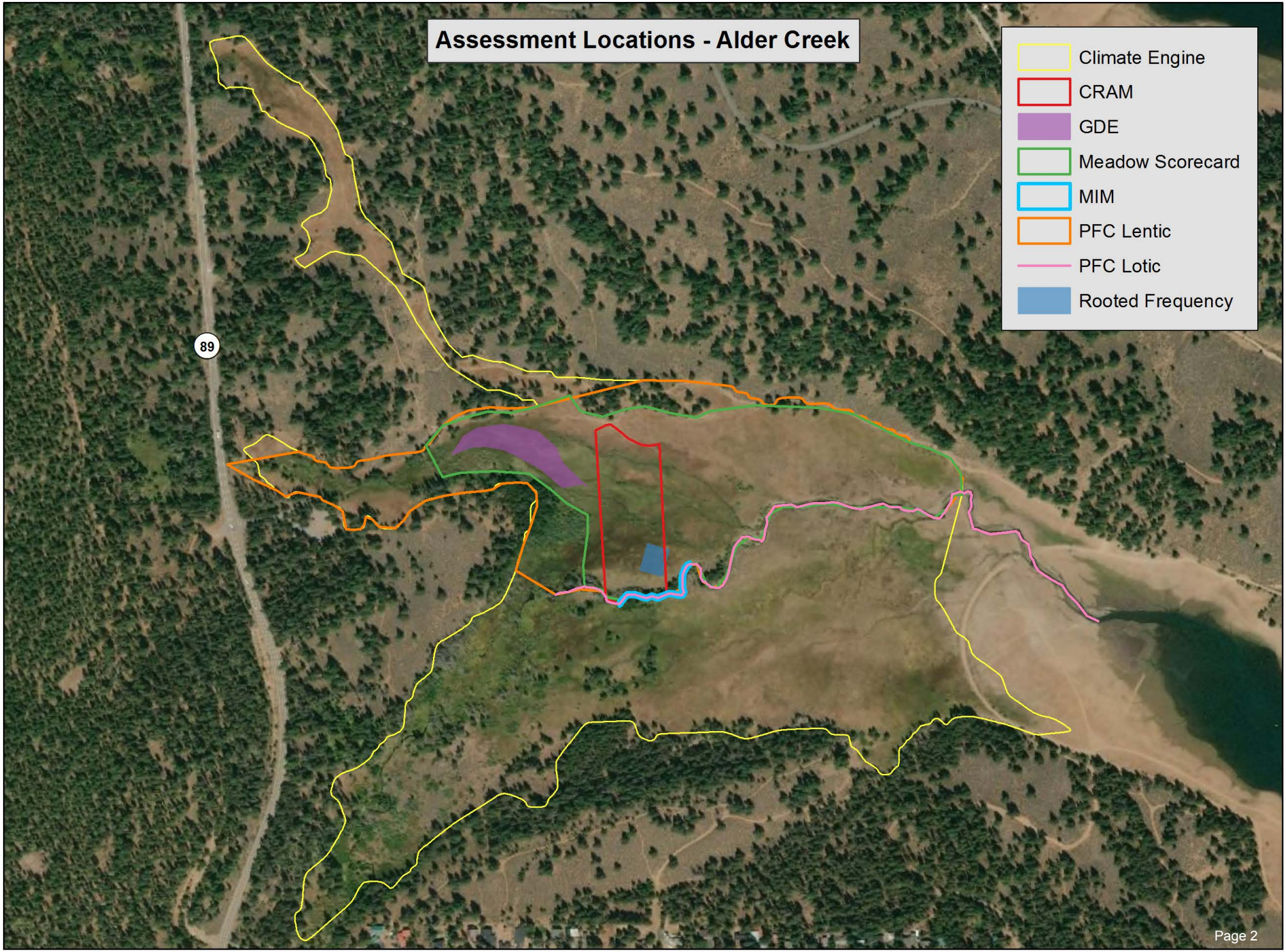
Assessment Data and Results for Alder Creek

This document includes the results and data collected from all of the protocols completed at Alder Creek. The first two pages are a map of Alder Creek, showing the locations of all assessments, by protocol and then showing the standardized rating. The third page is an overview table for all protocols including the assessment output, our standardized rating, and the factors identified that went into the rating. The following pages are the data sheets and/or summary results of each protocol.

Contents


Assessment Locations - Alder Creek
Climate Engine
CRAM
GDE
Meadow Scorecard
MIM
PFC Lentic
PFC Lotic
Rooted Frequency
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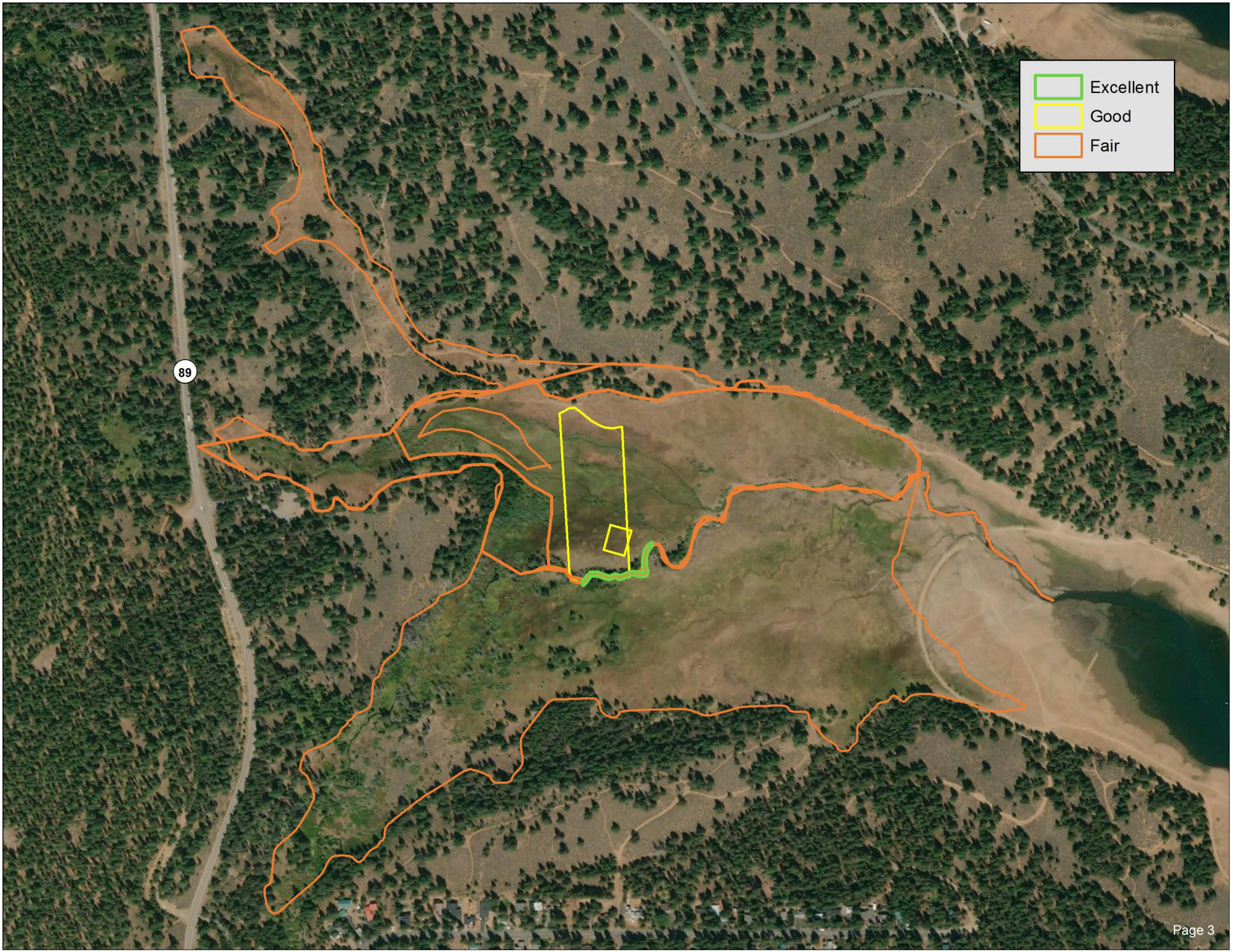

Excellent
Good
Fair
89

Assessment outputs at Alder Creek:

Protocol	Assessment Output	Standardized Rating	Factors Identified
Climate Engine	Downward trend and sensitivity to PWD	Fair	Drying, extensive downcutting, declining vegetative cover in small area
CRAM	84/100	Good	Incised channel, otherwise good condition
GDE	2 negative effects identified, no False Management Indicators	Good	Fen dewatering due to channelized flow
Meadow Scorecard	18/32 = 56%	Fair	Headcuts, channel incision, drying
MIM	Greenline Ecological Status Rating = 92.7 (PNC); Winward Greenline Stability Rating = 7.73 (High)	Excellent	Robust stream channel with no signs of erosion, no streambank alteration
PFC Lentic	Functional at Risk, with 8 variables identified as non-functional	Fair	Incision, headcutting, drying of meadow at downstream end
PFC Lotic	Functional at Risk, with 8 variables identified as non-functional	Fair	Incision, headcutting, fluctuation of water levels, lack of stabilizing vegetation at downstream end
Rooted Frequency	Ecological status rating of 63	Good	43% competitor/decreaser species

Alder Creek Meadow(UCDSNM 014565), Climate Engine Assessment – https://app.climateengine.org/
Assessed by: Christine Albano

The data derived from Climate Engine provide a long-term (1985-present) perspective on how vegetation vigor, indicated by the Normalized Difference Vegetation Index (NDVI), has changed over time and in response to interannual variations in climate. We focus on late summer (July-Sept) NDVI because this is the time vegetation is most sensitive to water availability, with higher NDVI values indicating greater vegetation vigor and cover. We use the median NDVI value from this time period because Landsat satellite images are only available for approximately every 8-16 days (depending on the year) and can have clouds or shadow effects that obscure the vegetation signal. By taking the median value for the handful of images for the July-Sept time period, we minimize the chances of having a low-quality image. Annual maximum NDVI is also commonly used as an indicator of peak biomass production and may also provide useful information for an assessment. It tends to be highly correlated with late summer NDVI. As a general rule of thumb, NDVI values range from -1 to 1. Negative NDVI values indicate surface water bodies, positive NDVI values < 0.2 indicate areas dominated by bare soil, NDVI values >0.4 indicate high cover/vegetation vigor typical of wet meadows, and values in between 0.2 and 0.4 indicate a mix of bare ground and vegetation.

NDVI and climate data can be used in combination to understand 1) the status of vegetation relative to the historical record, 2) the sensitivity of vegetation to climate variability, and 3) trends in vegetation over time.

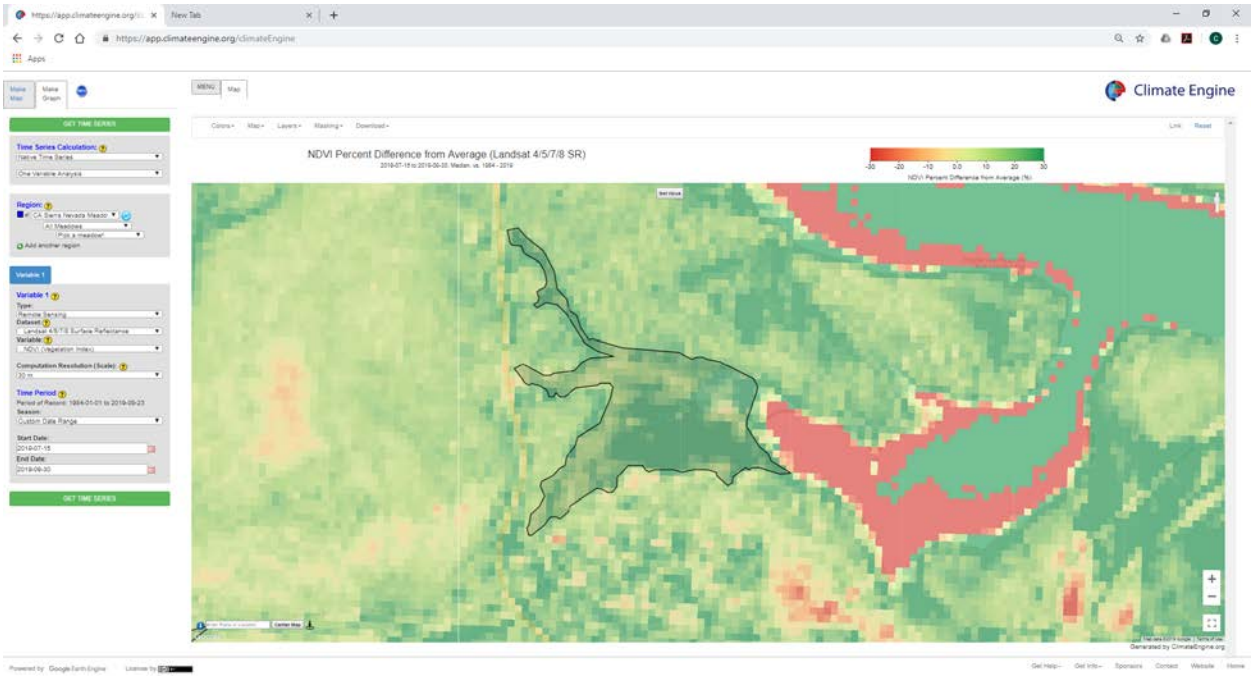
1) A status assessment compares NDVI in the year of interest relative to the historical record. Calculating the anomaly as the percent difference from average provides a useful and intuitive interpretation of the data. In a wet year, we would expect the NDVI anomaly to be positive (higher than average) and in a dry year, we would expect it to be negative (lower than average). When the anomaly differs from this expectation, it could indicate effects of disturbance or management influences. For example, if the anomaly is below average in a wet year, this could indicate degraded conditions relative to the historical record that merit additional field investigation. Because water has a very low NDVI value, it could also indicate the presence of surface water. If the anomaly is above average in a dry year, it suggests the meadow has higher water availability relative to the historical record, indicating positive effects of restoration or changes in management.

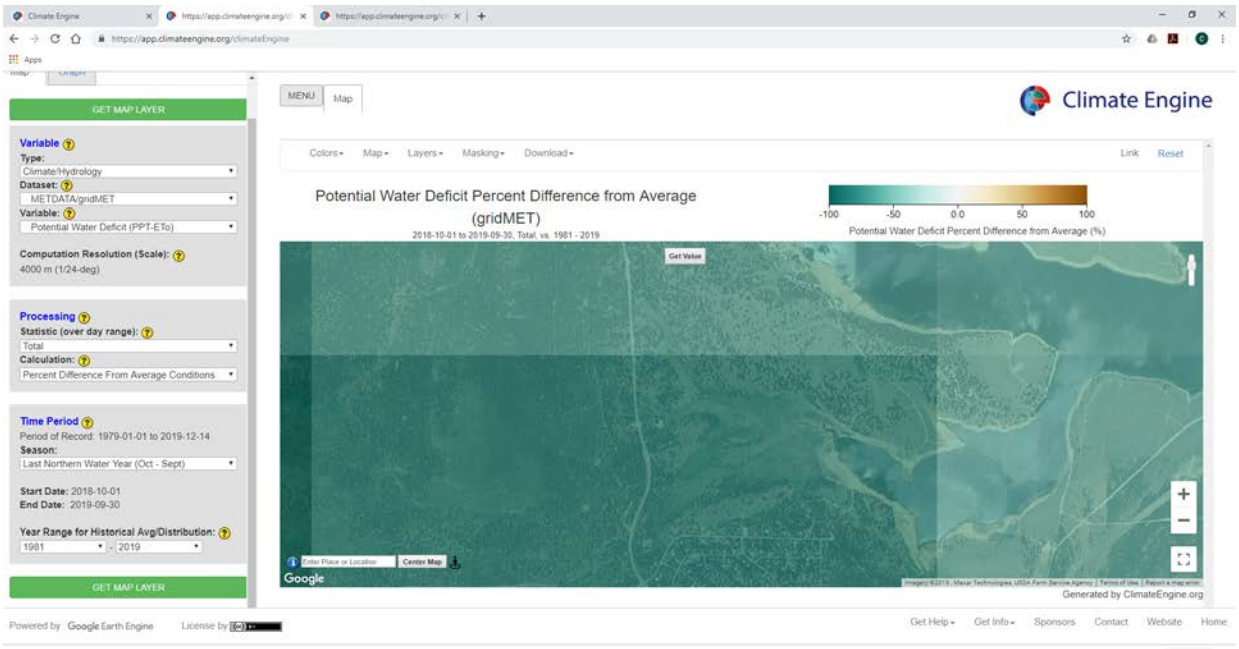
2) A climate sensitivity assessment identifies the slope of the relationship between NDVI and climate. Late-summer NDVI tends to be responsive to annual precipitation and evapotranspiration amounts, but the degree of sensitivity will vary depending on the amount of water subsidized to the meadow from ground or surface water. Drier meadows that are less connected to ground or surface water tend to be most sensitive to climate. In this assessment, we use annual water year (Oct-Sept) Potential Water Deficit, which equates to the difference between water year precipitation and potential evapotranspiration and tends to be more highly correlated with NDVI than precipitation or potential evapotranspiration, alone. Meadows with high climate sensitivity will exhibit highly variable vegetation cover/vigor from year to year and this should be taken into consideration when comparing field assessments among years.

3) A trend assessment is not yet possible in Climate Engine but is coming soon. The trend assessment uses the non-parametric Mann-Kendall test for monotonic trend to assess whether NDVI is increasing or decreasing over time. A decreasing trend indicates decreasing vegetation cover or vigor that may merit additional field investigation. It could also indicate increasing presence of water. An increasing trend indicates increasing vegetation cover/vigor due to increased connectivity with ground or surface water. It can also occur due to natural successional processes as vegetation grows in the absence of resource limitations. Increasing NDVI may also occur surrounding surface water bodies with declining water levels, as vegetation encroaches so does not always indicate increasing water availability.

Status Assessment:

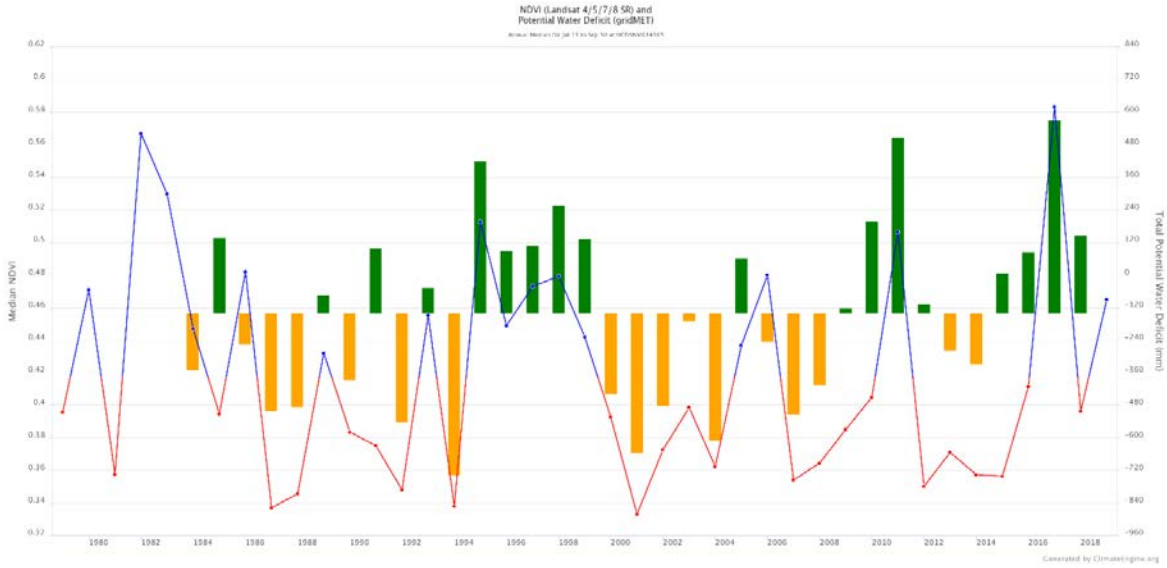
Relative to the historical (1984-2019 record), late summer (July 15-Sept 30) 2019 ***NDVI is higher than average in most parts of the meadow, due to the above normal water year***. This is the expected relationship. The northern and western periphery of the meadow show smaller anomalies than the central/southern, potentially indicating differences in responses to climate within the meadow or potentially indicating places where drying is occurring over time (lower anomaly areas). Beaver activity was observed in the greener area, which may explain this result. Similarly, extensive downcutting was observed in the northern part of the meadow which may also be playing a role. The red area outside the meadow and along the periphery of the reservoir indicates water levels are higher than average (water has a very low NDVI value).



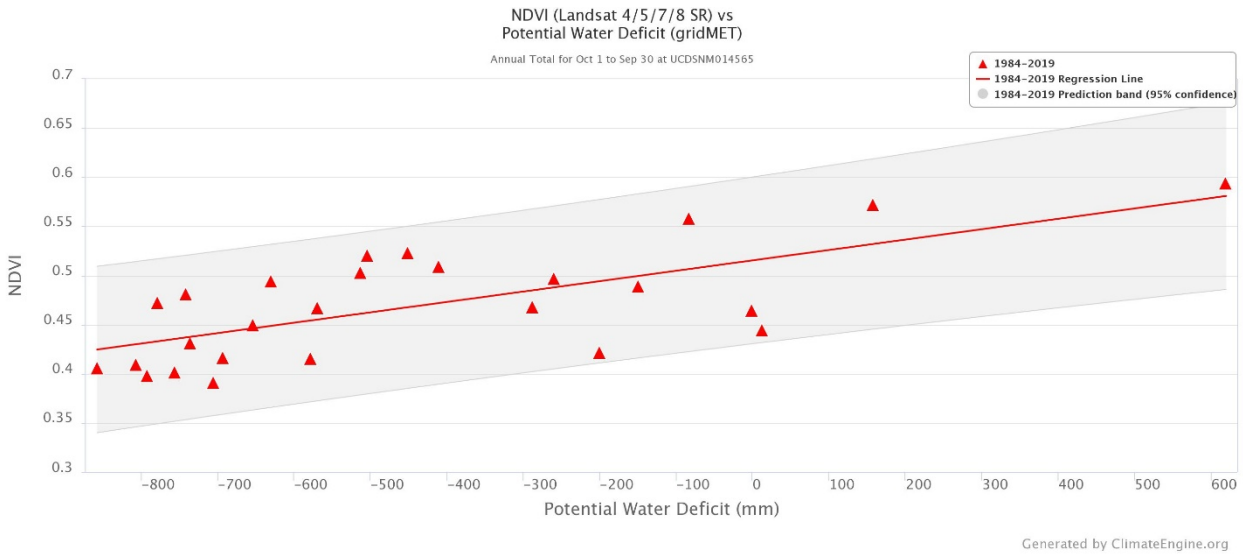


<u>Climate Sensitivity Assessment</u> (based on spatial averages of entire meadow polygon):

Over time, potential water deficit (PPT-PET) and NDVI tend to correspond well with each other. ***No apparent changes in their relationship over time that would indicate disturbance or changes due to management.***

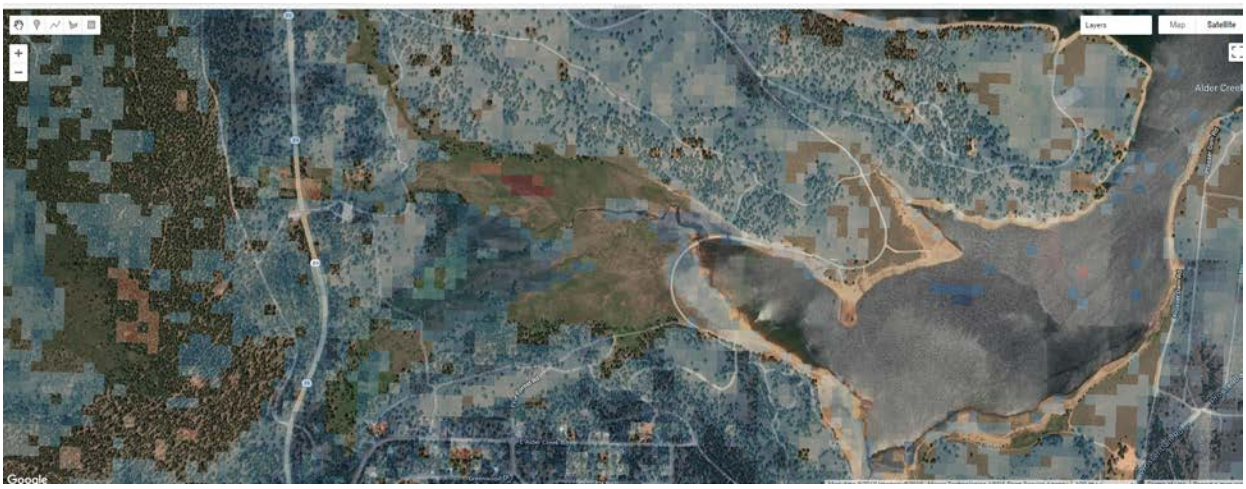


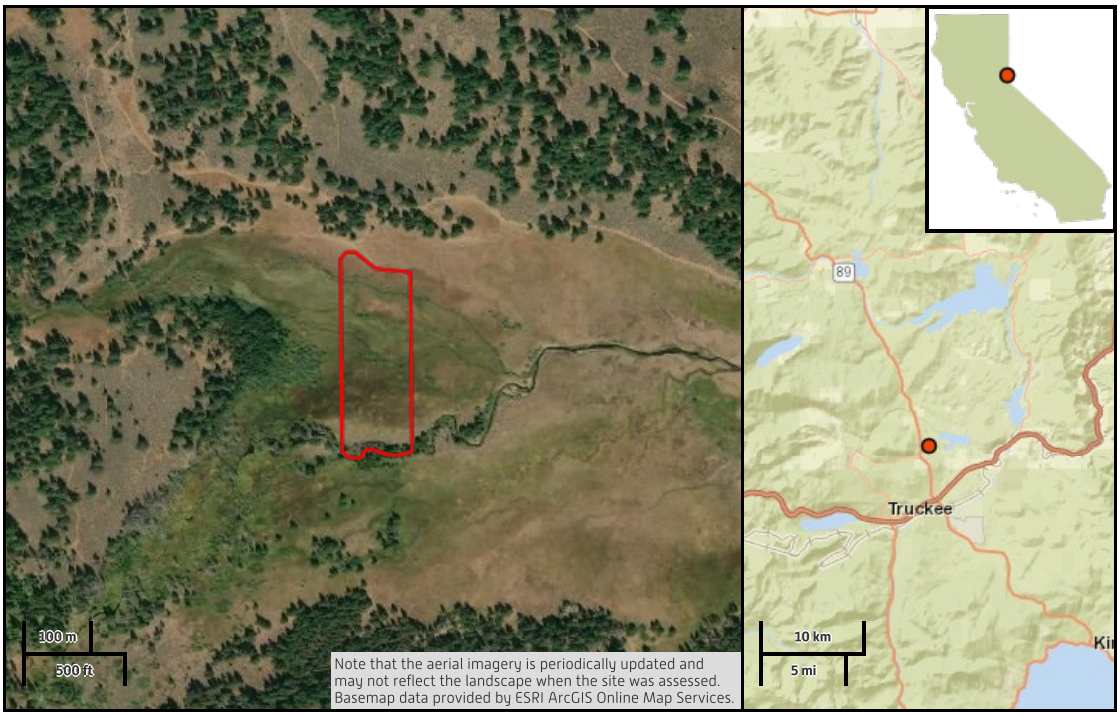
NDVI is somewhat sensitive to potential water deficit (PPT-PET), with NDVI values varying from about 0.42 to 0.59, on average, between the highest and lowest water defecit years. This suggests that water year climate is likely to influence conditions in this meadow and should be considered when making comparisons of ground assessments among years. Because this is a large meadow comprised of many different hydrogeomorphic surfaces, it is likely that drier parts of the meadow are driving this sensitivity moreso than areas with more consistently high water availability.



<u>Trend Assessment</u> (note that this capability is coming soon to Climate Engine but is not yet available):

1984-2018 trend in median July-Sept NDVI (red=declining NDVI, blue=increasing NDVI, no color= trend not significant): Much of the meadow exhibits no trend, but the a***rea around reach start generally is increasing in trend, same with inlet into Prosser Reservoir. Small area to north showing decreasing trend.*** The increasing trend around the Reservoir inlet likely suggests overall declines in water levels surrounding the reservoir over time (soil/vegetation have higher NDVI than water), despite relatively high water levels in 2019 (shown in status assessment). Other areas of dark blue may indicate effects of beaver activity over time resulting in increased water retention. The small red patch indicates declining vegetation cover/condition. This area was investigated in the field and could be due to overall drying of the fen-like conditions that occur here. A small number of dead trees were also found here that may also explain this decline. The lack of trend in the rest of the meadow does not necessarily indicate static conditions, rather it indicates a lack of consistent upward or downward trending over the 1984-2019 time period that was analyzed. The area surrounding the meadow is generally trending upward, indicating increase vegetation cover/vigor, and increased forest water use that has the potential to affect water availability in the meadow.





Basic Information

eCRAM ID	7051
Assessment Area Name	Alder Creek Meadow
Project Name	
Assessment Area ID	
Project ID	
Wetland Type	channeled wet meadow
CRAM Version	6.1
Visit Date	2019-08-06
AA Category	
Practitioners	Sarah Pearce (lead practitioner), Clifford Harvey (other practitioner), Brendan Reed (other practitioner)
Other Practitioners	
County	Nevada
Ecoregion	sierra
AA Centroid Latitude	39.37556
AA Centroid Longitude	-120.17569

AA Size (Hectares)	1.90897
Surface Water Present?	Yes
Hydrology Description	Groundwater support, seeps, and surface water flow from the creek (although it is now incised and likely doesn't flood the meadow any longer)
Peat soils present?	Yes
AA Encompasses	portion of the wetland
Hydrologic State	ponded/inundated
Apparent Hydrologic Regime	seasonal
Comments	This is part of the USFS Meadow Comparison, lead by Shana Gross and Jen Greenberg. This assessment overlapped with the collection of data by many other methodologies.

Metric Scores

Attribute	**Buffer And Landscape Context**	**100.00**
	Aquatic Area Abundance	A (12)
	Percent Of AA With Buffer	A (12)
	Average Buffer Width	A (12)
	Buffer Condition	A (12)
Attribute	**Hydrology**	**75.00**
	Water Source	B (9)
	Hydroperiod	A (12)
	Hydrologic Connectivity	
	Bank Height Ratio	D (3)
	Percent Dewatered	B (9)
Attribute	**Physical Structure**	**87.50**
	Structural Patch Richness	A (12)
	Topographic Complexity	B (9)
Attribute	**Biotic Structure**	**72.92**
	Number Of Plant Layers Present	C (6)
	Number Of Co-Dominant Species	B (9)
	Percent Invasion	B (9)
	Number Of Upland Encroachment Groups	B (9)
	Plant Community Score	8
	Horizontal Interspersion And Zonation	B (9)
	Plant Life Forms	B (9)
Index Score		**84**

Stressors **1** total, **0** with significant negative effect - indicated below with *

Attribute	Buffer And Landscape Context
	Passive recreation (bird-watching, hiking, etc.)

This report was created on Monday September 02, 2019, 8:26 PM using the SFEI eCRAM Mapper at www.cramwetlands.org

The data provided in this report is for informational purposes only and may not be sufficient for the purposes of fulfilling the requirements of a

regulatory permit. Please see "Using CRAM (California Rapid Assessment Method) To Assess Wetland Projects As an Element of Regulatory and Management Programs" CWMW, Oct. 13, 2009.

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GDE Level I Inventory Assessment Summary: Alder Creek Meadow

On August 5, 2019, Tim Stroope (USFS Hydrogeologist) and Eddie Gazzetti (USFS Hydrogeologist) conducted a GDE Level I Inventory assessment for a small fen, in Alder Creek Meadow, on the Tahoe National Forest. The GDE Level I protocol was specifically developed for inventorying and assessing the condition of groundwater dependent ecosystems (GDEs) typically encountered and managed on NFS lands with an emphasis on hydrologic function, biology and soil condition. The protocol does not assign ratings but does use a series of management indicator questions to assess GDEs. The information below summarizes the key findings from this assessment.

Small Fen (northwestern part of Alder Creek Meadow)

Hydrologic function: The fen was ~3200 m^2 downgradient of a spring. Flow was measured in the channel that originates at the spring at the eastern end of the fen. Flow was measured at 0.5 L/s. We augured a 67 cm hole in the middle of the fen with a water table depth of 0. There was a distinct channel running from the spring source through the middle of the fen that may be dewatering the fen. This main channel may be the result of channelized flow from and upgradient road and culvert. There were many other small channels in the fen as well as an adjacent trail.

Biology: The vegetation in the fen was comprised largely of peat-forming and wetland indicator species. There were favorable conditions adjacent to the fen (i.e. standing mature trees) that will contribute to the continued development of the peat body. A faunal assessment was not conducted at the site.

Soil condition: At the augured hole, peat peat was identified down to a depth of 43 cm where there was a transition to mineral soil. Fen characteristics, including the presence of a histosol, were observed.

MANAGEMENT INDICATOR TOOL

Management Indicators were assigned values based on the condition of this fen site and no the entire meadow.

No False (No) values were assigned.

Watershed (surface water) not altered (Runout Channel see **Hydrologic function**, Vegetation Composition, TES, SOI/SOC, Focal Floral Species, TES, SOI/SOC, Focal Faunal Species, and Invasive Species, and Construction, Roads not adversely affecting (see **Hydrologic function**)

Alder Creek Meadow - Meadow Assessment Comparison Project
Survey Summary Report, Springs Online Site ID 250064

Location: The Alder Creek Meadow ecosystem is located in Nevada County in the Truckee California, Nevada 16050102 HUC, managed by the US Forest Service. The spring is located in the Tahoe NF, Truckee RD, in the Hobart Mills USGS Quad, at 39.37677, -120.17828 measured using a GPS (WGS84). The elevation is approximately 1756 meters. Tim Stroope; Eddie Gazzetti surveyed the site on 8/06/19 for 01:30 hours, beginning at 10:30, and collected data in 4 of 10 categories. This survey was conducted under the Meadow Assessment Comparison project using the GDE Level I USFS protocol.

Fig 1.1 Alder Creek Meadow: Center of site upslope

Physical Description: Alder Creek Meadow is a helocrene spring. Alder Creek Meadow is a 428,000 SqM acre Sierra Nevada meadow ecosystem. The meadow contains multiple spring fed channels that flow into Prosser Creek Reservoir. At least one fen site has been identified and surveyed.

Geomorphology: Alder Creek Meadow emerges as a contact spring from a unconsolidated, alluvium rock layer. The emergence environment is subaerial, with a gravity flow force mechanism.

Access Directions: The meadow is accessible from the Donner Party Picnic Area on Highway 89.

Survey Notes: The fen that this survey was conducted for is part of the larger Alder Creek Meadow ecosystem that is approximately 428,000 SqM. It is located in the north fork of the meadow. The total area of the site is 3200 square meters, determined by Estimate from map or image. Surveyors reported fen characteristics. Surveyors also reported histic or histosol characteristics.

Evidence of groundwater influence: Flow from spring source, presence of peat, standing water, wetland vegetation.

Table 1.1 Alder Creek Meadow Percent cover.

Cover Type	Percent Cover
Spring	2
Channel/brook	3
Peatland	20
Wetland	75
Open Water	
Other/Unknown	

Flow: Surveyors measured a flow of 0.1 liters/second, using a v-notch weir. Flow was adjusted for an estimate of 95% of site flow capture. Inflow channel This spring is perennial, with a neorefugium persistence. The site was Groundwater inflow dominated, and both groundwater and surface water outflow significant.

Table 1.2 Alder Creek Meadow Water Table Measurements.

Location Description	Location	Source	Water Table Depth cm	Hole Depth cm	Dry?
Spring source	Other	Soil hole	0		No

Water Quality: Location 1: in an excavated hole in standing water at 10:21:00. Location 2: at a stream exiting the wetland in flowing water at 10:44:00.

Table 1.3 Alder Creek Meadow Water Quality Measurements.

Characteristic Measured	Average Value	Location Number	Device	Comments
Dissolved oxygen (field) % saturation	61	2	YSI ProPlus	
Oxygen Reduction Potential in mV	24	2	YSI ProPlus	
pH (field)	7.17	2	YSI ProPlus	
Specific conductance (field) (uS/cm)	242	2	YSI ProPlus	
Temperature, water C	16	2	YSI ProPlus	

Soils: Surveyors dug a 67 cm deep soil pit that was targeted, other (explain).
Fen characteristics: Yes
Histic Histosol: Yes

Table 1.4 Alder Creek Meadow Hydrologic Alteration

Water diversion (permanently diverted)	
Water diversion (water eventually returns to site)	
Upgradient extraction of surface water or groundwater (prespring emergence)	

Downgradient capture of surface water or groundwater (post-spring emergence)	
Extraction of water within a wetland	
Extraction of water at spring source	
Regulated water flow by impoundment/dam	
Pollution	
Flooding	
Wells	
Other hydrologic disturbance	
None observed	X
Diverted Volume	
Percent Diverted	

Table 1.5 Alder Creek Meadow Soil Alteration

Channel erosion	
Compaction	
Debris flow	
Deposition	
Displacement of soil	
Erosion (general)	
Evaporate deposition	
Excavation	
Ground disturbance (general)	
Gully erosion	
Mass wasting	
Mining	
Pedestals or hummocks (by people or animals)	
Pedestals (small-scale, rain-splash induced)	
Pipes	
Rill erosion	
Ruts (from vehicle tread)	
Sheet erosion	
Slump	
Splash erosion/soil crust	
Wind erosion	
Soil mixing/churning	
Soil removal (peat mining)	
Trails (by people or animals)	
Other soil disturbance	
None observed	X

Table 1.6 Alder Creek Meadow Structures

Buried utility corridors	
Enclosure (such as spring house, spring box or concrete enclosure)	
Erosion control structure	
Exclosure fence	

Oil and gas well	
Pipeline	
Point source pollution	
Power lines	
Road (includes construction and maintenance)	
Other structural disturbance	
None observed	X

Table 1.7 Alder Creek Meadow Recreational Effects

Camp sites	
Tracks or trails by vehicles (ATV, 4-wheel drive, etc.)	
Other recreational disturbance	
None observed	X

Table 1.8 Alder Creek Meadow Animal Effects (multiple ok)

Beaver activity	
Feral animals	
Grazing or browsing (by ungulates)	
Wild animals	
Livestock	
Trails by animals or people	X
Trampling (by ungulates, native or nonnative)	
Other animal disturbance	
None observed	

Table 1.9 Alder Creek Meadow Miscellaneous (multiple ok)

Fire	
Tree cutting (timber harvest or other)	
Refuse disposal	
Other misc disturbance	
None observed	X

Table 1.10 Alder Creek Meadow Management Indicators

Management Indicators	Response	Comment
Hydrology		
Aquifer Functionality: No evidence suggests that the aquifer supplying groundwater to the site is being affected by groundwater withdrawal or loss of recharge.	True	
Watershed Functionality: Within the watershed, no evidence suggests upstream/upgradient hydrologic alteration that could adversely affect the GDE site.	Unable to Assess (UA)	Channelized flow from upgradient culvert could be dewatering GDE
Water Quality: Changes in water quality (surface or subsurface) are not affecting the groundwater dependent ecosystem site.	True	
Geomorphology and Soils		

Landform Stability: No evidence of human-caused mass movement or other surface disturbance affecting the GDE site stability.	True	
Runout Channel: The channel, if present, is functioning naturally and is not entrenched, eroded, or otherwise substantially altered.	True	
Soil Integrity: Soils are intact and functional. For example, saturation is sufficient to maintain hydric soils, if present; there is not excessive erosion or deposition.	True	
Biology		
Vegetation Composition: Site has anticipated cover of plant species associated with the site environment, and no evidence suggests that upland species are replacing hydric species.	UA	
Vegetation Condition: Vegetation exhibits seasonally appropriate health and vigor.	UA	
TES, SOI/SOC, Focal Floral Species: Anticipated floral species are present.	UA	
Faunal Species: Anticipated aquatic and terrestrial faunal species associated with the site environment are present.	UA	
TES, SOI/SOC, Focal Faunal Species: Anticipated faunal species are present.	UA	
Invasive Species: Invasive floral and faunal species are not established at the site.	UA	
Disturbances		
Flow Regulation: Flow regulation is not adversely affecting the site.	True	
Construction and Road Effects: Construction, reconstruction, or maintenance of physical improvements, including roads, is not adversely affecting the site.	UA	Road and trail upgradient of GDE. Not sure if affects site at this time.
Fencing Effects: Protection fencing and exclosures are appropriate and functional.	NA	
Herbivore Effects: Herbivory is not adversely affecting the site.	True	
Recreational Effects: Recreational uses, including trails, are not adversely affecting the site.	True	
Other Disturbance Effects: Wildland fire, insect, disease, wind throw, avalanches, or other disturbances are not adversely affecting the site.	True	
Administrative Context		
Cultural Values: Archaeological, historical, or tribal values will not affect inventory, restoration, use, or management of this site.	UA	
Land Ownership: The entire site and immediate area is under the jurisdiction and management of the Forest Service.	True	

Other Landowner Actions: Activities or management on lands outside Forest Service jurisdiction are not adversely affecting the site.	UA	
Land Management Plan: The land and resource management plan provides for effective site protection.	UA	
Environmental Compliance: Authorized and administrative uses are in compliance and are not adversely affecting the site.	UA	
Water Uses: There are no substantial water uses in the watershed, or in the aquifer supplying groundwater to the site, that could directly or cumulatively adversely affect the GDE.	UA	
Water Rights: Water rights have been filed for the site under state law or water uses exempted under state law are documented. FS federal reserved rights documented as appropriate. Third-party water use in accordance with all elements of the water right or conditions of the exemption, & with FS authorization that allows the use.	UA	

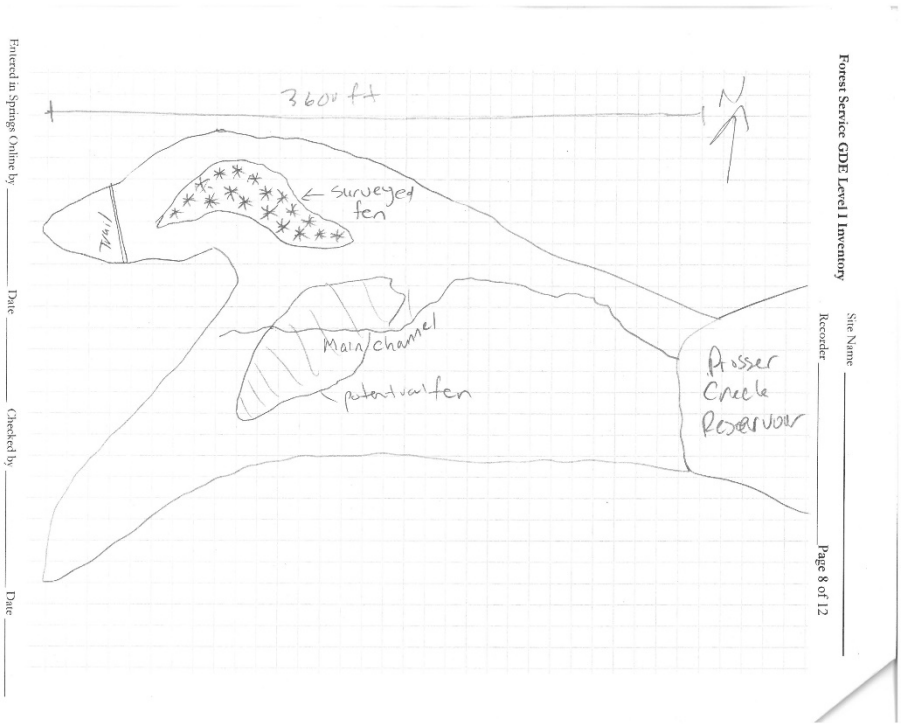

Fig 1.2 Alder Creek Meadow Sketchmap: Sketch Map

Fig 1.3 Alder Creek Meadow: Center of site downslope

Fig 1.4 Alder Creek Meadow: Soil core location

Fig 1.5 Alder Creek Meadow: Spring source

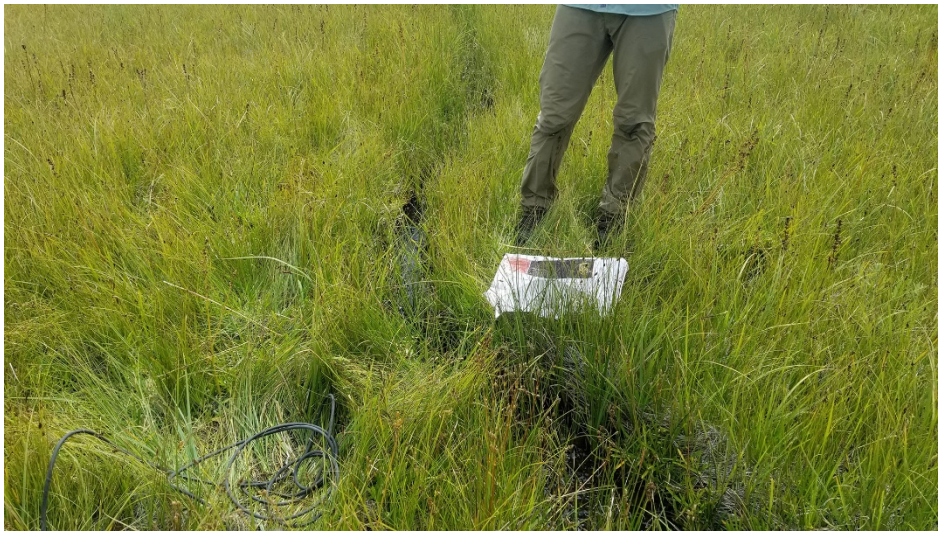

Fig 1.6 Alder Creek Meadow: Water quality measurement 2

Meadow Name Alder Creek Meadow	Date : 8 / 6 / 2019 (MM DD YYYY)
GPS Location:____._____ N _____._____W	
GPS Datum (e.g., WGS 84, NAD 27) _____	
Elevation (ft) 1,757m Slope (°) 6.9 County_____	
Watershed (HUC8) Truckee Landowner Tahoe National Forest	
USGS Quad Name	7.5' or 15' (circle one)
Observers: Jen Greenberg, Christine Albano	

	CONDITION CATEGORY			
Parameter	**Natural Condition**	**Slightly impacted**	**Moderately Impacted**	**Heavily Impacted**
1. Bank Height in Main Channel (measured in the riffle).	Little or no channel incision, Banks 0-2 feet high along >95% of the channel length.	Bank heights of 2-4 feet along less than 25% of the channel length; 0-2 feet elsewhere. .	Bank heights of 2-4 feet along more than 50% of channel length; higher than 4 feet along less than 25% of channel length.	Bank heights > 4 feet along more than 25% of channel length. Note if sections of channel have banks 0-2 feet high.
Score: 1	4	3	2	1
Second Channel (if present): 4	4	3	2	1
2. Bank Stability	<5% of bank length is unstable.	5-20% of bank length is unstable.	20-50% of bank is unstable	>50% of bank is unstable.
Score: 1	4	3	2	1
Second Channel (if present): 4	4	3	2	1
3. Gullies/ditches outside of main channel	No gullies or ditches outside of the main channel	Ditch or start of a gully outside of the main channel. Combined length of all gullies & ditches is less than 1/10th meadow length.	Combined length of all gullies and ditches up to 1/2 of meadow length	Combined length of all gullies and ditches is greater than 1/2 of meadow length.
Score: 1	4	3	2	1
4. Vegetation Cover	Graminoids account for 75-100% of the area covered by vegetation	50-75% graminoid cover	Forbs dominate. 25-50% graminoid cover.	Forbs dominate. <25% graminoid cover.
Score: 3	4	3	2	1
5. Bare Ground	Bare ground covers less than 5% of the meadow area.	Bare ground covers 5-10% of meadow area	Bare ground covers 10-15% of meadow area.	Bare ground covers > 15% of meadow area.
Score: 2	4	3	2	1
6. Conifer or Upland Shrub Encroachment	No upland shrub or conifer encroachment. Raised, topographically distinct areas may have upland species present, but not the meadow surface.	Few encroaching upland species; <10% of total meadow area	Encroaching upland species cover 10-20% of total meadow area	Encroaching upland species cover >20% of total meadow area
Score: 2	4	3	2	1

Total	18
Possible Points	32
Total/Possible	56%

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Additional Observations:

1. ☐Yes ▣No Evidence of conservation or restoration efforts (check dams, stabilized headcuts, exclosure fencing, etc.) Photo Numbers:_____
   Description:_____
2. ▣Yes ☐No Headcut present in meadow? Number of headcuts 4.

Describe the headcuts (Photo number, jump height, width, length, potential for movement. GPS or record location on map): photos #4, 6, 7 - 3' high, 8' wide, 120' long; vegetated in bottom, see photo notes for others

3. ▣Yes ☐No Invasive species observed? Describe Salsify

4. ☐Yes ■No Fish observed? Describe _____

5. ▣Recent ■Old ☐None Evidence of beavers? Describe near top of reach- dams, ponding, expanded floodplain

6. ☐Yes ■No Aspen present in or adjacent to meadow?

7. ▣Yes ☐No Accessible by vehicle?

8. Grazing observations. Check all that are present:

   ☐Trails ☐Stubble ☐Dung in channels ☐Hoof prints on banks

9. Human impacts. Check all that are present in the meadow:

   ■Trail ■Evidence of OHV use ☐Road ☐Corral ☐Building
   *possible fat tire bike

10. Adjacent land use. Check all that are present within 200 yards of meadow:

    ■Culvert ☐Bridge ■Road ☐Building

11. Gopher disturbance covers 0 % of meadow area (from toe-point transects).

12. Willow, alder and aspen cover 20 % of meadow area.

13. Comments on ease of/ barriers to restoration (e.g., are impacts localized or disbursed throughout meadow, access, adjacent land use)

    Accessible, highly used, scale of lower channel incision would result in a higher expense, but beaver activity could be leveraged.

Additional Notes & Comments:

Graminoid ratios in wet and dry areas very similar, veg transects don't tell the whole story

Meadow Name/Number Alder Creek Date 8/6/19

Observers J. Greenberg, C. Albano

	Graminoid	Forb	Bare: No Gopher	Bare: Yes Gopher	Other Cover: moss, litter,etc.
Upper Transect	29	11			3
Middle Transect	42	11			1
Lower Transect	29	18	8		4
Subtotal	A: 100	B: 39	C: 8	D:	E: 8

Total:	= A+B+C+D+E	155
Total Veg:	= A+B	139
Total Bare:	= C+D	16

% Gramminoid (Question 4)	= A/Total Veg X 100%	72%
% Bare (Question 2)	= Total Bare/Total X 100%	10%
% Gopher Disturbed (for Add'l ?'s)	= D/Total X 100%	0%

Meadows Assessment Photo Log

Photo #	Description	Notes
1	end of middle transect	looking S
2	looking at trail towards reservoir	
3	start of lower transect	
4	biggest gully	downstream of lower transect
5	channel outlet	reservoir edge
6 - 7	biggest gully	upstream, mid meadow
8	headcut of gully	
9	headcut of gully	
10	channel incision	looking downstream
11	channel with inset floodplain	looking upstream
12	beaver activity	upper channel
13	start of upper transect	looking S
14	trail in meadow	drying meadow surface

Meadows Assessment Photo Log (Continued)

Photo #	Description	Notes

Additional Notes:

Upstream of reach assessed the meadow is probably more stable, strongly influenced by beaver activity.

Large fen area in middle of meadow, between channels coming in from the N.

Multiple Indicator Monitoring (MIM)

Greenline Ecological Status Rating = 92.7 (PNC) Potential Natural Community; Winward Greenline Stability Rating = 7.73 (High)

Summary Analysis		DMA =	TAH1906								
		Pasture =	Alder Creek								
SHORT-TERM INDICATORS		Date =	8/6/2019								
	Stubble Height	**(Link to SH analysis)**		**Woody Use**		**Streambanks**					
MedianSH all Key species (inches))	Average SH for all key species (inches)	Dom key species for SH	Avg Ht of dom key species (inches)	Woody Species Use - all woody species (%)	Streambank Alteration (%)	Streambank stability(%)	Streambank cover (%)	Covered - Stable (%)	Covered - Unstable (%)	Uncovered - Stable (%)	Uncovered - Unstable (%)
		#DIV/0!			0	1	1	1	0	0	0
n=	0	1		0	1	57	57	57	0	0	0
95% conf Int[1]		*				*	*	*	*	*	*
95% CI[2]	0.93			0.057	0.062	0.05	0.05	0.05	0.05	0.05	0.05
LONG-TERM INDICATORS											
Vegetation Ratings						**Miscellaneous Vegetation Metrics**					
	Greenline Ecological Status Rating	**Site Wetland Rating**	**Winward greenline stability rating**	**Vegetation Biomass Index**	**Percent Rhizomatous Woody**	**Percent Forbs**	**Plant Diversity Index**	**Hydric plants (% by Constancy)**	**Woody composition (%)**	**Woody Species Frequency (N)**	**Hydric Herbaceous (%)**
	92.70191831	76.62154031	6.732370638			0.303030303	21.42968192	0.757575758	0.141414141	28	0.601010101
Rating	PNC	FACW	High								
n=	*	*	*	28	10	34	198	94	17		77
95% conf Int[1]	*	3.718077842	*	*	*	*	*	*	*	*	*
95% CI[2]	5.75	2.99	0.16					6.2	5.9		6.2
LONG-TERM INDICATORS											
	Woody Species Age Class		**Other metrics**								
Percent seedlings	Percent Young	Percent Mature	Woody composition by plot (%)	Hydric woody plant composition (%)	Hydric Plants (% by composition)						
0	0.076923077	0.923076923	0.3	0.2125	0.782430806	MORE					
0	2	24	24	17	17						
0.207147927	*	*	*	*	*						
0.07	0.07	0.07	5.9	5.9	5.9						
Group	IV										

* No confidence interval computed

Winward Riparian Capability Group**

Group

**Winward, A.H. 2000. Monitoring the riparian resources in riparian areas. Gen. Tech. Rep. RMRS-GTR-47. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT. 49 pp, Appendix A

Winward Greenline Stability Rating	Ecological Stat	**Site Wetland Rating**	
<4 Low	Low	0-15 Very ear	UPL = 0
			FAC=50
4-6 Mid	Mid	16-40 Early se	FAC- =17
			FACW- =67
>6 High	High	41-60 Mid sera	FACU =25
			FACW =75
		61-85 Late se	FACU+ =33
			FACW+ =83
		86+ PNC	FAC- =43
			OBL= 100

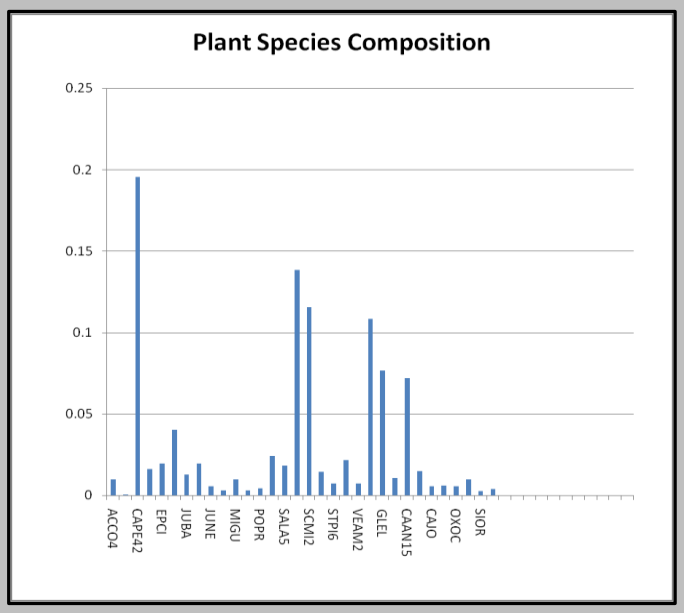
Narrative Summary

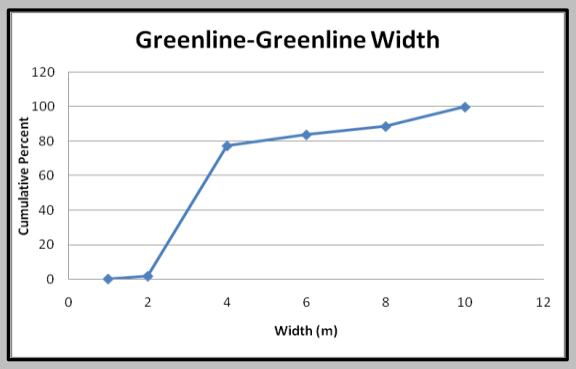
This site began with a narrow stream channel then ended as a seires of bevaer dams and pools, effecting the survey results by having to stop before obtaining all 80 points. Of what was surveyed the gathered data shows a robust stream channel with no signs of bank erosion or unstability.

There was no apparent streambank alteration (cow hoof print ½ inch deep) due to the dominate cover of CAAN15 (*Carex angustata*) and CAPE42 (*Carex petilla)* along the greenline, hydric woody species were very abunda (*Salix geyeriana* and Salix *lemmonii*). Streambank stability was good, with no uncovered or eroding banks.

Vegetation Ratings were high due to a 66% dominate cover of CAAN15, 48% cover of CAPE42, and 48% cover of SCMI2 (*Scripus microcarpus*). Tthe Plant diversity index was high at 21%. Overall this site rated high to moderate with the metrics used and will be a baseline for future surveys.

FREQUENCY DISTRIBUTIONS			Class	1	2	3	4	5	6
	Plant Height		Height range	<.5	.5 - 1	1 - 2	2 - 4	4 - 8	>8
			Total plants	0	5	11	1	2	9
			Height	0.4	0.75	1.5	3	6	12
			Frequency		17.85714286	57.14285714	60.71428571	67.85714286	100
	Percentile Heights		85th Percentile						9.2
			50th Percentile			1.363636364			
			25th Percentile			0.886363636			
			Total	28					





PLANT SPECIES COMPOSITION			
Species Plant Code	Greenline Composition	Cover	Constancy
ACCO4	1%	80%	1%
CAIN10	0%	5%	1%
CAPE42	20%	48%	17%
ELTR7	2%	23%	3%
EPCI	2%	20%	4%
EQAR	4%	20%	9%
JUBA	1%	26%	2%
JUEF	2%	40%	2%
JUNE	1%	45%	1%
JUXI	0%	25%	1%
MIGU	1%	20%	2%
PHPR3	0%	25%	1%
POPR	0%	18%	1%
SAGE2	2%	67%	2%
SALA5	2%	75%	1%
SALE	14%	96%	6%
SCMI2	12%	48%	10%
SOCA6	1%	30%	2%
STPI6	1%	20%	2%
SYSP	2%	30%	3%
VEAM2	1%	20%	2%
PICO	11%	82%	6%
GLEL	8%	29%	11%
ARLO6	1%	22%	2%
CAAN15	7%	66%	5%
LUPO	1%	25%	3%
CAJO	1%	23%	1%
JUIX	1%	25%	1%
OXOC	1%	23%	1%
ELGL	1%	80%	1%
SIOR	0%	20%	1%
ARMO4	0%	15%	1%

Portion of Comprehensive Report from the PFC Assessments for
Meadow Assessment Protocol Comparison and Review of 2019

Sherman Swanson and Meadow Assessment Protocol Comparison and Review Team

If multiple reaches are completed, the ID team can summarize their findings in a comprehensive report. **This is an excerpt of the combined report.** A report provides helpful information for future projects and analyses.

I. **Introduction** – To address the question of what protocol should be used to evaluate meadows, a Protocol Comparison and Review workshop was conducted with field work on August 5 &6 2019. Lotic riparian proper functioning condition (PFC) assessment was performed in three locations and lentic PFC assessment was performed in two locations. While this field assessment was performed by Sherman Swanson without the initial benefit of an interdisciplinary team, the input of others in field discussions was used to adjust some of the notes in this write up.

Location - Alder Creek Meadow

Meet at Donner Party Picnic Area, on Hwy 89, about 7 miles south from Sagehen (2.5 miles north of Hwy 80 interchange). Meadow is on south west corner of Prosser Reservoir, entire meadow is about 105 acres. UC Davis Meadow link: https://meadows.ucdavis.edu/meadows/ucdsnm014565

Reach starts at 39°22'28.6"N 120°10'37.3"W (yellow pin) going **downstream**. This lotic reach was extended down to the shore of Prosser Reservoir and therefore includes some area outside of this photo. In addition, the north lobe of the meadow was assessed with lentic PFC. The lentic area was assumed to be from Highway 89 (where a culvert comes under the highway from a spring west of the highway) down to the reservoir or to the stream (lotic reach) that flow into the reservoir. While the meadows converge, the zone of assessment for the lentic riparian meadow was the area influenced primarily by water from the north branch. That includes a fen dependent also on water upwelling to the east of the boardwalk trail that can be observed crossing the meadow east northeast of the meeting location.

II. PFC Assessment Results

a. **Description of assessment area** - While these three riparian meadows were distinct and on three separate streams, they were within 10 miles and represent a similar set of historic land uses including intensive logging and grazing by draft animals, beef and dairy cattle, and sheep. In recent decades, recreation has become a dominant land use.

b. **Reach delineation/stratification** – This step has not been performed in a systematic manner in any of the three watersheds. While reaches were identified to correspond with meadow protocol comparisons, the reaches do not necessarily represent logical reach delineation for a watershed-scale PFC assessment.

c. **Description of potential(s)** – This step was approximated in the field based upon field observations. This step should be modified to reflect the potential of the delineated reaches from step II-B above.

d. **Reach narrative** (summary of PFC assessment results in narrative form):
Alder creek and fen in the meadow north of the Donner Party Picnic Area – functional at risk – A dispersed spring complex west of Highway 89 is concentrated into a channel as water passes through a culvert under the highway. Downstream from this the channel splits into distributaries at several locations and water flow is augmented by springs that have generated a fen. Alder Creek historically supported an associated floodplain riparian meadow as evidenced by riparian meadow soils and highly sinuous pattern and low gradient of <2%. This stream-dependent meadow merges with the fen meadow. Prosser reservoir downstream of the meadow has widely different elevations through many or most years and among years. This and wave action erosion has created a lack of riparian vegetation that has apparently caused channel incision by up to ~ 8 feet. Although the incision could have been caused by other causes, the water level fluctuation prohibits return of riparian functions. The lowered base level for this creek and meadow puts the meadow - which contains a substantial fen - at risk. This is represented by channels that are increasingly incised as they near the Lake or the incised Alder Creek channel. Along these channels coming from the meadow/fen are over-steepened nick zones and headcuts or nick points.

e. **Observations/findings –** All three riparian areas are currently experiencing little or no livestock grazing. All three had an abundance of riparian stabilizer vegetation that is the source of considerable streambank stability. Two of the three, Kyburz Flat and Alder Creek are primarily impacted by infrastructure, an elevated road which is a floodplain dam concentrating flood energy and a reservoir with water level management that impairs riparian vegetation and functions.

f. **Issue identification and management recommendations** – While this road and reservoir are impactful in their current form and management, these impacts could be mitigated. The road could be hardened at the elevation of the floodplain meadow and the impacts of the water level fluctuation on the meadow could be limited through the use of headcut revetments that keep the risk of base level lowering from causing further headward migration of the incisions. While the road revision would be expensive and may not be necessary, the headcut revetments would be less expensive and more clearly important to the maintenance of riparian functions and values. However, these assessments without the

broader context of other riparian PFC and values assessments are not adequate for prioritizing riparian areas and riparian restoration or management projects. PFC assessment is the first step in integrated riparian management because it identifies the level of risk and the cause of risk across multiple riparian areas or reaches for broad consideration, along with riparian values for understanding priorities. Objectives (SMART = Specific (what to change), Measurable (with an established method), Achievable (within the potential of the site and likely to be met by the management methods), Relevant (to the management), and Timely (where the system is ready for that objective and within the time span of the plan)):

For Alder Creek and associated meadow fen base level lowering has created a clear need to prevent head ward migration of the headcuts or over-steepened reaches. This could be accomplished at a low level of expense using headcut revetments or other loose rock structures in the channels leading to the reservoir or to Alder Creek. The objective is to not allow incision to move head ward. While this would not restore hydrology to those small areas already drained, it would prevent further drainage of the fen and associated meadow. Upstream reaches of Alder Creek and its meadow are also put at risk due to beaver dams that are not stabilized by current beaver activity or by willows or alders anchoring those beaver dams with their roots. Cuttings could be planted in the dams to anchor them and downstream beaver dam analogs could be installed to provide additional woody structure to dissipate energy as water falls from the upstream elevation at floodplain level to the downstream elevation of the incised gully. Unstable banks caused by the incision are not a problem as gully widening is part of the recovery process that re-establishes floodplain width for energy dissipation within the gully.

III. **Monitoring methods**

a. Management or restoration actions implemented should be documented as to methods and timing with photos taken to illustrate before and as-built conditions.
b. Effectiveness monitoring would focus on objectives for projects or management actions: Are the headcut revetments stable and preventing head ward migration of incision? Are the beaver dams becoming stable with woody vegetation? Are they maintaining their terrace/meadow flooding function or do they or any beaver dam analogs need augmentation?

IV. **References** (soils surveys, stream classifications, riparian vegetation classifications, etc.) –

Dickard, M., Gonzales, M., Elmore, W., Leonard, S., Smith, D., Smith, S., Staats, J., Summers, P., Weixelman, D., & Wyman, S. 2015. Riparian area management: Proper functioning condition assessment for lotic areas (Technical Report No. 1737-15 v.2). Denver, CO, USA: US Department of the Interior, Bureau of Land Management.

Prichard, D., F. Berg, W. Hagenbuck, R. Krapf, R. Leinard, S. Leonard, M. Manning, C. Noble, and J. Staats. 2003. Riparian area management: A user guide to assessing proper functioning condition and the supporting science for lentic areas. Technical Reference 1737-16. U.S. Department of the Interior, Bureau of Land Management, Denver, CO. 109 pp

Lentic Assessment Form Name of Riparian-Wetland Area:**_Donner Party Picnic Area Loop Trail Meadow/Fen**

Date: 8/6/2019	Segment/Reach ID: The part of the larger meadow that is hydrated by water coming under Highway 89 (through the culvert and by fen springs	
ID Team Observers: **Sherman Swanson with review by Meadow Assessment Protocol Comparison Team**		GPS Start reach
Rationale for reach breaks (if any) This part of the meadow is not Alder Creek stream dependent		GPS End reach
Mgmt./Admin Unit Truckee District	Assessment Method Field Assessment	

Other assessment or monitoring data for area

Potential/Capability or altered potential & Rationale:
Hydrologic regime: **Spring fed base flows with snowmelt flood flows and occasional thunderstorms.**
Type(s) **__Much of this sloped wetland is a fen with drier margins and with a large northern area that is hydrated by intermittent snow melt with lentic aquifer recharge.**
Plant communities **__Most of the area is dominated by rhizomatous sedges, although willows occur near channels.**
Other **__The historic pioneer trail used by the Donner Party and other wagon caravans skirts the north edge of the meadow and Prosser Reservoir is a big influence on the downstream end where Alder Creek and other incisions have lower base level.**

Yes	No	N/A	HYDROLOGICAL
Yes			1) Riparian-wetland area is saturated at or near the surface or inundated in "relatively frequent" events. **Notes: Saturation occurs in most areas not close to the bottom end where incision of alder Creek and other channels are headcutting into the meadow. Channels occur in many places within the meadow and indicate some level of altered saturation.**
	No		2) Fluctuation of water levels is not excessive. **Notes: Prosser Reservoir water level fluctuation is a significant issue to this site. The fluctuation prohibits sustaining riparian stabilizers and wave action also enabled erosion that has led to incision and lowering of base level. Headcuts were observed on at least four channels.**
	No		3) Riparian-wetland area is enlarging or has achieved potential extent. **Notes: Wetland area is shrinking due to dehydration from incisions noted above. The northern part of the meadow where the Pioneer wagon road intercepts the intermittent channel is also dehydrating that area.**
	No		4) Upland watershed is not contributing to riparian-wetland degradation. **Notes: The dispersed spring area west of Highway 89 is concentrated into a culvert for passage under the highway. This concentrated flow persists as a channel in many areas downstream that may not have had a channel prior to the highway and the history of human uses.**
Yes			5) Water quality is sufficient to support riparian-wetland plants. **Notes: No issues observed.**
	No		6) Natural surface or subsurface flow patterns are not altered by disturbance (i.e., hoof action, dams, dikes, trails, roads, rills, gullies, drilling activities). **Notes: This concentrated flow from the culvert persists as a channel in many areas downstream that may not have had a channel prior to the highway and the history of human uses. Presumably livestock grazing would have facilitated channel formation.**
Yes			7) Structure accommodates safe passage of flows (e.g., no headcut affecting dam or spillway). **Notes: The Only other structure in the meadow is a boardwalk that crosses over the meadow. The boardwalk has been constructed to not interfere with water flow.**

Yes	No	N/A	VEGETATION
Yes			8) There is diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery). **Notes: No issues were observed.**
Yes			9) There is diverse composition of riparian-wetland vegetation (for maintenance/recovery). *[species present]* **Notes: There is a combination of fen/peat forming plants and a diversity of other sedges along with willows. This broad area has appears to have a very diverse flora that will be documented by other protocols.**
Yes			10) Species present indicate maintenance of riparian-wetland soil moisture characteristics. **Notes: Many species are wetland obligates or facultative wetland species.**
Yes			11) Vegetation is comprised of those plants or plant communities that have root masses capable of withstanding wind events, wave flow events, or overland flows (e.g., storm events, snowmelt). *[community types present]* **Notes: These plant communities occur in most areas.**
	No		12) Riparian-wetland plants exhibit high vigor. **Notes: Vigor issues were observed only where the fluctuation of water level has had plants inundated excessively this spring and near headcuts where dehydration occurs. These areas are small. However they indicate an issue that is significant.**
	No		13) Adequate riparian-wetland vegetative cover is present to protect shoreline/soil surface and dissipate energy during high wind and wave events or overland flows. *[enough?]* **Notes: While most of the meadow is very adequately covered, the places that create risk close to the Reservoir are not. And their absence has created incision that prohibits the ability of vegetation to be successful in stabilizing up-gradient parts of the meadow from continued incision and dehydration.**
Yes			14) Frost or abnormal hydrologic heaving is not present. **Notes: This was not observed.**
		NA	15) Favorable microsite condition (i.e., woody material, water temperature, etc.,) is maintained by adjacent site characteristics. **Notes:**

Yes	No	N/A	EROSION DEPOSITION
Yes			16) Accumulation of chemicals affecting plant productivity/composition is not apparent. **Notes: No issue was observed**
Yes			17) Saturation of soils (i.e., ponding, flooding frequency, and duration) is sufficient to compose and maintain hydric soils. **Notes: This is true in almost all areas.**
Yes			18) Underlying geologic structure/soil material/permafrost is capable of restricting water percolation. **Notes: No issue was observed other than the Reservoir water fluctuation.**
	No		19) Riparian-wetland is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition). **Notes: This low sediment environment causes any erosion in most areas to be net erosion. Incising near the incised Alder Creek and Prosser Lake is shrinking the meadow.**
	No		20) Islands and shoreline characteristics (i.e., rocks, coarse and/or large woody material) are adequate to dissipate wind and wave event energies. **Notes: Since Prosser Reservoir is relatively new it has not had the opportunity to form stable shorelines of rock such as would be necessary to dissipate wave**

			energies. The combination of stressed vegetation from fluctuating water levels and high wave energies is causing this near reservoir meadow to unravel.

SUMMARY DETERMINATION

Functional Rating
___ Proper Functioning Condition
_X_ Functional - At Risk
___ Nonfunctional
___ Unknown

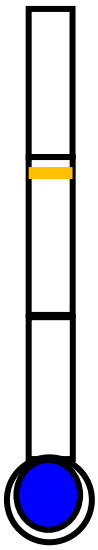
Trend for Functional - At Risk:

Apparent	Monitored
___ Upward	___ Upward
_X_ Downward	___ Downward
___ Not Apparent	___ Static

Rationale _While most of the meadow is sustaining itself, the downstream end is incising and headcutting, leading to dehydration.

Are factors contributing to unacceptable conditions outside the control of the manager?
Yes _X_ No ___

(Revised 1998) (7/2012& 5/16)



If yes, what are those factors?
___ Flow regulations
___ Mining activities
___ Upstream channel conditions
___ Channelization
___ Road encroachment
___ Oil field water discharge
___ Augmented flows
_X_ Other (specify) _____

Prosser Reservoir water level management and wave action

Are factors contributing to unacceptable conditions within the control of the manager?
Yes _X_ No ___

If yes, what are those factors? **While the Forest Service does not control Prosser Reservoir water management, it could collaborate with the Bureau of Reclamation to address the issues noted here by constructing headcut revetments or Zuni bowls that would constrain head ward migration of incision.**

Lentic riparian-wetland areas are functioning properly when adequate vegetation, landform, or debris is present to:

- dissipate energies associated with wind action, wave action, and overland flow from adjacent sites, thereby reducing erosion and improving water quality;
- filter sediment and aid floodplain development; improve flood-water retention and ground-water recharge;
- develop root masses that stabilize islands and shoreline features against cutting action; restrict water percolation;
- develop diverse ponding characteristics to provide the habitat and water depth, duration, and temperature necessary for fish production, waterbird breeding, and other uses; and
- support greater biodiversity.

PFC Assessment Form (Lotic) Name of Riparian-Wetland Area:_Alder Creek

Date: 8/6/2019	Segment/Reach ID: Along south side of meadow east of the Donner Party Picnic Area	
ID Team Observers: Sherman Swanson with review by Meadow Assessment Protocol Comparison Team		GPS Start reach 39 22’ 28.6” N 120 10’37.3” W
Rationale for reach breaks Meadow was selected for Meadow Assessment Protocol Comparison		GPS End reach
Mgmt./Admin Unit Truckee District	Assessment Method Field Assessment	

Other assessment or monitoring data for area __NA_____

Description of potential and rationale:
Hydrologic regime _Perennial spring fed snowmelt driven hydrology with occasional summer thunderstorms
Stream Type(s) _ Alder Creek historically supported an associated floodplain riparian meadow as evidenced by riparian meadow soils and highly sinuous pattern and low gradient of <2%. It has incised and is now going through channel evolution (now at states 4-5 (see page 36 in Dickard et al. 2015) downstream of beaver dams and states 1-2 at or upstream of beaver dams near the GPS point.. Areas farthest downstream in state 4 may not recover as the fluctuation of Prosser Reservoir levels prohibits establishment of riparian stabilizers. Elsewhere the potential is probably a sinuous narrow low gradient and gravel bedded Rosgen E4.
Plant communities _Tall clumped willows, and alders, provide an overstory. Lodge pole pine is locally surviving and has recently been killed by beaver dam flooding in other areas. Small fruited bull rush is now acting as a riparian stabilizer along the incised active channel with robust stabilizing sedges dominating floodplain meadow areas that are still accessible above a headcut flooded by beaver dams or above those beaver dams that have elevated pond water onto the floodplain surface that is at the elevation of the terrace next to the downstream incised channel.
Other __

Yes	No	N/A	**HYDROLOGY**
	No		1) Floodplain inundated in “relatively frequent events” (1-3 years). **Notes: Stream below beaver dams is deeply incised. However stream adjacent to upper beaver dams is actively flooding the floodplain terrace. In parts of the incised channel there are new floodplains forming.**
	No		2) Beaver dams are stable. **Notes: No recent beaver activity was observed (although some of the Team thought they had observed recent beaver activity indicators). Many beaver dams did not have fresh cutting on the dam or nearby. The dams were close to willows, but willows were not observed growing on the dams as needed to anchor the dam materials without active maintenance.**
	No		3) Width/depth ratio, sinuosity, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region). **Notes: Incised channel is in state 4-5 below beaver dams.**
	No		4) Riparian-wetland area is expanding or has achieved potential extent. **Notes: Riparian area has expanded by flooding and killing lodge pole pine trees near beaver ponds that are flooding onto the meadow surface. However this is offset by riparian area dehydration adjacent to the incised parts of the stream. Contraction is more of an issue closer to Prosser reservoir where headcuts are moving up various channels into the meadow.**
Yes			5) Riparian impairment from the upstream or upland watershed is absent. **Notes: No issues were observed and would appear to be minor in comparison to onsite issues.**

Yes	No	N/A	VEGETATION
Yes			6) There is adequate diversity of stabilizing riparian vegetation for recovery/maintenance. **Notes:** (List plant species and note their abundance and location on the NV Riparian Plant Checklist) **Tall clumped willows, alders, small fruited bull rush with robust stabilizing sedges (See plant lists collected by Dave Weixelman or others for other protocols).**
Yes			7) There are adequate age class(es) of stabilizing riparian vegetation for recovery/maintenance **Notes: Various age classes were observed.**
Yes	**No**		8) Species present indicate maintenance (or recovery) of riparian soil moisture characteristics. **Notes: Yes where the beaver dams are flooding the meadow and on the new floodplains within the incision. Now below the beaver dams on the terrace that is dehydrating due to drainage toward the incision.**
Yes			9) Stabilizing plant communities capable of withstanding moderately high streamflow events are present along the streambank. **Notes: Tall clumped willows, and alders, provide an overstory. Small fruited bull rush is now acting as a riparian stabilizer along the incised active channel with robust stabilizing sedges dominating floodplain meadow areas that are still accessible above a headcut flooded by beaver dams or above those beaver dams that have elevated pond water onto the floodplain surface that is at the elevation of the terrace next to the downstream incised channel.**
Yes			10) Riparian plants exhibit high vigor. **Notes: No issues were observed**
Yes	**No**		11) Adequate amount of stabilizing riparian vegetative is present to protect banks and dissipate energy during moderately high flows. **Notes: Yes above beaver dams or along vegetated new floodplains above or closer to the beaver dams. No closer to the lake where fluctuation of water levels is prohibiting formation of riparian stabilizer plant communities.**
Yes			12) Plant communities are an adequate source of woody material for maintenance/recovery. **Notes: Areas where lodge pole pine have been killed by beaver pond flooding are enabling growth of willows and alters in hydrated pond fringes.**

Yes	No	N/A	GEOMORPHOLOGY
Yes			13) Floodplain and channel characteristics (i.e., rocks, woody material, vegetation, floodplain size, overflow channels) are adequate to dissipate energy. **Notes: Beaver dam caused floodplain access moderates flood flows and below beaver dams bank erosion is part of the healing process.**
Yes			14) Point bars are revegetating with stabilizing riparian plants. **Notes: These were observed above the influence zone of Prosser Reservoir water level fluctuation.**
Yes	**No**		15) Streambanks are laterally stable. **Notes: Yes above beaver dams where robust rhizomatous sedges provide stability and in areas below the dams where willows and alders with small fruited bulrush provide stability. No close to the lake where water level fuuctuation prohibits formation of streambank stabilizing plant communities.**
	No		16) Stream system is vertically stable [not incising]. **Notes: Stream incision due to unstable beaver dams would dramatically dehydrate the currently flooded meadow floodplain that would become a terrace.**

Yes			17) Stream is in balance with the water and sediment that is being supplied by the drainage basin (i.e., no excessive erosion or deposition). **Notes: Inadequate or excessive water or sediment is not the issue here. Onsite incision perhaps due to or exacerbated by reservoir water level fluctuation is the issue.**

SUMMARY DETERMINATION

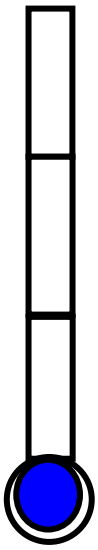
Functional Rating
___ Proper Functioning Condition
_X_ Functional - At Risk
___ Nonfunctional
Rationale **_Fluctuating water level has apparently enabled incision through loss of riparian vegetation and functions close to Prosser Reservoir. The incision creates risk for upstream reaches. Thes areas have been prevented from incision and/or have been rehydrated by beaver dams. However the beaver dams are unstable without willows on the dams and without active beaver dam maintenance.**

Trend for Functional - At Risk:

Apparent	Monitored
___ Upward	___ Upward
___ Downward	_X_ Downward
___ Not Apparent	_X_ Static

Rationale **_Downward trend is apparent near the reservoir with persistent state 4 and meadow dehydration. Trend appears static near the beaver dams. However Google Earth photos suggest they have been built since 2009.**

Are factors preventing achievement of PFC or affecting progress towards desired condition outside the control of the manager? Yes _X_ No ___



If yes, what are those factors?
___ Flow regulations
___ Mining activities
___ Upstream channel conditions
___ Channelization
___ Road encroachment
___ Oil field water discharge
___ Augmented flows
_X_ Other (specify) _Reservoir water level fluctuation and persistence of beavers are not within control of the Forest Service

Explain factors preventing achievement of PFC:**_Due to the importance of downstream base level to this stream dependent meadow, headcut revetments should be installed where meadow channels are incising close to their bottom end near Prosser Lake or the incised Alder Creek. If the beavers have left or been killed, willow cuttings could be used to strengthen dams and additional beaver dam analogs could be installed along the incised channel downstream from the existing beaver dams.**

(Revised 6/2015) (See Dickard et al. (2015) for reach information form & 6-page version with more room for notes)

A lotic riparian area is considered to be in PFC or "functioning properly when adequate vegetation, landform, or large woody debris is present to:

- dissipate stream energy associated with high waterflow, thereby reducing erosion & improving water quality;
- capture sediment and aid floodplain development;
- improve floodwater retention and ground-water recharge;
- develop root masses that stabilize streambanks against erosion;
- maintain channel characteristics.

Rooted Frequency

Code	Species	Ecological Status	Wetland Status	Frequency
JUBA	Juncus balticus	C	OBL	41
STOC2	Stipa occidentalis	C	UPL	17
ARTR2	Artemisia tridentata			10
MURI	Muhlenbergia richardsonis	C	FAC	4
POPR	Poa pratensis	I	FAC	59
CISC2	Cirsium scariosum	I	FAC	3
PODO4	Polygonum douglasii	R	FACU	1
GADI2	Gayophytum diffusum	R		1
MIGR	Microsteris gracilis	R		2
AGGL	Agoseris glauca	R	FAC	1
ASTER	Asteraceae			5
			Total hits	144

Competitors/Decreasers:	43%
Intermediate/Increasers:	43%
Ruderals/Invaders:	3%

*Percentages do not add to 100% due to presence of one unidentified species, and one without an assigned ecological status rating.

Ratliff Ecological Status Rating:	63
(Ratliff 1985 p. 46)	middle of "good" range

Ground Cover	
Bare Soil	0.42%
Rodent Bare Soil	0.42%
Rock	0.42%
Litter	96.25%
Live Basal Vegetation	2.08%
Gravel	0.42%

Soil data	
Texture at 25 cm:	sandy clay loam
Depth to mottles:	50 cm
Depth to saturation:	71 cm

Depth of "many" fine roots (1 per cm2, <2mm diameter)		
T1	T2	T3
10 cm	9 cm	9cm

Presence of animal dung		
T1	T2	T3
0	0	0