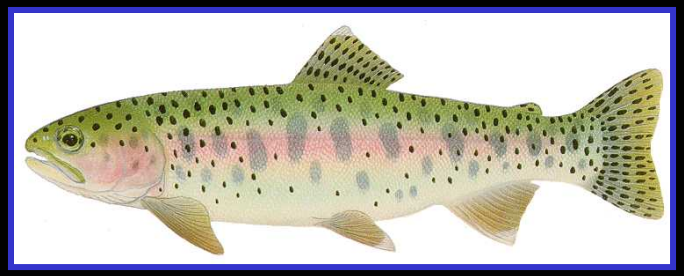
Riparian Grazing Strategies
and their impact on riparian health



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UCCE Rangeland Watershed Group

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.

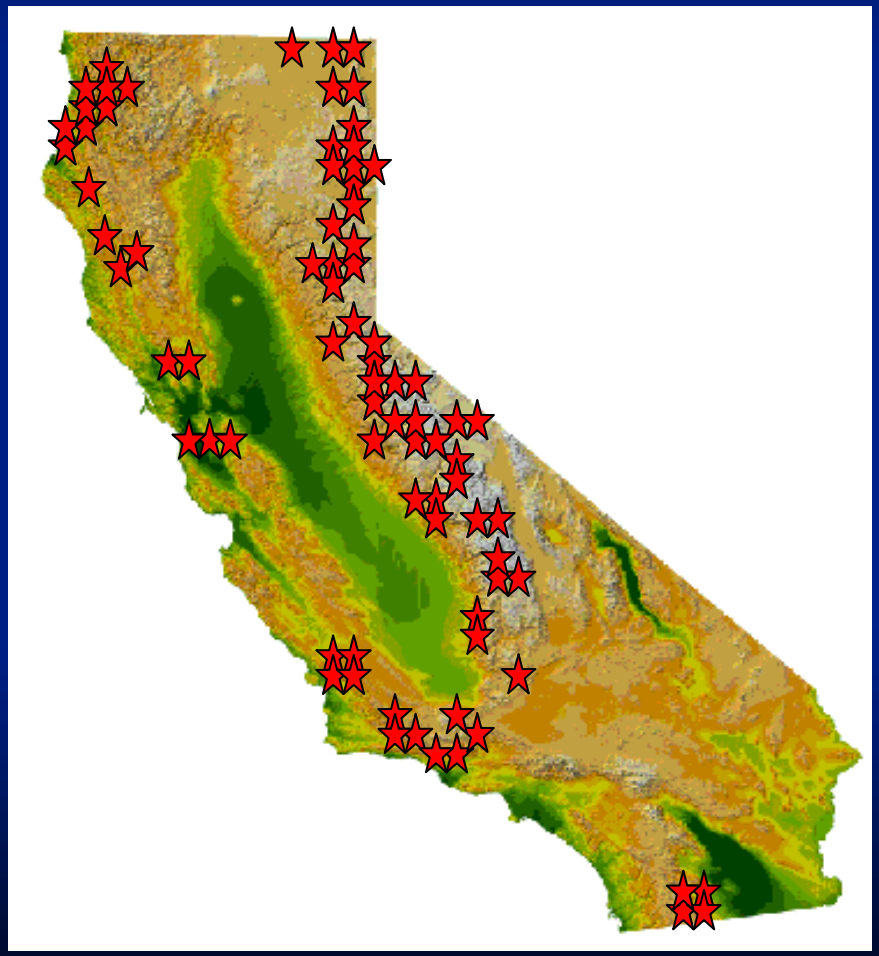
Background

- 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.**
  2. **Identify grazing management and site characteristics associated with high and low "riparian health".**
  3. **Synthesize data for site specific recommendations.**
  4. **Publish and extend information.**
  5. **Utilize sites to develop set of case studies.**

Study Sites



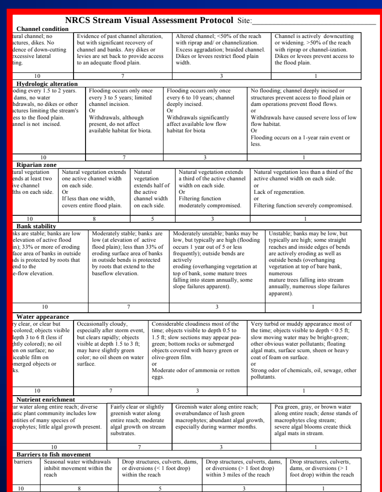
Survey Tools

Habitat Assessments

EPA

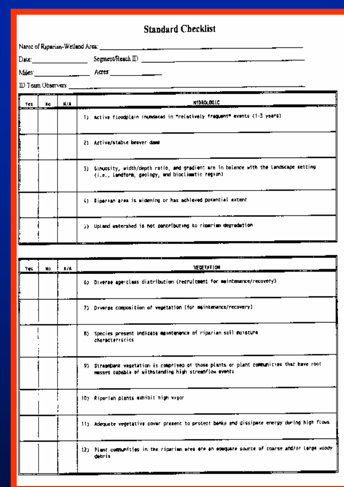

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

NRCS

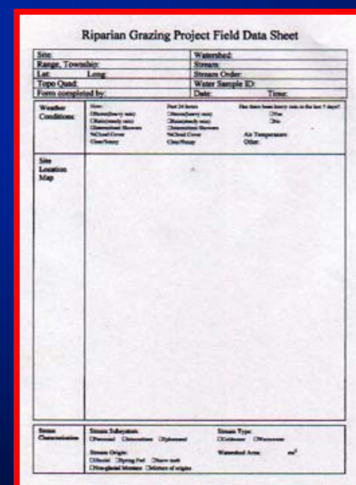

NRCS Stream Visual Assessment Protocol

Hydrologic Condition

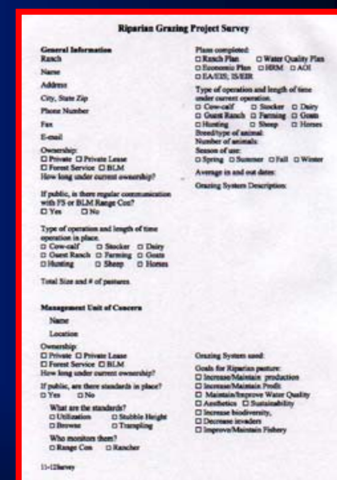
BLM


Standard Checklist

Site Characterization


Riparian Grazing Project Field Data Sheet

Management Survey


Riparian Grazing Project Survey

Habitat Features

Hydrologic Function

Physical Characteristics

Data Collected:

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

Pearson Correlation Coefficients (r):

EPA × NRCS	PFC × EPA	PFC × 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

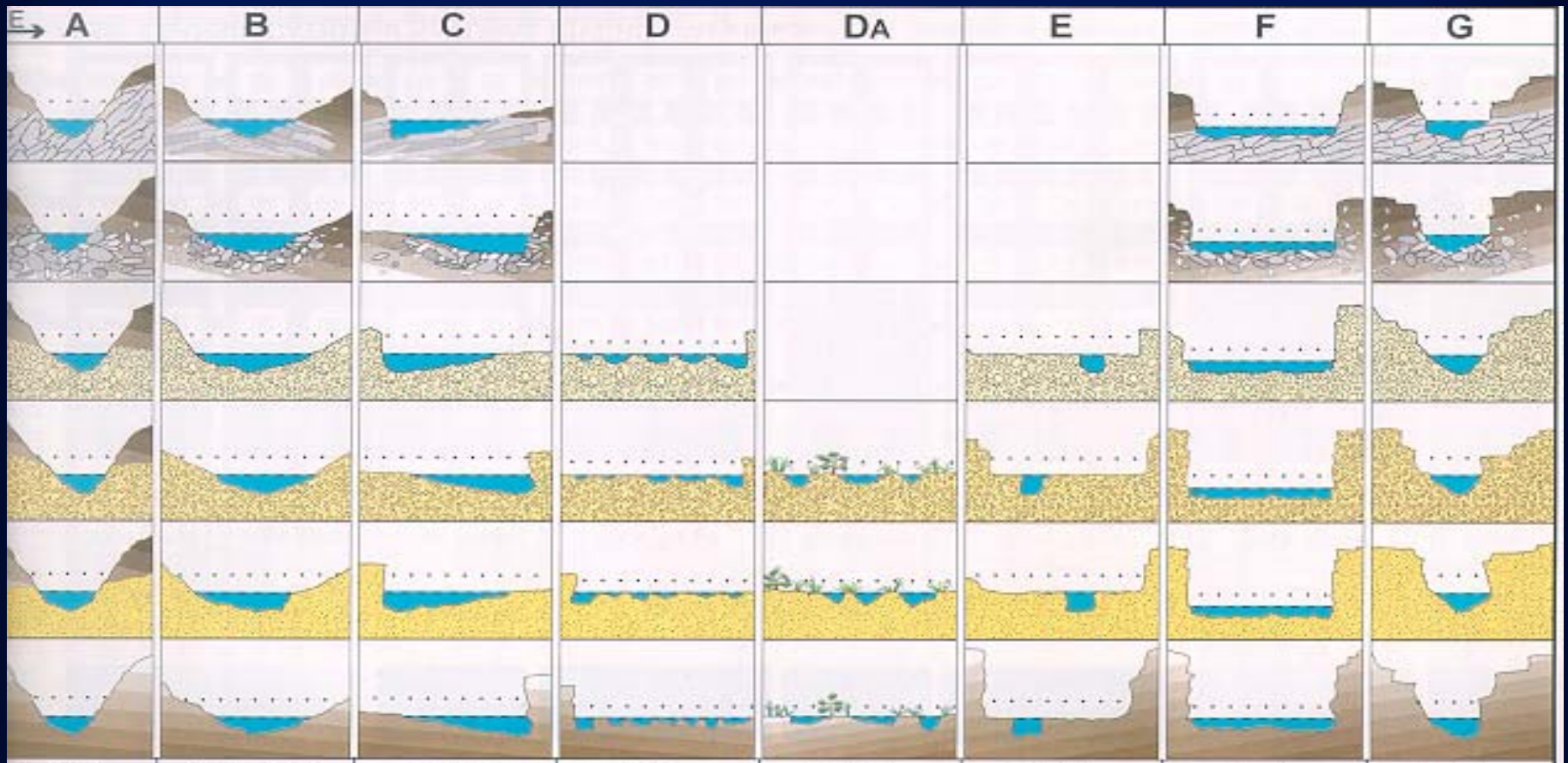
Level I

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

Level II

- above plus Substrate Size

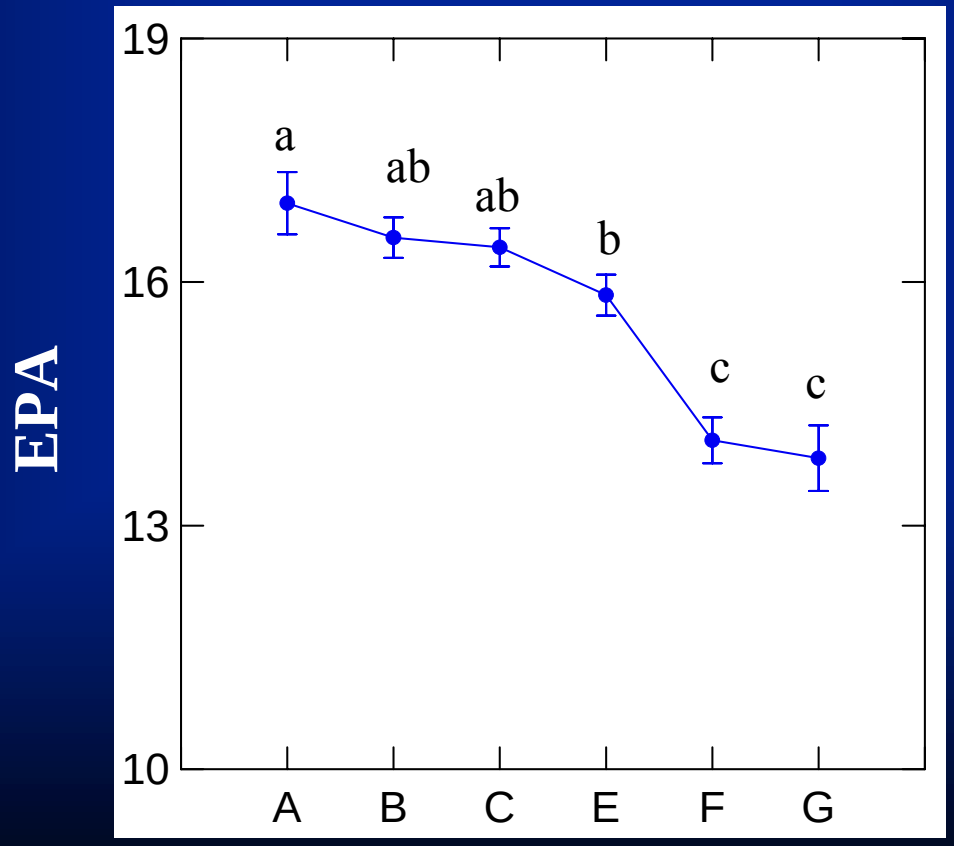
Rosgen Classification



E→ A	B	C	D	DA	E	F	G
< 1.4	1.4 - 2.2	> 2.2	n/a	> 4.0	> 2.2	< 1.4	< 1.4
< 12	> 12	> 12	> 40	< 40	< 12	> 12	< 12
1 - 1.2	> 1.2	> 1.2	n/a	variable	>1.5	> 1.2	>1.2
.04-.099	.02-.039	< .02	< .04	< .005	< .02	< .02	.02-.039

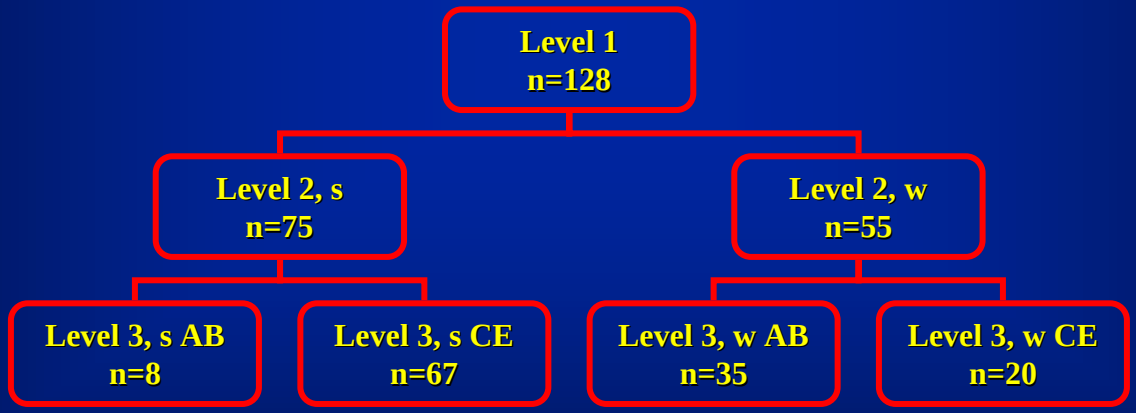
Analysis

- How best can we get site specific results?



Analysis

- 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

Results:

Level 2, w-

EPA = 16.63 – 0.353(Stock Density)

n=55, $R^2 = 0.10$

Results:

Level 3, s AB-

Sample Size too small to analyze. n=8

Results:

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

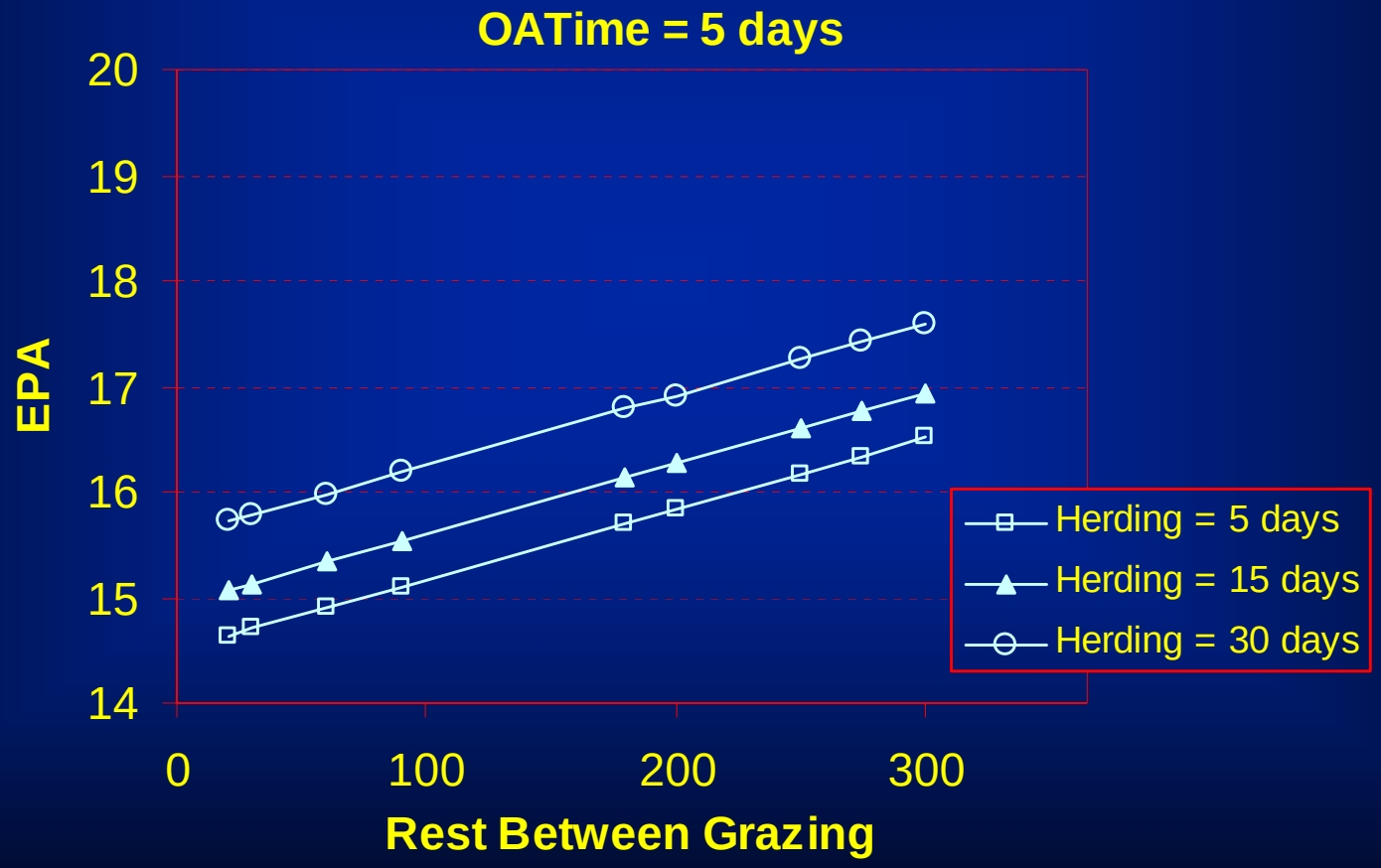
Results:

Level 3, s CE, PFC

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

Predicting EPA through Management:

(Level 3, s CE streams)



Results:

Level 3, w AB streams-

No terms were significantly associated with EPA.

n=35

A and B Streams

Results:

Level 3, w CE streams-

EPA = 15.70 – 0.030(Stock Density)

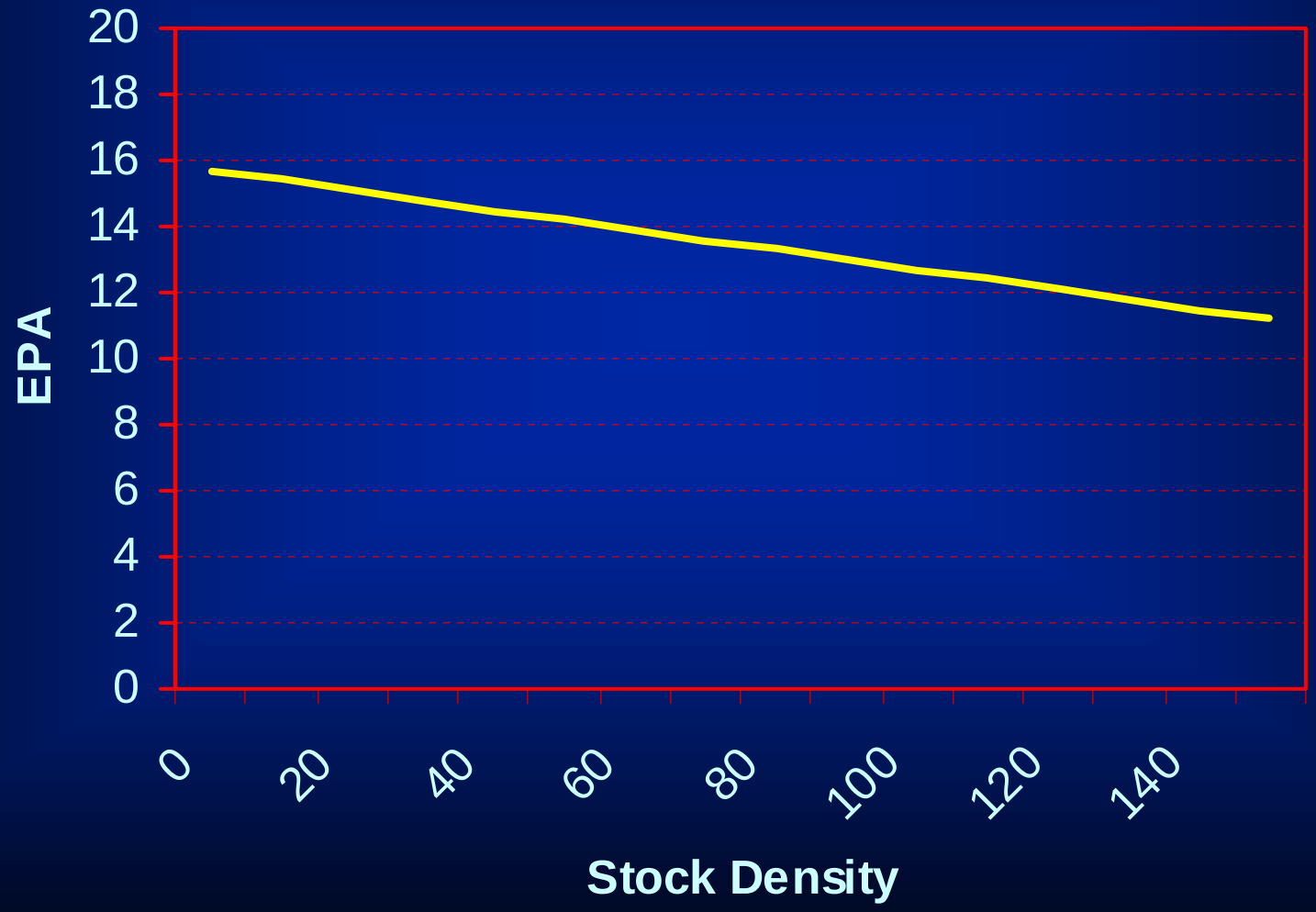
$n=20$, $R^2 = 0.18$

Results:

Level 3, w CE streams, PFC-

	β	P
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?