Rapid Assessment of Ecosystem Condition: Tools and Applications for Restoring Sierra Nevada Meadows


Purpose and Need
- Meadow Ecosystem Services:
  - Grazing forage
  - Wildlife habitat
  - Groundwater storage / Augmented baseflows
  - Water quality improvement
  - Flood attenuation
  - Carbon sequestration
  - Recreation

Meadow Restoration Need:
- Limited resource: Comprise only 10% of Sierras
- Degraded system: Estimated 40-60%

Objectives
- Identify and Delineate:
  - Where: Identify meadow locations
  - How Much: Delineate meadow boundaries
  - Groundtruth desktop delineations
- Identify delineation discrepancies
- Develop a Meadow Assessment Protocol
- Rapid
- Cost-effective
- Identifies restoration candidates
- Technically accessible

Case Study Site: Yuba Watershed
- Targeted Meadow: > 20 acres
- Field Delineation: 26 meadows
- > 5,000 ft ml
- GPS

Meadow Delineation Results
- Meadow Size Discrepancy:
  - Actual size is 52% ± 8% (95% CI) of the CDFG-delineated area.
  - The total groundtruthed area of all meadows was 51% of the total CDFG-delineated meadow acreage.
- Causes for Delineation Differentiation:
  - Inclusion of sloped areas (> 65 grade)
  - Inclusion of alder and willow thickets and thin riparian strings

Meadow Assessment Prioritization
- In-depth Analysis Selection

In-depth Analysis Results: Vegetation
- Vegetation ecological function groups based on:
  - Rooting habit: rhizomatous, cespitose
  - Wetland rating: Obligate (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and upland (UPL)
  - Root depth (for graminoid species)
  - Life history (annual or perennial)
  - Life form (grass, grasslike, forb, woody
  - Plant height
  - N-fixing capability

Table 1: Decision matrix for the seven meadows not chosen for in-depth analysis.

In-depth Analysis Results: Channel Condition

Conclusions
- Meadow size is currently overestimated, thus an improved desktop delineation methodology is needed and groundtruthing
- Steptwise approach to more detailed meadow assessment protocols proved time and cost efficient
- Future Effort:
  - Quantifying restoration benefits
  - Forage quality
  - Flood attenuation
  - Instream flows: summer base flows
  - Terrestrial and aquatic habitat
  - Public meadow restoration database

References

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