited and assessed per day. Additional briefer visits can and will be made to 25 GRTS-selected points predicted to be wetlands but not mapped as such, and to 25 “terrestrial” points (neither mapped nor predicted to be wetlands) which serve as controls for model validation. These additional 50 points, as well as at least 25 mapped wetlands selected non-randomly, may usually be covered while returning from the assessment of the 50 primary wetland sites. Some days also will be reserved for contingencies, e.g., injury, illness, sites discovered to be inaccessible or non-existent only after attempting to access them. When severely inclement weather prohibits beginning the field work on a given day, the site visit will be rescheduled for another day during the 7-day work period and time off will be taken. The crew will work no more than 5 days in

any given 7-day period. Our ability to cover the park may be extended by recruiting qualified volunteers, allowing the main crew to be split for short periods.

3.2 Field Crew Composition and Responsibilities

During at least the first of the 16 weeks, the crew will consist of the senior wetland scientist (SWS), one seasonal botanist (plant scientist, PS), and one seasonal soil scientist (SS). For at least 2 weeks thereafter, or until such point that the SWS believes the other crew members are interpreting wetland features as consistently as intended, just the PS and SS will assess the wetlands. At approximately one month into the project, volunteers will be welcomed to begin participating as part of the crew. Should opportunities arise wherein a volunteer, over the course of several wetland visits, demonstrates skills and knowledge nearly equal to that of one of the seasonal staff, and wishes to accept greater responsibility, that volunteer will be given the opportunity to pair with one seasonal crew member while the other seasonal is accompanied by the SWS or another volunteer of proven capability. This will allow a desirable extension of wetland coverage for limited periods of the season but is not essential to meeting project goals. In any event, the SWS will be part of a crew for a minimum of 4 of the 16 weeks, during which he will repeatedly monitor data quality and consistency. Additionally, on a weekly basis he will be emailed electronic files containing completed field forms for immediate checking, and on a daily basis he will be available by phone to assist interpretations and discuss progress.

3.3 Scales of Data Collection

As noted in the proposal, we will visit two types of areas: areas identified as wetlands (from existing NWI maps) and areas identified as “possible wetlands” with scores having been assigned beforehand (using terrain analysis models) to reflect predictions of the likelihood they are indeed wetlands. Field crews will visit sites selected *a priori* in a probabilistic sample of these areas. Depending on the indicator being assessed, field estimates of indicators will be made at the scale of centerpoint, plot, polygon (site), and/or polygon buffer..

A ***polygon*** is the entire contiguous wetland, usually separated from similar polygons by upland or deepwater (>6 ft deep).

A ***centerpoint*** is the point that represented the polygon during the site selection process and has specific coordinates which have a precision of about 40 ft.. It is not necessarily located in the center of a wetland polygon.

A ***plot*** is a releve plot of variable dimensions but standard area in which detailed vegetation data may be collected..

A ***buffer*** is the upland zone mostly extending 50m upslope from the polygon’s outer edge.

This distance is doubled up any polygon tributaries, and may be contracted if an impervious runoff barrier (e.g., tall berm or levee) is present before the 50m distance is reached.

In addition, existing non-field data at the scale of ***watershed*** are being compiled using GIS.

3.4 Field Tasks

Basic tasks that must be accomplished each day are:

- Navigate to and from the centerpoint of a wetland that’s been targeted for assessment (those with a “K” prefix in the parkwide map of sample points)
- Determine if the site is a wetland.

- If the site is a wetland, place one unobtrusive marker (**benchmark**) at or within a measured distance and direction of the centerpoint. The marker will be an unflagged aluminum nail driven into a tree at eye level, with at least 0.5 inch protruding. No other permanent markers or lasting evidence of our visit will remain in any wetland. Locations of most data collected in the wetland will be referenced to this benchmark. It could serve as a basis for linking our data to future “vital signs” data and trends monitoring..

Record data from the following tasks

- Dig at least four 12-inch deep pits, GPS them, and evaluate soil indicators and vegetation. Replace soil. If the wetland is smaller than 100 square meters, a smaller number of pits may be used.
- Survey plants in a standard-sized plot, as well as while walking as much of the wetland as time and physical access allow.
- Observe and assess vegetation structure, distribution of water, signs of human presence, and other indicators of wetland function and condition as shown in the data forms (Appendix B)².
- Take one series of panoramic shots from a fixed point with a digital camera (document the location and direction by including a labeled whiteboard in the picture). For consistency, shoot the photos from left to right (clockwise).
- On an airphoto or grid sheet, sketch the approximate polygon boundary and key points.

On a given day, field tasks will proceed in approximately the following order. Tasks will be conducted by the Plant Scientist (PS), Soil Scientist (SS), or both together (Both). Tasks performed simultaneously but independently by the PS and SS have an a, b suffix below. Even when the PS and SS are operating independently in different parts of a wetland, they may stay in touch through use of their walkie-talkies.

1. Person PS. Before leaving camp:

- Review the checklist (Appendix A) to ensure all needed supplies are packed.
- Decide which centerpoint to visit and plan the route. Identify alternative wetlands or survey points that may be visited if the primary target is unsuitable or inaccessible, or if sufficient time remains in the day to assess these after assessing the primary target. Set waypoints on the GPS unit as necessary.
- Be sure all electronics are charged

2. (Both persons). Upon arriving at the **centerpoint**, determine if the point is a wetland by virtue of its vegetation, soil, and/or hydrologic indicators. For this project, channels that lack a predominance of wetland vegetation should be considered wetlands if they convey flow at least once annually. If yes, proceed to #3. If not, spend 20 minutes searching (mainly in a downhill direction) for such wetland indicators. If found, establish a centerpoint and record the GPS coordinates (decimal degrees, NAD 83). Continue with #3. If none found, proceed to the alternative point selected for today.

² These were initially derived partly from data forms used previously by the author (WET, HGM), in other NPS projects (Pt. Reyes, CRAM), and officially by the California Native Plant Society (releve procedure). However, this form is intended to describe wetlands with much greater detail than existing methods, with regard to structural components important to wetland function and ecological integrity. This greater level of detail is needed to provide the sensitivity needed to distinguish functionally significant differences among wetlands of which most are expected to be in nearly-pristine condition. All data being collected can easily be cross-walked to indicators used by CRAM and the Point Reyes wetlands assessment, and can be interpreted to yield the Cowardin and HGM class labels.

3a. Person PS. Establish the **benchmark** at or near the centerpoint. Reference its exact location by measuring distance and direction from the centerpoint, as well as with GPS and by marking on the airphoto or grid sheet. Provide a detailed description.

3b. Person SS. At the **centerpoint** or in the **plot** (see below), dig one shallow pit (shovel width) and assess soil features as requested in the field sheet (Data Form S). Measure the minimum depths to indicators such as gleying, mottles, changes in texture or color. Do not attempt to dig a pit where water, waterlogged soils, or hard rock is apparent at the surface, or where rare plants or archaeological relicts are noted. In such cases, move the point to the closest location where conditions permit digging a 12-inch deep pit. Measure and record the pit's distance and direction to the centerpoint. Also take panoramic series of photos from the centerpoint, or from a point referenced to the centerpoint. Additional photos should be taken of any human-related site disturbances that are noted. If archaeological relicts are discovered record their location with GPS and on the sketch map, and leave them in place.

4. (Both). Using the meter tape, lay out the boundaries of the **plot**, which will be square or rectangular with one corner anchored at the centerpoint³. Lay out the plot in a configuration that more or less conforms with the topography and appears to provide the most homogeneity of vegetation form, e.g., doesn't mix large patches of shrubs within a herbaceous plot or vice versa.. For plots that are primarily **herbaceous, the contiguous area must be exactly 100 square meters** (e.g., 10m x 10m, or 20m x 5m, etc.). For plots that are primarily **shrub or tree, the plot must cover exactly 400 square meters**. To the extent such areas can be avoided, the plots should be configured to exclude unvegetated water areas (e.g., deep streams and ponds), bare rock, and areas dominated by non-wetland plant species, i.e., upland. **If a wetland is too small to contain a plot of 100 square meters**, measure its exact dimensions and survey whatever plants and soils are within it.

5a. Person PS:

- Conduct a complete releve-style survey within the plot. Identify all species possible and assign cover class to each within each height stratum. Photograph and place the few unknowns in a baggie with label. As needed, consult the list of plants known to occur in LAVO (Appendix D). Record data in part A of Data Form B, using the approved codes (see Appendix B).
- Lay out and survey a second releve plot if necessary (i.e., if shrubs are a major component of the polygon but the first plot was herb-focused, or vice versa). In very large and diverse wetlands, survey additional plots as time allows. Locate any additional releve plots based on (a) whether it is dominated by a plant association not encountered up to this point in the field season, and secondarily, (b) its perceived representativeness of the wetland in which it is located.
- After completing the above, walk the remainder of the polygon (wetland), visiting all microhabitats while you build a cumulative list of any plant species not found in the plot(s). Continue as time allows or until species-accumulation curve seems to level off. Record time spent. As you walk around, also fill out part B of Data Form B.
- Identify all species possible. Photograph all species once during the field season, i.e., "voucher photo." Include the whiteboard in the picture to label what you're calling the plant in the image. Take multiple images if necessary to illustrate key diagnostic features. Then check off on the master list to indicate the species has been photographed, and denote the date and

³ But if the centerpoint is in a plant association that already was surveyed as a releve plot in another wetland on a previous day, you may shift the centerpoint such that the plot will cover a new association. Be sure to explain this.

location. Be especially sure to photograph and label any unknowns, and place them in a baggie with label to work on back at camp or under the dissecting scope.

- 5b. Person SS. Walk the remainder of the polygon (as much as time allows). During this time:
- Evaluate soils in a minimum of 2 more pits (and no more than 12) located to represent different geomorphic and/or vegetation associations within the polygon. Assess at least one pit in the adjoining upland for sake of reference. Record the data in Data Form S.
 - If a channel is present, measure 3 cross-sections as prescribed on Data Form F, and measure specific conductance (electrical connectivity) and pH.
 - Fill out all remaining sections of Data Form F, which deals with hydrologic features.
 - Sketch the approximate wetland boundary on the gridded sheet (Form G) and airphoto.
 - Photograph the channel cross-section (upstream, down) and any signs of prior human activity there or elsewhere in the polygon.
6. (Both). Before leaving the polygon, review each others' data sheets, add any species or features overlooked by the partner, and resolve any differing interpretations.
7. Person PS: Upon completing the day's field work:
- Transfer the day's digital photos to a computer. After checking to be sure they've been saved, erase them from the camera's memory.
 - Charge batteries (radio, GPS). If you'll be away from a power source for more than a day (i.e., packing in overnight), be sure to bring along extra charged-up batteries.
 - Identify or press unidentified plants
 - Check weather and plan route for next day
 - On a semi-daily basis, fax or mail me copies of all completed data forms. My fax number is (541) 745-7325 – you must call first. Please be sure they're legible and complete.
 - At least once every 2 weeks, burn a CD with the digital photos and send it to me (6028 NW Burgundy Dr., Corvallis, OR 97330).

3.5 Impact Minimization

Every effort should be made to minimize impact of crew members on Lassen's wetlands. The following will or have been implemented:

- The shallow soil pits will be refilled immediately and returned as close as possible to their original condition.
- No archaeological relicts will be disturbed.
- When a plant cannot be identified in the field, a single specimen will be collected for later examination. However, if fewer than 10 individuals of the plant are noted, it will be photographed rather than collected.
- Crew members have been notified of plant species known to be so rare in LAVO that they should NEVER be collected.
- Except for the unobtrusive benchmark nail, no flagging or other markers will be left onsite.
- Crews and volunteers have been instructed in the usual "leave-no-trace" practices of backcountry travel and camping.
- To minimize transfer of organisms among wetlands, footwear will be dipped in a bucket with Chlorox at the end of each day, and any seeds picked off.

4.0 Data Synthesis

Field and GIS (spatial) data will be analyzed to address the two main questions:

- What are the rates of omission and commission in existing maps of LAVO wetlands?
- What is the relative functional capacity and ecological condition of LAVO wetlands?

We have proposed to address the second objective partly by contrasting the vegetation composition, soils, and other indicators in the 50 randomly-selected wetlands with the same indicators in at least 25 wetlands that are believed by LAVO staff to be experiencing high levels of human use or were altered historically by humans (Ziegenbein & Wagner 2000). In addition to contrasting the conditions of individual indicators, we will contrast the relative levels of potential wetland functions by assigning scores to metrics and indices derived from the data (all data forms). These indices will represent the following:

- Potential Capacity for Natural Water Storage & Slow Infiltration
(for streamflow support and fire hazard reduction)
- Potential Capacity for Intercepting and Stabilizing Suspended Sediments
- Potential Capacity for Processing Carbon, Nutrients, Metals, and Other Substances
- Potential Capacity for Supporting Invertebrate Communities Characteristic of the Wetland Type
- Potential Capacity for Supporting Native Fish Characteristic of the Wetland Type
- Potential Capacity for Supporting Amphibians Characteristic of the Wetland Type
- Potential Capacity for Supporting Birds & Mammals Characteristic of the Wetland Type
- Potential Capacity for Supporting Plant Species & Associations Characteristic of the Wetland Type
- Potential Capacity for Supporting Levels of Primary Production Characteristic of the Wetland Type

In all instances, wetlands will be scored relative to others of their type, where “type” is defined by their hydrogeomorphic class (Brinson 1993) and Cowardin class (Cowardin et al. 1979). The upper end of the scoring scale will be anchored by wetlands that we judge to be the “best examples” of each wetland class as suggested by our field data (particularly the botanical metrics) both directly and after processing to generate the above indices.

Because the data forms we will use (Appendix B) specify data that includes (but goes beyond) the types of data collected by the California Rapid Assessment Method (CRAM, Collins et al. 2004) and synthesis methods used at Point Reyes National Seashore (Parsons and Donovan 2005), the data we collect can readily be processed by those methods should a need arise. Opportunities for restoring degraded wetlands in particular will be highlighted.

Our data also will provide a baseline against which future changes to LAVO wetlands – such as from invasive species, atmospheric deposition of pollutants, or other factors -- may be monitored. Furthermore, the botanical data we collect will provide a foundation for developing a classification of wetland vegetation for national parks of the Klamath Region. Existing information does not allow managers in these parks to evaluate actual impacts to their wetlands because there are no systematic data that quantify what unaltered wetlands of each major type “should” look like, in terms of the range of plant diversity, species composition, functions, and potential habitat for selected species. Our report will provide such reference information, by type of wetland and landscape setting, with quantified levels of precision and inclusiveness because our sites were chosen using a spatially-balanced random selection process. And by statistically analyzing the data -- using regression, ordination, and recursive-partitioning procedures -- we will be able to identify environmental factors most strongly associated

with the occurrence of each wetland species or species association. Such information is essential to identifying best management practices for LAVO's wetlands, as well as for learning which native plant species are most capable of excluding non-native species from wetlands, and under which conditions.

Although the draft report will be based on collection and analysis of a vast array of data, it will not be a mere statistical monologue. Rather, we will interpret the data to prepare a highly readable, well-illustrated report describing the status and condition of LAVO's wetlands, in a watershed context. We also will provide NPS with a CD-ROM that includes all the data and maps, with study site locations plotted and with photographs of all the visited wetlands.

5.0 Literature Cited

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Appendix A. Field Gear List

site folder (with maps, airphotos, printout of attributes from prior GIS analysis)

blank data forms, clipboard, pencils

grid sheet for sketch map

field notebook

first aid kit

two-way radio

walkie talkies with GPS

flashlight/ headlamp

compass

digital camera

hand lens

plant identification books

specific conductance meter

quadrat frame (PVC pipe)

meter tape & chaining pins

ruler (for soil pit)

baggies for plant specimens (pre-numbered)

whiteboard & marker for panorama labeling

pen for marking laminated airphoto

soil shovel (sharpie)

Munsell color chart

knife

3-inch aluminum nails for benchmark

squirt bottle

inflatable raft with PFD & inflator (when needed)

snorkel & face mask (when needed)

personal gear:

 sunscreen

 bug repellent

 backpack

 sunglasses, hat, raingear

 water and/or water filter

 toiletries

 food

 bearproof container

LEAVE AT OFFICE: battery charger, heavy plant books

Appendix B. Data forms

F Physical Features

S Soils

B Botanical

C Collective Assessment

G Gridded Map

Form F. Physical Features Data Form
Wetland Assessment - Lassen Volcanic National Park 2005

Point Code: _____ Wetland Polygon Code: _____ Name: _____
 Date: _____ Time Begin: _____ a.m. p.m.
 Approximate Acreage (from database): _____ acres Crew: _____

<i>Point locations</i>	Latitude	Longitude	Offset Direction	Offset Distance	Direction to CP	Distance to CP
Center Point (CP)			°		---	---
Photo Point			°			
Benchmark			°			
Soil Core #1			°			
Main Xsec			°			

Mark approximate locations of these on the sketch map and airphoto.

1. Landscape Position (of most of the wetland polygon; multiple entries are allowed)
 ___ midslope ___ toe slope ___ lake fringe ___ floodplain ___ interfluvial ___ depression/flat

2. Hydrologic Connectivity: (check all that apply)

- ___ No inlet, no outlet
- ___ Outlet channel, flowing
- ___ Outlet channel, currently no flow
- ___ Inlet channel, flowing
- ___ Inlet channel, currently no flow

Is this a source wetland? (i.e., outflow-only) ___ yes ___ no
 If yes, is the channel *head* (initiation point) an abrupt vertical break? ___ yes ___ no

3. Outlet Impoundment

___ none ___ beaver-impounded ___ slide-impounded ___ levee/ debris-impounded ___ natural constriction

4. Channel Patterns

___ no channel ___% confined entrenched ___% confined meander ___% braided ___% diffuse

5. Stream Order (maximum): _____

6. Water Marks:

Indicate height above today's wetted edge:

	in channel	outside channel
Type of indicator*		
Maximum height above today's wetted edge		

*Debris, Stain, Ice abrasion, Algae If none found, enter "0"

7. Estimate the **maximum depth** and **maximum area** of **surface water** (<6 ft deep) within the wetland as it would exist during each month specified during an average year

	May	June	July	August	September	October
Standing water						
Flowing water						

* do so by considering the basin or channel morphology, elevation, contributing area, and today's water depth
Desired Precision: If >10 ac = ±1 acre; If 1-10 ac = ±0.5 acre; If <1 acre estimate square ft (cumulative).

8. Are there defined channels that convey water **less often than once per year**? ____ yes
____ no

9. **Springs/ Seeps** (*report evidence*: temperature, conductivity, rust deposits, colored precipitates, dispersible oil sheen, "boils," shallow pools not supported by recent rain or snowmelt, etc.)

Thermal Springs: _____

Non-thermal Springs: _____

10. **Saturated-only Areas (SAT)**, not annually inundated

Percent of entire polygon _____%

11. **Estimated Water Sources** (late summer):

_____ % Subsurface Inflow (springs etc.)
_____ % Surface Inflow (channels, overland runoff)
_____ % Detained Direct Precipitation
100%

12. **Overall Wetland Gradient** (as percent of vegetated part of polygon):

no observable gradient: _____% slight (1-5%): _____% very obvious (>5%) _____%

13. **Predominant Aspect** (circle one): N NE E SE S SW W NW

14. **Terrain Microtopography** (excluding logs and temporary objects)

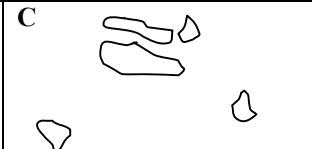
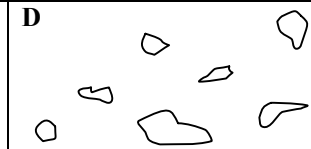
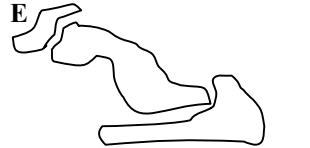
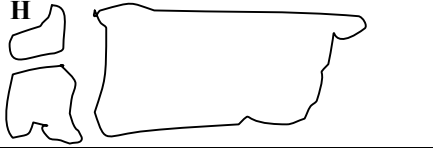
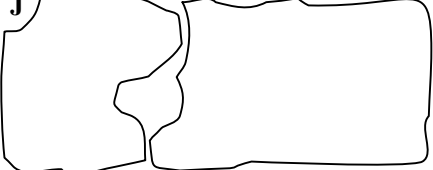
1 2 3 4 5
minimal → extensive

15. **Above-water basking sites?** ____ none ____ 1-3 ____ >3

16. **Percent shaded at mid-day:**

_____ % of standing water _____ % of flowing water

17. Standing Water Interspersion -- water with vegetation:

Percent & distribution of pools			
	Pools are few & are mostly clumped together	Pools somewhat scattered, more common	Pools numerous, scattered evenly, & highly intermixed with vegetation
None A			
1-30% of polygon is pools	B 	C 	D 
30-60% of polygon is pools	E 	F 	G 
60-90% of polygon is pools	H 		I 
>90% of polygon is pools	J 		K 

18. Snags within wetland

Estimated number: #: 0= none; Rare= 1 to 10; Uncommon= 11-20; Abundant= >20

	barked	hard	soft
4-12"			
12-18"			
18-24"			
>24"			

minimum height = 10 ft.

dispersion: **1** **2** **3** **4** **5**
concentrated → dispersed

19. Downed Wood: size and decay class

Categorical # of pieces: 0= none; Rare= 1 to 10; Common = >10

	Class 1	Class 2	Class 3
4-8"			
9-14"			
15-30"			
>30"			

minimum length = 6 ft.

dispersion: **1** **2** **3** **4** **5**
concentrated → dispersed

20. Channel Dimensions. Locate the largest wadeable channel within the polygon. Measure 3 cross-sections, beginning at the widest point and 1 each at a distance upstream and downstream equal to 10 times this width, but at least 10m from the initial point..

	Distance from W.	Wetted Width (today)	Bankfull Width	Floodprone Width (est.)	Water Depth (today)	Bank Height	Flood Height (est.)
Widest	----						
Upstream							
Downstream							

21. Channel Bank Characteristics.

Percent of the polygon's channel network with channel banks that are:
(Each row must add to 100%. Combine both sides of the channel)

undercut: ____% steep (>30% slope): ____% gradual: ____%

bare rock: ____% bare soil ____% vegetated/ downed wood: ____%

no distinct bank: ____% benched ____% naturally leveed ____%

22. Specific Conductance

Standing Water: _____ Flowing Water: _____

Ending Time: _____ a.m. p.m.

Form S. Soil Assessment Sheet

Wetland Assessment - Lassen Volcanic National Park 2005

Pit #1

Location relative to benchmark: Direction: _____° Distance: _____

Distance to upslope surface water: _____ Slope: _____

Dominant Veg.(50-20 rule): _____

Texture & Indicators by depth:

	Texture*	Indicators**
depth1: 0 - _____"		
depth2: _____ - _____"		
depth3: _____ - _____"		
depth4: _____ - 12"		

* SA=sand, ST=silt, LO=loam, CL=clay, MU=muck, PE=peat, PU=pumice, GR=gravel, CB= cobble

** Mottled, Gleyed, Chroma 1-2, Organic streaks in sandy soils, Sulfidic odor, SW= shrink-swell cracks

Also indicate any charred layer (B) or hardpan/ spodic horizon (H)

Pit #2

Location relative to benchmark: Direction: _____° Distance: _____

Distance to upslope surface water: _____ Slope: _____

Dominant Veg.(50-20 rule): _____

Texture & Indicators by depth:

	Texture*	Indicators**
depth1: 0 - _____"		
depth2: _____ - _____"		
depth3: _____ - _____"		
depth4: _____ - 12"		

Pit #3

Location relative to benchmark: Direction: _____° Distance: _____

Distance to upslope surface water: _____ Slope: _____

Dominant Veg.(50-20 rule): _____

Texture & Indicators by depth:

	Texture*	Indicators**
depth1: 0 - _____"		
depth2: _____ - _____"		
depth3: _____ - _____"		
depth4: _____ - 12"		

Form B. Botanical Data Form
Wetland Assessment - Lassen Volcanic National Park 2005

Polygon Code: _____ Polygon Name: _____
 Date: _____ Time Begin: _____
 Crew: _____

PART A: Relve Plot Data

<i>Point locations</i>	Latitude	Longitude	Offset Direction	Offset Distance	Direction to CP	Distance to CP
Center Point (CP)					---	---
Releve Plot 1						
Releve Plot 2						
Releve Plot 3						

Be sure to also mark approximate locations of these on the sketch map and airphoto.

A1. Plot Dimensions

Length _____ Width _____
 Aspect (circle one): N NE E SE S SW W NW none (flat)

A2. Type of Relve Plot (*check dominant one*)

Moss _____ Herb (<0.5 m) _____ Shrub (0.5-4m) _____ Tree (>4m) _____

A3. Landscape Position of the Plot

___ interfluve ___ midslope ___ toe slope ___ depression/flat ___ floodplain ___ lake fringe

A4. Hydro Zones included in the Plot

	% of the plot
Permanently Inundated Zone (PIZ)	
Seasonally Inundated Zone (SIZ)	
Saturated Zone (SAT)	

A5. Plot Vegetation Dispersion (*for each, indicate: Continuous, Intermittent, Open, or None*)

Moss _____ Herb (<0.5 m) _____ Shrub (0.5-4m) _____ Tree (>4m) _____

A6. Detailed Height Strata in the Plot (all species combined)

Height	Name	% Cover	Main Species (1 or 2)
0-.25m	Moss/Lichen	%	
0-.25m	Low Herb.	%	
.25-.50m	Medium Herb	%	
.50-1m	Low Shrub	%	
1-2m	Herb/ Medium Shrub	%	
2-5m	High Shrub	%	
5-10m	Low Tree	%	
10-20m	Medium Low Tree	%	
20-30m	Medium High Tree	%	
>30m	High Tree	%	

Cover classes: **1** (<1%), **2** (1-5%), **3** (5-15%), **4** (15-25%), **5** (25-50%), **6** (50-75%), **7** (>75%)

[illegible][illegible][illegible]

PART B: Overall Polygon Vegetation

B1. Veg Zones:

B1a) Abovewater Herbaceous (Emergent) Vegetation (AHV) & moss

AHV as % of polygon area: _____%

AHV as % of:

permanently-inundated standing water area: _____%

seasonally-inundated standing water area: _____%

permanently-inundated flowing water area: _____%

seasonally-inundated flowing water area: _____%

AHV cumulative edge-length with flowing permanent water (estimated): _____

Top 5 AHV species

Species Code	% of AHV area	Depth Max.

Area threshold: 1% of AHV zone or 9 m², whichever smaller

Invasives as % of AHV area: _____%

Sphagnum moss as % of AHV area: _____%

B1b) Underwater Herbaceous Vegetation (UHV) in:

UHV as % of standing permanent water area: _____

Top 5 UNV species and % of UHV zone occupied:

Species Code	% of UHV area

Area threshold: 1% of AHV zone or 9 m², whichever smaller

B1c) Shrubs, Seedlings, and Saplings (SS)

SS as % of polygon: _____

SS as % of:

permanently-inundated standing water area: _____%

seasonally-inundated standing water area: _____%

permanently-inundated flowing water area: _____%

seasonally-inundated flowing water area: _____%

What is under shrub drip line?

	% of shrub understory
herbaceous	
water – flowing	
water – lentic	
bare	

Top 5 shrub species and percent of shrub area occupied::

Species Code	% of shrub area

Area threshold: 1% of SS zone or or 9 m², whichever smaller

If invasives collectively surpass any of the top 5, treat as a group.

Maximum shrub patch width perpendicular to permanent* water: _____ ft

* if no permanent water, use max. dimension of largest shrub patch

Invasives as % of SS canopy: _____%

Percent of stems dead (circle one): <1% 1-25% >25%

Shrub cumulative edge-length with permanent water (estimated): _____

B1d) Trees (T)

% of polygon: _____

What is under tree drip line?

	% of subcanopy
shrubs	
herbaceous	
water – flowing	
water – lentic	
bare	

Percent of trees dead (circle one): <1% 1-25% >25%

Tree cumulative edge-length with permanent water (estimated): _____

Maximum tree patch width perpendicular to permanent* water: _____

* if no permanent water, use max. dimension of largest tree patch

Top 5 tree species-height classes and percent of treed area occupied:

Species	height class	% of treed area

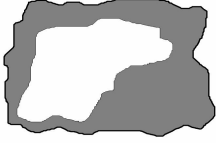
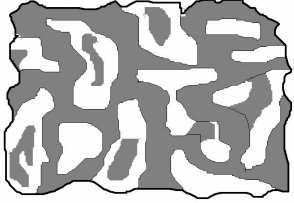
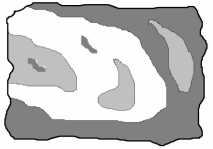
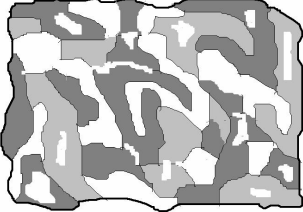
height classes: SA= sapling (<6”), P= pole (6-11”), ST= small tree (11-24”), LT= large tree (>24”)

Area threshold: 1% of AHV zone or or 9 m², whichever smaller

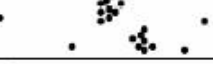
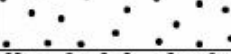
If invasives collectively surpass any of the top 5, treat as a group.

Invasives as % of tree canopy: _____%

B2. Overall Vegetation Pattern/ Zonation:

Number & distribution of vegetation forms Forms= herb, shrub, tree.			
	Veg forms are mostly in discrete, quite homogeneous zones or patches:	Zones/patches are recognizable but not homogeneous, and are:	Forms are highly intermixed; zones are mostly not recognizable; no patch >20% of polygon
Only ONE vegetation form = A			
Two forms ...	B 1. of about equal area 	C 1. of about equal area 	D 
	B 2. of unequal areas 	C 2. of unequal areas 	
All three forms ...	E 1. of about equal area 	F 1. of about equal area 	G 
	E 2. of unequal areas 	F 2. of unequal areas 	

B3. Invasive vegetation pattern (circle one)

CLASS	DESCRIPTION OF ABUNDANCE	DISTRIBUTION PATTERN
0	No invasive plants on the polygon	
1	Rare occurrence	
2	A few sporadically occurring individual plants	
3	A single patch	
4	A single patch plus a few sporadically occurring plants	
5	Several sporadically occurring plants	
6	A single patch plus several sporadically occurring plants	
7	A few patches	
8	A few patches plus several sporadically occurring plants	
9	Several well spaced patches	
10	Continuous uniform occurrence of well spaced plants	
11	Continuous occurrence of plants with a few gaps in the distribution	
12	Continuous dense occurrence of plants	
13	Continuous occurrence of plants associated with a wetter or drier zone within the polygon.	

B4. In hindsight, how **representative** do you feel the releve was of the entire polygon?

1 2 3 4 5
 unique → similar

Ending Time: _____ a.m. p.m.

**B5. Plant species only
found outside the plot(s)**

Circle any dominant non-wetland species (“50-20 rule”) if it’s at a spot appearing to have prolonged inundation or hydric soil.
Determine GPS coordinates of any rare species.
Denote with * if photographed.

Height Class:

L: <0.5m tall

M: 0.5-4m

T: >4m

Relative Extent:

Rare= only 1 plant noticed;

Uncommon= a few;

Common= extensive;

Abundant= one of the “50-20 rule” species

[illegible][illegible][illegible]

Form C. Collective Assessment Data Form
Wetland Assessment - Lassen Volcanic National Park 2005

Polygon Code: _____ Polygon Name: _____
 Date: _____ Time Begin: _____ Crew: _____

1. Signs of Human Presence:

Indicate: 1= minor 2= extensive	On-site recent	On-site old	Off-site recent	Off-site old	Closest Distance & Direction to Centerpoint
Bridge/ culvert					
Building					
Cairn/ tailings					
Dig					
Ditch					
Fence					
Fill					
Fire ring					
Firefighting paraphernalia					
Fish hooks/ line					
Flagging, other markers					
Footprints/ trail					
Grazing: browsed veg					
Grazing: cattle present					
Grazing: gullies, headcuts					
Plantings					
Saw/ axe mark					
Tiremark/ compaction*					
Trash					

* increase in soil bulk density of >15% or macropore reduction of >50%

2. Natural Events Causing Severe Damage to Vegetation or Substrate:

Indicate: 1= minor 2= extensive	On-site recent	On-site old	Off-site recent	Off-site old
Insect/ disease damage to veg				
Rockfall				
Landslide/ sedimentation				
Avalanche damage				
Fire				
Flood damage				
Wind damage				
Other: _____				

3. Signs of possible damage. If uncertain, photograph these for later diagnosis.

- | | |
|---|--|
| ☐ Unnaturally incised or headcut channel | ☐ Very high water marks despite small contributing area |
| ☐ Hydrophytes with blotched/discolored foliage | ☐ Extensive mud, suggesting recent sudden drawdown |
| ☐ Sediment or oil coatings on foliage | ☐ Extensive blowdown/ windthrow of trees |
| ☐ Severe growths of aquatic algae | ☐ Non-rocky soils very difficult to penetrate |
| ☐ Unnatural water color or odor (H ₂ S) | ☐ Soils with reddish upper horizons due to hot burn |

4. Review the file of polygon characteristics derived from existing spatial data layers.

Do your observations contradict anything reported? Explain: _____

5. Review the 1988 natural-color airphoto. Do your observations contradict anything apparent? In particular:

percent-expansion of conifers into the wetland: _____%

percent-expansion of all woody vegetation into the wetland: _____%

evidence of human disturbance not currently present? _____

other (explain): _____

6. What else distinguishes this wetland from others you've seen so far in this Park?

7. Condition. Relative to other Lassen wetlands, how would you rate its overall ecological integrity? (*just a gut feeling – this will not supercede future results from models and data analysis*)

1
less-functional

2

3
→

4

5
more functional

8. Detailed description of benchmark location (height, facing direction, type of tree, etc.):

9. Incidental Observations or Signs (not used in data analysis)

Indicate Type of Detection

x= observed

A= auditory

B= burrow/ tree cavity

C= carcass, kill

D= den, lodge, dam

L= claw

N= nest

S= scat

T= track

___ Deer

___ Bear

___ Beaver

___ Coyote/ dog

___ Otter

___ Bat

___ Raccoon

___ Rabbit

___ Muskrat

___ Frog/ Toad

___ Salamander/ Newt

___ Snake

___ Lizard

___ Turtle

___ Fish

___ Algae, floating

___ Ant hill

___ Gopher Mound

___ Duck (note if Bufflehead)

___ Heron/ Bittern

___ Sandpiper/ Dipper

___ Kingfisher

___ Bald Eagle

___ Hawk

___ Dragonfly

___ Butterfly

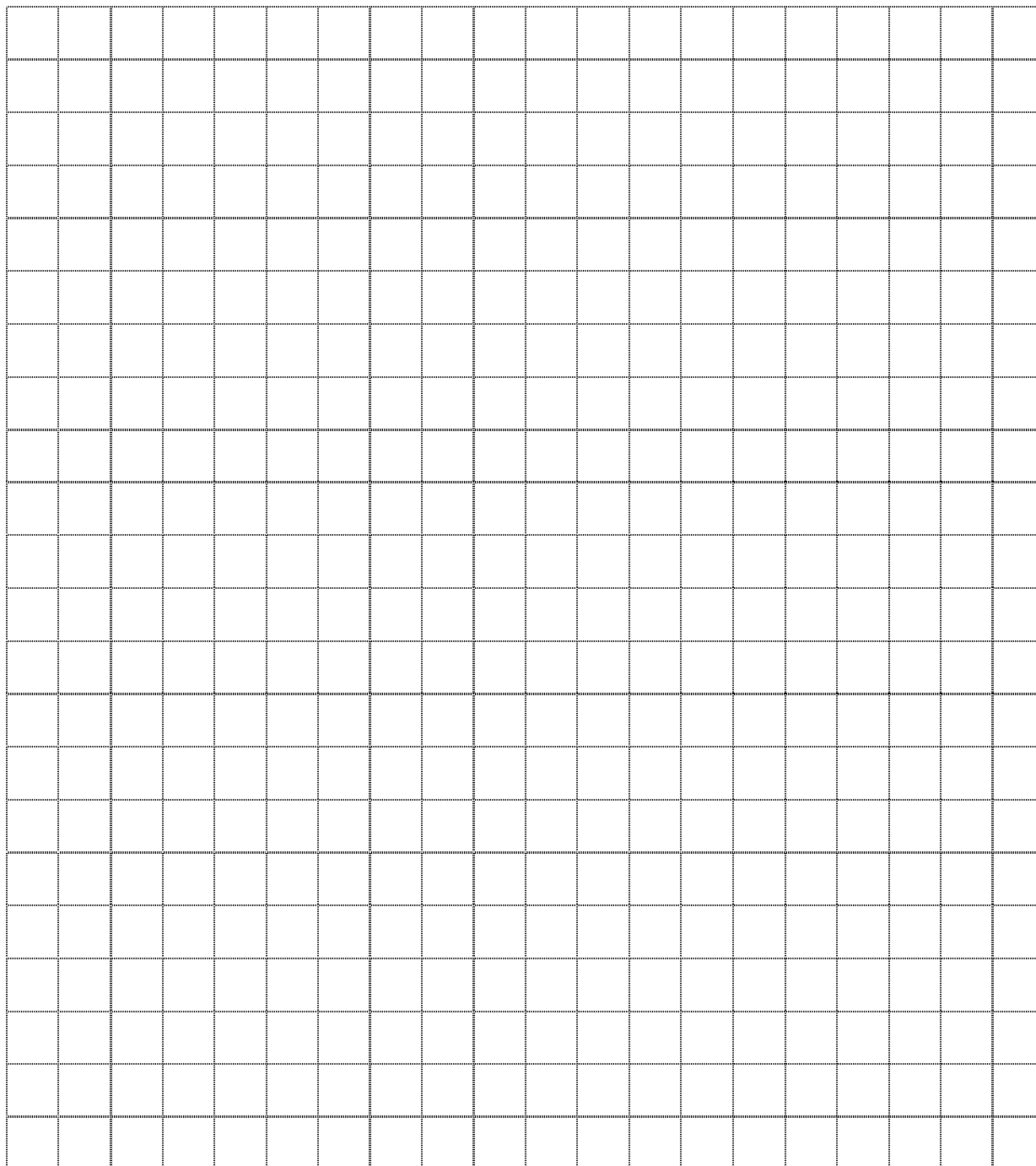
In margins, list other identifiable animal species & type of detection:

Time End: _____

Form G. Grid sheet for sketch map of wetland polygon

Show: Polygon boundary. Center point (CP), benchmark (BM), photo point (PP), soil pit (SP), channel cross-sections (X). Evidence of humans (H). Inlets & outlets. Springs (S). Flow direction. Runoff directions. Also boundaries of PIZ, SIZ, SAT. Channels. Larger patches of AHV, UHV, SS, T, invasives. Land cover in buffer.

Indicate map scale: 1 box = _____ (ft.) (m) approximately.



Appendix C. Additional Field Instructions

Locating the Centerpoint

1. Don't rely on the printed map or airphoto to locate the centerpoint -- their precision is not great. Instead rely on the GPS, assuming an adequate signal is obtained.
2. If you can't obtain an adequate GPS signal initially, search for the point in the approximate area indicated by the map and airphoto, while constantly looking for wetland plant species to narrow the search area, and repeatedly checking the GPS to see if signal interception has improved. Once the GPS signal is adequate, collect required data at that point, and separately note the occurrence and GPS coordinates (if available) of wetland plants you found elsewhere while searching if their distribution is not contiguous to the survey point. If no adequate GPS signal is obtained after about 20 minutes, and if you've found no predominance of wetland plants while searching in the vicinity, proceed to the next survey point.

Deciding When to Do Additional Relevés at a Site

1. First priority: Do a relevé at the designated sample point IF it is a wetland. If not, see above.
2. Second priority: Do one in the same wetland if it represents a different vegetation form than found elsewhere onsite, or if it is a different plant association than found at any other wetland that's been assessed up to this point in the field season.
3. Third priority – ONLY if time allows. Do one where there has been a major localized human disturbance, e.g., road crossing, or if you see a wetland plant association not encountered at any other site you visited up to this point in the field season.

Priorities for Field Surveys

Priority 1. Points labeled “K” (random points mapped as wetlands by NWI). Must survey all 50 before end of field season. All other considerations being equal, survey the lower-numbered K points first and proceed upwards in numeric sequence. Be sure the highest-elevation points are covered before autumn snowfall

Priority 2. Points labeled “NW” (random points predicted to be wetlands but not mapped as such). Survey these only during “remainder of day” after surveying one “K” point and there is not enough time to survey a second “K” point during that day. And/or survey these late in the season after all 50 “K” points have been surveyed. The goal is to survey 25 NW's and 25 T's before end of the season.

Priority 3. Points labeled “T” (random points predicted to be terrestrial). The goal is to survey 25 T's before end of the season.

Priority 4. Points labeled “NRS” (points mapped as wetlands by NWI but selected *non-randomly* to encompass geomorphic or stressor conditions not covered by the randomly-selected sites). The goal is to survey as many as possible before end of the season, without compromising any of the above priority goals. It's likely that I will select additional NR points during the first month of field work, and substitute for ones that haven't been covered as of that time.

If time remains in a day and it is equally convenient to survey either of two NW or T points, survey the one with the lower number first. The NR points may be surveyed in any order, but at a lower priority than K, NW, and T points..

Worst Case: If you arrive at a point and find (a) no wetland there, or you cannot safely access the wetland, and (b) there are no unsurveyed points anywhere in the vicinity, and (c) your chances are slim of being able to get to other unsurveyed points with enough time to survey adequately before dark, THEN survey whatever undesignated wetland(s) you can find in the vicinity or along the way back, so the day is not a total waste. Give each undesignated wetland a unique number preceded by the prefix “NRF” (non-random found, as opposed to non-random selected).

When such unmapped “NRF” wetlands are encountered opportunistically (e.g., while hiking to designated points), note their GPS coordinates (just one point) and record their predominant plant species in each vertical stratum, but do not allow this to hinder accomplishment of the above priorities.

While Traveling To and From Target Wetlands:

If the most efficient route to the target wetland intercepts another *mapped but unvisited wetland*, as you pass it by, briefly record its apparently dominant vegetation, Cowardin type, and HGM type (and identify it by its polygon code on our map).

While en route to a target wetland IF you notice:

- (a) a very rare wetland plant species or association not encountered previously in your surveys,
- (b) a channel, or
- (c) an unmapped wetland, i.e., an area of any size dominated by wetland indicator species, or
- (d) surface water occupied by plants, even if the dominant species are not on the list of those officially designated as wetland indicators,

THEN:

get a GPS reading and note the lat-long, along with the date and the dominant species, using the audio recorder (to avoid having to slow down to retrieve forms, etc.). If it’s a rare plant, also take photographs and estimate the number of individuals.

Plant Voucher Photographs

Include the whiteboard in the first image in a series showing the plant (show the plant’s code).

Include a clearly-marked ruler in all images

Attempt to photograph all plant parts likely to be diagnostic.

Use the macro or portrait setting when appropriate. (i.e., blur the background).

Don’t bother attempting photographs if it’s raining (risk of camera damage).

Data Entry

Because we need to maximize field time (number of wetlands visited), keying of data into a computer database is to be done only if extreme weather prohibits accessing any targeted wetlands and field work cannot be postponed. Paul Adamus will provide a file structure for data keying, that allows easy linking to files maintained by the NPS Klamath Region I & M office. At various points during and after the field season you will be asked to briefly review the accuracy of your data as keyed into the database by support staff.

Appendix D. List of LAVO plant species, with indicator status and standardized codes

Compiled mainly from Gillett and Oswald (1995).

Scientific Name	Code	Wetland indicator status	Wetland? 0= no 1= maybe 2= yes
<i>Abies concolor</i>	ABICON	NIU	0
<i>Abies magnifica</i>	ABIMAG	FACU	0
<i>Acer glabrum</i>	ACEGLA	FACU	0
<i>Acer glabrum</i> var. <i>torreyi</i>	ACEGLA	FACU	0
<i>Achillea millefolium</i>	ACHMIL	FACU	0
<i>Achillea millefolium</i> var. <i>occidentalis</i>	ACHMIL	FACU	0
<i>Achnatherum lemmonii</i>	ACHLEM	FACU	0
<i>Achnatherum nelsonii</i> ssp. <i>dorei</i>	ACHNEL	NOLU	0
<i>Achnatherum occidentale</i> ssp. <i>californicum</i>	ACHOCC	NOLU	0
<i>Achnatherum occidentale</i> ssp. <i>occidentale</i>	ACHOCC	NOLU	0
<i>Achnatherum occidentale</i> ssp. <i>pubescens</i>	ACHOCC	NOLU	0
<i>Aconitum columbianum</i>	ACOCOL	FACW	2
<i>Actaea rubra</i>	ACTRUB	NIW	1
<i>Actaea rubra</i> ssp. <i>arguta</i>	ACTRUB	NIW	1
<i>Adenocaulon bicolor</i>	ADEBIC	NOLW	1
<i>Adiantum aleuticum</i>	ADIALE	FAC	1
<i>Agastache parvifolia</i>	AGAPAR	NOLU	0
<i>Ageratina occidentalis</i>	AGEOCC	NOLU	0
<i>Agoseris aurantiaca</i>	AGOaur	FACU	0
<i>Agoseris glauca</i>	AGOGLA	FAC-	0
<i>Agoseris glauca</i> var. <i>monticola</i>	AGOGLA	FAC-	0
<i>Agoseris grandiflora</i>	AGOGRA	NOLW	1
<i>Agoseris heterophylla</i>	AGOHET	NOLW	1
<i>Agoseris retrorsa</i>	AGORET	NOLU	0
<i>Agrostis exarata</i>	AGREXA	FACW	2
<i>Agrostis gigantea</i>	AGRGIG	FAC	1
<i>Agrostis idahoensis</i>	AGRIDA	FACW	2
<i>Agrostis oregonensis</i>	AGRORE	FAC	1
<i>Agrostis scabra</i>	AGRSCA	FAC	1
<i>Agrostis thurberiana</i>	AGRTHU	FACW	2
<i>Agrostis variabilis</i>	AGRVAR	NOLW	1
<i>Allium campanulatum</i>	ALLCAM	NOLW	1
<i>Allium parvum</i>	ALLPAR	NOLU	0
<i>Allium platycaule</i>	ALLPLA	NOLU	0
<i>Allium validum</i>	ALLVAL	OBL	2
<i>Allophyllum integrifolium</i>	ALLINT	NOLU	0
<i>Allotropa virgata</i>	ALLVIR	NOLU	0
<i>Alnus incana</i> ssp. <i>tenuifolia</i>	ALNINC	FACW	2
<i>Alnus tenuifolia</i>	ALNTEN	FACW	2
<i>Alopecurus aequalis</i>	ALOAEQ	OBL	2
<i>Alopecurus geniculatus</i>	ALOGEN	OBL	2
<i>Alopecurus pratensis</i>	ALOPRA	FACW	2
<i>Alyssum minus</i> ssp. <i>micranthum</i>	ALYMIN	NOLW	1
<i>Amaranthus blitoides</i>	AMABLI	FACW	2
<i>Ambrosia psilostachya</i>	AMBPSI	FACU+	0

Scientific Name	Code	Wetland indicator status	Wetland? 0= no 1= maybe 2= yes
Amelanchier utahensis	AMEUTA	NIU	0
Amsinckia menziesii var. menziesii	AMSMEN	NOLU	0
Anaphalis margaritacea	ANAMAR	NOLU	0
Anemone drummondii	ANEDRU	NOLU	0
Anemone occidentalis	ANEOCC	NOLU	0
Anemone oregana	ANEORE	FACU	0
Angelica breweri	ANGBRE	NOLW	1
Antennaria corymbosa	ANTCOR	FAC	1
Antennaria dimorpha	ANTDIM	NOLU	0
Antennaria geyeri	ANTGEY	NOLU	0
Antennaria media	ANTMED	NIW	1
Antennaria rosea ssp. confinis	ANTROS	NOLU	0
Apocynum androsaemifolium	APOAND	NIU	0
Aquilegia formosa	AQUFOR	FAC	1
Arabis breweri var. breweri	ARABRE	NOLU	0
Arabis breweri var. pecuniaria	ARABRE	NOLU	0
Arabis glabra var. glabra	ARAGLA	NOLW	1
Arabis holboellii var. pinetorum	ARAHOL	FACU-	0
Arabis holboellii var. retrofracta	ARAHOL	FACU-	0
Arabis lemmonii var. depauperata	ARALEM	FACU-	0
Arabis lemmonii var. lemmonii	ARALEM	FACU-	0
Arabis lyallii	ARALYA	NOLU	0
Arabis lyallii var. lyallii	ARALYA	NOLU	0
Arabis platysperma	ARAPLA	NOLW	1
Arabis platysperma var. howellii	ARAPLA	NOLU	0
Arabis platysperma var. platysperma	ARAPLA	NOLU	0
Arabis rectissima var. rectissima	ARAREC	NOLU	0
Arabis sparsiflora var. arcuata	ARASPA	NOLU	0
Arabis suffrutescens	ARASUF	NOLU	0
Arabis suffrutescens var. suffrutescens	ARASUF	NOLU	0
Arceuthobium abietinum	ARCABI	NOLU	0
Arceuthobium americanum	ARCAME	NOLU	0
Arceuthobium californicum	ARCCAL	NOLU	0
Arceuthobium campylopodum	ARCCAM	NOLU	0
Arctostaphylos nevadensis	ARCNEV	NOLU	0
Arctostaphylos patula	ARCPAT	NOLU	0
Arenaria congesta var. subcongesta	ARECON	NOLU	0
Arenaria kingii ssp. compacta	AREKIN	NOLU	0
Arenaria kingii var. glabrescens	AREKIN	NOLU	0
Arnica chamissonis ssp. foliosa	ARNCHA	FACW	2
Arnica cordifolia	ARNCOR	NOLW	1
Arnica discoidea	ARNDIS	NOLU	0
Arnica longifolia	ARNLON	FACW	2
Arnica mollis	ARNMOL	FAC	1
Arnica nevadensis	ARNNEV	NOLU	0
Artemisia arbuscula ssp. arbuscula	ARTARB	NOLU	0
Artemisia douglasiana	ARTDOU	FACW	2
Artemisia tridentata ssp. tridentata	ARTTRID	NOLU	0
Asarum hartwegii	ASAHAR	NOLU	0
Asclepias cordifolia	ASCCOR	NOLU	0
Asclepias speciosa	ASCSPE	FAC+	2

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Aspidotis densa	ASPDEN	NOLU	0
Asplenium septentrionale	ASPSEP	NOLU	0
Aster alpinus var. andersonii	ASTALPIG	FAC	1
Aster breweri	ASTBRE	NOLU	0
Aster eatonii	ASTEAT	FAC+	2
Aster foliaceus var. parryi	ASTFOL	FACW-	2
Aster frondosus	ASTFRO	OBL	2
Aster integrifolius	ASTINT	NOLW	1
Aster occidentalis var. occidentalis	ASTOCC	FAC	1
Aster occidentalis var. yosemitanus	ASTOCC	FAC	1
Athyrium alpestre	ATHALP	NOLW	1
Athyrium alpestre var. americanum	ATHALP	NOLW	1
Athyrium filix-femina var. cyclosorum	ATHFIL	FAC	1
Balsamorhiza sagittata	BALSAG	NOLU	0
Barbarea orthoceras	BARORT	FACW+	2
Betula glandulosa	BETGLA	OBL	2
Bidens cernua var. cernua	BIDCER	FACW+	2
Boschniakia strobilacea	BOSSTR	NOLU	0
Botrychium multifidum	BOTMUL	FAC	1
Botrychium simplex	BOTSIM	FACU	0
Botrychium simplex var. compositum	BOTSIM	FACU	0
Brasenia schreberi	BRASCH	OBL	2
Brickellia grandiflora	BRIGRA	NOLU	0
Brickellia greenei	BRIGRE	FACU	0
Brodiaea coronaria ssp. coronaria	BROCOR	FAC	1
Brodiaea coronaria var. rosea	BROCOR	FAC	1
Bromus carinatus	BROCAR	NOLW	1
Bromus ciliatus	BROCIL	FAC	1
Bromus inermis ssp. inermis	BROINE	FAC	1
Bromus inermis ssp. inermis	BROINE	FAC	1
Bromus orcuttianus	BROORC	NOLW	1
Bromus suksdorfii	BROSUK	NOLW	1
Bromus tectorum	BROTEC	NOLW	1
Calamagrostis canadensis	CALCAN	FACW+	2
Calandrinia ciliata	CALCIL	NIW	1
Callitriche verna	CALVER	OBL	2
Calocedrus decurrens	CALDEC	NOLU	0
Calochortus leichtlinii	CALLEI	NOLW	1
Calochortus nudus	CALNUD	FAC	1
Caltha leptosepala	CALLEP	OBL	2
Caltha leptosepala var. biflora	CALLEP	OBL	2
Calyptridium monospermum	CALMON	NOLU	0
Calyptridium umbellatum	CALUMB	NOLU	0
Calystegia malacophylla	CALMAL	NOLU	0
Calystegia malacophylla ssp. malacophylla	CALMAL	NOLU	0
Calystegia occidentalis	CALOCC2	NOLW	1
Calystegia occidentalis ssp. occidentalis	CALOCC2	NOLW	1
Camassia quamash ssp. quamash	CAMQUA	FACW	2
Camissonia subacaulis	CAMSUB	FACW-	2
Camissonia tanacetifolia ssp. tanacetifolia	CAMTAN	NIW	1
Campanula scabrella	CAMSCA	NOLU	0

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Campanula scouleri	CAMSCO	NIW	1
Capsella bursa-pastoris	CAPBUR	FACU	0
Cardamine bellidifolia var. pachyphylla	CARBEL	NOLW	1
Cardamine breweri	CARBREW1	FACW+	2
Cardamine breweri var. breweri	CARBREW1	FACW+	2
Carex abrupta	CARABR	NIW	1
Carex amplifolia	CARAMP	FACW+	2
Carex angustata	CARANGUS	FACW+	2
Carex athrostachya	CARATHRO	FACW	2
Carex aurea	CARAUR	FACW+	2
Carex bolanderi	CARBOL	FACW	2
Carex brainerdii	CARBRA	NOLU	0
Carex breweri var. breweri	CARBREW2	NOLU	0
Carex canescens	CARCAN	FACW+	2
Carex capitata	CARCAP2	FAC	1
Carex cusickii	CARCUS	OBL	2
Carex echinata	CARECH	OBL	2
Carex echinata ssp. echinata	CARECH	OBL	2
Carex feta	CARFET	FACW	2
Carex fracta	CARFRA	NOLW	1
Carex hassei	CARHAS	FACW	2
Carex helleri	CARHEL	NOLU	0
Carex heteroneura	CARHET	FAC	1
Carex hoodii	CARHOO	FAC	1
Carex illota	CARILL	FAC	1
Carex integra	CARINT1	NOLW	1
Carex jonesii	CARJON	FACW+	2
Carex lanuginosa	CARLANU	OBL	2
Carex lasiocarpa	CARLAS	OBL	2
Carex lemmonii	CARLEM	OBL	2
Carex lenticularis var. impressa	CARLEN	FACW+	2
Carex lenticularis var. lipocarpa	CARLEN	FACW+	2
Carex leporinella	CARLEPO	NIW	1
Carex limosa	CARLIM	OBL	2
Carex luzulifolia	CARLUZ	NOLW	1
Carex luzulina var. ablata	CARLUZ	OBL	2
Carex mariposana	CARMAR	NOLW	1
Carex microptera	CARMIC	FAC+	2
Carex multicaulis	CARMULAU	NOLU	0
Carex multicostata	CARMULCO	NOLW	1
Carex nebrascensis	CARNEB	OBL	2
Carex nervina	CARNER	FACW-	2
Carex nigricans	CARNIG	FACW	2
Carex pachystachya	CARPAC	FAC	1
Carex phaeocephala	CARPHA	FACU	0
Carex praeceptorium	CARPRA	OBL	2
Carex preslii	CARPRE	FACU	0
Carex raynoldsii	CARRAY	FACU	0
Carex rossii	CARROS	NOLW	1
Carex scopulorum	CARSCO2	FACW	2
Carex scopulorum var. bracteosa	CARSCO2	FACW	2

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Carex senta	CARSEN	OBL	2
Carex simulata	CARSIM	OBL	2
Carex specifica	CARSPE	NOLW	1
Carex spectabilis	CARSPE	FACW	2
Carex stramineiformis	CARSTR	NOLW	1
Carex subfusca	CARSUBF	FAC-	0
Carex teneriformis	CARTEN	FAC-	0
Carex utriculata	CARUTR	OBL	2
Carex vernacula	CARVER	FAC	1
Carex vesicaria	CARVES	OBL	2
Carex vesicaria	CARVES	OBL	2
Carex vesicaria var. vesicaria	CARVES	OBL	2
Carex vesicaria var. vesicaria	CARVES	OBL	2
Carex whitneyi	CARWHI	NOLW	1
Cassiope mertensiana	CASMER	FACU+	0
Castanopsis sempervirens	CASSEM	NIU	0
Castilleja applegatei	CASAPP	NOLW	1
Castilleja applegatei ssp. pallida	CASAPP	NOLW	1
Castilleja applegatei ssp. pinetorum	CASAPP	NOLW	1
Castilleja arachnoidea	CASARA	NOLU	0
Castilleja campestris	CASCAM	FACU	0
Castilleja campestris ssp. campestris	CASCAM	FACU	0
Castilleja lemmonii	CASLEM	FACW	2
Castilleja miniata	CASMIN	FACU	0
Castilleja miniata ssp. miniata	CASMIN	FACU	0
Castilleja tenuis	CASTEN	FACU-	0
Ceanothus cordulatus	CEACOR	NOLU	0
Ceanothus prostratus	CEAPRO	NOLU	0
Ceanothus velutinus	CEAVEL	NOLU	0
Ceanothus velutinus var. velutinus	CEAVEL	NOLU	0
Centaurea solstitialis	CENSOL	NOLW	1
Cephalanthera austiniiae	CEPAUS	NOLU	0
Cerastium fontanum ssp. vulgare	CERFON	FACU	0
Ceratophyllum demersum	CERDEM	OBL	2
Cercocarpus ledifolius var. intermontanus	CERLED	NOLU	0
Chaenactis douglasii	CHADOU	NOLU	0
Chaenactis douglasii var. douglasii	CHADOU	NOLU	0
Chaenactis nevadensis	CHANEV	NOLU	0
Chamaebatiaria millefolium	CHAMIL	NOLU	0
Chamaesaracha nana	CHANAN	NOLU	0
Chamaesyce maculata	CHAMAC2	UPL	0
Chamaesyce serpyllifolia	CHASER	NOLW	1
Chamaesyce serpyllifolia ssp. serpyllifolia	CHASER	NOLW	1
Chamomilla suaveolens	CHASUA	NOLU	0
Cheilanthes gracillima	CHEGRA	NOLU	0
Chenopodium album	CHEALB	FAC	1
Chenopodium atrovirens	CHEATR	NOLW	1
Chenopodium botrys	CHEBOT	FACU	0
Chenopodium incognitum	CHEINC	NOLW	1
Chenopodium leptophyllum	CHELEP	FACU	0
Chenopodium pumilio	CHEPUM	NOLW	1

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<i>Chimaphila menziesii</i>	CHIMEN	NOLU	0
<i>Chimaphila umbellata</i>	CHIUMB	NOLU	0
<i>Chimaphila umbellata</i> ssp. <i>occidentalis</i>	CHIUMB	NOLU	0
<i>Chrysolepis sempervirens</i>	CHRSEM	NIU	0
<i>Chrysothamnus nauseosus</i>	CHRNAU	NOLW	1
<i>Chrysothamnus nauseosus</i> ssp. <i>albicaulis</i>	CHRNAU	NOLW	1
<i>Chrysothamnus parryi</i> ssp. <i>latior</i>	CHRPAR	NOLU	0
<i>Chrysothamnus viscidiflorus</i>	CHRVIS	NOLU	0
<i>Cichorium intybus</i>	CICINT	NIU	0
<i>Cicuta douglasii</i>	CICDOU	OBL	2
<i>Cinna latifolia</i>	CINLAT	FACW	2
<i>Circaea alpina</i> ssp. <i>pacifica</i>	CIRALP	FAC	1
<i>Cirsium andersonii</i>	CIRAND	NOLW	1
<i>Cirsium douglasii</i> var. <i>breweri</i>	CIRDOU	OBL	2
<i>Cirsium drummondii</i>	CIRDRU	OBL	2
<i>Cirsium foliosum</i>	CIRFOL	FAC	1
<i>Cirsium scariosum</i>	CIRSCA	NIW	1
<i>Cirsium vulgare</i>	CIRVUL	FACU	0
<i>Cistanthe umbellata</i> var. <i>umbellata</i>	CISUMB	NOL	0
<i>Clarkia rhomboidea</i>	CLARHO	NOL	0
<i>Claytonia lanceolata</i>	CLALAN	FAC-	0
<i>Claytonia nevadensis</i>	CLANEV	FAC	1
<i>Claytonia rubra</i> ssp. <i>rubra</i>	CLARUB	NOLW	1
<i>Collinsia parviflora</i>	COLPAR	NOLW	1
<i>Collinsia torreyi</i> var. <i>latifolia</i>	COLTOR	NOLU	0
<i>Collinsia torreyi</i> var. <i>wrightii</i>	COLTOR	NOLU	0
<i>Collomia debilis</i> var. <i>larsenii</i>	COLDEB	NOLU	0
<i>Collomia grandiflora</i>	COLGRA	NOLW	1
<i>Collomia larsenii</i>	COLLAR	NOLU	0
<i>Collomia linearis</i>	COLLIN2	FACU	0
<i>Collomia tinctoria</i>	COLTIN	NOLU	0
<i>Convolvulus arvensis</i>	CONARV	NOLU	0
<i>Conyza canadensis</i>	CONCAN	FACU	0
<i>Corallorrhiza maculata</i>	CORMAC	FAC-	0
<i>Cordylanthus tenuis</i> ssp. <i>tenuis</i>	CORTEN	NOLU	0
<i>Cornus nuttallii</i>	CORNUT	NIW	1
<i>Cornus sericea</i>	CORSER	FACW	2
<i>Cornus sericea</i> ssp. <i>sericea</i>	CORSER	FACW	2
<i>Corydalis caseana</i> ssp. <i>caseana</i>	CORCAS	FACW+	2
<i>Crepis acuminata</i>	CREACU	NOLU	0
<i>Crepis capillaris</i>	CRECAP	FACU	0
<i>Crepis monticola</i>	CREMON	NOLU	0
<i>Crepis occidentalis</i>	CREOCC	NOLU	0
<i>Crypsis schoenoides</i>	CRYSCH	OBL	2
<i>Cryptantha affinis</i>	CRYAFF	NOLU	0
<i>Cryptantha ambigua</i>	CRYAMB	NOLU	0
<i>Cryptantha simulans</i>	CRYSIM	NOLU	0
<i>Cryptantha sobolifera</i>	CRYSOB	NOLU	0
<i>Cryptantha torreyana</i>	CRYTOR	NOLU	0
<i>Cryptogramma acrostichoides</i>	CRYACR	NOLU	0
<i>Cryptogramma cascadenis</i>	CRYCAS	NOLU	0

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<i>Cuscuta californica</i>	CUSCAL	NOLU	0
<i>Cuscuta californica</i> var. <i>breviflora</i>	CUSCAL	NOLU	0
<i>Cuscuta californica</i> var. <i>californica</i>	CUSCAL	NOLU	0
<i>Cuscuta subinclusa</i>	CUSSUB	NOLU	0
<i>Cycladenia humilis</i>	CYCHUM	NOLW	1
<i>Cycladenia humilis</i> var. <i>humilis</i>	CYCHUM	NOLU	0
<i>Cymopterus terebinthinus</i> var. <i>californicus</i>	CYMTER	NOLW	1
<i>Cynoglossum occidentale</i>	CYNOCC	NOLU	0
<i>Cyperus niger</i>	CYPNIG	FACW+	2
<i>Cyperus squarrosus</i>	CYPSQU	OBL	2
<i>Cystopteris fragilis</i>	CYSFRA	FACU	0
<i>Dactylis glomerata</i>	DACGLO	FACU	0
<i>Danthonia californica</i>	DANCAL	FACU	0
<i>Danthonia californica</i> var. <i>americana</i>	DANCAL	FACU	0
<i>Danthonia unispicata</i>	DANUNI	NOLW	1
<i>Delphinium depauperatum</i>	DELDEP	NOLW	1
<i>Delphinium nuttallianum</i>	DELNUT1	NOLW	1
<i>Deschampsia caespitosa</i>	DESCES	FACW	2
<i>Deschampsia caespitosa</i> ssp. <i>caespitosa</i>	DESCES	FACW	2
<i>Deschampsia danthonioides</i>	DESDAN	FACW-	2
<i>Deschampsia elongata</i>	DESELO	FACW-	2
<i>Descurainia incana</i>	DESINC	NOL	0
<i>Dicentra formosa</i>	DICFOR	FACU	0
<i>Dicentra formosa</i> ssp. <i>oregona</i>	DICFOR	FACU	0
<i>Dicentra uniflora</i>	DICUNI	NOLW	1
<i>Dichanthelium acuminatum</i> var. <i>thermale</i>	DICACU	FAC	1
<i>Dichanthelium acuminatum</i> var. <i>thermale</i>	DICACU	FAC	1
<i>Dichanthelium acuminatum</i> var. <i>thermale</i>	DICACU	FACW	2
<i>Dichelostemma congestum</i>	DICCON	NOLU	0
<i>Digitalis purpurea</i>	DIGPUR	FACU	0
<i>Dodecatheon alpinum</i>	DODALP	FACW+	2
<i>Downingia yina</i>	DOWYIN	OBL	2
<i>Draba albertina</i>	DRAALB	NIW	1
<i>Draba aureola</i>	DRAAUR2	NOLU	0
<i>Draba breweri</i>	DRABRE	NOLU	0
<i>Drosera anglica</i>	DROANG	OBL	2
<i>Drosera rotundifolia</i>	DROROT	OBL	2
<i>Dulichium arundinaceum</i>	DULARU	OBL	2
<i>Eleocharis acicularis</i>	ELEACI	OBL	2
<i>Eleocharis acicularis</i> var. <i>acicularis</i>	ELEACI	OBL	2
<i>Eleocharis acicularis</i> var. <i>bella</i>	ELEACI	OBL	2
<i>Eleocharis macrostachya</i>	ELEMAC	OBL	2
<i>Eleocharis pauciflora</i>	ELEPAU	OBL	2
<i>Elymus elymoides</i>	ELYELY	FACU-	0
<i>Elymus elymoides</i> ssp. <i>californicus</i>	ELYELY	FACU-	0
<i>Elymus glaucus</i>	ELYGLA	FACU	0
<i>Elymus glaucus</i> ssp. <i>glaucus</i>	ELYGLA	FACU	0
<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>	ELYTRA	FAC	1
<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	ELYTRA	FAC	1
<i>Elymus X hansenii</i>	ELYHAN	NOLU	0
<i>Elymus X saundersii</i>	ELYSAU	NOL	0

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<i>Elytrigia intermedia</i> ssp. <i>intermedia</i>	ELYINT	NOLU	0
<i>Epilobium anagallidifolium</i>	EPIANA	FACU-	0
<i>Epilobium angustifolium</i> ssp. <i>circumvagum</i>	EPIANG	FACU+	0
<i>Epilobium brachycarpum</i>	EPIBRA	UPL	0
<i>Epilobium canum</i> ssp. <i>latifolium</i>	EPICAN	NOLU	0
<i>Epilobium ciliatum</i> ssp. <i>ciliatum</i>	EPICIL	FACW-	2
<i>Epilobium ciliatum</i> ssp. <i>glandulosum</i>	EPICIL	FACW-	2
<i>Epilobium densiflorum</i>	EPIDEN	FACW-	2
<i>Epilobium glaberrimum</i> ssp. <i>fastigiatum</i>	EPIGLA	FACW	2
<i>Epilobium glaberrimum</i> ssp. <i>glaberrimum</i>	EPIGLA	FACW	2
<i>Epilobium halleanum</i>	EPIHAL	FACW	2
<i>Epilobium hornemannii</i> ssp. <i>hornemannii</i>	EPIHOR	FACW-	2
<i>Epilobium minutum</i>	EPIMIN	NIW	1
<i>Epilobium obcordatum</i>	EPIOBC	FACU	0
<i>Epilobium oregonense</i>	EPIORE2	FACW	2
<i>Equisetum arvense</i>	EQUARV	FAC	1
<i>Equisetum laevigatum</i>	EQULAE	FACW	2
<i>Eremocarpus setigerus</i>	ERESET	NOLU	0
<i>Ericameria bloomeri</i>	ERIBLO1	NOLU	0
<i>Ericameria bloomeri</i>	ERIBLO	NOLU	0
<i>Ericameria greenei</i>	ERIGRE	NOLU	0
<i>Ericameria whitneyi</i>	ERIWHI	NOLU	0
<i>Erigeron acris</i> ssp. <i>debilis</i>	ERACR	FAC	1
<i>Erigeron barbellulatus</i>	ERIBAR	NOLU	0
<i>Erigeron breweri</i>	ERIBRE	NOLU	0
<i>Erigeron breweri</i> var. <i>breweri</i>	ERIBRE	NOLU	0
<i>Erigeron compositus</i>	ERICOM1	NOLU	0
<i>Erigeron coulteri</i>	ERICOU	FACW	2
<i>Erigeron elegantulus</i>	ERIELE	NOLU	0
<i>Erigeron inornatus</i>	ERIINO	NOLW	1
<i>Erigeron inornatus</i> var. <i>inornatus</i>	ERIINO	NOLU	0
<i>Erigeron lassenianus</i>	ERILAS	NOLW	1
<i>Erigeron lassenianus</i> var. <i>lassenianus</i>	ERILAS	NOLW	1
<i>Erigeron peregrinus</i> ssp. <i>callianthemus</i>	ERIPER	FACW	2
<i>Erigeron peregrinus</i> var. <i>callianthemus</i>	ERIPER	FACW	2
<i>Eriogonum marifolium</i>	ERIMAR	NOLU	0
<i>Eriogonum nudum</i>	ERINUD	UPL	0
<i>Eriogonum nudum</i> var. <i>murinum</i>	ERINUD	UPL	0
<i>Eriogonum nudum</i> var. <i>pubiflorum</i>	ERINUD	UPL	0
<i>Eriogonum ochrocephalum</i>	ERIOCH	NOLU	0
<i>Eriogonum ovalifolium</i>	ERIOVA	NOLU	0
<i>Eriogonum ovalifolium</i> var. <i>nivale</i>	ERIOVA	NOLU	0
<i>Eriogonum pyrolifolium</i>	ERIPYR	NOLU	0
<i>Eriogonum rosense</i>	ERIRO	NOLU	0
<i>Eriogonum spergulinum</i> var. <i>reddingianum</i>	ERISPE	NOLU	0
<i>Eriogonum umbellatum</i>	ERIUMB	NIU	0
<i>Eriogonum umbellatum</i> var. <i>nevadense</i>	ERIUMB	NIU	0
<i>Eriogonum umbellatum</i> var. <i>polyanthum</i>	ERIUMB	NIU	0
<i>Eriogonum ursinum</i>	ERIURS	NOLU	0
<i>Eriophorum gracile</i>	ERIGRA	OBL	2
<i>Eriophyllum lanatum</i>	ERILAN	NOLU	0

Scientific Name	Code	Wetland indicator status	Wetland? 0= no 1= maybe 2= yes
Eriophyllum lanatum var. achillaeoides	ERILAN	NOLU	0
Eriophyllum lanatum var. hallii	ERILAN	NOLU	0
Eriophyllum lanatum var. integrifolium	ERILAN	NOLU	0
Erodium cicutarium	EROCIC	NOLU	0
Eryngium alismifolium	ERYALI	FACW	2
Erysimum capitatum	ERYCAP	NOLU	0
Erysimum capitatum var. angustatum	ERYCAP	NOLU	0
Erysimum capitatum var. capitatum	ERYCAP	NOLU	0
Erysimum capitatum var. perenne	ERYCAP	NOLU	0
Erythronium purpurascens	ERYPUR	NOLW	1
Euphorbia crenulata	EUPCRE	NOLU	0
Festuca brachyphylla ssp. breviculmis	FESBRA	NOLU	0
Festuca idahoensis	FESIDA	FACU	0
Festuca occidentalis	FESOCC	FACU	0
Festuca pratensis	FESPRA	FACU	0
Festuca rubra	FESRUB	FAC+	2
Festuca subulata	FESSUB1	FACU+	0
Floerkea proserpinacoides	FLOPRO	FACW	2
Fragaria vesca ssp. californica	FRAVES	NIW	1
Fragaria virginiana	FRAVIR	FACU	0
Frangula rubra	FRARUB	UPL	0
Fritillaria atropurpurea	FRIATR	NOLU	0
Galium aparine	GALAPA	FACU	0
Galium bifolium	GALBIF	NOLW	1
Galium bolanderi	GALBOL	NOLU	0
Galium grayanum	GALGRA	NOLU	0
Galium grayanum var. grayanum	GALGRA	NOLU	0
Galium trifidum var. pacificum	GALTRIFID	FACW+	2
Galium trifidum var. pusillum	GALTRIFID	FACW+	2
Galium triflorum	GALTRIFLO	FACU	0
Gaultheria humifusa	GAUHUM	FACW	2
Gayophytum diffusum ssp. diffusum	GAYDIF	UPL	0
Gayophytum diffusum ssp. parviflorum	GAYDIF	UPL	0
Gayophytum eriospermum	GAYERI	NOL	0
Gayophytum heterozygum	GAYHET	NOLU	0
Gayophytum humile	GAYHUM	NIW	1
Gayophytum racemosum	GAYRAC	NIW	1
Gentiana newberryi var. tiogana	GENNEW	NIW	1
Gentianella amarella ssp. acuta	GENAMA	FACW-	2
Gentianopsis simplex	GENSIM	FACW	2
Geum macrophyllum	GEUMAC	FAC+	2
Geum triflorum	GEUTRI	FACU	0
Gilia capillaris	GILCAP1	NIW	1
Gilia leptalea	GILLEP1	NOLW	1
Gilia leptalea ssp. leptalea	GILLEP1	NOLW	1
Glyceria borealis	GLYBOR	OBL	2
Glyceria elata	GLYELA	FACW+	2
Gnaphalium canescens ssp. thermale	GNACAN	FACU	0
Gnaphalium luteoalbum	GNALUT	FACW-	2
Gnaphalium palustre	GNAPAL	FAC+	2
Goodyera oblongifolia	GOOBL	FACU-	0

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Gratiola ebracteata	GRAEBR	OBL	2
Hackelia californica	HACCAL	NOLU	0
Hackelia floribunda	HACFLO	FACU-	0
Hackelia micrantha	HACMIC	NIW	1
Hackelia nervosa	HACNER	NOLW	1
Hastingsia alba	HASALB	OBL	2
Hazardia whitneyi var. whitneyi	HAZWHI	NOLU	0
Helenium bigelovii	HELBIG	FACW+	2
Helianthella californica var. nevadensis	HELCAL	NOLU	0
Helianthus bolanderi	HELBOL2	FAC	1
Heracleum lanatum	HERLAN	FACU	0
Herniaria hirsuta ssp. hirsuta	HERHIR	NOLW	1
Heterocodon rariflorum	HETRAR	FACW	2
Hieracium albiflorum	HIEALB	NOLW	1
Hieracium bolanderi	HIEBOL	NOLU	0
Hieracium gracile	HIEGRA	NIW	1
Hieracium greenei	HIEGRE	NOLU	0
Hieracium horridum	HIEHOR	NOLU	0
Hieracium scouleri	HIESCO	NOLW	1
Hieracium scouleri var. nudicaule	HIESCO	NOLU	0
Hieracium scouleri var. scouleri	HIESCO	NOLU	0
Hippuris vulgaris	HIPVUL	OBL	2
Hirschfeldia incana	HIRINC	NIU	0
Holcus lanatus	HOLLAN	FAC	1
Holodiscus microphyllus var. glabrescens	HOLMIC	NIU	0
Hordeum brachyantherum	HORBRA	FACW-	2
Hordeum brachyantherum ssp. brachyantherum	HORBRA	FACW-	2
Hordeum jubatum	HORJUB	FAC-	0
Horkelia fusca ssp. tenella	HORFUS	NOLU	0
Horkelia tridentata ssp. tridentata	HORTRI	NOLU	0
Hulsea nana	HULNAN	NOLU	0
Hydrophyllum occidentale	HYDOCC	FACW	2
Hypericum anagalloides	HYPANA	OBL	2
Hypericum formosum var. scouleri	HYPFOR	FAC-	0
Hypericum perforatum	HYPPER	UPL	0
Ipomopsis aggregata	IPOAGG1	NOLW	1
Ipomopsis aggregata ssp. aggregata	IPOAGG1	NOLW	1
Ipomopsis aggregata ssp. formosissima	IPOAGG2	NOLW	1
Ipomopsis congesta ssp. montana	IPOCON	NOLU	0
Iris tenuissima ssp. purdyiformis	IRITEN	NOLU	0
Isoetes bolanderi	ISOBOL	OBL	2
Isoetes nuttallii	ISONUT	OBL	2
Isoetes tenella	ISOTEN	NOLW	1
Ivesia gordonii	IVEGOR	NOLU	0
Juncus balticus	JUNBAL	OBL	2
Juncus bufonius var. bufonius	JUNBUF	FACW	2
Juncus bufonius var. occidentalis	JUNBUF	FACW	2
Juncus drummondii	JUNDRU	FACW-	2
Juncus effusus var. pacificus	JUNEFF	OBL	2
Juncus ensifolius	JUNENS	FACW	2
Juncus hemiendytus var. hemiendytus	JUNHEM	FACW+	2

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Juncus howellii	JUNHOW	NOLW	1
Juncus mertensianus	JUNMER	OBL	2
Juncus nevadensis	JUNNEV	FACW	2
Juncus occidentalis	JUNOCC1	NIW	1
Juncus orthophyllus	JUNORT	FACW	2
Juncus parryi	JUNPAR	FAC+	2
Juncus patens	JUNPAT	FACW	2
Juniperus occidentalis	JUNOCC2	NOLU	0
Juniperus occidentalis var. occidentalis	JUNOCC2	NOLU	0
Kalmia polifolia ssp. microphylla	KALPOL	OBL	2
Kelloggia galioides	KELGAL	NOLU	0
Koeleria phleoides	KOEPHL	NOLU	0
Lactuca serriola	LACSER	FACU	0
Lathyrus nevadensis ssp. nevadensis	LATNEV	NOLU	0
Ledum glandulosum	LEDGLA	FACW+	2
Lemna trisulca	LEMTRI	OBL	2
Lemna turionifera	LEMTUR	OBL	2
Lepidium heterophyllum	LEPHET	NOLU	0
Leptodactylon pungens	LEPPUN	NOLU	0
Lesquerella occidentalis	LESOCC	NOLU	0
Lesquerella occidentalis ssp. occidentalis	LESOCC	NOLU	0
Leucanthemum vulgare	LEUVUL	NOLU	0
Leucothoe davisiae	LEUDAV	FACW	2
Lewisia nevadensis	LEWNEV	NOLW	1
Lewisia triphylla	LEWTRI	UPL	0
Ligusticum grayi	LIGGRA	NIW	1
Lilium pardalinum ssp. shastense	LILPAR	OBL	2
Lilium washingtonianum var. washingtonianum	LILWAS	NOLU	0
Limosella acaulis	LIMACA	OBL	2
Linanthus ciliatus	LINCIL	NOLW	1
Linanthus harknessii	LINHAR	NOLW	1
Linum lewisii	LINLEW	NOLU	0
Linum lewisii var. lewisii	LINLEW	NOLU	0
Listera convallarioides	LISCON	FAC	1
Lithocarpus densiflorus	LITDEN	NOLU	0
Lithophragma glabrum	LITGLA	NOLW	1
Lithophragma tenellum	LITTEN	NOLU	0
Lolium perenne	LOLPER	FAC	1
Lonicera cauriana	LONCAU	FACW	2
Lonicera conjugialis	LONCON	FAC	1
Lonicera involucrata	LONINV	FAC+	2
Lonicera involucrata var. involucrata	LONINV	FAC+	2
Lotus corniculatus	LOTCOR	FAC	1
Lotus crassifolius var. crassifolius	LOTCRA	NOLW	1
Lotus nevadensis	LOTNEV	NOLW	1
Lotus nevadensis var. nevadensis	LOTNEV	NOLW	1
Lotus oblongifolius var. oblongifolius	LOTOBL	OBL	2
Lotus purshianus	LOTPUR	NOLW	1
Lotus purshianus var. purshianus	LOTPUR	NOLW	1
Ludwigia palustris	LUDPAL	OBL	2
Lupinus angustiflorus	LUPANG	NOLU	0

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Lupinus arbustus	LUPARB2	NOLU	0
Lupinus lepidus var. lobbii	LUPLEP	NOLW	1
Lupinus lepidus var. sellulus	LUPLEP	NOLW	1
Lupinus obtusilobus	LUPOBT	NOLU	0
Lupinus polyphyllus	LUPPOL2	FAC+	2
Lupinus polyphyllus var. burkei	LUPPOL2	FAC+	2
Lupinus sellulus	LUPSEL	NOLU	0
Luzula comosa	LUZCOM	NIW	1
Luzula divaricata	LUZDIV	NOLW	1
Luzula subcongesta	LUZSUB	NIW	1
Lycopus uniflorus	LYCUNI	OBL	2
Lysimachia thyrsiflora	LYSTHY	OBL	2
Lythrum hyssopifolia	LYTHYS	NOLU	0
Machaeranthera canescens var. shastensis	MACCAN	NIU	0
Madia bolanderi	MADBOL	NOLW	1
Madia citrigracilis	MADCIT	NOLW	1
Madia elegans	MADELE	NOLU	0
Madia elegans ssp. elegans	MADELE	NOLU	0
Madia glomerata	MADGLO	FACU+	0
Madia gracilis	MADGRA	UPL	0
Madia minima	MADMIN	UPL	0
Malva neglecta	MALNEG	NOLU	0
Marsilea oligospora	MAROLI	OBL	2
Melica aristata	MELARI	NOLU	0
Melica bulbosa	MELBUL	FACU	0
Melica fugax	MELFUG	NOLU	0
Melica stricta	MELSTR	NOLU	0
Melica subulata	MELSUB	NOLW	1
Melilotus alba	MELALB	NOLU	0
Melilotus indica	MELIND	NOLU	0
Mentha arvensis	MENARV	FAC	1
Mentzelia dispersa	MENDIS	NOLW	1
Mentzelia laevicaulis	MENLAE	NOLU	0
Menyanthes trifoliata	MENTRI	OBL	2
Mertensia oblongifolia var. nevadensis	MEROBL	NOLU	0
Microseris nutans	MICNUT	NOLW	1
Microsteris gracilis	MICGRA	FACU	0
Mimulus breweri	MIMBRE2	NIW	1
Mimulus dentatus var. gracilis	MIMDEN	OBL	2
Mimulus guttatus	MIMGUT	OBL	2
Mimulus jepsonii	MIMJEP	NOLU	0
Mimulus layneae	MIMLAY	NOL	0
Mimulus leptaleus	MIMLEP	NOL	0
Mimulus lewisii	MIMLEW	FACW+	2
Mimulus mephiticus	MIMMEP	NOLU	0
Mimulus moschatus	MIMMOS	FACW+	2
Mimulus moschatus var. longiflorus	MIMMOS	FACW+	2
Mimulus primuloides var. primuloides	MIMPRI	FACW+	2
Mimulus pulsiferae	MIMPUL	NIW	1
Mimulus tilingii	MIMTIL	OBL	2
Mimulus torreyi	MIMTOR	NOLU	0

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<i>Minuartia nuttallii</i>	MINNUT	NOLU	0
<i>Minuartia nuttallii</i> ssp. <i>gracilis</i>	MINNUT	NOLU	0
<i>Mitella pentandra</i>	MITPEN	FAC	1
<i>Monardella odoratissima</i>	MONODO	FACU-	0
<i>Monardella odoratissima</i> ssp. <i>pallida</i>	MONODO	FACU-	0
<i>Monolepis nuttalliana</i>	MONNUT	FAC-	0
<i>Montia chamissoi</i>	MONCHA	OBL	2
<i>Montia fontana</i>	MONFON	OBL	2
<i>Montia linearis</i>	MONLIN	NOLW	1
<i>Muhlenbergia andina</i>	MUHAND	FAC	1
<i>Muhlenbergia filiformis</i>	MUHFIL	FACW-	2
<i>Muhlenbergia jonesii</i>	MUHJON	NOLW	1
<i>Muhlenbergia richardsonis</i>	MUHRIC	FAC	1
<i>Myriophyllum hippuroides</i>	MYRHIP	OBL	2
<i>Myriophyllum sibiricum</i>	MYRSIB	OBL	2
<i>Najas flexilis</i>	NAJFLE	OBL	2
<i>Nama lobbii</i>	NAMLOB	NOLU	0
<i>Navarretia divaricata</i>	NAVDIV	NOLU	0
<i>Navarretia divaricata</i> ssp. <i>divaricata</i>	NAVDIV	NOLU	0
<i>Navarretia intertexta</i>	NAVINT	FAC	1
<i>Navarretia intertexta</i> ssp. <i>intertexta</i>	NAVINT	FAC	1
<i>Navarretia intertexta</i> ssp. <i>propinqua</i>	NAVINT	FAC	1
<i>Navarretia leucocephala</i> ssp. <i>minima</i>	NAVLEU	FAC	1
<i>Nemophila parviflora</i> var. <i>austiniae</i>	NEMPAR	NOLU	0
<i>Nemophila pedunculata</i>	NEMPED	FAC	1
<i>Nemophila spatulata</i>	NEMSPA	NOLW	1
<i>Nicotiana attenuata</i>	NICATT	FACU	0
<i>Nicotiana quadrivalvis</i>	NICQUA	FACU	0
<i>Nuphar luteum</i> ssp. <i>polysepalum</i>	NUPLUT	OBL	2
<i>Nuphar polysepalum</i>	NUPPOL	OBL	2
<i>Oenothera elata</i> ssp. <i>hirsutissima</i>	OENELA	FACW-	2
<i>Orobanche fasciculata</i>	OROFAS	NOLU	0
<i>Orobanche pinorum</i>	OROPIN	NOLU	0
<i>Orobanche uniflora</i>	OROUNI	FACU	0
<i>Orthilia secunda</i>	ORTSEC	FACU	0
<i>Orthocarpus cuspidatus</i> ssp. <i>cryptanthus</i>	ORTCUS	NOLU	0
<i>Osmorhiza chilensis</i>	OSMCHI	NOLW	1
<i>Osmorhiza occidentalis</i>	OSMOCC	NOLW	1
<i>Oxypolis occidentalis</i>	OXYOCC	OBL	2
<i>Oxyria digyna</i>	OXYDIG	FACU-	0
<i>Paeonia brownii</i>	PAEBRO	NOLU	0
<i>Panicum acuminatum</i> var. <i>acuminatum</i>	PANACU	FAC	1
<i>Panicum capillare</i>	PANCAP	FACU+	0
<i>Parnassia californica</i>	PARCAL	NIW	1
<i>Pedicularis attollens</i>	PEDATT	OBL	2
<i>Pedicularis densiflora</i>	PEDDEN	NOLU	0
<i>Pedicularis groenlandica</i>	PEDGRO	OBL	2
<i>Pedicularis semibarbata</i>	PEDSEM	NOLU	0
<i>Pellaea brachyptera</i>	PELBRA	NOLU	0
<i>Penstemon cinicola</i>	PENCIN	NIU	0
<i>Penstemon davidsonii</i>	PENDAV	NOLU	0

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Penstemon davidsonii var. davidsonii	PENDAV	NOLU	0
Penstemon deustus	PENDEU	NOLU	0
Penstemon deustus var. pedicellatus	PENDEU	NOLU	0
Penstemon deustus var. suffrutescens	PENDEU	NOLU	0
Penstemon gracilentus	PENGRA	NOLU	0
Penstemon heterodoxus var. shastensis	PENHET	NOLW	1
Penstemon laetus	PENLAE	NOL	0
Penstemon neotericus	PENNEO	NOLU	0
Penstemon newberryi	PENNEW	NOLU	0
Penstemon newberryi ssp. newberryi	PENNEW	NOLU	0
Penstemon oreocharis	PENORE	FACU	0
Penstemon rydbergii var. oreocharis	PENRYD	FACU	0
Penstemon speciosus	PENSPE	NOLU	0
Perideridia bolanderi	PERBOL	NIW	1
Perideridia bolanderi ssp. bolanderi	PERBOL	NIW	1
Perideridia gairdneri	PERGAI	FAC	1
Perideridia howellii	PERHOW	FACW	2
Perideridia lemmonii	PERLEM	NOLW	1
Perideridia parishii ssp. latifolia	PERPAR	FACW	2
Phacelia hastata ssp. compacta	PHAHAS	NOLU	0
Phacelia hydrophylloides	PHAHYD	NOLU	0
Phacelia linearis	PHALIN	NOL	0
Phacelia mutabilis	PHAMUT	NOLW	1
Phacelia procera	PHAPRO	FAC+	2
Phacelia racemosa	PHARAC	NOLW	1
Phleum alpinum	PHLALP	FAC+	2
Phleum pratense	PHLPRA	FAC-	0
Phlox bryoides	PHLBRY	NOLU	0
Phlox diffusa	PHLDIF	NOLU	0
Phlox gracilis	PHLGRA	FACU	0
Phlox muscoides	PHLMUS	NOLU	0
Phoenicaulis cheiranthoides	PHOCHE	NOLU	0
Phoradendron libocedri	PHOLIB	NOLU	0
Phyllodoce breweri	PHYBRE	FAC	1
Pinus albicaulis	PINALB	NOLU	0
Pinus contorta	PINCON	FACU	0
Pinus contorta var. murrayana	PINCON	FACU	0
Pinus jeffreyi	PINJEF	NOLU	0
Pinus lambertiana	PINLAM	NOLU	0
Pinus monticola	PINMON	FACU	0
Pinus ponderosa	PINPON	FACU-	0
Pinus washoensis	PINWAS	NOLU	0
Piperia unalascensis	PIPUNA	FAC	1
Plagiobothrys cognatus	PLACOG	NOLW	1
Plagiobothrys hispidulus	PLAHIS	NOLU	0
Plagiobothrys hispidus	PLAHIS	NOLW	1
Plantago lanceolata	PLALAN	FACU+	0
Plantago major	PLAMAJ	FAC	1
Platanthera leucostachys	PLALEU	NIW	1
Platanthera sparsiflora	PLASPA	FACW	2
Pleuricospora fimbriolata	PLEFIM	NOLU	0

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<i>Poa annua</i>	POAANN	FAC	1
<i>Poa bolanderi</i>	POABOL	NOLW	1
<i>Poa bulbosa</i>	POABUL	NOLU	0
<i>Poa cusickii</i> ssp. <i>epilis</i>	POACUS	NOLU	0
<i>Poa palustris</i>	POAPAL	FAC	1
<i>Poa pratensis</i>	POAPRA	FAC	1
<i>Poa pratensis</i> ssp. <i>pratensis</i>	POAPRA	FAC	1
<i>Poa pringlei</i>	POAPRI	NIU	0
<i>Poa wheeleri</i>	POAWHE	FACU-	0
<i>Polemonium californicum</i>	POLCAL1	NOLW	1
<i>Polemonium pulcherrimum</i>	POLPUL	NOLU	0
<i>Polemonium pulcherrimum</i> var. <i>pilosum</i>	POLPUL	NOLU	0
<i>Polygonum amphibium</i> var. <i>stipulaceum</i>	POLAMP	OBL	2
<i>Polygonum arenastrum</i>	POLARE	NIW	1
<i>Polygonum bistortoides</i>	POLBIS	FACW	2
<i>Polygonum davisiae</i>	POLDAV	NIW	1
<i>Polygonum douglasii</i> ssp. <i>douglasii</i>	POLDOU	FACU	0
<i>Polygonum douglasii</i> ssp. <i>johnstonii</i>	POLDOU	FACU	0
<i>Polygonum douglasii</i> ssp. <i>spergulariiforme</i>	POLDOU	FACU	0
<i>Polygonum lapathifolium</i>	POLLAP	FACW	2
<i>Polygonum minimum</i>	POLMIN	FACU+	0
<i>Polygonum natans</i>	POLNAT	OBL	2
<i>Polygonum phytolaccifolium</i>	POLPHY	FAC-	0
<i>Polygonum polygaloides</i> ssp. <i>confertiflorum</i>	POLPOL1	NIW	1
<i>Polygonum polygaloides</i> ssp. <i>kelloggii</i>	POLPOL1	NIW	1
<i>Polygonum shastense</i>	POLSHA	NOLU	0
<i>Polygonum spergulariiforme</i>	POLSPE	FACU	0
<i>Polystichum imbricans</i> ssp. <i>imbricans</i>	POLIMB	NOLU	0
<i>Polystichum scopulinum</i>	POLSCO	NOLU	0
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	POPBAL	FAC	1
<i>Populus tremuloides</i>	POPTRE	FAC+	2
<i>Populus trichocarpa</i>	POPTRI	FAC	1
<i>Porterella carnosula</i>	PORCAR	OBL	2
<i>Potamogeton amplifolius</i>	POTAMP	OBL	2
<i>Potamogeton foliosus</i>	POTFOL	OBL	2
<i>Potamogeton foliosus</i> ssp. <i>foliosus</i>	POTFOL	OBL	2
<i>Potamogeton gramineus</i>	POTGRA1	OBL	2
<i>Potamogeton natans</i>	POTNAT	OBL	2
<i>Potamogeton nodosus</i>	POTNOD	OBL	2
<i>Potamogeton praelongus</i>	POTPRA	OBL	2
<i>Potamogeton pusillus</i> var. <i>tenuissimus</i>	POTPUS	OBL	2
<i>Potamogeton richardsonii</i>	POTRIC	OBL	2
<i>Potamogeton robbinsii</i>	POTROB	OBL	2
<i>Potentilla drummondii</i>	POTDRU	FAC	1
<i>Potentilla drummondii</i> ssp. <i>breweri</i>	POTDRU	FAC	1
<i>Potentilla drummondii</i> ssp. <i>drummondii</i>	POTDRU	FAC	1
<i>Potentilla flabellifolia</i>	POTFLA1	FAC	1
<i>Potentilla glandulosa</i>	POTGLA	FAC-	0
<i>Potentilla glandulosa</i> ssp. <i>ashlandica</i>	POTGLA	FAC-	0
<i>Potentilla glandulosa</i> ssp. <i>glandulosa</i>	POTGLA	FAC-	0
<i>Potentilla glandulosa</i> ssp. <i>pseudorupestris</i>	POTGLA	FAC-	0

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Potentilla gracilis var. fastigiata	POTGRA2	FAC	1
Potentilla millefolia	POTMIL	NIW	1
Potentilla palustris	POTPAL	OBL	2
Prunella vulgaris ssp. lanceolata	PRUVUL	FACU+	0
Prunus emarginata	PRUEMA	FACU	0
Prunus virginiana var. demissa	PRUVIR	FACU	0
Pseudostellaria jamesiana	PSEJAM	NOL	0
Pseudotsuga menziesii var. menziesii	PSEMEN	FACU	0
Pteridium aquilinum	PTEAQU	FACU	0
Pteridium aquilinum var. pubescens	PTEAQU	FACU	0
Pterospora andromedea	PTEAND	NOLU	0
Pteryxia terebinthina var. californica	PTETER	NOLW	1
Pyrola asarifolia ssp. asarifolia	PYRASA	FACW-	2
Pyrola picta	PYRPIC	NOLW	1
Pyrola picta ssp. integra	PYRPIC	NOLU	0
Quercus kelloggii	QUEKEL	NOLU	0
Quercus vaccinifolia	QUEVAC	NOLU	0
Raillardella argentea	RAIARG	NOLU	0
Raillardella scaposa	RAISCA	NIU	0
Ranunculus alismifolius var. alismellus	RANALI	FACW	2
Ranunculus alismifolius var. alismifolius	RANALI	FACW	2
Ranunculus aquatilis	RANAQU	OBL	2
Ranunculus aquatilis var. capillaceus	RANAQU	OBL	2
Ranunculus flammula	RANFLA2	OBL	2
Ranunculus occidentalis	RANOCC	FAC	1
Ranunculus orthorhynchus var. orthorhynchus	RANORT	FACW	2
Ranunculus populago	RANPOP	FACW	2
Ranunculus uncinatus	RANUNC	FAC	1
Rhamnus rubra	RHARUB	NOLU	0
Rhus trilobata	RHUTRI	NIU	0
Rhynchospora alba	RHYALB	OBL	2
Ribes cereum	RIBCER	FAC	1
Ribes cereum var. cereum	RIBCER	FAC	1
Ribes inerme var. inerme	RIBINE	FAC	1
Ribes montigenum	RIBMON	NOLU	0
Ribes nevadense	RIBNEV	NIW	1
Ribes roezlii	RIBROE	NOLU	0
Ribes roezlii var. roezlii	RIBROE	NOLU	0
Ribes viscosissimum	RIBVIS	FAC	1
Rorippa curvisiliqua	RORCUR2	OBL	2
Rosa woodsii var. ultramontana	ROSWOO	FACU	0
Rubus leucodermis	RUBLEU	NIW	1
Rubus parviflorus	RUBPAR	FAC-	0
Rumex acetosella	RUMACE2	FACU+	0
Rumex crispus	RUMCRI	FAC+	2
Rumex occidentalis	RUMOCC	FACW+	2
Rumex salicifolius var. denticulatus	RUMSAL	FACW	2
Rumex salicifolius var. triangulivalvis	RUMSAL	FACW	2
Rumex triangulivalvis	RUMTRI	OBL	2
Sagina saginoides	SAGSAG	FACW-	2
Sagittaria cuneata	SAGCUN	OBL	2

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<i>Salix arctica</i>	SALARC	FAC	1
<i>Salix boothii</i>	SALBOO	FACW+	2
<i>Salix jepsonii</i>	SALJEP	OBL	2
<i>Salix lasiandra</i>	SALLAS1	OBL	2
<i>Salix lemmonii</i>	SALLEM	FACW+	2
<i>Salix lucida</i> ssp. <i>lasiandra</i>	SALLUC	FACW+	2
<i>Salix melanopsis</i>	SALMEL	OBL	2
<i>Salix scouleriana</i>	SALSCO	FAC	1
<i>Sambucus mexicana</i>	SAMMEX	FACU	0
<i>Sambucus microbotrys</i>	SAMMIC	FACU	0
<i>Sambucus racemosa</i> var. <i>microbotrys</i>	SAMRAC	FACU	0
<i>Sambucus racemosa</i> var. <i>racemosa</i>	SAMRAC	FACU	0
<i>Sanguisorba occidentalis</i>	SANOCC	NOLW	1
<i>Sanicula graveolens</i>	SANGRA	NOLU	0
<i>Sanicula tuberosa</i>	SANTUB	NOLW	1
<i>Sarcodes sanguinea</i>	SARSAN	NOLU	0
<i>Saxifraga aprica</i>	SAXAPR	FAC	1
<i>Saxifraga bryophora</i>	SAXBRY	NOLW	1
<i>Saxifraga nidifica</i> var. <i>nidifica</i>	SAXNID	FACW	2
<i>Saxifraga odontoloma</i>	SAXODO	FACW+	2
<i>Saxifraga oregana</i>	SAXORE	FACW+	2
<i>Saxifraga tolmiei</i>	SAXTOL	NIU	0
<i>Scheuchzeria palustris</i> ssp. <i>americana</i>	SCHPAL	OBL	2
<i>Scirpus acutus</i> var. <i>occidentalis</i>	SCIACU	OBL	2
<i>Scirpus americanus</i>	SCIAME	OBL	2
<i>Scirpus congdonii</i>	SCICON	FACW	2
<i>Scirpus microcarpus</i>	SCIMIC	OBL	2
<i>Scirpus subterminalis</i>	SCISUB	OBL	2
<i>Scutellaria nana</i>	SCUNAN	NOLU	0
<i>Scutellaria siphocampyloides</i>	SCUSIP	FACU	0
<i>Senecio aronicoides</i>	SENARO	NOLW	1
<i>Senecio canus</i>	SENCAN	NOLU	0
<i>Senecio fremontii</i>	SENFRE	NOLU	0
<i>Senecio fremontii</i> var. <i>fremontii</i>	SENFRE	NOLU	0
<i>Senecio hydrophilus</i>	SENHYD2	OBL	2
<i>Senecio pauciflorus</i>	SENPAU	FACW	2
<i>Senecio scorzonella</i>	SENSCO	FAC	1
<i>Senecio triangularis</i>	SENTRI	FACW+	2
<i>Sibbaldia procumbens</i>	SIBPRO	NIW	1
<i>Sidalcea glaucescens</i>	SIDGLA	NOLU	0
<i>Sidalcea malviflora</i> ssp. <i>asprella</i>	SIDMAL	NOLU	0
<i>Sidalcea oregana</i>	SIDORE	FACW-	2
<i>Sidalcea oregana</i> ssp. <i>oregana</i>	SIDORE	FACW-	2
<i>Sidalcea oregana</i> ssp. <i>spicata</i>	SIDORE	FACW-	2
<i>Silene bernardina</i>	SILBER	NOLU	0
<i>Silene bernardina</i> ssp. <i>maguirei</i> var. <i>rigidula</i>	SILBER	NOLU	0
<i>Silene douglasii</i>	SILDOU	NOLU	0
<i>Silene douglasii</i> var. <i>douglasii</i>	SILDOU	NOLU	0
<i>Silene grayi</i>	SILGRA	NOLU	0
<i>Silene invisa</i>	SILINV	NOLW	1
<i>Silene lemmonii</i>	SILLEM	NOLU	0

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<i>Silene occidentalis</i> ssp. <i>occidentalis</i>	SILOCC	NOLU	0
<i>Silene suksdorfii</i>	SILSUK	NOLU	0
<i>Sisymbrium orientale</i>	SISORI	NOLU	0
<i>Sisyrinchium bellum</i>	SISBEL	FACW-	2
<i>Sisyrinchium idahoense</i> var. <i>idahoense</i>	SISIDA	FACW	2
<i>Sium suave</i>	SIUSUA	OBL	2
<i>Smelowskia ovalis</i> var. <i>congesta</i>	SMEOVA	NOLU	0
<i>Smilacina racemosa</i>	SMIRAC	FAC-	0
<i>Smilacina stellata</i>	SMISTE	FAC	1
<i>Solanum physalifolium</i>	SOLPHY	NOL	0
<i>Solidago canadensis</i> ssp. <i>elongata</i>	SOLCAN	FACU	0
<i>Sonchus asper</i> ssp. <i>asper</i>	SONASP	FAC-	0
<i>Sonchus oleraceus</i>	SONOLE	UPL	0
<i>Sorbus californica</i>	SORCAL	NOLW	1
<i>Sparganium angustifolium</i>	SPAANG	OBL	2
<i>Sparganium emersum</i>	SPAEME	OBL	2
<i>Sparganium natans</i>	SPANAT	OBL	2
<i>Spergularia rubra</i>	SPERUB	FAC-	0
<i>Sphenosciadium capitellatum</i>	SPHCAP	FACW	2
<i>Spiraea densiflora</i>	SPIDEN	NOLW	1
<i>Spiraea douglasii</i>	SPIDOU	FACW	2
<i>Spiranthes porrifolia</i>	SPIPOR	NOLW	1
<i>Spirodela punctata</i>	SPIPUN	OBL	2
<i>Stachys ajugoides</i> var. <i>rigida</i>	STAAJU	OBL	2
<i>Stellaria borealis</i> ssp. <i>sitchana</i>	STEBOR	FACW-	2
<i>Stellaria calycantha</i>	STECAL	FACW	2
<i>Stellaria crispa</i>	STECRI	FAC+	2
<i>Stellaria longipes</i>	STELON2	FACW-	2
<i>Stellaria longipes</i> var. <i>longipes</i>	STELON2	FACW-	2
<i>Stellaria media</i>	STEMED	FACU	0
<i>Stellaria obtusa</i>	STEOBT	FACW	2
<i>Stephanomeria lactucina</i>	STELAC	NOLU	0
<i>Stephanomeria tenuifolia</i>	STETEN	NOLW	1
<i>Streptanthus tortuosus</i> var. <i>orbiculatus</i>	STRTOR	NOLU	0
<i>Streptopus amplexifolius</i> var. <i>americanus</i>	STRAMP	FAC-	0
<i>Subularia aquatica</i> var. <i>americana</i>	SUBAQU	OBL	2
<i>Symphoricarpos mollis</i>	SYMMOL	NOLU	0
<i>Symphoricarpos rotundifolius</i> var. <i>rotundifolius</i>	SYMROT	NOLU	0
<i>Taraxacum officinale</i>	TAROFF	FACU	0
<i>Taxus brevifolia</i>	TAXBRE	FACU	0
<i>Thalictrum fendleri</i>	THAFEN	FAC	1
<i>Thalictrum fendleri</i> var. <i>fendleri</i>	THAFEN	FAC	1
<i>Thalictrum sparsiflorum</i>	THASPA	FAC	1
<i>Tofieldia occidentalis</i> ssp. <i>occidentalis</i>	TOFOCC	NOLW	1
<i>Torreya californica</i>	TORCAL	NOLU	0
<i>Torreyochloa erecta</i>	TORERE	OBL	2
<i>Torreyochloa pallida</i> var. <i>pauciflora</i>	TORPAL	OBL	2
<i>Tragopogon dubius</i>	TRADUB	NOLW	1
<i>Trautvetteria caroliniensis</i> var. <i>occidentalis</i>	TRACAR	FAC	1
<i>Trichostema lanceolatum</i>	TRILAN	NOLW	1
<i>Trichostema oblongum</i>	TRIOBL	NOLW	1

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<i>Tridentalis borealis</i>	TRIBOR	FAC-	0
<i>Trifolium cyathiferum</i>	TRICYA	FAC	1
<i>Trifolium geminiflorum</i>	TRIGEM	NOLW	1
<i>Trifolium hybridum</i>	TRIHYP	FAC	1
<i>Trifolium kingii</i> var. <i>productum</i>	TRIKIN	FAC	1
<i>Trifolium lemmonii</i>	TRILEM	NOL	0
<i>Trifolium longipes</i> var. <i>nevadense</i>	TRILON	FAC-	0
<i>Trifolium microcephalum</i>	TRIMIC1	FAC	1
<i>Trifolium monanthum</i> ssp. <i>monanthum</i>	TRIMON	FACW	2
<i>Trifolium pratense</i>	TRIPRA	FACU	0
<i>Trifolium repens</i>	TRIREF	FAC-	0
<i>Trifolium variegatum</i>	TRIVAR	FAC	1
<i>Trifolium wormskioldii</i>	TRIWOR	FACW	2
<i>Triglochin maritima</i>	TRIMAR	OBL	2
<i>Trimorpha acris</i> var. <i>debilis</i>	TRIACR	FAC	1
<i>Trisetum canescens</i>	TRICAN	NOLU	0
<i>Trisetum spicatum</i>	TRISPI	UPL	0
<i>Trisetum wolfii</i>	TRIWOL	FACU	0
<i>Triteleia hyacinthina</i>	TRIHYA	FACU	0
<i>Triteleia montana</i>	TRIMON	NOLW	1
<i>Tsuga mertensiana</i>	TSUMER	FACU	0
<i>Typha latifolia</i>	TYPLAT	OBL	2
<i>Urtica dioica</i> ssp. <i>holosericea</i>	URTDIO	FAC+	2
<i>Utricularia intermedia</i>	UTRINT	OBL	2
<i>Utricularia minor</i>	UTRMIN	OBL	2
<i>Utricularia vulgaris</i>	UTRVUL	OBL	2
<i>Vaccinium caespitosum</i>	VACCAE	FACW	2
<i>Vaccinium uliginosum</i> ssp. <i>occidentale</i>	VACULI	FACW	2
<i>Valeriana californica</i>	VALCAL	OBL	2
<i>Veratrum californicum</i> var. <i>californicum</i>	VERCAL	OBL	2
<i>Verbascum blattaria</i>	VERBLA	UPL	0
<i>Verbascum thapsus</i>	VERTHA	NIW	1
<i>Veronica americana</i>	VERAME	OBL	2
<i>Veronica peregrina</i> ssp. <i>xalapensis</i>	VERPER1	OBL	2
<i>Veronica scutellata</i>	VERSCU	OBL	2
<i>Veronica serpyllifolia</i> ssp. <i>humifusa</i>	VERSER	FAC	1
<i>Veronica wormskioldii</i>	VERWOR	FACW-	2
<i>Vicia americana</i> var. <i>americana</i>	VICAME	FAC	1
<i>Vicia benghalensis</i>	VICBEN	NOL	0
<i>Viola adunca</i>	VIOADU	FACW-	2
<i>Viola bakeri</i>	VIOBAK	NOLW	1
<i>Viola glabella</i>	VIOGLA	FAC	1
<i>Viola lobata</i>	VIOLOB	NOL	0
<i>Viola lobata</i> ssp. <i>lobata</i>	VIOLOB	NOL	0
<i>Viola macloskeyi</i>	VIOMAC	OBL	2
<i>Viola purpurea</i>	VIOPUR	NOLU	0
<i>Viola purpurea</i> ssp. <i>dimorpha</i>	VIOPUR	NOLU	0
<i>Viola purpurea</i> ssp. <i>integrifolia</i>	VIOPUR	NOLU	0
<i>Viola sororia</i> ssp. <i>affinis</i>	VIOSOR	NOLW	1
<i>Vulpia microstachys</i> var. <i>pauciflora</i>	VULMIC	NOLU	0
<i>Vulpia microstachys</i> var. <i>pauciflora</i>	VULMIC	NOLU	0

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<i>Vulpia myuros</i> var. <i>hirsuta</i>	VULMYU	FACU	0
<i>Whitneya dealbata</i>	WHIDEA	NOLU	0
<i>Woodsia scopulina</i>	WOOSCO	NOLU	0
<i>Wyethia mollis</i>	WYEMOL	NOLU	0
<i>Zigadenus paniculatus</i>	ZIGPAN	FACU	0
<i>Zigadenus venenosus</i> var. <i>venenosus</i>	ZIGVEN	FACU	0