

Meadow Name _____	Date : ____ / ____ / ____ MM DD YYYY
GPS Location: _____ N _____ W	
GPS Datum (e.g., WGS 84, NAD 27) _____	
Elevation (m) _____	Slope (°) _____ County _____
Watershed (HUC8) _____	Landowner _____
USGS Quad Name _____	7.5' or 15' (circle one)
Observers: _____	

Parameter	CONDITION CATEGORY			
	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 25% or more of channel length; higher than 4 feet along less than 25% of channel length.	Bank heights > 4 feet along 25% or more 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 impacting hydrology 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 1/10 th 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	
			Possible Points	
			Total/Possible	



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Additional Observations:

1. Yes No Evidence of conservation or restoration efforts (check dams, stabilized headcuts, enclosure fencing, etc.) Photo Numbers: _____
Description: _____

2. Yes No Headcut present in meadow? Number of headcuts _____
Describe headcuts (Photo number, jump height, width, length, movement potential. GPS or record location on map):

3. Yes No Meadow contains inset floodplain surrounded by upland vegetation?
Describe _____

4. Yes No Invasive species observed? Describe _____

5. Yes No Fish observed? Describe _____

6. Recent Old None Evidence of beavers? Describe _____

7. Yes No Aspen present in or adjacent to meadow?

8. Yes No Accessible by vehicle?

9. Grazing observations. Check all that are present:
Trails Stubble Dung in channels Hoof prints on banks

10. Human impacts. Check all that are present in the meadow:
Trail Evidence of OHV use Road Corral Building

11. Adjacent land use. Check all that are present within 200 yards of meadow:
Culvert Bridge Road Building

12. Gopher disturbance covers _____% of meadow area (from toe-point transects).

13. Willow, alder and aspen cover _____% of meadow area.

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

Additional Notes & Comments:

Explanation:

This scorecard uses observations of the main channel as well as observations recorded throughout the meadow. One strategy for moving through the meadow is to start at an outflow and walk a main channel to the top of the meadow, making observations of bank height (Question 1), bank stability (Question 2), headcuts or eroded tributaries (Part of Question 3, and additional observations). Walk the length of all main channels present (adding lines to Q's 1 & 2, if there are more than 2 channels, which is unusual). It may help to make notes on an aerial photograph. Also, as you walk up a channel, note vegetation patterns by looking across the meadow. Then, aided by an aerial photograph, choose toe-point transects that cross the dominant vegetation types (Questions 4 & 5). Lastly, visit areas of possible conifer encroachment along the meadow edge (6). Make notes adjusting the delineated meadow to the actual meadow bounds. Again, an aerial photograph may be useful for this task. Determining the correct meadow extent from groundtruthing is integral for calculating what percentage of meadows are over or under delineated in classified aerial imagery

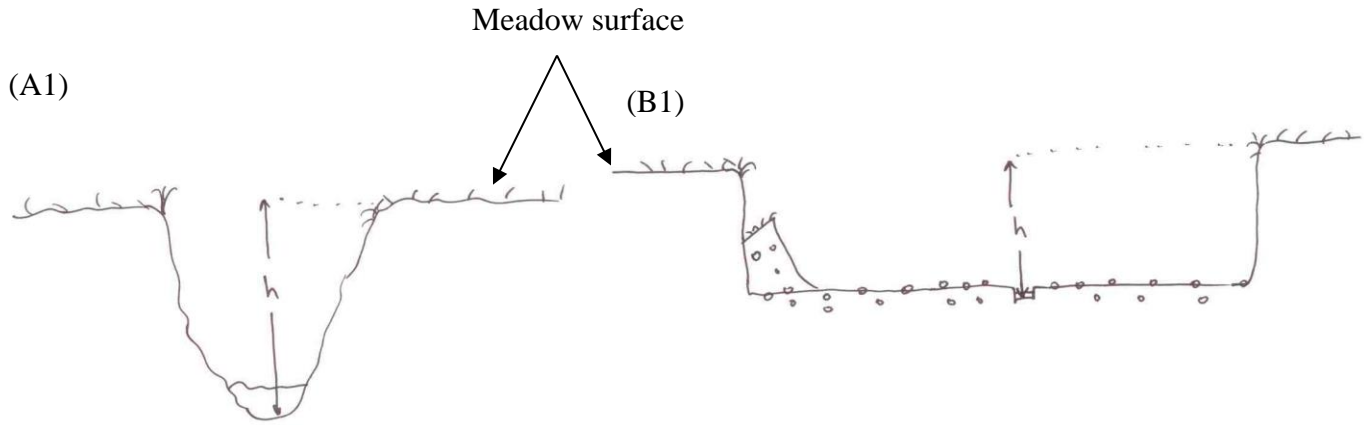
Mountain Meadow Definition:

An existing mountain meadow is an ecosystem type that is currently composed of one or more plant communities dominated by herbaceous species and supports plants that use surface water and/or shallow ground water (generally at depths of less than 1 m). Woody vegetation (e.g., trees and shrubs such as Alder and Willow) may occur, and be locally dense, but are not dominant. Historical mountain meadows are areas that once supported meadow vegetation as above but have been altered either hydrologically or by disturbance or both. These alterations can be part of natural cycles or induced by human activity (D. Wiexleman, D. Cooper, E. Below). For the purposes of this rapid assessment method, the meadow should be scored based on historical meadow area when possible.

- (1) **Bank Height in Main Channel:** This question applies to the main channel, which is the channel that flows parallel to the valley from the top of the meadow to the bottom. Occasionally multiple main channels may be encountered, if the meadow is at the confluence of more than one stream of nearly equal size. In these cases, score the channels separately. When in doubt, split them out.

Bank height is measured from the deepest part of the riffle to the meadow surface at the top of the bank. Areas of local incision, where a stream cuts through a raised region, such as an alluvial fan, should not be considered when scoring the channel.

In the illustrations below, series B shows a distinct low-flow channel inset within a high-flow channel. In contrast, the low-flow channel in series A floods onto the meadow surface. Note the corresponding difference in bank height measures; in both cases the bank height is measured to the vegetated meadow surface.



Bank height greater than 4 feet, score=1
(Bear Valley, Bear River Watershed)



Bank height 2-4 feet, score=2
(Pacific Valley, Mokelumne Watershed)



Bank height 0-2 feet, score=4
(Austin Meadow, Yuba River Watershed)



Bank height 2-4 feet, score=2
(Hermit Valley, Mokelumne Watershed)

- (2) **Bank Stability.** A bank is unstable if one of the following features exist: Either a (1) **fracture** (a crack is obvious along the top or on the face of the bank); (2) **slump** (a portion of the bank has slipped down as a separate block of soil or sod see B2 and B3 above); or (3) **slough** (soil broken away or crumbled and accumulated at the base of the bank.) or if the bank is steep (within 10 degrees of vertical), and/or bare, and eroding (including bare depositional bars).

- (3) Gullies, Ditches, or Eroding Tributaries Outside Main Channel.** Gullies may be the result of headcuts which have propagated upstream from an incised main channel, or they may be new channels that have formed in areas where no natural channel was present. The new channels may be due to roads, trails, or culverts concentrating flows, or the channels may be ditches purposely cut to drain portions of the meadow.

(G1)



Headcut and gully forming in Freeman Meadow (Yuba Watershed)

(G2)



A ditch with vegetated banks in Hope Valley (Carson Watershed).

- (4) Vegetation Cover:** This question and the following one are derived from the toe-point transects (see description below). The % graminoid cover is a correlate for vegetation function –a measure of how much the vegetation stabilizes the soil (D. Weixelman pers. comm., J. Roccio 2006)
- (5) Bare Ground:** The percent cover of bare ground is derived from the toe-point transects (see below). Bare ground may be soil or peat, but it is not covered by water. If the bare ground is due to gopher disturbance, the gopher activity should be noted in the Additional Observations.
- (6) Conifer or Upland Shrub Encroachment.** Upland shrubs include sagebrush, rabbitbrush and ceanothus. Not included are species which are found in wet meadow and riparian areas: blueberries, alder, willow and aspen. Exclude any topographically-distinct, well-drained areas within the meadow from the extent of encroachment (see figure). Encroachment may not start at the meadow edge (e.g., encroachment on the well-drained banks of an incised tributary.)



Two areas of sagebrush (greenish) are outlined in the figure. The patch outlined in blue would be included as encroachment because it is low-lying, at the level of the meadow surface –here atop the stream bank. The patch outlined in red is on a higher terrace. Because it is above the meadow surface, this area would not be included in the estimate of encroachment.

Toe point transects:

Toe point transects are a quick method of estimating percent cover by pacing transects and making equally spaced observations at every step, or every other step, depending on the length of the transect and number of points to be sampled. A measurement is taken as follows: as the observer takes a step, a stick is held against at the toe of the boot to define the precise point of observation. Where the stick lands, the observer tallies which is present: graminoid, forb, bare ground, or other (moss, litter, woody species, etc.). Bare ground is further divided as either gopher disturbed or not obviously gopher-disturbed; see the datasheet below.

Three transects across “representative areas” of the meadow are to be taken. Take a photograph looking along the transect from the start and finish. Also photograph where the channel crosses the stream.

Along each transect, the goal is to take approximately 50 equally-spaced measurements, so depending on the width of the meadow, a transect spanning the meadow (and crossing the channels) with ~50 measurements may call for sampling every step, or for large meadows, perhaps every 10th step. Complete a full transect across the meadow. If needed to complete the transect, it is acceptable to go substantially over the 50-measurement count. It is unacceptable to cut short the transect once 50 measurements have been made or to change the spacing between measurements within a transect. In each meadow, three toe-point transects will be walked; one each in the upper, middle and lower meadow. The upper meadow is where the channel enters the meadow, and the lower meadow is the lowest elevation, where the channel exits the meadow.

The data sheet has space for tallies along each transect, with space to calculate the percentages used in the scorecard. The hatching in some cells are a reminder of which cells to divide to calculate the final percentages. A cross section of the main channel should also be drawn at each transect, labeled with approximate heights and widths. Include historic terraces if the meadow has an inset floodplain.

Additional Observations:

Examples of Headcuts (also see G1 above): For headcuts, record the height of the jump, the width and the length (from top of jump to base of jump).

