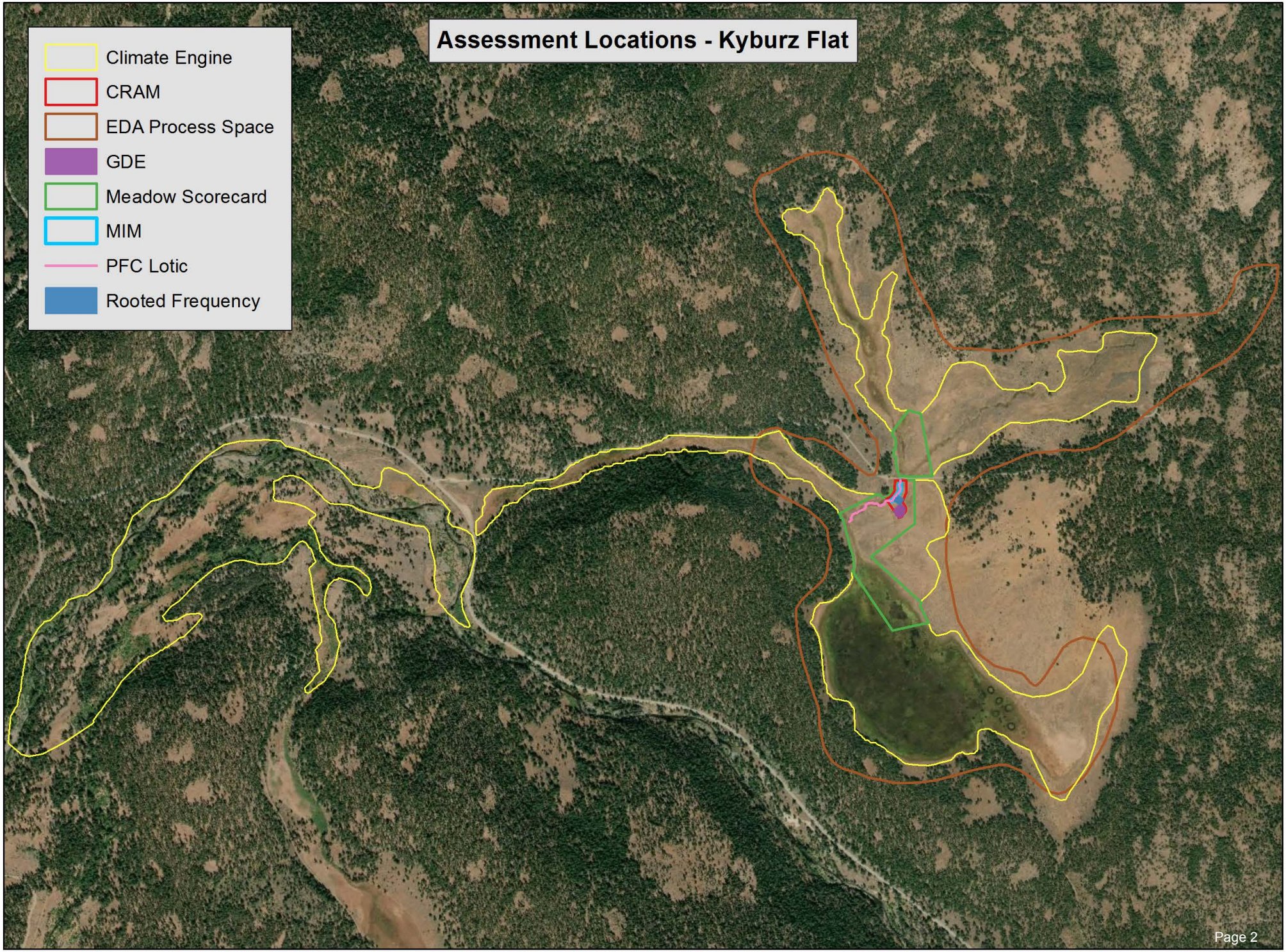
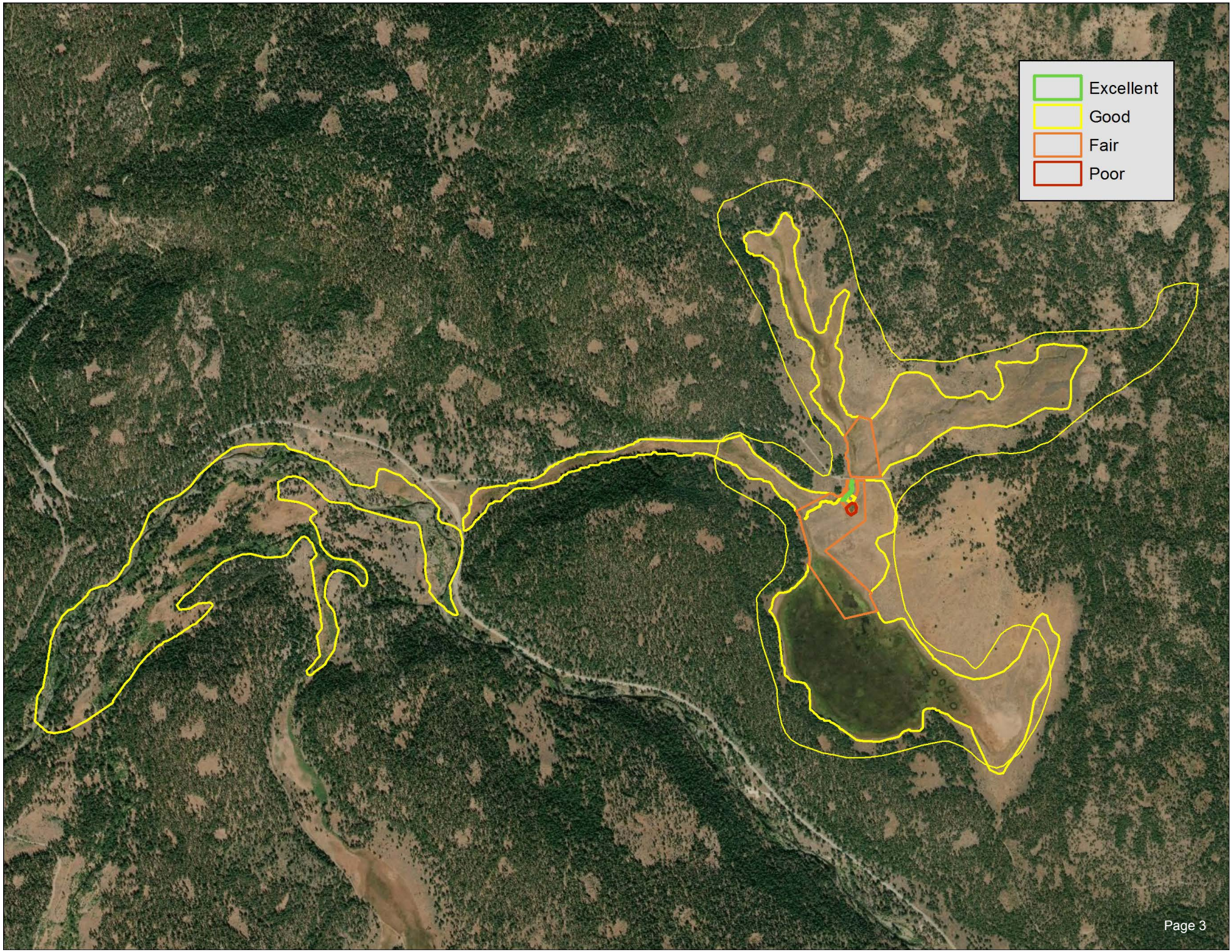
Assessment Data and Results for Kyburz Flat

This document includes the results and data collected from all of the protocols completed at Kyburz Flat. The first two pages are a map of Kyburz Flat, 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 - Kyburz Flat
Climate Engine
CRAM
EDA Process Space
GDE
Meadow Scorecard
MIM
PFC Lotic
Rooted Frequency


Excellent
Good
Fair
Poor

Assessment outputs at Kyburz Flat:

Protocol	Assessment Output	Standardized Rating	Factors Identified
Climate Engine	Mostly no trend and low sensitivity to PWD	Good	Potentially some drying and conifer encroachment
CRAM	72/100	Fair	Hydrologic and physical structure attributes - dikes, levees, culverts, channel incision, drying.
EDA	Partially recovered but locked in current state.	Good	Current infrastructure disconnects hydrology.
GDE	5 negative effects identified, 3 False Management Indicators	Poor	Channel incision, erosion, altered hydrology
Meadow Scorecard	14/24=58%	Fair	Bare ground, conifer encroachment
MIM	Greenline Ecological Status Rating = 100 (PNC); Winward Greenline Stability Rating = 7.94 (High)	Excellent	No streambank alteration along the greenline.
PFC Lotic	Functional at Risk, with 4 variables identified as not-functional	Good	Culvert, road, concentrated flood flows, channel incision, erosion
Rooted Frequency	Ecological status rating of 51	Good	31% competitor/decreaser species

Kyburz Flat Meadow (UCDSNM 014791), 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.

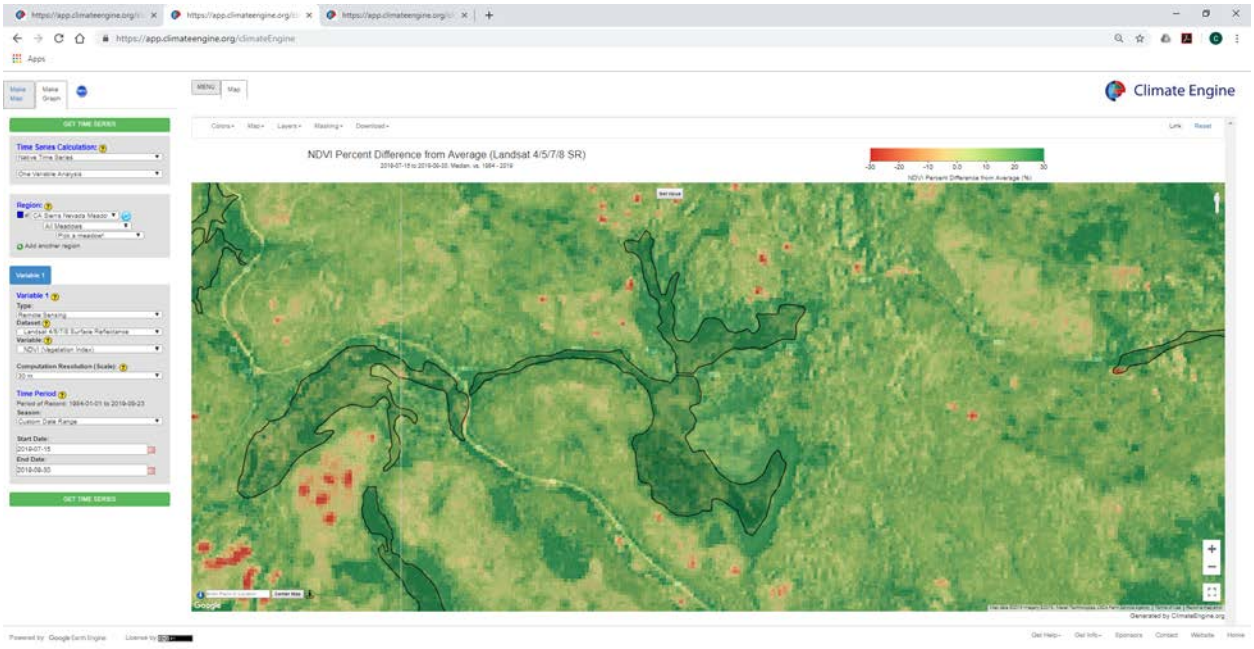
1) A status assessment compares NDVI in the year of interest relative to the historical record. Calculating the anomaly as the percent difference from average provides a useful and intuitive interpretation of the data. In a wet year, we would expect the NDVI anomaly to be positive (higher than average) 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.

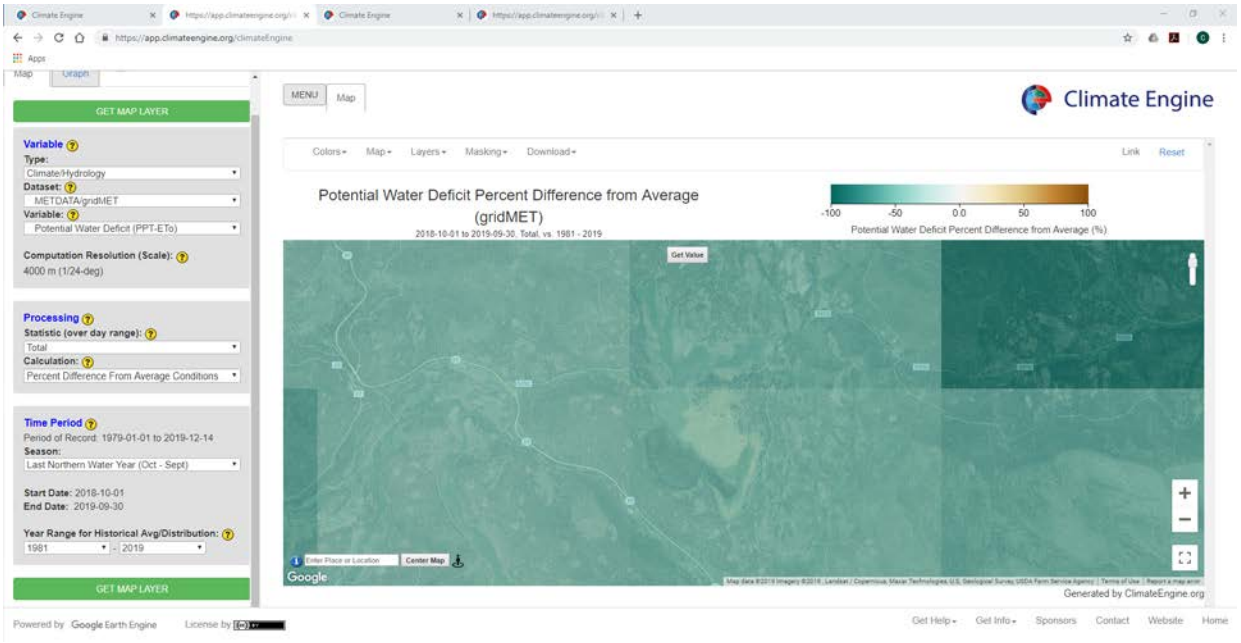
2) A climate sensitivity assessment identifies the slope of the relationship between NDVI and climate. Late-summer NDVI tends to be responsive to annual precipitation and evapotranspiration amounts, but the degree of sensitivity will vary depending on the amount of water subsidized to the meadow from 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:

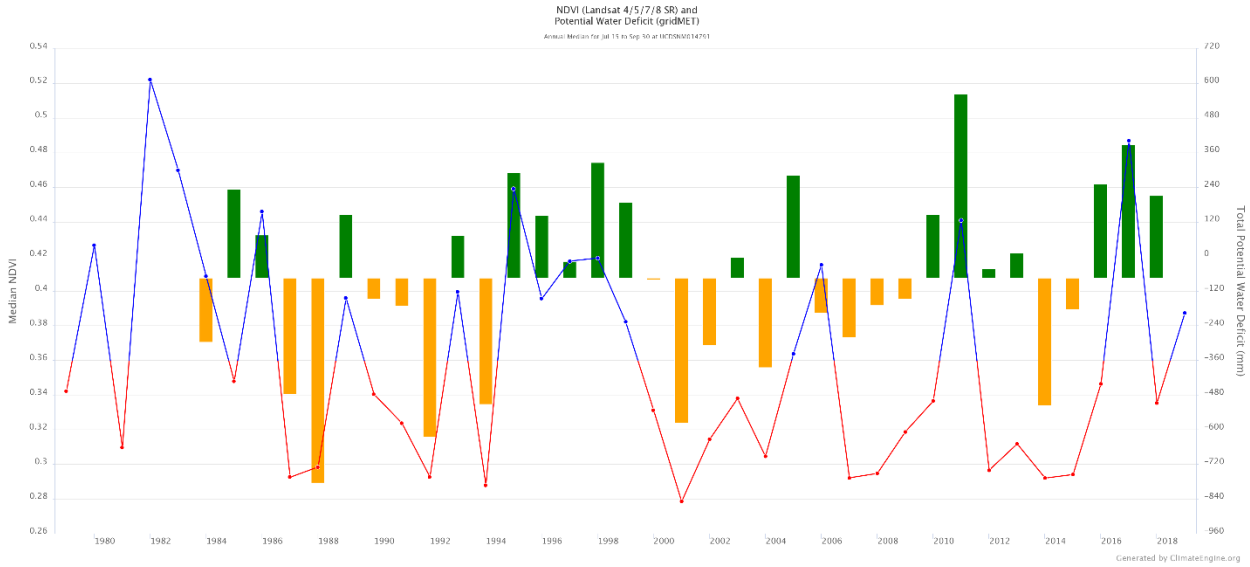
Relative to the historical (1984-2019 record), late summer (July 15-Sept 30) 2019 ***NDVI is higher than average in most parts of the meadow, due to the above normal water year***. This is the expected relationship. Differences in the anomaly magnitudes potentially indicate differences in responses to climate within the meadow or potentially indicate places where drying is occurring over time (lower anomaly areas). The central portion of the meadow which contained dry meadow and upland vegetation, and where most ground assessments took place show a lower anomaly, potentially indicating drying over time.



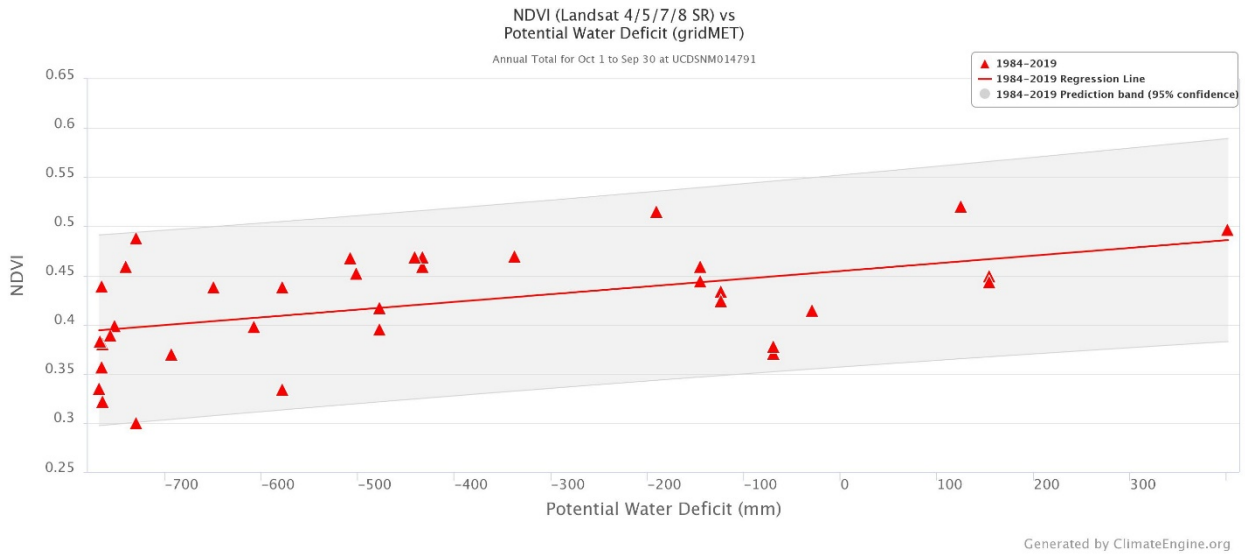


<u>Climate Sensitivity Assessment</u> (based on spatial averages of entire lower meadow polygon):

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 0.39 to 0.5, on average, between the highest and lowest water defecit years. This sensitivity is relatively low compared to other meadows. It represents an average across very wet and very dry parts of the meadow and thus does not capture the variation in sensitivities that likely exist. Water year climate is likely to influence conditions in dry parts of this meadow and should be considered when making comparisons of ground assessments among years.



<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): ***Most area within the meadow shows no trend. Increasing trends around periphery of meadow could be due to conifer encroachment.*** 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 shows much variation in upward and downward trends due to fire and forest thinning. Changes in forest water use associated with these changes has the potential to affect water availability in the meadow.

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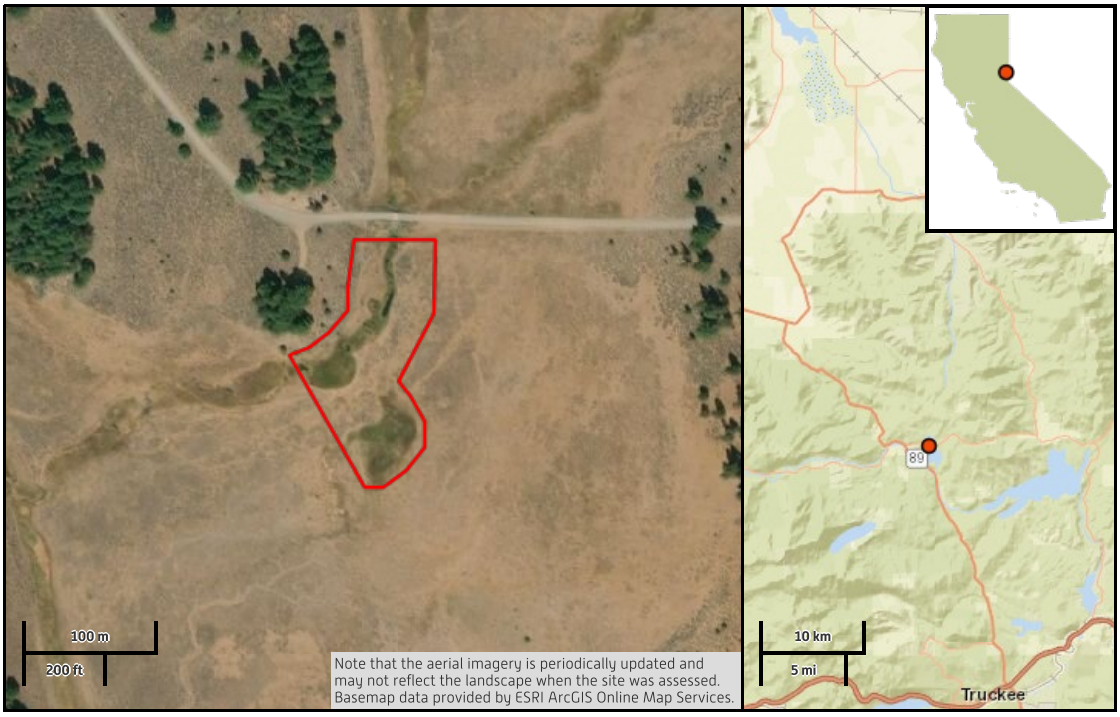
CRAM

California Rapid Assessment Method

Summary Assessment Report



Basic Information

eCRAM ID	7029
Assessment Area Name	Kyburz Flat
Project Name	
Assessment Area ID	MC-001
Project ID	
Wetland Type	channeled wet meadow
CRAM Version	6.1
Visit Date	2019-08-05
AA Category	training
Practitioners	Sarah Pearce (lead practitioner), Clifford Harvey (other practitioner), Brendan Reed (other practitioner)
Other Practitioners	
County	Sierra
Ecoregion	sierra
AA Centroid Latitude	39.50352

AA Centroid Longitude	-120.24003
AA Size (Hectares)	0.77395
Surface Water Present?	Yes
Hydrology Description	Overall supported by groundwater; has a small channel with surface flow. However the channel is routed through a culvert under the road, and thus concentrated, causing some channel incision and drying of the meadow.
Peat soils present?	No
AA Encompasses	portion of the wetland
Hydrologic State	moist
Apparent Hydrologic Regime	perennial
Comments	This was part of the USFS Meadows Assessment comparison, on 8/5 and 8/6 2019 lead by Shana Gross and Jen Greenberg. This site was selected for multiple assessment methods to be conducted concurrently.

Metric Scores

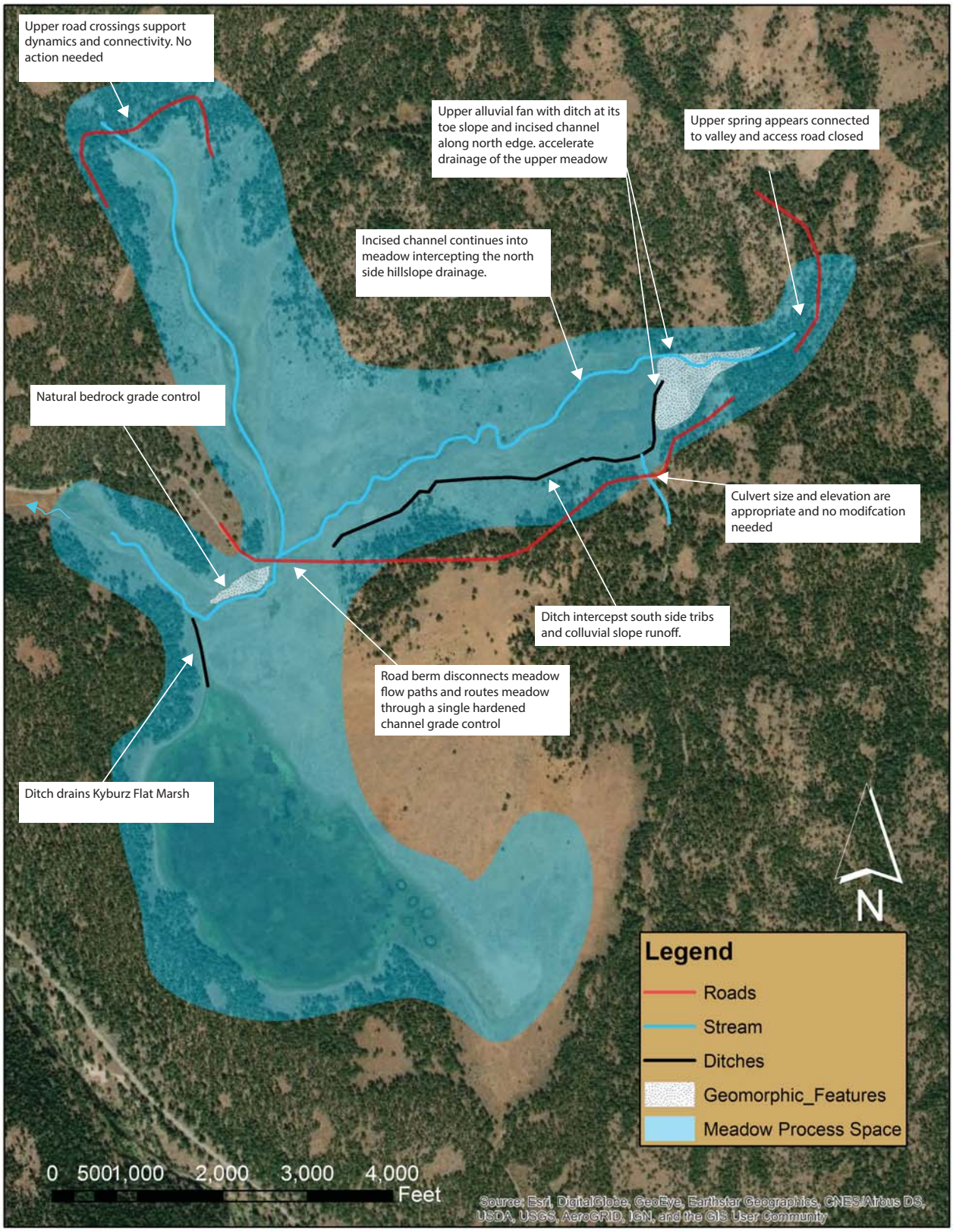
Attribute	Buffer And Landscape Context	87.50
	Aquatic Area Abundance	B (9)
	Percent Of AA With Buffer	A (12)
	Average Buffer Width	A (12)
	Buffer Condition	A (12)
Attribute	**Hydrology**	**70.83**
	Water Source	A (12)
	Hydroperiod	C (6)
	Hydrologic Connectivity	
	Bank Height Ratio	B (9)
	Percent Dewatered	C (6)
Attribute	**Physical Structure**	**50.00**
	Structural Patch Richness	C (6)
	Topographic Complexity	C (6)
Attribute	**Biotic Structure**	**79.17**
	Number Of Plant Layers Present	B (9)
	Number Of Co-Dominant Species	B (9)
	Percent Invasion	A (12)
	Number Of Upland Encroachment Groups	A (12)
	Plant Community Score	11
	Horizontal Interspersion And Zonation	B (9)
	Plant Life Forms	B (9)
Index Score		**72**

Stressors **7** total, **1** with significant negative effect - indicated below with *

Attribute	Biotic Structure
	Mowing, grazing, excessive herbivory (within AA)
Attribute	**Buffer And Landscape Context**
	Passive recreation (bird-watching, hiking, etc.)
	Rangeland (livestock rangeland also managed for native vegetation)
	Transportation corridor
Attribute	**Hydrology**
	Dike/levees*
	Engineered channel (riprap, armored channel bank, bed)
	Flow obstructions (culverts, paved stream crossings)

This report was created on Wednesday August 28, 2019, 8:31 AM 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.

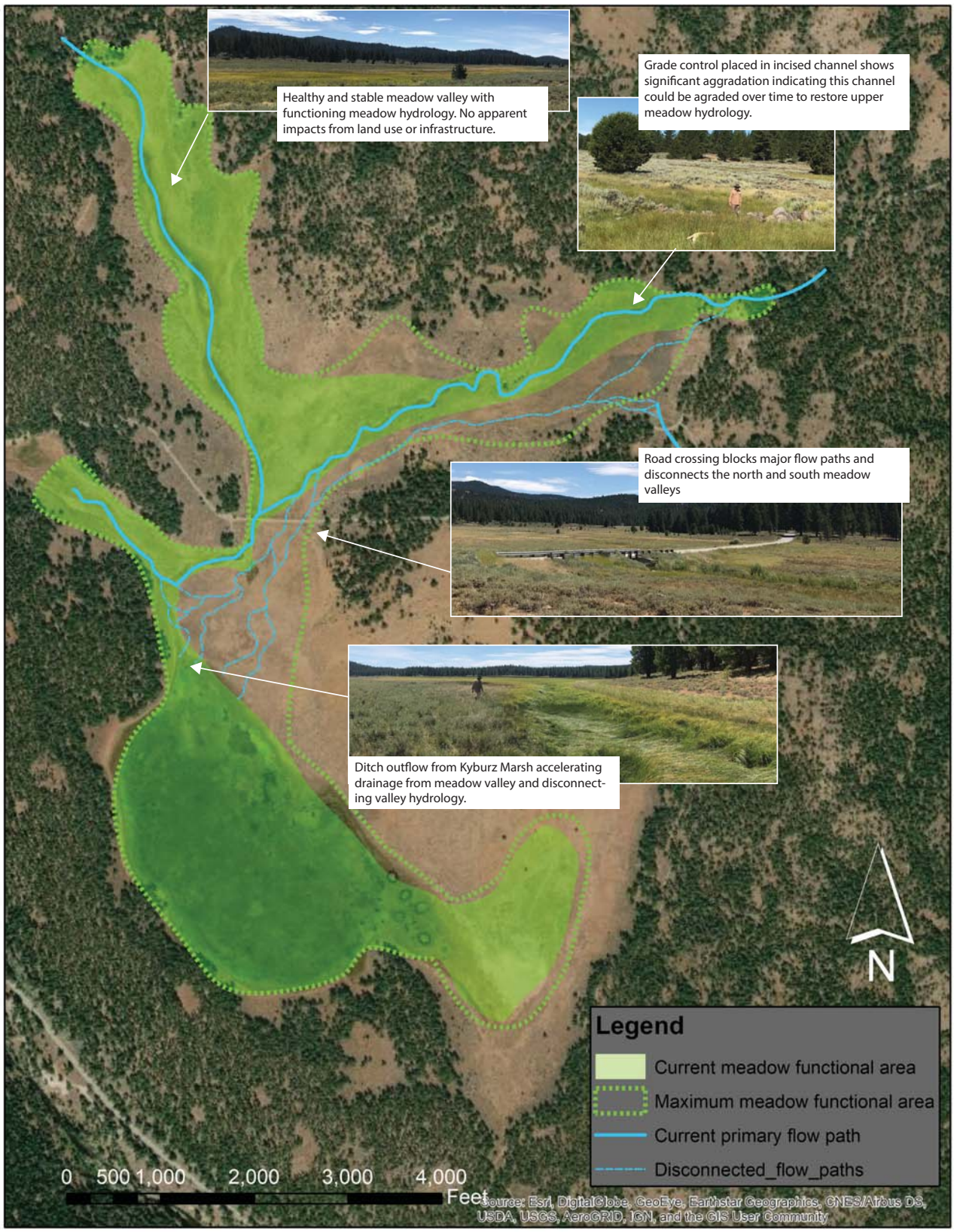
Process Space Mapping Excersise for Determining Restoration Potential and Identifying Actions



Methodology
Step 1- Map the Meadow Process Space this is the valley bottom and immediate tributary inputs, stream channels, colluvial slopes and alluvial fans.
Step 2- Overlay the human infrastructure disconnections and major land use impacts such as intensive cattle operations over the Meadow Process Space Map.
Step 3 - During site visit characterize the disconnections and other management constraints to the meadow in more detail to prioritize their relative impacts on natural processes.

In Kyburz Flat most of the disconnectivity occurs at the Hesses road crossing and two remnant drainage ditches

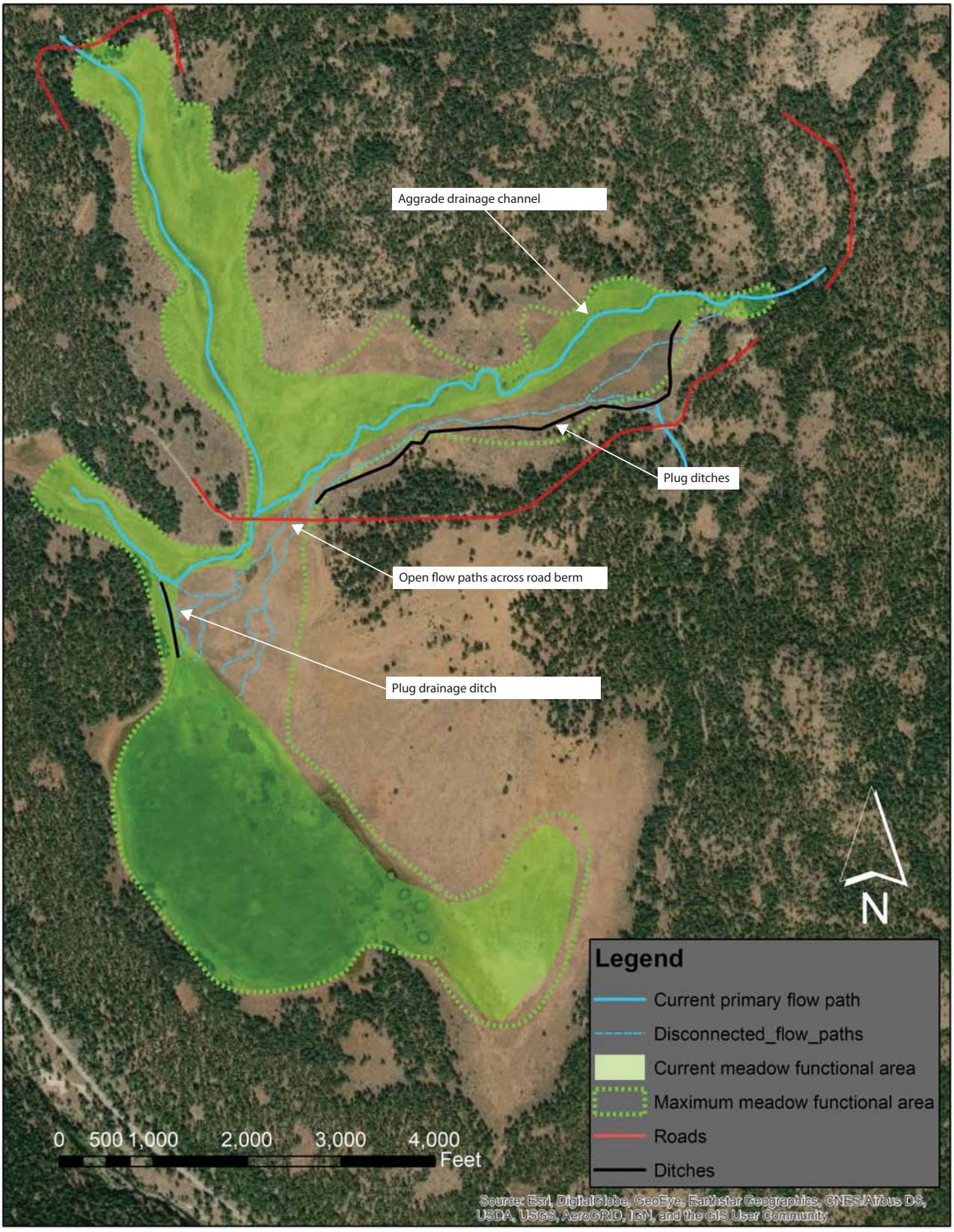
Kyburz Meadow Process Space



Methodology
Step 4 – Field evaluation of system recovery (where is the system looking healthy and what processes are supporting this state?). This is the more difficult and most commonly overlooked analysis by restoration practitioners and will take the most practice.
Step 5 – Field evaluation of system degradation (where is the system looking unhealthy and what processes are contributing to this?).

Kyburz Meadow Current and Restored Connectivity

Restoration Actions to Restore Meadow Connectivity



Methodology

Final step - Prirotize restoration actions. Generally the highest priority actions are those that open or reconnect the most process space or meadow functional area. In this case the highest gain in connectivity occurs when flow paths are opened across the middle road berm. Other gains in hydrologic connectivity occur if ditches are plugged and the northeast drainage channel is aggraded. The estimated gain in functioning meadow is depicted above. Priority Actions:

1) Open flow paths accross the road berm
2) Plug the outflow ditch from Kyburz Marsh
) Plug smaller ditches draining the northeast flow path
4) Aggrade the incised channel draining the northeast flow path

Kyburz Meadow Priority Actions

GDE Level I Inventory Assessment Summary: Kyburz Flat

On August 4, 2019, Tim Stroope (USFS Hydrogeologist) and Eddie Gazzetti (USFS Hydrogeologist) conducted a GDE Level I Inventory assessment for a mounded area surrounding a spring with peat accumulation in Kyburz Flat 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.

Mounded Area with Fen Characteristics (middle of meadow, ~100 m SE of parking area)

Hydrologic function: The mounded area (fen) was ~2000 m^2 with a distinct spring orifice near the center of the site. We were unable to measure discharge but there appeared to be a strong upward gradient. We augured a 90 cm hole about a meter from the orifice and measured the water table at a depth of 76 cm. The water table was rising very slowly (also observed from a group who had augured a hole 100-200 m south of our site) so it was probably not equilibrated at the time of our final measurement. There was a distinct channel running from the spring source that did not appear to adversely affecting the fen and was likely creating a local water table that defined the fen area and extent of peat accumulation. An adjacent stream channel was deeply incised, likely due to flow concentration from a culvert associated with a road that dissected the meadow. The incised channel was likely draining the meadow and disconnected the meadow's water table from the local water table created by the spring.

Biology: The vegetation in the fen was comprised largely of peat-forming and wetland indicator species. The surrounding meadow, with the exception of the marsh at the south end, was dominated by upland vegetation; primarily shrubs and grasses. The edge of the fen was distinct and was likely static due to consistent, perennial discharge from the spring. A faunal assessment was not conducted at the site but other groups did note the presence of anticipated faunal species at other areas in the meadow.

Soil condition: At the augured hole, fibric peat was identified down to a depth of 30 cm where there was a transition to sandy clay mineral soil. While a histosol was not identified at the site it did exhibit fen characteristics including the histic epipedon described earlier, groundwater influenced and high water table.

MANAGEMENT INDICATOR TOOL

Management Indicators were assigned values based on the condition of the meadow and not just the fen site.

False (No) values were assigned to the following management indicators:

- Watershed Functionality: Evidence, the stream incision likely due to the road and associated culvert, suggests upstream/upgradient hydrologic alteration that could adversely affect the GDE site.
- Runout Channel: The channel, if present, is functionally naturally and is not entrenched, eroded, or otherwise substantially altered.

Unable to assess values were assigned to the following management indicators:

Soil Integrity, Vegetation Composition, Vegetation Condition, TES, SOI/SOC, Focal Floral Species, Faunal Species, TES, SOI/SOC, Focal Faunal Species, and Invasive Species

Meadow Assessment Comparison Project – Kyburz Flat
Survey Summary Report, Springs Online Site ID 250061

Location: The Kyburz Flat ecosystem is located in Sierra County in the Truckee California, Nevada 16050102 HUC, managed by the US Forest Service. The spring is located in the Tahoe NF, Sierraville RD, in the Sardine Peak USGS Quad, at 39.50300, -120.24001 measured using a GPS (WGS84). The elevation is approximately 1900 meters. Tim Stroope; Eddie Gazzetti surveyed the site on 8/05/19 for 02:20 hours, beginning at 9:45, 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 Kyburz Flat: Looking north from the edge of Kyburz Marsh towards the parking area

Physical Description: Kyburz Flat is a helocrene/limnocrene spring. Kyburz Flat is a 500+ acre Sierra Nevada meadow ecosystem. The meadow contains multiple spring fed channels. Kyburz Marsh, a 260 acre wetland, is located at the south end of the meadow.

Geomorphology: Kyburz Flat emerges as a fracture spring from an igneous, andesite rock layer. The emergence environment is subaerial, with a gravity flow force mechanism.

Access Directions: Take Hwy 89 north, about 5 miles north of turn off for Sagehen Field Station. Turn right on Henness Pass Road. Follow that for 1.3 miles to a small parking area adjacent to the meadow.

Survey Notes: This survey describes a mounded area surrounding a spring with peat accumulation and not the entire meadow. The exception is the plants list which is for the entire meadow. The total area of the site is 2000 square meters, determined by Estimate

Cover Type	Percent Cover
Spring	2
Channel/brook	5
Peatland	40
Wetland	50
Open Water	3
Other/Unknown	

Flow: This spring is perennial, with a neorefugium persistence. Surveyors were unable to measure flow due to diffuse outflow. The site was Groundwater inflow dominated, and both groundwater and surface water outflow significant.

Water Quality: Location 1: at the spring source in flowing water at 11:55:00.

Table 1.2 Kyburz Flat Water Quality Measurements.

Characteristic Measured	Average Value	Location Number	Device	Comments
Dissolved oxygen (field) % saturation	27	1	YSI ProPlus	
Oxygen Reduction Potential in mV	101.6	1	YSI ProPlus	
pH (field)	7.88	1	YSI ProPlus	
Specific conductance (field) (uS/cm)	186.5	1	YSI ProPlus	
Temperature, air C	24.7	1	YSI ProPlus	
Temperature, water C	9.5	1	YSI ProPlus	

Flora: This flora record is for the entire Kyburz Flat meadow ecosystem and not just the sub-site described by the rest of this survey. The surrounding vegetation was Tree dominated; bryophyte was a Minor component.

Table 1.3 Kyburz Flat Dominant Vegetation (1=greatest, 5=least)

Type	Rank	Dominant Vegetation Species	Collected?
Tree	5		No
Shrub	2		No
Graminoid	1		No
Forb	3		No
Aquatic	4		No

Bryophyte	4		No
Unknown			No

Soils: Surveyors dug a 90 cm deep soil pit that was targeted, other (explain). The depth to the mineral layer was 30 cm, the underlying texture was Sandy clay.
Redox concentrations: Present
Hydrogen sulfide odor: 1
Fen characteristics: Yes
Histic Histosol: Yes

Table 1.4 Kyburz Flat Hydrologic Alteration

Water diversion (permanently diverted)	X
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	
Diverted Volume	
Percent Diverted	

Table 1.5 Kyburz Flat Soil Alteration

Channel erosion	X
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	

Table 1.6 Kyburz Flat 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)	X
Other structural disturbance	
None observed	

Table 1.7 Kyburz Flat Recreational Effects

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

Table 1.8 Kyburz Flat Animal Effects (multiple ok)

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

Table 1.9 Kyburz Flat Miscellaneous (multiple ok)

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

Table 1.10 Kyburz Flat 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.	False	Road though middle of site may be concentrating flow through a culvert
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.	False	Pools and bank erosion in channel may be exacerbated by concentrated flow
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.	Unable to Assess (UA)	
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.	True	
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.	True	
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.	False	Road has altered hydrology but extent is unknown
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.	True	
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.	True	
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.	True	
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	

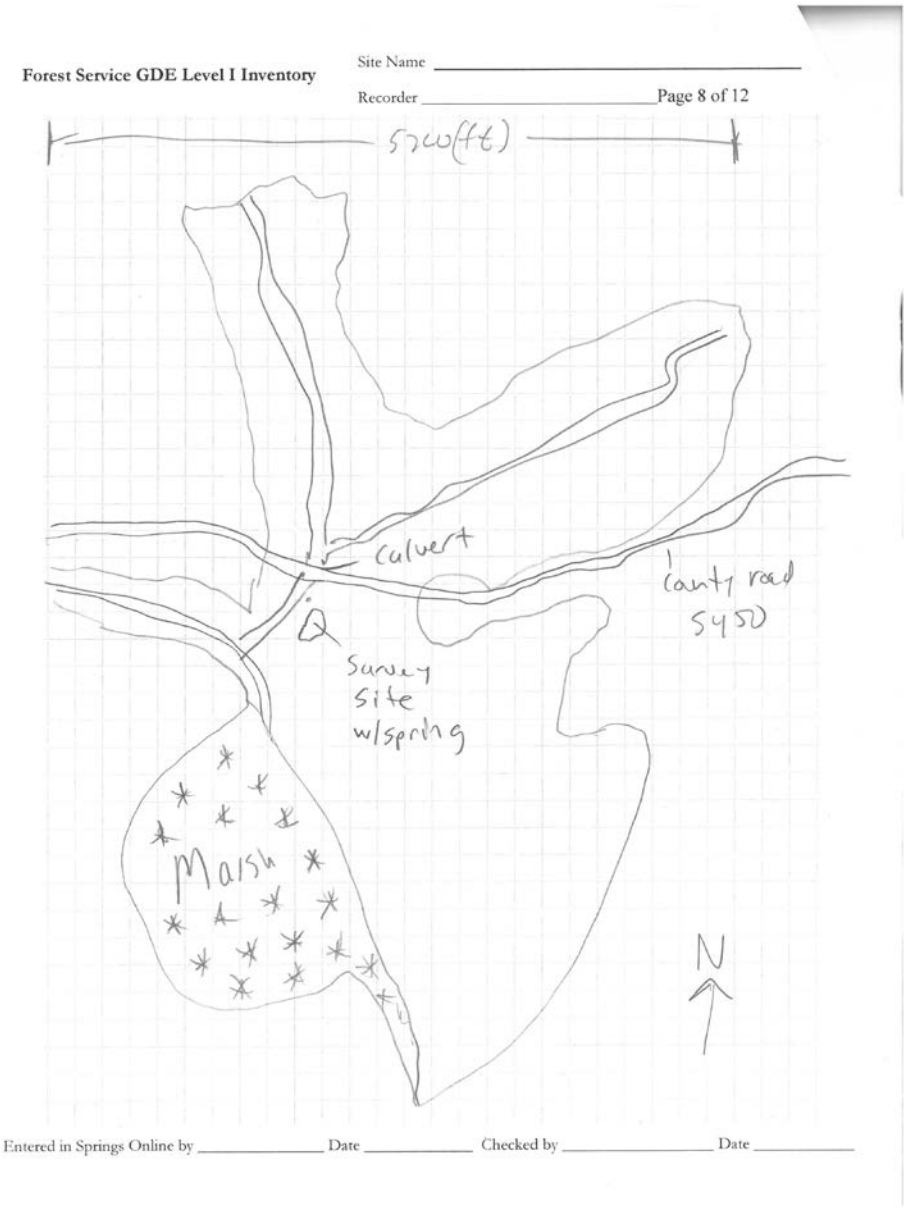


Fig 1.2 Kyburz Flat Sketchmap: Sketch map

Fig 1.3 Kyburz Flat: Kyburz - Soil core location

Meadow Name Kyburz Flat (UCDSNM014804)	Date : 08 / 05 / 2019 (MM DD YYYY)
GPS Location: 4376363 N 737384 W	
GPS Datum (e.g., WGS 84, NAD 27) UTM, NAD 83, Zone 10	
Elevation (ft) 6332 Slope (°) Sierra County	
Watershed (HUC8) Truckee Landowner USFS	
USGS Quad Name Sardine Peak and Hobart Mills Quadrangles 7.5' or 15' (circle one)	
Observers: Michelle Coppoletta (USFS); Jen Greenberg (California Tahoe Conservancy)	

	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:	4	**3**	2	1
Second Channel (if present):	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:	4	**3**	2	1
Second Channel (if present):	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:	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:	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:	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:	4	3	2	**1**

Total	14
Possible Points	24
Total/Possible	0.58

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Additional Observations:

1. ☒Yes ☐No Evidence of conservation or restoration efforts (check dams, stabilized headcuts, exclosure fencing, etc.) Photo Numbers: see photo log
   Description: _____
2. ☐Yes ☒No Headcut present in meadow? Number of headcuts Small areas of incision were observed, especially closer to the bridge; however no headcuts (i.e. those that were draining the meadow) were evident

Describe the headcuts (Photo number, jump height, width, length, potential for movement. GPS or record location on map):

3. ☐Yes ☒No Invasive species observed? Describe _____

4. ☒Yes ☐No Fish observed? Describe tiny fish were seen in some of the small ponded portions of the stream

5. ☐Recent ☐Old ☒None Evidence of beavers? Describe _____

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

7. ☒Yes ☐No Accessible by vehicle?

8. Grazing observations. Check all that are present: Evidence of sheep grazing in the recent past. Old fencing and enclosures present, dung in the meadow, and old tires in the wetter portion of the meadow (may be salt licks?).

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

9. Human impacts. Check all that are present in the meadow: Corral is more of an enclosure (see photo). Other evidence of human impacts include old tires (see grazing observations) and bird boxes.

   ☐Trail ☐Evidence of OHV use ☒Road ☒Corral ☐Building

10. Adjacent land use. Check all that are present within 200 yards of meadow: The bridge and road bisect the meadow

    ☐Culvert ☒Bridge ☒Road ☐Building

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

12. Willow, alder and aspen cover 1 % of meadow area.

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

Impacts to the meadow appear to be generally concentrated above and below the road and bridge, both of which bisect the meadow and are the likely cause of the down cutting observed down stream. The rockfall on the downstream side of the bridge is below the meadow surface elevation. Access to this meadow is good. The road could be manged by the County, so any restoration actions would have to be coordinated. Restoration activities (adding additional culverts or dips at the appropriate grade) would likely improve the condition of the meadow.

Additional Notes & Comments:

Along the stream channel were a number of small, relatively deep pools that currently hold standing water.
Bird boxes are present and are being utilized.
We found two old tires in a very wet portion of the meadow (old salt licks?).
The southern portion of the meadow includes a large sedge-dominated wet meadow, with no visible channel, and a pond with floating vegetation.

Meadow Name/Number Kyburz Flat Date 8/5/19

Observers Michelle Coppoletta and Jen Greenberg

	Graminoid	Forb	Bare: No Gopher	Bare: Yes Gopher	Other Cover: moss, litter,etc.
Upper Transect	11	16	19		4
on channel Middle Transect	12	8	19		13 (mostly litter)
East side of meadow	24	8	13		6
Lower Transect	13		8		3 (standing water)
Subtotal	A: **60**	B: **32**	C: **59**	D: **0**	E: **26**

Total:	= A+B+C+D+E	**177**
Total Veg:	= A+B	**92**
Total Bare:	= C+D	**59**

% Gramminoid (Question 4)	= A/Total Veg X 100%	**65%**
% Bare (Question 2)	= Total Bare/Total X 100%	**33%**
% Gopher Disturbed (for Add'l ?'s)	= D/Total X 100%	**0%**

Meadows Assessment Photo Log

Photo #	Description	Notes
KB_1	Middle Transect (looking SE)	This was the transect done "on channel" (see data above)
KB_2	Middle Transect (looking NW)	This was the transect done "on channel" (see data above)
KB_3	Jen standing in deep channel	Evidence of undefined channel with deep pools
KB_4	Jen measuring channel depth	Jen in wide vegetated channel, measuring channel depth
KB_5	Wide, vegetated channel	Vegetated channel leading to large green meadow (S end of meadow)
KB_6	Start of Lower Transect	S. portion of meadow (wet, sedge-dominated) start of lower transect
KB_7	Edge between wet and dry veg	Shows the contrast in vegetation between encroached dry and sedge-dominated wet meadow
KB_8	Metal structures in wet meadow	Old metal structures (troughs?) next to pond in wettest portion of meadow
KB_9	Group measuring	Ground water dependent ecosystems group doing their assessment
KB_10	Middle transect (second)	Start of second middle transect "east side of meadow" (see data above)
KB_11	Enclosure	Old abandoned enclosure in meadow
KB_12	Data collection	Other assessment groups collecting data
KB_13	Bridge with rock outfall	Rockfall below (downstream) of the bridge that bisects the meadow
KB_14	Lower edge of rockfall	Lower edge of rockfall below bridge; looking south into meadow
KB_15	Upstream of bridge	Metal and rock barrier constructed above the bridge (meant to retain H2O)

Meadows Assessment Photo Log (Continued)

Photo #	Description	Notes
KB_16	Upper transect	Start of upper transect

Additional Notes:

Multiple Indicator Monitoring (MIM)

Greenline Ecological Status Rating = 100 (PNC) Potential Natural Community; Winward Greenline Stability Rating = 7.94 (High)

Summary Analysis DMA = TAH1902 | Pasture = Kyburz | Date = 5/8/2019

LINK TO PROPER FUNCTIONING CONDITION (PFC) ANALYSIS

LINK TO GRAPHS WORKSHEET

LINK TO CORRELATION MATRIX

SHORT-TERM INDICATORS

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 (%)
5.00	5.0	CANE2	4.83	17.8%	0%	100%	100%	100%	0%	0%	0%
n=	65	41		23	1	62	62	62	0	0	0
95% conf Int[1]	0.28	*	0	7.2%		*	*	*	*	*	*
95% CI[2]	**0.85**			**6%**	**6%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**

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 (%)
	100	95	7.94	46	0%	20%	8.38	84%	4%	40	79.3%
Rating	**PNC**	**FACW+**	**High**								
n=	*	*	*	67	0	20	133	106	6		100
95% conf Int[1]	*	2.0	*	*	*	*	*	*	*	*	*
95% CI[2]	**5.75**	**3**	**0.16**					**6.2**	**5.9**		**6.2**

	Substrate:				Pools				Width and Shade		
	Percent fines	D16 Particle Size (mm)	D50 Particle Size (mm)	D84 Particle Size (mm)	Total number pools	Pool Frequency (#/mile)	Mean Residual Depth - All (m)	Mean Residual Depth - >.06 (m)	Greenline-greenline width (m)	Average Woody Plant Height (m)	Shade Index
					0				1.41	0.9	0.03
n=	0	0	0	0	0	0	0	0	64	7	67
95% conf Int[1]	#DIV/0!	*	*	*	*	*			0.24	1	*
95% CI[2]	**11.6**					**14**	**0.06**	**0.06**	**0.32**		

[1] **95% conf Int: 95% confidence interval based the data in this DMA**

[2] **95% CI: the 95% confidence interval from all test sites (see Table F7 in TR 1737-23)** MORE

* No confidence interval computed

Winward Riparian Capability Group**	
Group	IV

**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

Narrative Summary

This site was not an ideal candidate for this protocol, nor did the survey have enough survey points (66 out of 80). No riffle or pools were present, so no data was gathered for this metric. The stream disappeared in a few areas, making it hard to follow the greenline and there were a few isolated deep pools that changed the stream morphology.

There was no apparent streambank alteration (cow hoof print ½ inch deep) due to the dominate cover of CANE2 (*Carex nebrascensis*) along the greenline, however there were signs of grazing of hydric woody species (*Salix geyeriana* and Salix *lemmonii*). Streambank stability was good, with no uncovered or eroding banks.

Vegetation Ratings were high due to a 40% dominate cover of CANE2 and the Plant diversity index was moderate at 8.3%. Overall this site rated high to moderate with the metrics used and will be a baseline for future surveys.

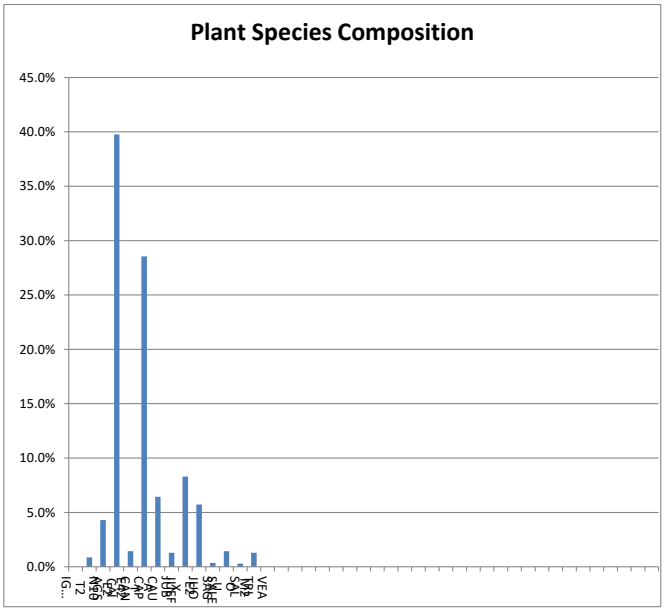
FREQUENCY DISTRIBUTIONS

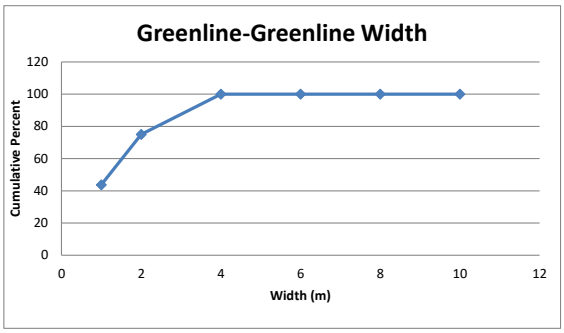
Plant Height

Class	Height range	Total plants	Height	Frequency
1	<.5	1	0.4	14
2	.5 - 1	3	0.75	57
3	1 - 2	3	1.5	100
4	2 - 4	0	3	
5	4 - 8	0	6	
6	>8	0	12	

Percentile Heights

85th Percentile	50th Percentile	25th Percentile		Total
				7
	0.69	0.49		
1.24				





PLANT SPECIES COMPOSITION			
Species Plant Code	Greenline Composition	Cover	Constancy
IGNORE	0.0%	0.0%	1%
AGST2	0.9%	20.0%	2%
CAIN10	4.3%	37.5%	6%
CANE2	39.8%	60.4%	34%
CAPE42	1.4%	100.0%	1%
CAUT	28.5%	79.8%	19%
JUBA	6.4%	30.0%	11%
JUEF	1.3%	45.0%	1%
JUOX	8.3%	29.0%	15%
SAGE2	5.7%	100.0%	3%
SALE	0.4%	25.0%	1%
SALU	1.4%	100.0%	1%
TRLO	0.3%	10.0%	1%
VEAM2	1.3%	18.0%	4%

Downstream Across

Upstream Across

Downstream Up

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 - Kyburz Flat

Meeting location is on Henness Pass Road. Take Hwy 89 north, about 5 miles north of turn off for Sagehen, turn right on Henness Pass Road. Follow that for 1.3 miles, please park at the pull out just to the west of the site, on the south side of the road, red pin below. The entire meadow is over 500 acres, so we're going to focus on the part **south** of the road, outlined some of the area in red below. UC Davis Meadow Clearinghouse link: https://meadows.ucdavis.edu/meadows/ucdsnm014804

Reach starts at culvert (yellow pin below, 39°30'15.12"N, 120°14'23.68"W), going **downstream**. For lotic PFC assessment, the reach below the road was extended to the confluence with the tributary coming in from the northwest about 1000 feet below the road.

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):
Kyburz Flat – functional at risk (FAR) - The meadow potential is believed to be a wide area of gradual water flow without a channel. The current channel receives concentrated flood flows because the Henness Road is elevated above the meadow surface and thus creates a floodplain dam. Flood waters pass under the road in a double box concrete culvert and the shear stress from this has required placement of large boulders below the culvert to dissipate some energy and protect against erosion. Still the hydraulic energy form these flows may be responsible for numerus scour pools along the floodplain surface below the road. Currently it is unclear whether these scour pools are expanding and connecting into a gully with headward cutting of pools or becoming smaller and more disjunct by accumulation of sediment as floodwaters pass through patches of riparian herbaceous stabilizers, primarily Carex species.

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)):

Kyburz Flat - The first step is to identify trend in scour pool interconnection versus restoration of floodplain energy dissipation with riparian stabilizing vegetation. Some baseline data were estimated by a simple pace transect along the thalweg, the deepest part of the channel where floodwater would be deepest, Currently between the road and the confluence with the downstream tributary, there was approximately 770 feet of riparian stabilizers and 588 feet of either bare ground, deep water without stabilizing vegetation, or other vegetation – principally Eleocharis sp. (spike rush) or grasses. Are the stabilizers increasing as a % of the thalweg? If the trend is up over a period of many years, a road revision may not be necessary. If the trend is downward and scour pools are connecting, a road fix may be warranted. Of course grazing management may also influence this metric.

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

PFC Assessment Form (Lotic) Name of Riparian-Wetland Area:__Kyburz Flat_____

Date:8/5/2019	Segment/Reach ID: Henness Rd to confluence
ID Team Observers: Sherman Swanson with review by Meadow Assessment Protocol Comparison Team	GPS Start reach 39 30 15.12 N 120 14 23.68 E
Rationale for reach breaks: Double Box culvert in floodplain dam of Henness Rd. and confluence with tributary contributing >15% to flow	GPS End reach
Mgmt./Admin Unit Kyburz Allotment, Truckee Dist.	Assessment Method Field assessment

Other assessment or monitoring data for area _____

Description of potential and rationale:
Hydrologic regime _Intermittent with snowmelt and occasional thunderstorm floods_
Stream Type(s) Possibly there was no channel with a great proportion of flood waters crossing the broader meadow surface. If there was a channel, it was likely well vegetated with riparian stabilizers__
Plant communities _Plant communities were herbaceous stabilizers although there may have been occasional willows_
Other _Meadow width is 4-500 feet at the narrow zone along where the road crosses the meadow. Floodflow is now restricted to a small fraction of this area through the concrete culverts._

Yes	No	N/A	**HYDROLOGY**
Yes			1) Floodplain inundated in "relatively frequent events" (1-3 years). **Notes: Most deep water areas have berms between the scour pools. Some pools are currently filled to near the floodplain surface (upstream). Others (downstream) have various levels of water remaining, but were filled to the new inset floodplain elevation in times of flow. Broader areas of the meadow are now a terrace that is less frequently flooded.**
		NA	2) Beaver dams are stable. **Notes: Willows are spotty and there were no beaver dams of beaver sign.**
	No		3) Width/depth ratio, sinuosity, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region). **Notes: Pools that are deep and too numerous are in a zone of fast water within a preferential flow path below the culvert that is less wide than the presumed potential broad meadow flow path.**
Yes			4) Riparian-wetland area is expanding or has achieved potential extent. **Notes: Stabilizing sedges are abundant on the floodplain surface within the shallow incision. This setting with indications of past disturbance (later confirmed with Google Earth) suggests previous or ongoing expansion of riparian vegetation. With accumulation of soil organic matter, the water can spread and sustain wetland species in more areas. However, the abundance and possibly expanding connections between the scour pools can facilitate drainage.**
	No		5) Riparian impairment from the upstream or upland watershed is absent. **Notes: The road creates a floodplain dam that concentrates flood flows through the culvert, rather than across the breadth of the meadow. This narrows the wetted area during high flows and concentrates hydraulic energy. This is believed to be a causative factor in the formation and possible enlarging of scour pools along much of the thalweg along a channel that may not have had a well developed channel or where the vegetated channel surface would have been continuous and the wetted surface wider.**
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) **See the plant list provided by Dave Weixelman and add to that Artemisia cana that is broadly distributed across the now drier meadow surface.**

Yes			7) There are adequate age class(es) of stabilizing riparian vegetation for recovery/maintenance **Notes: Many sedge patches appear to have expanded recently (after a presumed grazing management change).**
Yes			8) Species present indicate maintenance (or recovery) of riparian soil moisture characteristics. **Notes: While currently being maintained, they are much drier than potential across much of the silver sage vegetated meadow surface.**
Yes			9) Stabilizing plant communities capable of withstanding moderately high streamflow events are present along the streambank. **Notes: Stabilizers, primarily rhizomatous sedges, dominate many well expressed pateches of stabilizing bank vegetation around scour pools.**
Yes			10) Riparian plants exhibit high vigor. **Notes: Abundant growth occurred this year and there has been little grazing.**
Yes			11) Adequate amount of stabilizing riparian vegetative is present to protect banks and dissipate energy during moderately high flows. **Notes: Approximately 95% of streambanks are dominated by stabilizers, mostly herbaceous although willows are locally abundant below the culvert.**
		NA	12) Plant communities are an adequate source of woody material for maintenance/recovery. **Notes: This is not a wood dominated or influenced system. Forest trees were never close to the meadow channel.**

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: The pools are not generally connected and that provides floodplain access with much stabilizing herbaceous vegetation in the wide incised channel. However, additional connections between scour pools would change this and focus hydraulic energy.**
Yes			14) Point bars are revegetating with stabilizing riparian plants. **Notes: Bare point bars were not observed, but may have been common in prior decades.**
Yes			15) Streambanks are laterally stable. **Notes: Although some scour pools are enlarging, this is not leading to lateral movement. Also widening of the pools enables them to fill and colonize with riparian plants or progress through succession toward stabilizers.**
	No		16) Stream system is vertically stable [not incising]. **Notes: Many pools appear to have head ward movement and thus may connect with upstream pools. Connection of pools would cause channel incision.**
	No		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: Very little sediment comes from this watershed and so erosion, though very slow, appears to be net erosion in this reach.**

SUMMARY DETERMINATION

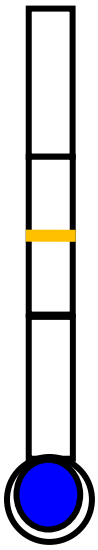
Functional Rating
___ Proper Functioning Condition
_X_ Functional - At Risk
___ Nonfunctional
Rationale **_Currently the abundance of stabilizers indicates aquifer recharge and stability through floodplain accessibility and vegetation roughness. The concentration of flow forces has created or enlarged scour pools that may be connecting, and this would effect channel incision and loss of functions.**

Trend for Functional - At Risk:

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

Rationale **_Expansion of herbaceous vegetation stabilizers appears to have been substantial and may be continuing. However, connection of scour pools may be happening through headcutting.**

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



PFC

FAR

NF

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

Explain factors preventing achievement of PFC:**_The Henness Road constricts flow and concentrates hydraulic energy. This has created scour pools. The road could be converted into a floodplain elevation boulder/cobble bedded ford that does not concentrate flow. Monitoring of the proportion of the thalweg vegetated by stabilizing riparian vegetation (versus colonizing vegetation or bare ground) could quantify trend as could the width of wetland indicators.**

(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
ACAM	Acmispon americanum	R	FACU	20
ACMI2	Achillea millefolia	I	FACU	6
ARCA13	Artemisia cana	C	FACU	18
ARTRV	Artemisia tridentata ssp. vaseyana	C		14
CAMI7	Carex microptera	C	FACU	3
CANE2	Carex nebrascensis	C	OBL	14
CASTI	Castilleja sp.			1
CREPI	Crepis sp.			2
CRYPT	Cryptantha sp.	R		13
DECE	Deschampsia caespitosa	C	FACW	12
DEDA	Deschampsia danthonoides	R	FACW	157
ELEL5	Elymus elymoides	C	FACU	7
ELQU2	Eleocharis quinqueflora	C	OBL	24
EPBR3	Epilobium brachycarpum	R		7
EPCI	Epilobium ciliatum	I	FACW	6
HOBR2	Hordeum brachyantherum	I	FACW	27
JUBA	Juncus balticus	C	OBL	172
JUBU	Juncus bufonius	R	FACW	1
MADIA	Madia sp.			3
MICA	Micropus californicus	R	FACU	4
MIGR	Microsteris gracilis	R	FACU	8
NAIN2	Navarretia intertexta	R	FACW	79
ORFA	Aphyllon fasciculatum			2
PEPA21	Perideridia parishii	I	FAC	17
PERY	Penstemon rydbergii	I	FACU	3
POBU	Poa bulbosa	R	FACU	1
PODO4	Polygonum douglasii	R	FACU	12
POPO4	Polygonum polygaloides	R	FACW	18
POPR	Poa pratensis	I	FAC	18
POSE	Poa secunda	C	FACU	52
RAAL	Ranunculus alismifolius	R	FACW	14
SYSP	Symphyotrichum spathulatum	I	FAC	134
TRLO	Trifolium longipes	I	FAC	140
VEPEX	Veronica peregrina ssp. xalapensis	R	OBL	5
			Total hits	1014

Competitors/Decreasers:	31%
Intermediate/Increasers:	35%
Ruderals/Invaders:	33%

*Percentages do not add to 100% due to presence of a few species unidentified/without an assigned

Ratliff Ecological Status Rating: 51

(Ratliff 1985 p. 46) low end of "good" range

Ground Cover	
Bare Soil	8.75%
Rodent Bare Soil	0.42%
Cryptogam	0.83%
Litter	83.75%
Live Basal Vegetation	5.42%

Soil data

Texture at 25 cm: sandy clay loam

Depth to mottles: 40 cm

Depth to saturation: 145 cm

Depth of "many" fine roots (1 per cm2, <2mm diameter)

T1	T2	T3
0 cm	4 cm	4.5 cm

(no plants at site of T1 hole)

Presence of animal dung (sheep)

T1	T2	T3
3	0	0

Visually dominant species (cover)

Deschampsia danthonoides	15%
Juncus balticus	10%