Riparian Grazing Strategies and their impact on riparian health





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Grazing and Riparian Health?









Background

Review of literature base (Allen-Diaz et al. 1999, Belsky et al. 1999, Larsen et al. 1998, Rinne 1999).

- Critical study components undefined such as stocking rates, physical characteristics, and grazing system.
- Experiments compare "grazing" to "no grazing".

 Sparse information on direct links of "grazing" and fisheries.



Background

Lacking in literature:
 Toolbox of tested, site-specific grazing recommendations.

Needs:

Data driven, management scale project to identify feasible grazing management that enhances riparian resources.

Riparian Grazing Project

- Objectives:
 - **1** Cross-sectional survey of California's rangeland riparian areas.
 - Identify grazing management and site characteristics associated with high and low "riparian health".
 - **3** Synthesize data for site specific recommendations.
 - Publish and extend information.
 - **5** Utilize sites to develop set of case studies.

Study Sites





Survey Tools

Habitat Assessments

EPA

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	VESTIGATORS					
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NRCS



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Site Characterization

Management Survey

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Habitat Features









Hydrologic Function







Physical Characteristics





Data Collected:

		# of		
	# of	Hydrologic	# of Site	
# of	Habitat	Function	Characterization	# of Management
Sites	Questions	Questions	Covariates	Questions
°221	25	17	65	130

Pearson Correlation Coefficients (r):

EPA	PFC	PFC
×	×	×
NRCS	EPA	NRCS
0.81	0.58	0.54

Significant Physical Parameters

		EPA	NRCS	PFC
Entrenchment		0.002	0.004	0.09
Slope		n.s.	0.026	n.s.
Substrate		0.04	<0.001	0.04
% Run		n.s.	<0.001	n.s.
% Riffle		<0.001	n.s.	n.s.
% Pool		<0.001	n.s.	n.s.
% Canopy		<0.001	<0.001	0.04
	R ²	0.59	0.58	0.17

Significant p values reported

Rosgen Stream Morphology Components

Level I

- Entrenchment ratio
- Width to Depth ratio
- > Slope
- Sinuosity

Level II

> above plus Substrate Size

Rosgen Classification







How best can we get site specific results?







Examine current management practices (as person days per year) at various Levels of detail.



A and B Streams

Steep gradient Limited Floodplain Bedrock and Boulder





C and **E** Streams

Low Gradient Large Floodplain Lots of Meanders





Independent Variables:

- Growing Season Grazing (Early, Late, or Entire Season, Dormant Season)
- Stock Density (Number of head per acre)
- Animal Unit per Acre per Year (No. of animals/acre/year)
- Rest Provided (Yes/No)
- Rest Between Grazing (Days)
- **Frequency** (Number of times per year pasture is grazed)
- Herding (Man Days per Year)
- **Off-Site Attractant Provided** (Yes/No)
- **Off-Site Attractant Time** (Man Days per Year)
- **Fencing** (Yes/No)
- **Fencing Time** (Man Days per Year)

Results:

Level 1-

EPA = 15.73 – 0.248(Stock Density) – 0.332(Frequency) + 0.003(Rest Between Grazing) +0.024(Herding) + 0.046(Off-Site Attractant Time) + 0.111(Frequency*Stock Density)

 $n=128, R^2 = 0.20$

Results:

Level 2, s-

EPA = 14.04 + 0.006(Rest Between Grazing) + 0.043(Herding) + 0.066(Off-Site Attractant Time)

 $n=75, R^2 = 0.19$



Level 2, w-

EPA = **16.63** – **0.353**(**Stock Density**)

 $n=55, R^2 = 0.10$



Level 3, s AB-

Sample Size too small to analyze. n=8



Level 3, s CE-

EPA = 13.85 + 0.007(Rest Between Grazing) + 0.043(Herding) + 0.088(Off-Site Attractant Time)

 $n=67, R^2 = 0.24$

Results:

Level 3, s CE, PFC

	β	Р
Herding	-0.0446	0.0578
OA Time	-0.0362	0.4055
Rest between Grazing	-0.0014	0.5851



Level 3, s CE, PFC

	β	Р
Herding	-0.0389	0.0938
OA Yes/ No	-1.2461	0.0924

Predicting EPA through Management:

(Level 3, s CE streams)





Level 3, w AB streams-

No terms were significantly associated with EPA.

n=35

A and B Streams







Level 3, w CE streams-

EPA = 15.70 - 0.030(Stock Density)n=20, R² = 0.18



Level 3, w CE streams, PFC-

	β	Р
Stock Density	-0.0320	0.4223

Predicting EPA through Management (Level 3, w CE streams)



Off-Site Attractant Time Across Three Levels

Level	Coefficient	n	p values	R ²
Level 1	0.0046	128	0.003	0.20
Level 2, summer	0.066	75	0.069	0.19
Level 3, summer CE streams	0.088	67	0.020	0.24

Conclusions

 Underlying factors interact with management regimes.
 However- we are identifying feasible grazing management practices



Questions?

