

Northern California

**An example of cross-scale, cross-program
AIM implementation**



The Fundamentals of Land Health

BLM

AIM – Assessment, Inventory, and Monitoring

Form 1221-2
(June 1969)



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MANUAL TRANSMITTAL SHEET

Release

4-110

Date

1/16/09

Subject

4180 – Land Health

1. Explanation of Materials Transmitted: This release transmits a complete revision of Manual 4180, the Land Health Manual for the Bureau of Land Management. This manual establishes policy, provides guidelines, and assigns management structure and responsibilities for conducting land health evaluations.

2. Reports Required: None

3. Materials Superseded: Rangeland Health Manual Section 4180- Release 4-106

4. Filing Instructions: File as directed below

REMOVE

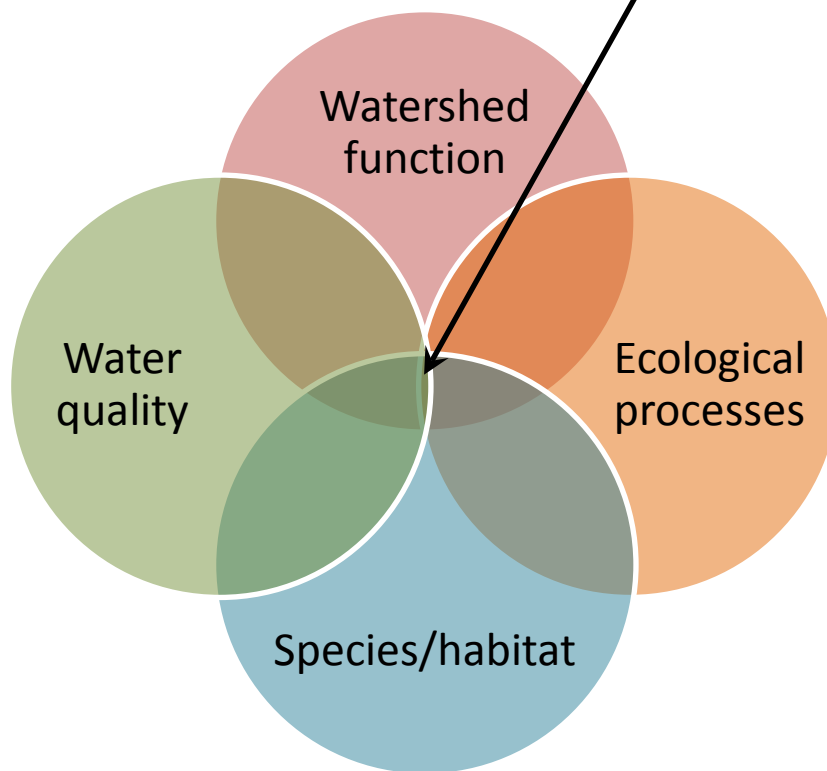
INSERT

Release 4-106
Dated 01/19/2001
Total 6 pages

4180 (total 14 pages)

Director, Bureau of Land Management

Fundamentals of Land Health: Ecosystem Integrity



AIM & the Fundamentals of Land Health

Cross-walk of lotic
AIM indicators and
Fundamentals of
Land Health

AIM has not
developed new
indicators, but
rather prioritized
indicators and
standardized
methods

Fundamentals of Land Health	AIM Lotic Indicators
Watershed function: Stream channel form and function and riparian areas	Stream bed particle size
	Floodplain connectivity
	Bank stability and cover
	Riparian canopy cover
	Pool dimensions & frequency
	Riparian vegetation cover and complexity
	Relative bed stability ¹
Water quality	Instream habitat complexity ¹
	Salinity
	pH
	Temperature
	Macroinvertebrates
	Total nitrogen & phosphorous ¹
Habitat quality for T&E and special status species	Turbidity ¹
	Indicators from the above standards, where applicable.
Ecological Processes	Indicators from the above standards, where applicable.

¹Contingent indicator



AIM & the Fundamentals of Land Health

Cross-walk of
terrestrial AIM
indicators and
Fundamentals of
Land Health

AIM has not
developed new
indicators, but
rather prioritized
indicators and
standardized
methods

Fundamentals of Land Health	AIM Terrestrial Indicators
	Bare ground
	Canopy gap
Watershed Function	Vegetation cover and composition
	Soil aggregate stability ¹
Habitat quality (i.e., T&E, Native, and Sensitive Species)	Vegetation cover, composition and height
	Indicators from the above, where applicable
Ecological Processes	Indicators from the above, where applicable
Water Quality	See aquatic core

¹Contingent indicator



Standards and Guides of Rangeland Health—Northeastern California

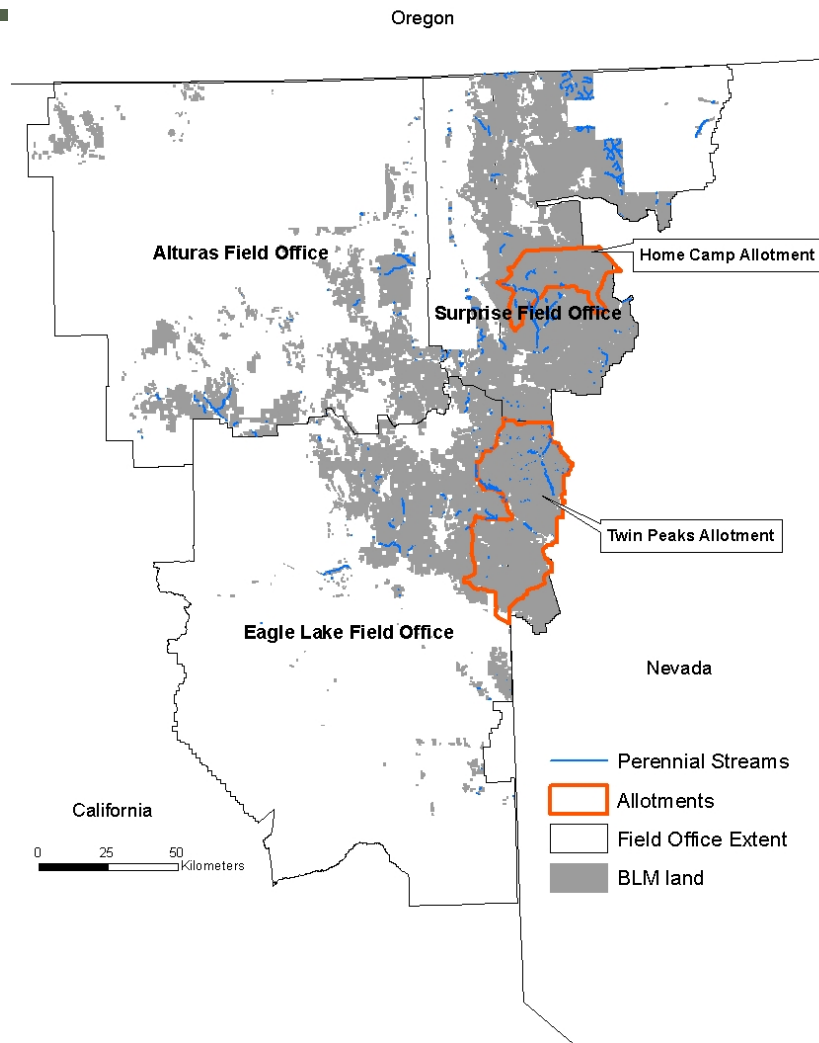
- Upland soils
- Streams
- Water quality
- Riparian and Wetland Sites
- Biodiversity



In Development!

Management Objectives

- LUP
- GRSG
- Permit Renewal
- ES&R
- Baseline
- Climate change



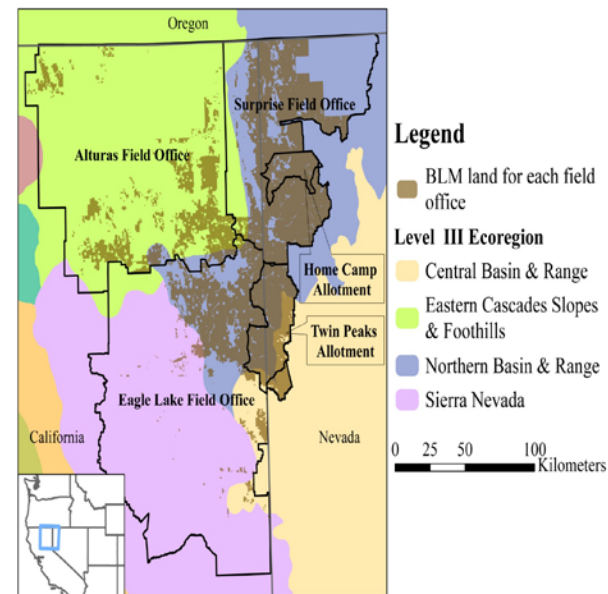
Monitoring Objective Examples

- LUP-Streams standard
 - Aquatic biological condition, as indicated by BMI, rated as minimal or moderate departure from reference for 80% of stream km with 90% confidence across 5 years.
- LUP-Upland soils
 - Soil and site stability, as indicated by bare ground is within reference condition for 95% of acres with 90% confidence across 5 years. Reference condition is defined as:
 - Alluvial 9-16": 15-40% bare ground
 - Arid/Sodic: 30-80% bare ground
 - Claypan: 10-45% bare ground
 - Loamy slope 6-12": 15-50% bare ground
- Permit Renewal—Water quality
 - Water quality meets state standards (e.g., EC < 700 μ S/cm) on 80% of stream km with 90% confidence across 3 years.
- Permit Renewal--Biodiversity
 - Herbaceous plant height for pronghorn habitat meets reference conditions on 90% of acres across 5 years.
- ESR
 - Greater than 70% perennial foliar cover is present when compared to a similar unburned ecological condition, after the first year



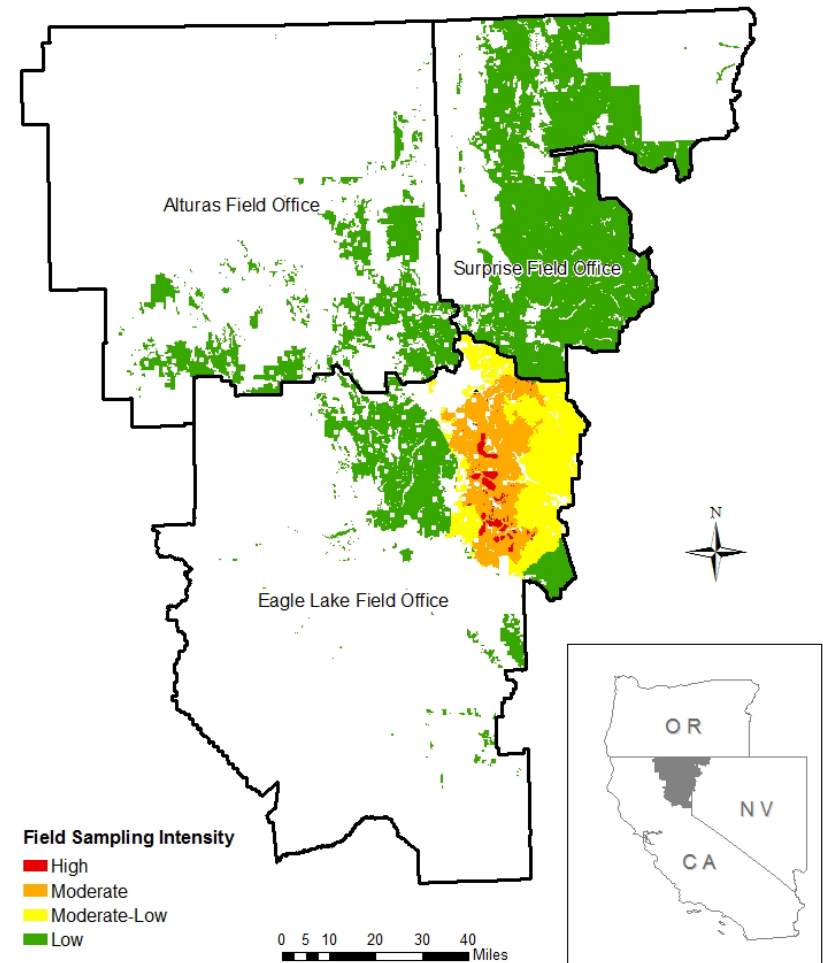
Study Area

- Four level III ecoregions
 - Precip: 200 – 600 mm
 - Elevation: 1,400 – 2,400 m
- > 10,000 km² & 450+ stream km
- Management drivers
 - Grazing (including WH&B)
 - Greater sage-grouse + other SOC
 - Fire, roads, archeology



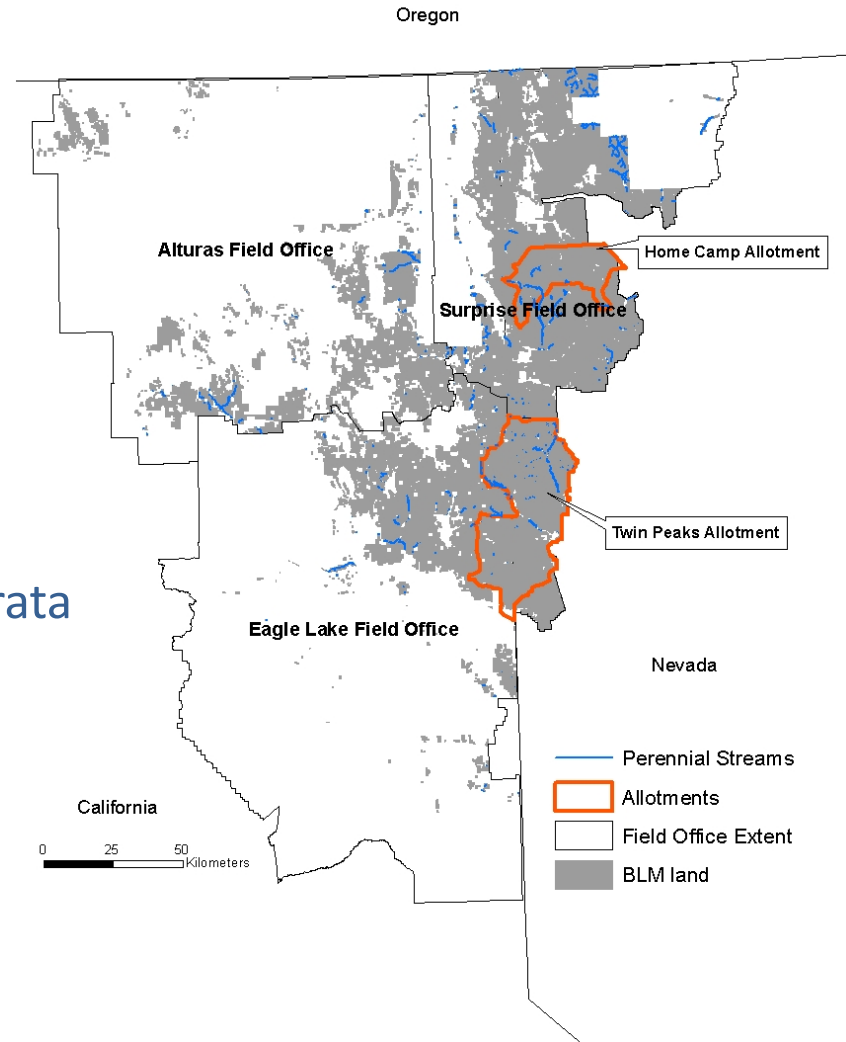
Survey design - Terrestrial

- Target populations – BLM rangelands within
 - Field offices in NorCal
 - Rush fire and surrounding allotments
 - ES&R Treatments within the fire
- Reporting units
 - All three FOs
 - Individual FOs
 - Allotments (especially Rush Fire)
- Strata
 - Remote-sensing-derived strata to help ensure distribution of locations (in absence of ecological sites)
- Sample Design
 - Annual intensifications in allotments for grazing permit renewals
 - Intensification in Rush Fire area
 - ESR Treatment areas



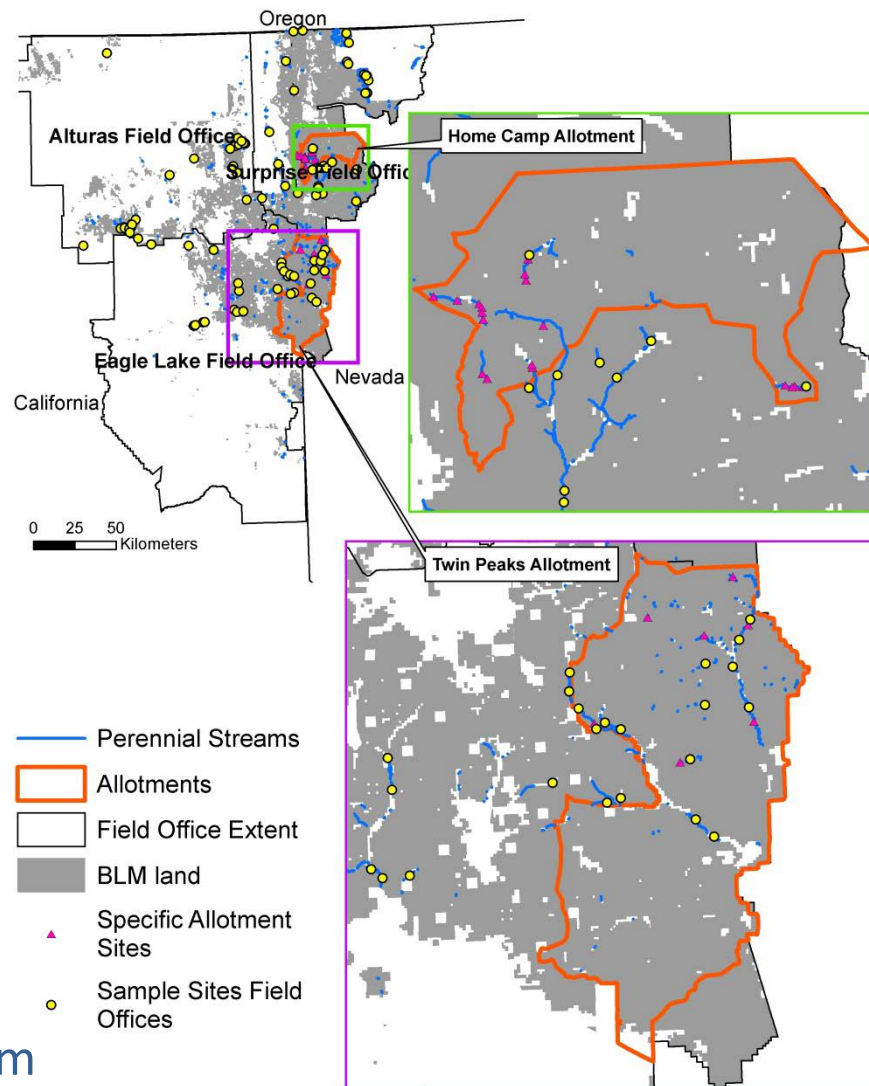
Survey design - Aquatic

- Target population: perennial streams and rivers on BLM lands: > 550 km
- Reporting units:
 - All three FOs
 - Individual FO
 - Two grazing allotments
 - Home Camp
 - Twin Peaks
- Strata: none besides reporting strata



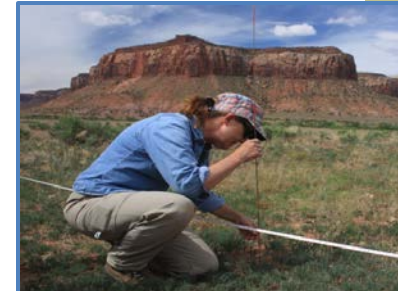
Survey design - Aquatic

- Target population: perennial streams and rivers on BLM lands (> 550 km defined by NHD)
- Reporting units & sample sizes:
 - All three FOs: 75
 - Individual FO: 25
 - Two grazing allotments
 - Home Camp: 15
 - Twin Peaks: 15
- Strata: none besides reporting units
- Site selection weighted by stream order



Indicators

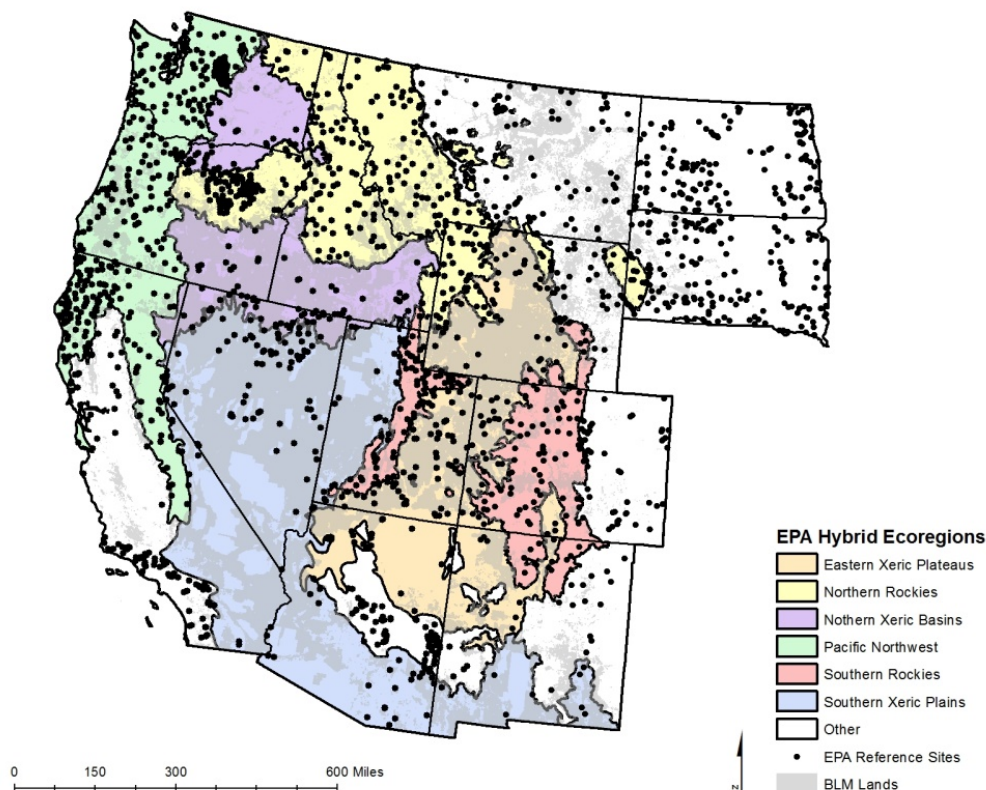
- Aquatic
 - Core
 - Contingent
 - TN & TP
 - Instream habitat complexity
 - Bank angle
 - Longitudinal profile
- Terrestrial
 - Core
 - Plant density (ES&R only)
 - IIRH



Benchmarks- Aquatic

Chemical, physical and biological condition classes based on:

- *“Least disturbed conditions” or “best available conditions”*
 - o Source: EPA, USGS & CA, NV & OR regulatory agencies

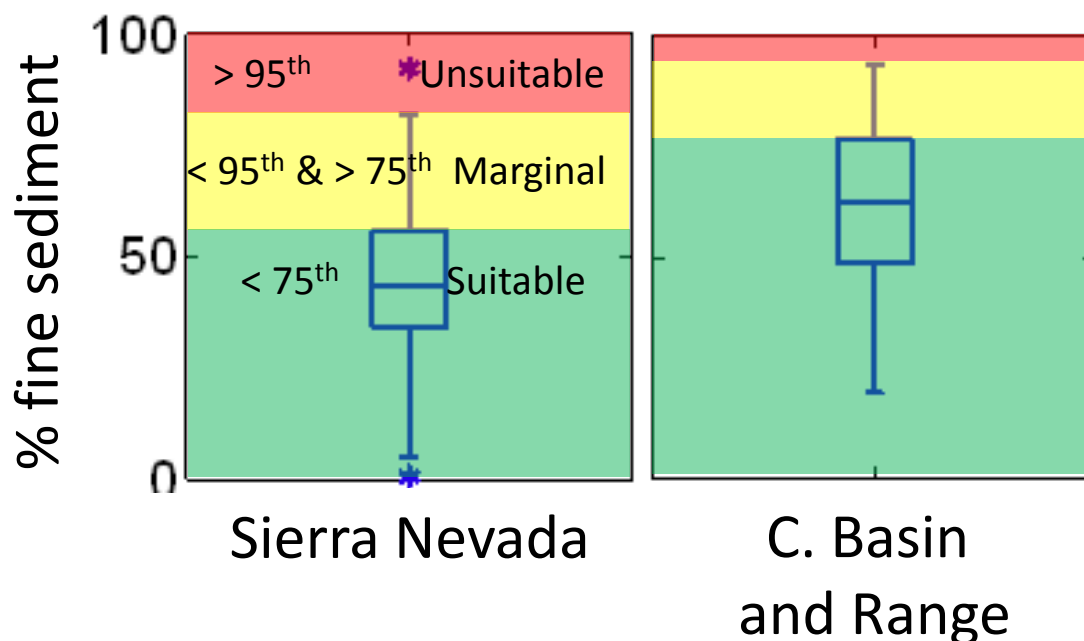


Benchmarks - Aquatic

Used “*Least disturbed conditions*” to establish condition classes (e.g., “good”; “Poor”):

- Option 1: Range of reference conditions by ecoregion

Range of REFERENCE fine sediment values among ecoregions



Benchmarks - Aquatic

- Option 2: Predicted natural condition



Static Predictors

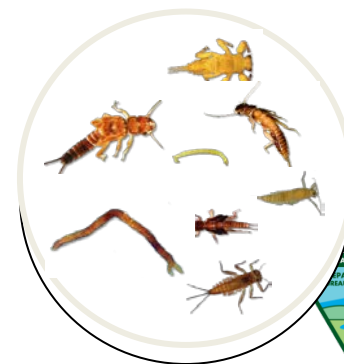
Slope
Parent geology
Stream order
Watershed area

Dynamic Predictors

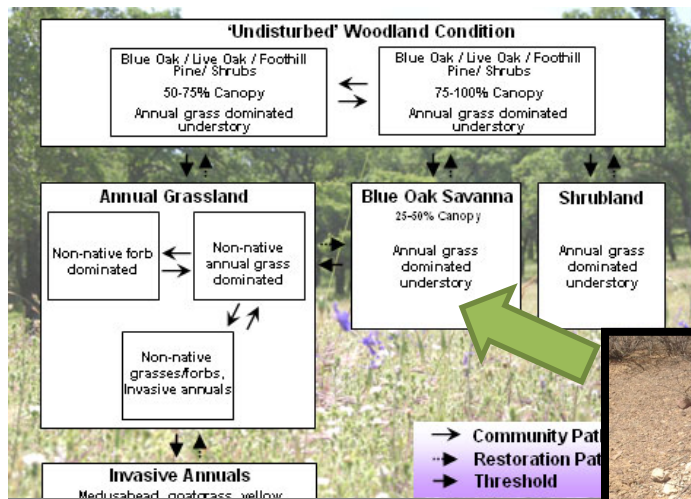
Precipitation
Temp

Physical
model

Predicted
Indicator



Benchmarks - Terrestrial



Ecological Site Description

Canopy Gaps > 2m



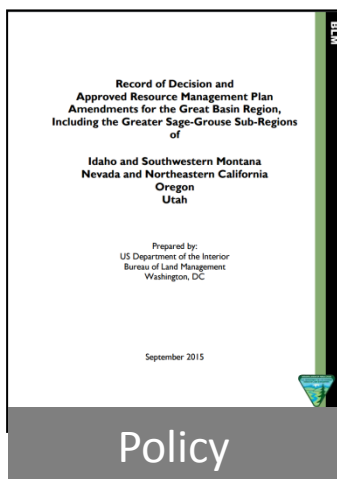
10th & 90th
Percentile from
field data

25th & 75th
Percentile
from field data

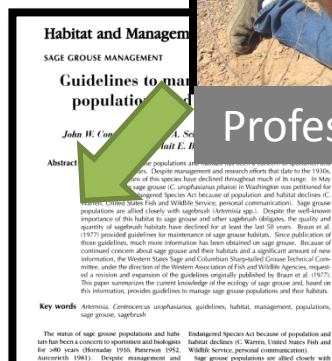
50th Percentile
from field
data

Professional judgement

Reference sites



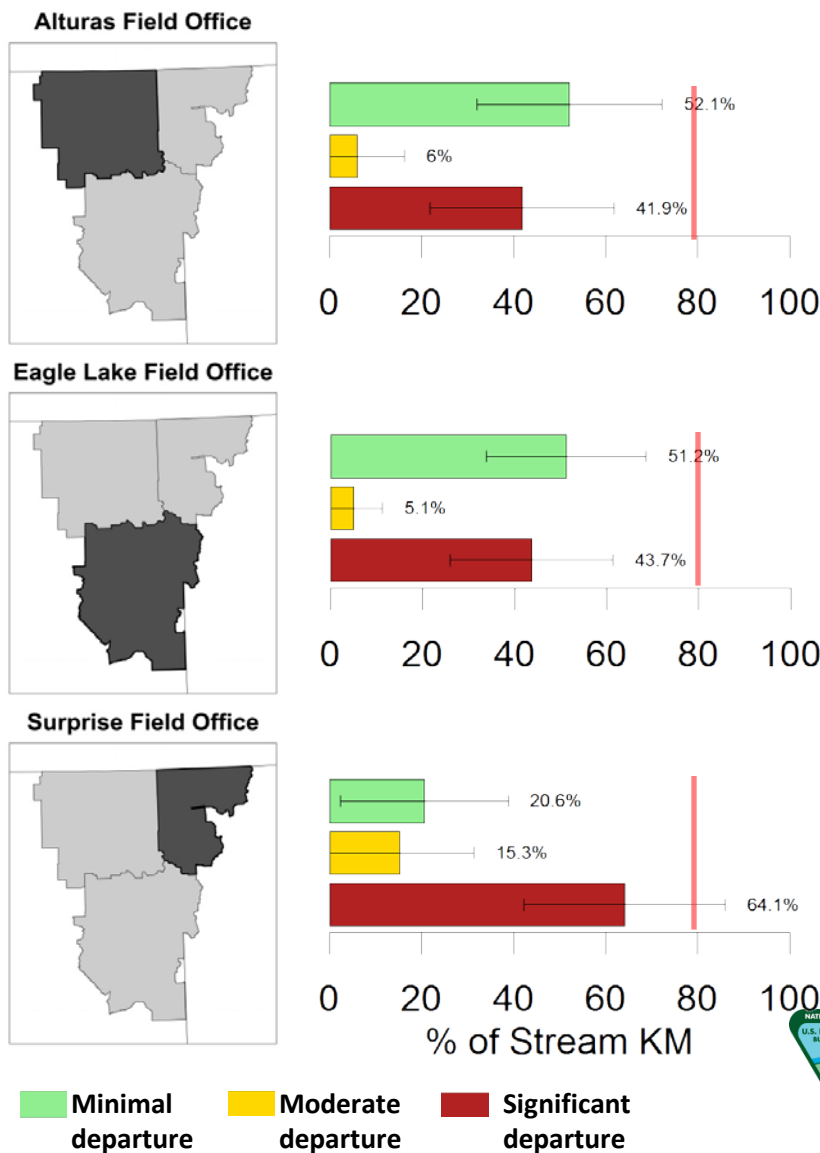
Policy



Peer reviewed
literature

S&G Standard: Streams

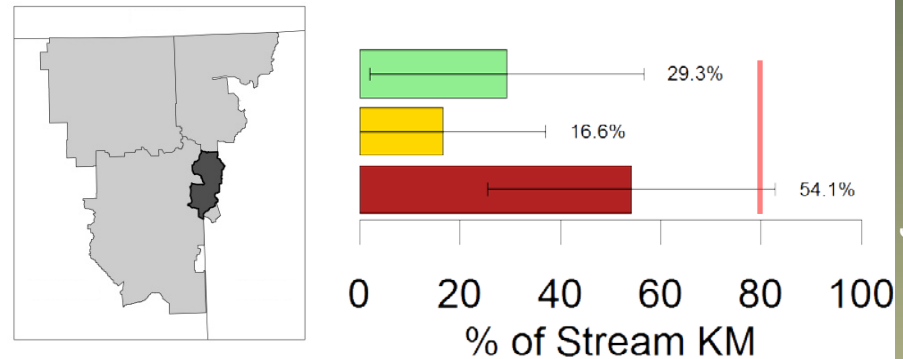
LUP - Aquatic biological condition, as indicated by BMI, rated as '*Suitable*' or '*Marginal*' for 80% of stream km with 90% confidence



S&G Standard: Streams

Permit renewal -
Aquatic biological
condition, as indicated
by BMI, rated as
'Suitable' or *'Marginal'*
for 80% of stream km
with 90% confidence

Twin Peaks Allotment

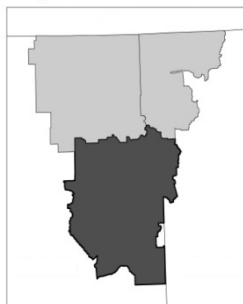


Minimal departure Moderate departure Significant departure

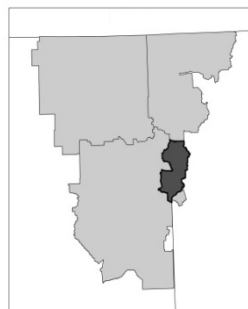


S&G Standard: Streams

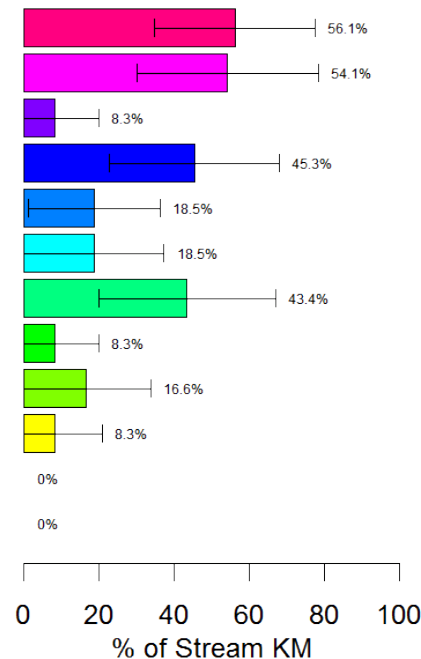
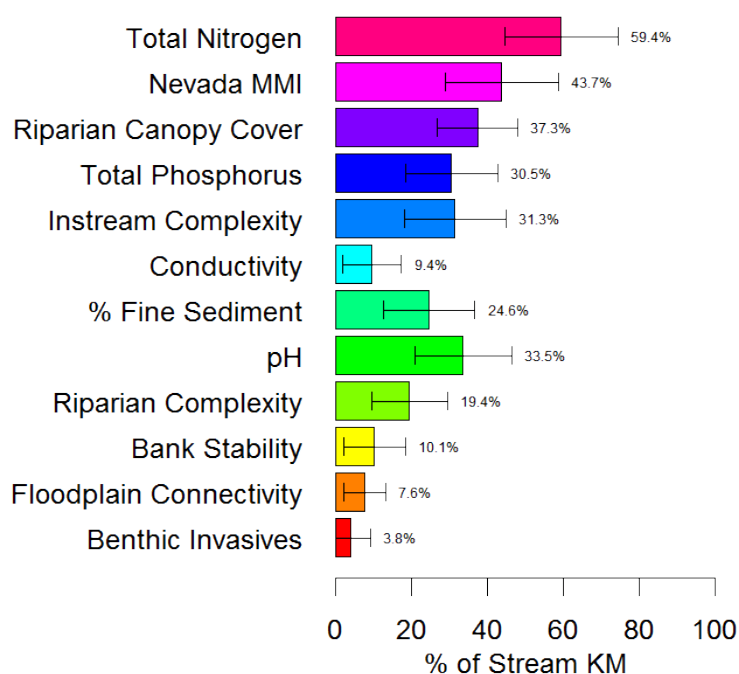
Eagle Lake Field Office



Twin Peaks Allotment



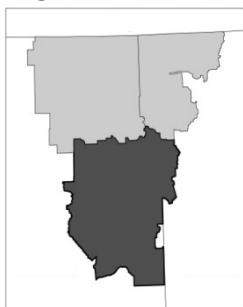
Percent of stream kilometers with significant departure from reference



S&G Standard: Upland Soils

LUP: Bare ground is meeting reference condition for 95% of acres, with 80% confidence.

Eagle Lake Field Office



Meeting



43%

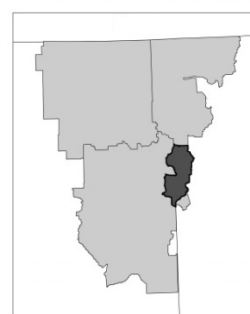
Not Meeting



57%

Proportion of Study Area

Twin Peaks Allotment

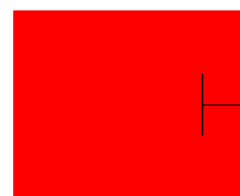


Meeting



54%

Not Meeting



46%

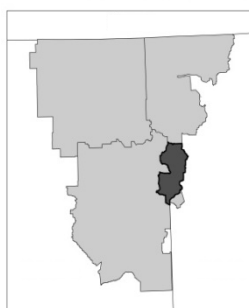
Proportion of Study Area

S&G Standard: Upland Soils

Eagle Lake Field Office

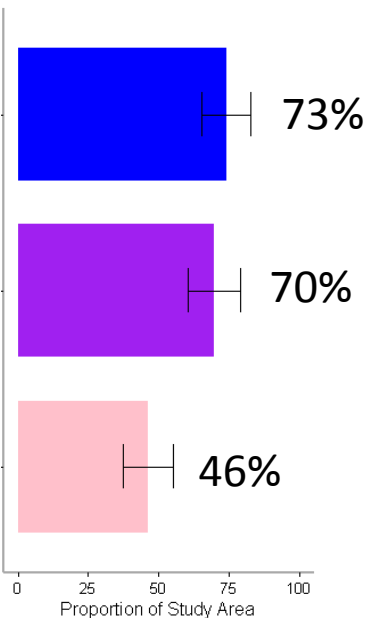
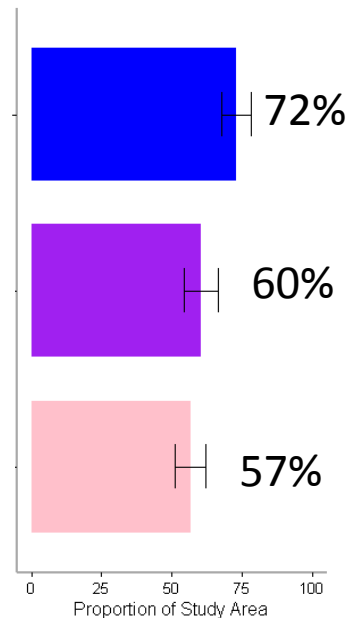


Twin Peaks Allotment

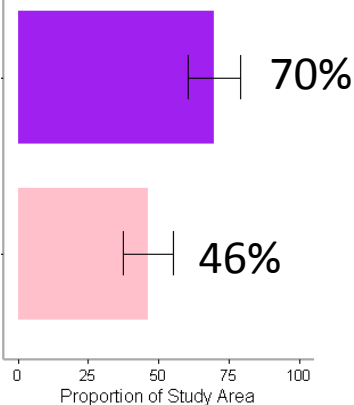
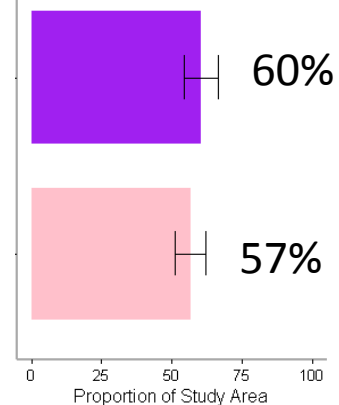


Percent of acres with departure from reference

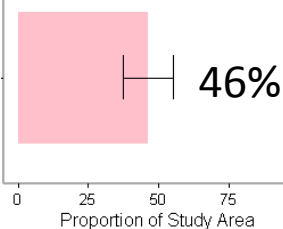
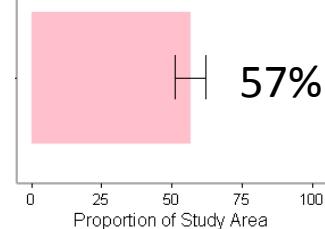
Intercanopy gaps > 2m



Soil stability



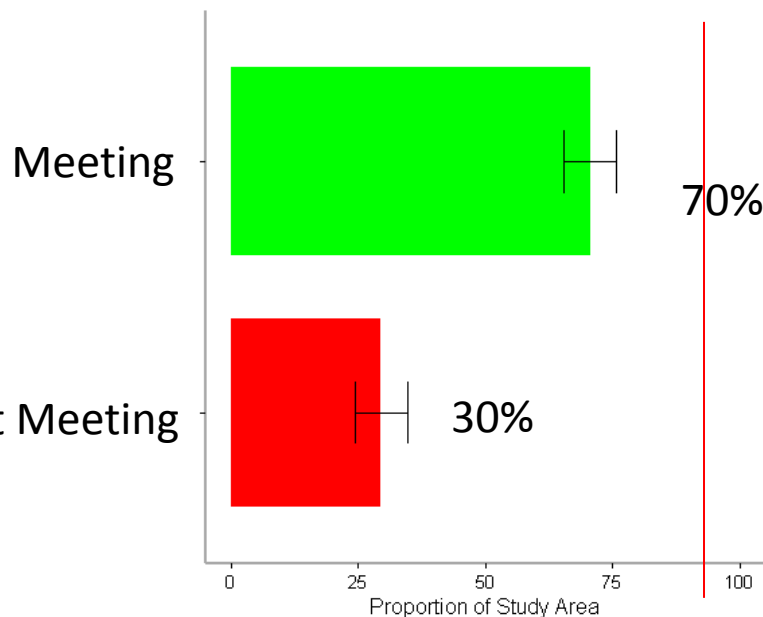
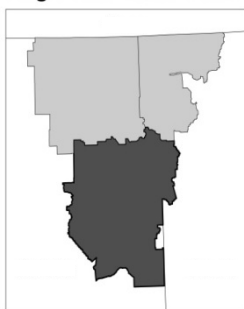
Bare ground



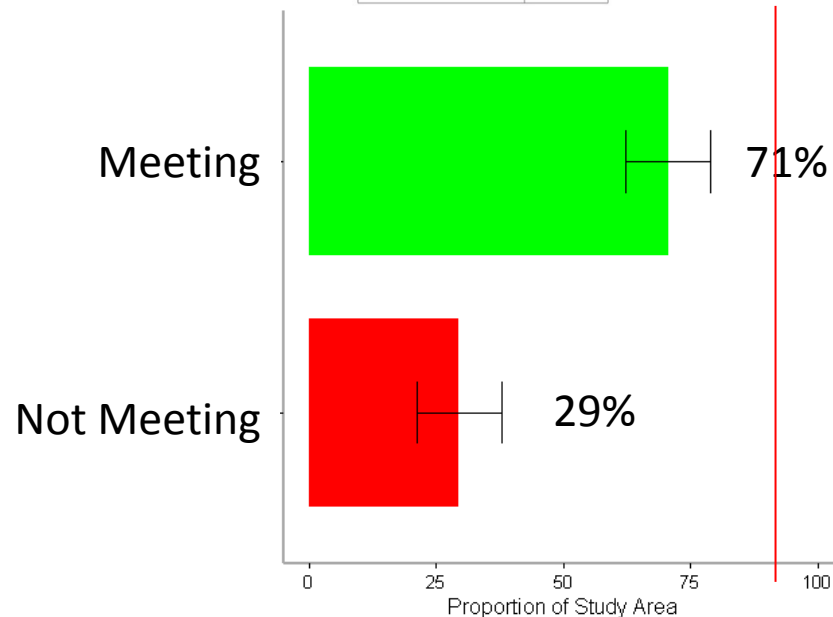
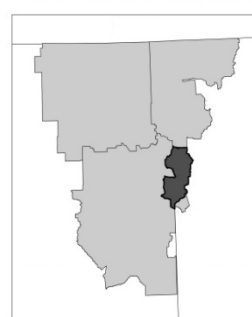
S&G Standard: Biodiversity

Herbaceous plant height for pronghorn habitat meets reference conditions on 90% of acres across 5 years.

Eagle Lake Field Office



Twin Peaks Allotment

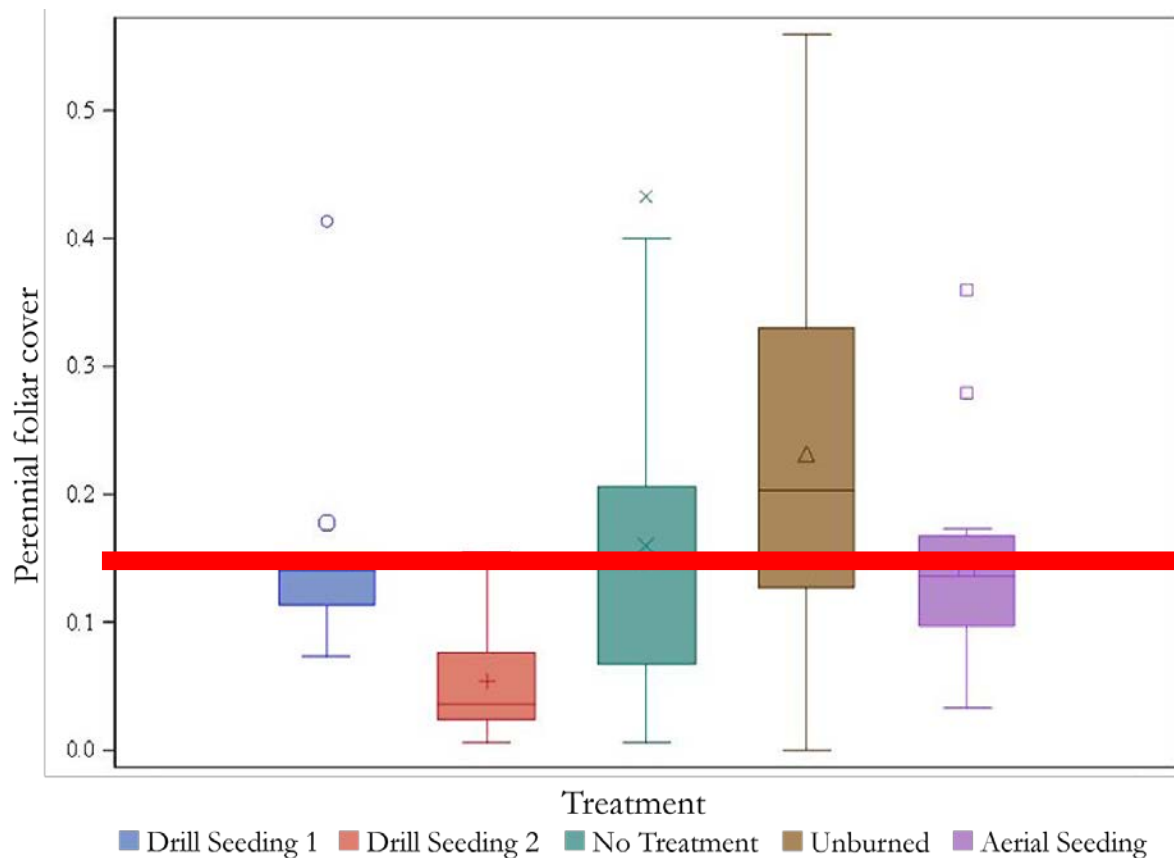


ESR Treatment Effectiveness

Greater than 70% perennial foliar cover is present when compared to a similar unburned ecological condition, after the first year

Perennial Plant Foliar Cover

Year 1



Objective
Achieved

Objective Not
Achieved

Project Implementation Process



2012 - 2013

- FO
- WO
- NOC
- Jornada
- NAMC
- ES&R

2012 - 2013

- FO
- NOC
- Jornada
- NAMC

Each year

- FO
- NOC
- Jornada
- NAMC

Ongoing

- FO
- NOC
- GBI
- NAMC

Ongoing

- FO
- NOC
- GBI
- NAMC

Ongoing

- FO
- NOC
- Jornada
- NAMC



Many, many thanks to the Eagle Lake and Applegate Field Offices!