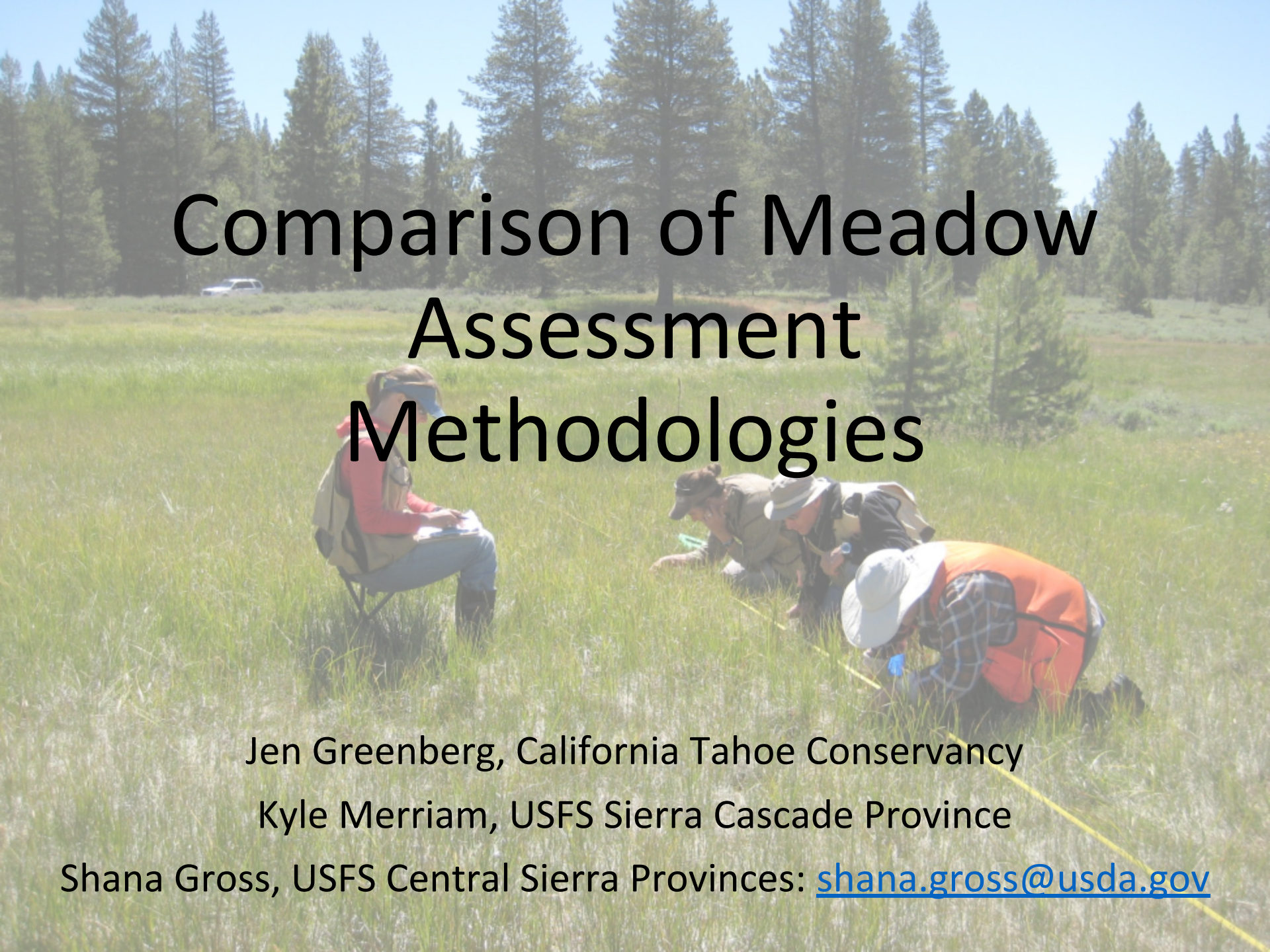
Comparison of Meadow Assessment Methodologies



Jen Greenberg, California Tahoe Conservancy

Kyle Merriam, USFS Sierra Cascade Province

Shana Gross, USFS Central Sierra Provinces: shana.gross@usda.gov

Assessment Methodologies

American Rivers
CRAM Meadow
Groundwater Dependent Systems
Multiple Indicator Monitoring
National Riparian Core
Climate engine (NDVI/NDWI)
PFC Fens
PFC Lentic
PFC Lotic
R5 Range Monitoring (rooted frequency)

Contributors

- Dave Weixelman, USDA Forest Service
- Joseph Gurrieri, USDA Forest Service
- Justin Huntington, Desert Research Institute
- Luke Hunt, American Rivers
- Sarah Pearce, San Francisco Estuary Institute
- Sherm Swanson, University of Nevada Cooperative Extension

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- Target System
- Is Channel Required
- Scale
- Time and Resources Needed
- Assessment or Assessment and Monitoring
- Quantitative Level
- Indicator Groups
- Purpose of Protocol
- Key Questions

Meadow Scorecard (American Rivers)

Target System

Wet or mesic meadows

Is a Channel Required?

Yes

Scale

Size of meadow

Time and Resources Needed

- Two hours or less
- Minimal equipment: camera, field sheet, meter stick
- Field calibration is important, but it requires minimal specialized skill

What is the purpose of the protocol?

It is a preliminary screening tool. The purpose is to identify meadows with hydrologic restoration potential.

The scorecard is qualitative in nature; however the scoring is based on quantitative measurements, such as bank height, percent bare ground, and length of gullies. These measurements enable observers to be field-calibrated and return similar results.

Key Questions

- Is the channel likely to be incised?
- How much bank instability?
- Relative length of gullies?
- Estimate graminoid/forb ratio
- Estimate % bare ground
- Estimate relative area with upland shrub encroachment
- Also records other observations: beaver observed? Aspen present? Roads/culverts/waterholes that may be of interest.

Assessment Only

Quantitative Level:

**Level 2: rapid assessment of stream/meadow condition*

Indicator Groups

- Hydrology/ Structure?
- Vegetation

Documents or publications: https://s3.amazonaws.com/american-rivers-website/wp-content/uploads/2016/06/21173412/1-Evaluating-and-Prioritizing-Meadow-Restoration-in-the-Sierra.pdf

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- Strengths
- Limitations
- Interpreting Results
- Metric table and metric is evaluated
- Additional Comments

Meadow Scorecard (American Rivers)

Assessment Strengths

- Quick
- Minimal specialized knowledge
- Easy to calibrate observers
- Existing database
- Focused on restoration screening

Assessment Weaknesses

- Not a monitoring tool
- No criteria for defining meadow edge, beyond Weixelman's meadow definition, so encroachment, in particular, can be ambiguous
- Bank height is a misleading measure of incision in large streams (but we decided not to use a ratio that requires identifying bankfull)
- Likewise, entrenched channels with well-established inset banks may be ambiguous

Interpreting Results

- Scorecards include six numbers, photographs, and a list of observations (e.g. one can filter by meadows with aspen observed or culverts present). There is an existing database to manage scorecard assessments.
- Interpretation is straightforward if there are severe impacts or minimal impacts (extremes) and inconclusive where impacts are intermediate.

Metric	How Metric is Evaluated
Bank height	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.
Bank stability	A bank is unstable if one of the following features exist: a fracture, slump, or slough. Evaluated as percent of the bank that is unstable.
Length of gullies and ditches	Length of gullies or ditches relative to the meadow length.
Vegetation cover (graminoid/ forb ratio)	Derived from three toe-point transects, the % graminoid cover is a correlate for vegetation function –a measure of how much the vegetation stabilizes the soil.
Bare Ground	Derived from three toe-point transects, percent cover of bare ground may be soil or peat, but it is not covered by water.
Conifer or upland shrub encroachment	Percent of the meadow area with upland species cover. Upland shrubs include sagebrush, rabbitbrush and ceanothus.

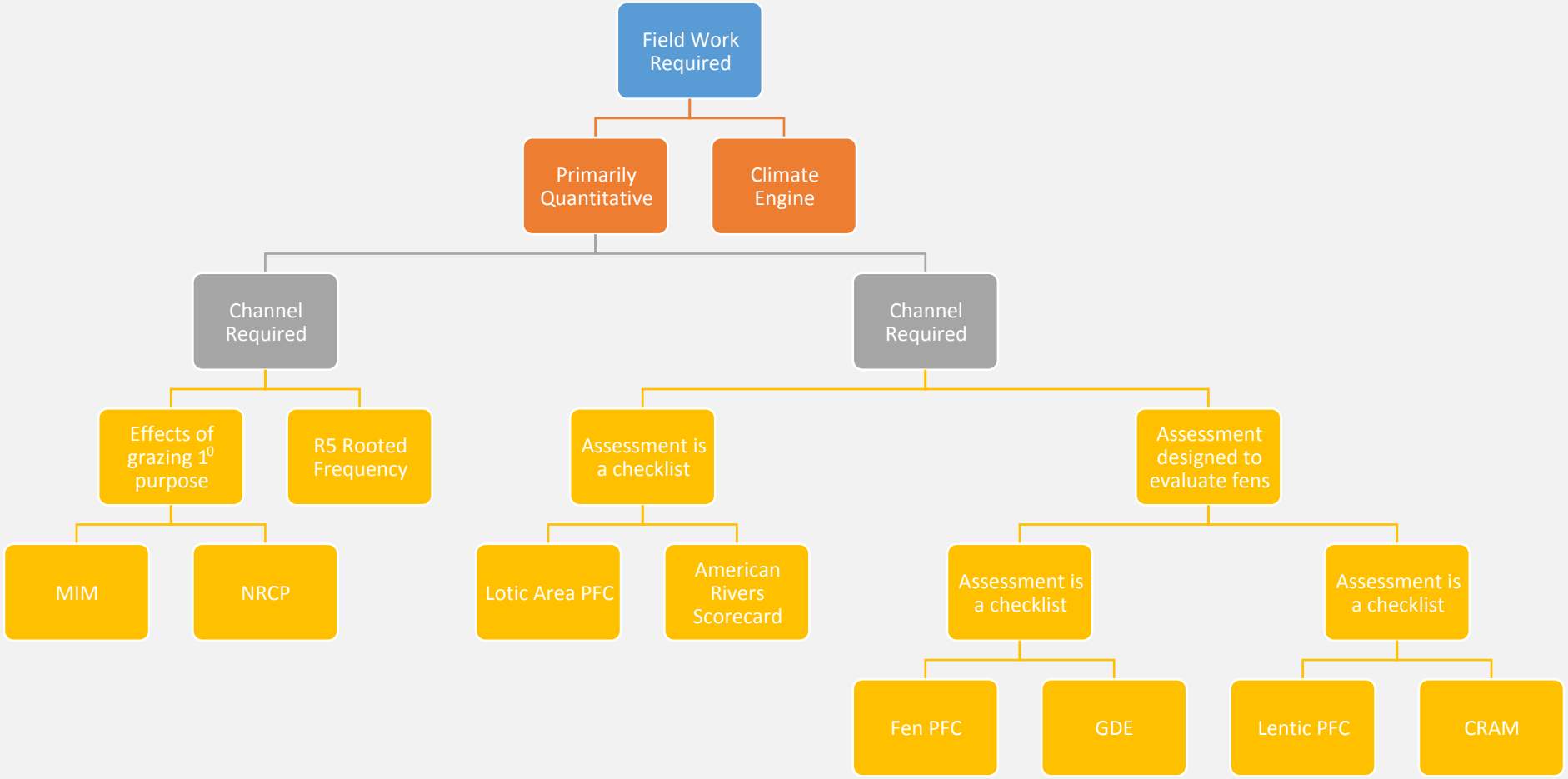
Additional Comments

In addition to the quantitative metrics above, a checklist records anecdotal observations such as past restoration efforts, roads in or adjacent to the meadow, grazing observations, evidence of beavers, and the amount of gopher disturbance.

Practitioners are discouraged from relying on a single score because a deeply entrenched meadow with no encroachment is a much better candidate for restoration than a slightly entrenched meadow with slight entrenchment, even though the averages of all six attributes might be the same. Still, some people report only this number.

Summary Information

Protocol	American Rivers
Requires field work?	yes
Quantitative	no
Requires channel?	yes
Checklist style (yes/no)	no
Used for?	meadows
Scale	Meadow
Time needed	≤ 2 hrs
Livestock metrics?	no
How interpreted	Numerical score
Requires plant ID to species	no


Field Work Required
Primarily Quantitative
Climate Engine
Channel Required
Channel Required
Effects of grazing 1^{0} purpose
R5 Rooted Frequency
Assessment is a checklist
Assessment designed to evaluate fens
MIM
NRCP
Lotic Area PFC
American Rivers Scorecard
Assessment is a checklist
Assessment is a checklist
Fen PFC
GDE
Lentic PFC
CRAM

Indicator Groups

Indicator Groups	Number of Protocols
Climate	1
Cultural	1
Geomorphology	8
Hydrology	6
Landscape context	6
Soil	6
Vegetation	10

Indicator Subgroups

Vegetation Subgroups	Number of Protocols
Age class distribution	3
Browse	1
Composition	8
Cover	3
Diversity	3
Encroachment	2
Height	1
Invasives	1
Vigor	2

Next Steps

- Contributors Review
- Results comparison