GRAZING EFFECTS MONITORING IN THE GOLDEN TROUT WILDERNESS

Hugh Safford
Regional Ecologist
US-Forest Service
Pacific Southwest Region
hughsafford@fs.fed.us
707-562-8934

The Issue:

I. Four grazing allotments on the Inyo NF portion of the Kern Plateau

II. Concern that grazing in Golden Trout Wilderness may be negatively impacting the Golden Trout

A. Knapp and Matthews 1996, NAmJFishMgt 16

i. Majority of stream physical characteristics show large differences between grazed and adjacent exclosed areas
   a. Ungrazed areas: greater canopy shading, stream depths and bank-full heights, and smaller stream widths

ii. CGT density and biomass per unit-area greater in ¾ of comparisons in ungrazed exclosures

iii. Current levels of grazing are degrading stream and riparian components of meadows to the detriment of CGT populations

II. Grazing concerns (cont.)

B. California Golden Trout Conservation Strategy, April 1999

i. Summarized results of various studies and IDed two major threats to viability of CGT

a. Non-native fish introduction (genetic issues)

b. Habitat degradation due to 150 years of grazing

- Stream channels widened and downcut = loss of hiding and resting cover, and filling of pools (critical winter habitat)
- Sediment impacting habitat of aquatic inverts (food)
- Downcut channels = lowered H_2O table = loss of off-channel ponds necessary for mtn yellow-legged frog reproduction (food)

c. Summary: Habitat degradation has led to losses in critical wintering habitat and food availability, increasing risk of extinction under extreme environmental conditions

III. Forest Service response to CGT-grazing concerns

A. Inyo NF Inventory and Monitoring efforts

i. Stream Condition Inventory 1994-present
ii. Watershed Improvement Needs Inventory 1980-present
iii. Proper Functioning Condition assessments 1998-1999
iv. Headcut monitoring 1998-present
v. Nutrient cycling studies 1992-1993
vi. Fish habitat monitoring ("GAWS") 1988-1997
vii. Stream macroinvert sampling 1999-2001
viii. Regional meadow condition & trend monitoring 1999-present
ix. Ecological Unit Inventory, GTW meadows 1996-2000

B. Development of monitoring plan and desired habitat condition for Volcano GT Conservation Strategy (Riley 1998)

i. Identified and compared stream habitat quality indices for use in monitoring
ii. Outlined existing and desired conditions for Golden Trout habitat

III. Forest Service response (cont.)

C. Environmental Assessment (EA) for the Templeton and Whitney Grazing Allotments 1998-2001

i. Various action alternatives analyzed at great length (no change, no grazing, proposed action, voluntary resource protection, etc.)

ii. Purpose & Need: rapid recovery of watershed condition and riparian habitat, and minimization of grazing impact on wilderness character

D. Decision Notice March 2001

i. Adopted Alternative A: rest the Whitney and Templeton Allotments until trend improves

III. Forest Service response (cont.)

E. Appeal of decision

i. Deputy Regional Forester upholds decision after review

ii. DRF direction

a. There is "insufficient support for the conclusions related to…effects on invertebrate species"

b. "…there are some gaps in our knowledge regarding the rate of recovery of the meadow and riparian areas (including Golden Trout habitat)"

c. Develop a monitoring plan using the currently rested (Whitney and Templeton) and currently grazed (Mulkey and Monache) allotments in comparative fashion, to monitor trend within both areas, as well as to determine the effectiveness of the Inyo NF LRMP Amendment #6 grazing standards.

d. District decision to rest the Whitney and Templeton Allotments will stand until an ID-Team recommends a new proposed action based on the results of the mandated monitoring.

IV. Condition and trend monitoring in the GTW

A. Riparian meadow C&T monitoring

1. Region 5 Range monitoring program
   - ongoing since 1999
2. GTW monitoring
   - to begin summer 2005

B. Modified Stream Condition Inventory

1. Funding from California Department of Fish and Game, Inyo National Forest, Forest Service Pacific Southwest Region, CalTrout/Orvis

2. Contract with UC-Santa Barbara, Sierra Nevada Aquatic Research Lab (SNARL), Mammoth Lakes

3. PI is Dave Herbst
   - expert on macroinvertebrate fauna of Sierra Nevada streams
   - analyzed original Riley data in 1990's

Modified SCI Protocol

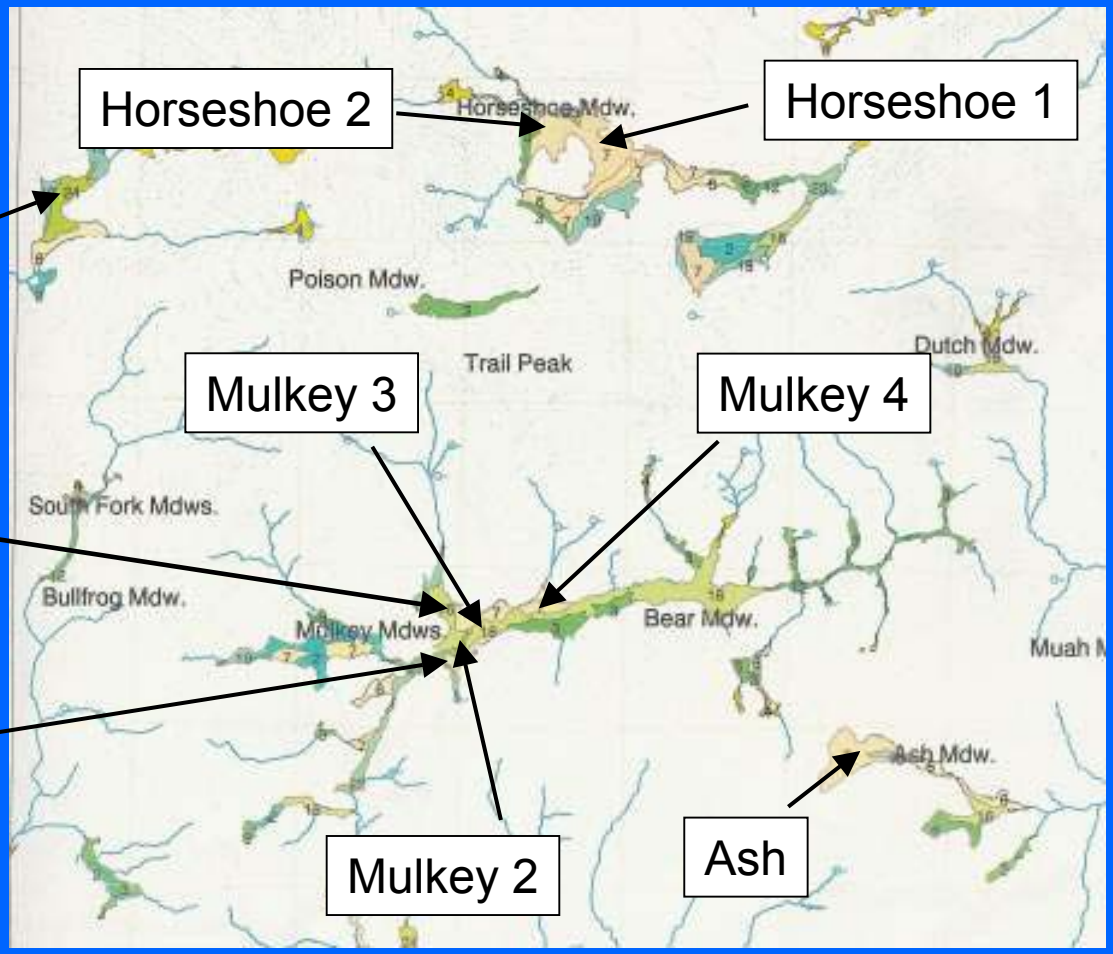
54 sites visited

Final sample size = 39 reaches

23 ungrazed sites - historical data (1990's - Riley) exist for all 23 of these

16 grazed sites - historical data (Riley) exist for 9 of these reaches

Remainder were dry (including Siberian Outpost in SEKI NP)



Reaches IDed in two ways:

- Original Riley reach
- New sites with similar stream characteristics

Stream reaches standardized to 250m length

Physical habitat measurements

- Temperature, conductivity, pH, sinuosity
  (length/linear distance from start to end of reach)
- All pools and riffles IDed (start and finish)
- First ten pools: pool tail crest and maximum depth
- Bankfull width and depth recorded in five places within each reach

Recorded every 20m (13 times per reach):

5 depth measurements across channel
5 velocity measurements across channel
5 substrate measurements across channel

Recorded every 10m (25 times per reach):

- Stream width
- Bank cover left and right
- Bank angle left and right
- Vegetation cover (Densiometer: left, right, upstream, downstream)

Bioassessment of macroinvertebrates

4 representative riffles chosen from each reach
2 samples obtained from each of these riffles
- 60 seconds massaging substrate while capturing fallout using d-net
- substrate type (and vegetation presence) recorded at each sample site

4 x 2 = 8 subsamples pooled into one invert sample per reach

Miscellaneous

- Sites GPSed and start locations clearly described
- Digital photos taken at start, finish and every 50m mark of each reach
- Observations of overall condition of reach and exclosure integrity recorded, etc.

Preliminary Results

Qualitative

1. 5 years after rest, Whitney and Templeton Allotments are still showing livestock effects
2. In some cases, dry weather of last 5 years, increased gopher activity and grasshopper invasions have worsened the situation

Stokes Stringer 5 years after rest

Preliminary Results

Qualitative (cont.)

3. Both vegetation (willows, sedges) and stream macroinvertebrates provide evidence that the grazing exclosures in Mulkey and Ramshaw meadows are working

4. Exclosures require maintenance:

The Mulkey exclosure has been breached and recovering vegetation at the upper end is being seriously impacted by livestock

Broken fence

Stream damage within the Mulkey exclosure

Trampled experimental plots

Preliminary Results

Quantitative

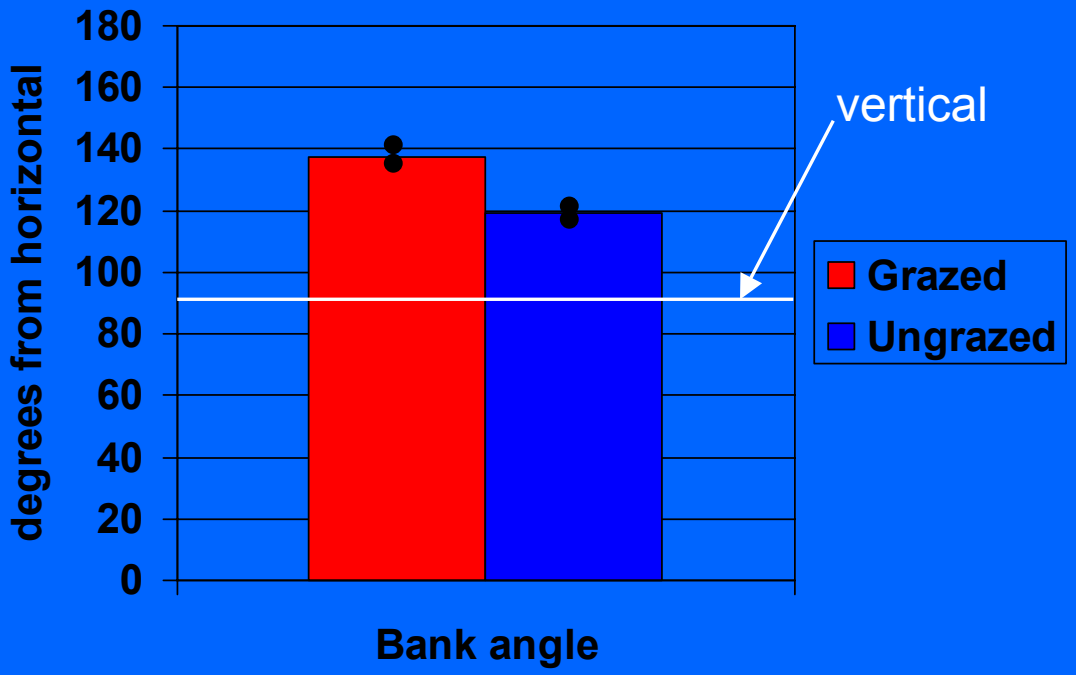
1. Macroinvertebrate species diversity is low in currently grazed sites
    - Monache meadows sites average about 14 spp per reach
    - Little Whitney meadow sites average about 40 spp
2. Macroinvert community composition changes from grazed to ungrazed sites
    - This is especially apparent in long-term grazing exclosures
    - Taxa sensitive to sediment loading (mayflies, caddisflies, salmon flies) become rare or disappear in grazed reaches
    - Taxa adapted to shallow, wider streams become more common (riffle beetles)

Quantitative (cont.)

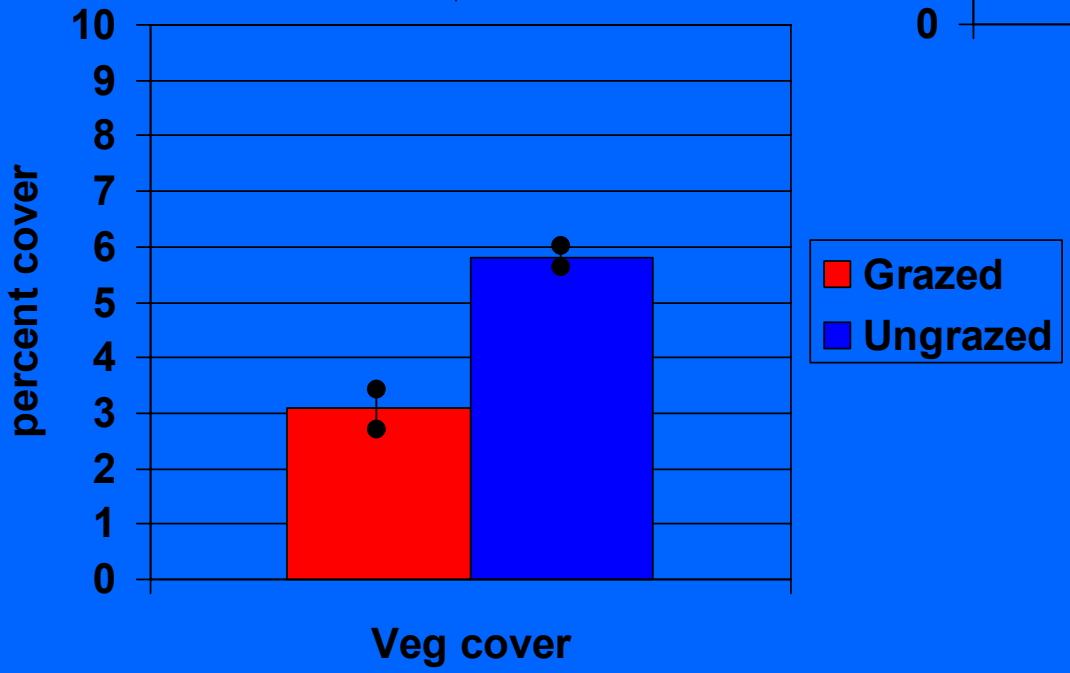
3. Grazed vs. Ungrazed

A. Bank angle
B. Veg cover

$t = 3.120$
$P = 0.004$



$t = 3.378$
$P = 0.002$

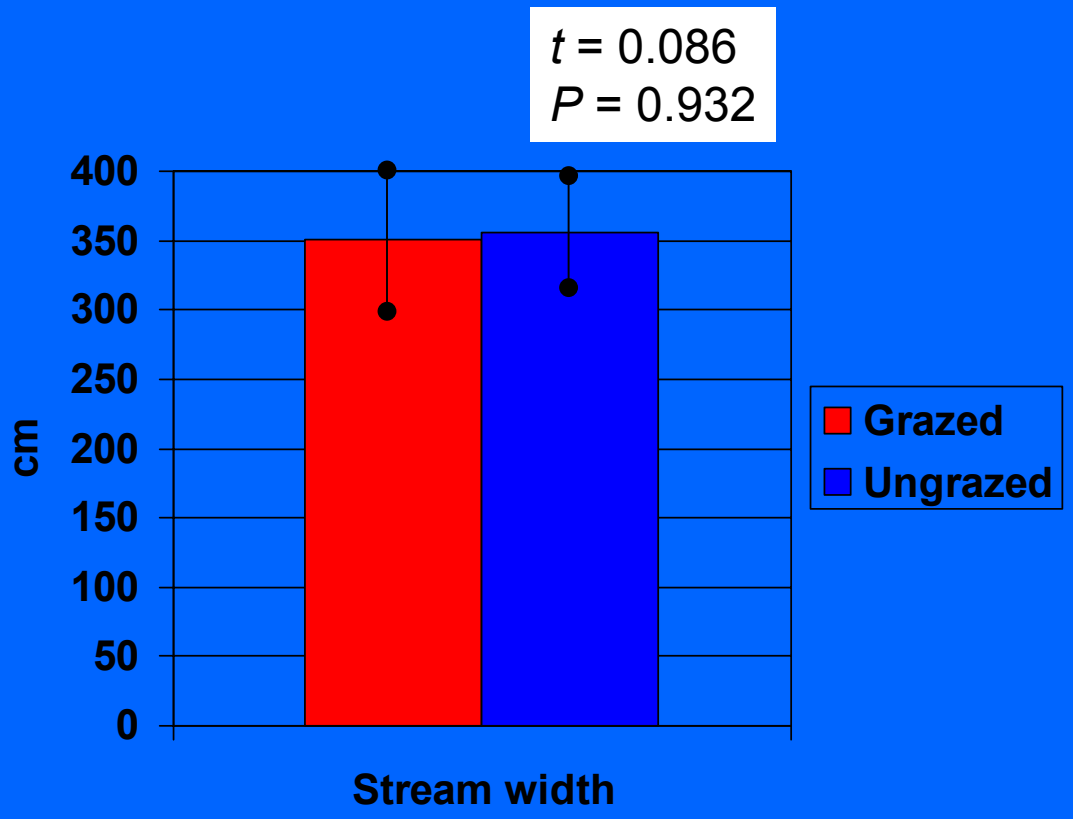


Quantitative (cont.)

3. Grazed vs. Ungrazed

C. Stream width

Stream width will require much longer to recover



Analysis progress

Data have been entered
Macroinvertebrate analysis is underway
Final report due in summer, 2005
One or two publications will result
Workshop with Inyo NF and partners

Future plans

Riparian meadow condition and trend assessment

- 31 sites have already been sampled, dating from 1999-2001, using R5 C&T protocol
- we will resample these summer 2005, and add ca. 20 sites, linking with SCI reaches where possible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