

Designing habitat for *Sigmodon arizonae*: A management strategy?

S. A. Neiswenter

Bureau of Reclamation, MSCP

Intro

- *Sigmodon arizonae* distribution
- Historically part of *S. hispidus*
- Ecologically probably very similar
 - Draw some general conclusions from that spp.



Intro

- MSCP HCP
 - 125 acres of marsh (5-56, 5-57 of HCP)
 - Of the 512 acres for Yuma clapper rail
 - “Marsh” (5-27 of HCP)
 - Mosaic of marsh vegetation (tule, cattail, common reed) ranging from 25-100% of the total land cover
 - As well as, trees, grasses, open water, and mudflats

Intro

- From the LCR = old and not quantitative
 - Marsh veg, Weedy, old-field
 - Grinnell 1914, 1933 – *S. hispidus*
 - Bradley 1964
 - Zimmerman 1970
 - Anderson and Nelson 1999
 - Blood 1991
- Other spp...

Anderson and Nelson 1999. Rodent use of anthropogenic and 'natural' desert riparian habitat, lower Colorado River, Arizona. *Regulated Rivers: Research and Management* 15:377-393.

Blood 1990. Taxonomy and distribution of *Sigmodon* in California. *Bulletin of Southern California Academy of Sciences*.

Bradley 1966. Status of the cotton rat in Nevada. *Journal of Mammalogy* 47:349:350.

Grinnell 1914 An Account of the mammals and birds of the lower Colorado Valley. *University of California Publications in Zoology*.

Grinnell 1933. A review of the recent mammal fauna of California. *University of California Publications in Zoology*.

Zimmerman 1970. Karyology, systematics, and chromosomal evolution in the rodent genus *Sigmodon*. *Publication of the museum Michigan State university*

Intro

- From *S. hispidus*
 - prefer grasslands, old-field habitat (Cameron and Spencer 1981)
 - High herbaceous cover (Stokes 1995)
 - Shun areas where tree canopy shades ground cover (Geortz 1964)
 - early successional clear-cuts (Brown et al. 1999)
 - Prefer sites with tall (>1m) shrubs and high percent cover but no selection for particular vegetation type (Browne et al. 1999)

Browne et al. 1999. Effects of landscape spatial structure on movement patterns of the hispid cotton rat (*Sigmodon hispidus*). *Landscape Ecology* 14:53–65.

Cameron, G.N. and Spencer, S.R. 1981. *Sigmodon hispidus*. *Mammalian Species* 158:1–9.

Geortz, J.W. 1964. Influence of habitat quality upon density of cotton rat populations. *Ecological Monographs* 34:359–381.

Stokes, M.K. 1995. Selection of refuge sites by sympatric *Microtus ochrogaster* and *Sigmodon hispidus*. *Journal of Mammalogy* 76: 83–87.

Intro

- Surveys to date
 - 3 consistent populations
 - 1 *might* be considered marsh...
 - Marsh veg is maybe 25%, no trees, and little grass...dang!
 - Other 2 are dominated by grasses, bushes, and on a broader scale trees.

Intro

- How do we get habitat credit?
 - Presence
 - One's enough?
 - Habitat based program
 - Must be able to quantify habitat characteristics

Objectives

- Quantify microhabitat characteristics
- Estimate demographic parameters
- Design monitoring strategy
- Get habitat credit

Methods

- Mark-recapture
 - Permanent trapping grids at each site
 - Station every 10 meters
 - Analyzed with program MARK
- Vegetation quantification
 - Each station at 1m measure veg
 - Logistic regression

Big Picture Results

- Survival est. for 3 sites:
 - PVER bench - Higher
 - Nature Trail - Higher
 - Pintail - Lower
- Site and Seasonal differences in vegetation cover
 - Not vertical density
- Is there a connection? maybe...

How do I make *Sigmodon* habitat?

- Parameters of two competing models:
 - VD2
 - VD10
 - Average litter depth
- Other variables in either model:
 - Cover of grass, forb, or litter
 - VD5

How do I get Habitat Credit?

- Presence = not enough?
- 2 “stage” monitoring
 - 1st = directed presence survey (\$)
 - Broad scale random sampling unnecessary, costly, and ineffective (\$\$\$-\$\$\$\$)
 - If present: 2nd = monitoring (\$-\$\$)
 - Est. survival and/or population size
 - Determine what is appropriate (e.g. X survival through Y time)

\$ = cheap \$\$ = moderate \$\$\$ = expensive \$\$\$\$ = prohibitively expensive

I made habitat but nobody showed up



- Habitat based
 - Anyone (yes, anyone) can measure veg at a site and estimate the probability:

$$\Pi_k(X) = 1 - \sum_{i=1}^{k-1} \Pi_i(X)$$

- This eventually becomes a management issue...
 - sweet, is the title going to make sense now?

Management issues

- Weedy species
- Occur in short lived primary succession
- Necessarily require active management
- Seriously, how do I get Habitat Credit?

Management Strategy?

- Habitat Formula
 - Measure veg at a site
 - Plug into formula and estimate probability of capturing *Sigmodon*
- To increase the probability of capturing *Sigmodon*
 - the formula can identify what to change
- It could also be used to track the progression of habitat
 - Inform management decisions on when to make changes
 - Give idea of how long an area will meet requirements

Free at last, Free at last!

- The next 17 slides are pictures...

But you still have to listen to me
ramble :D :D :D











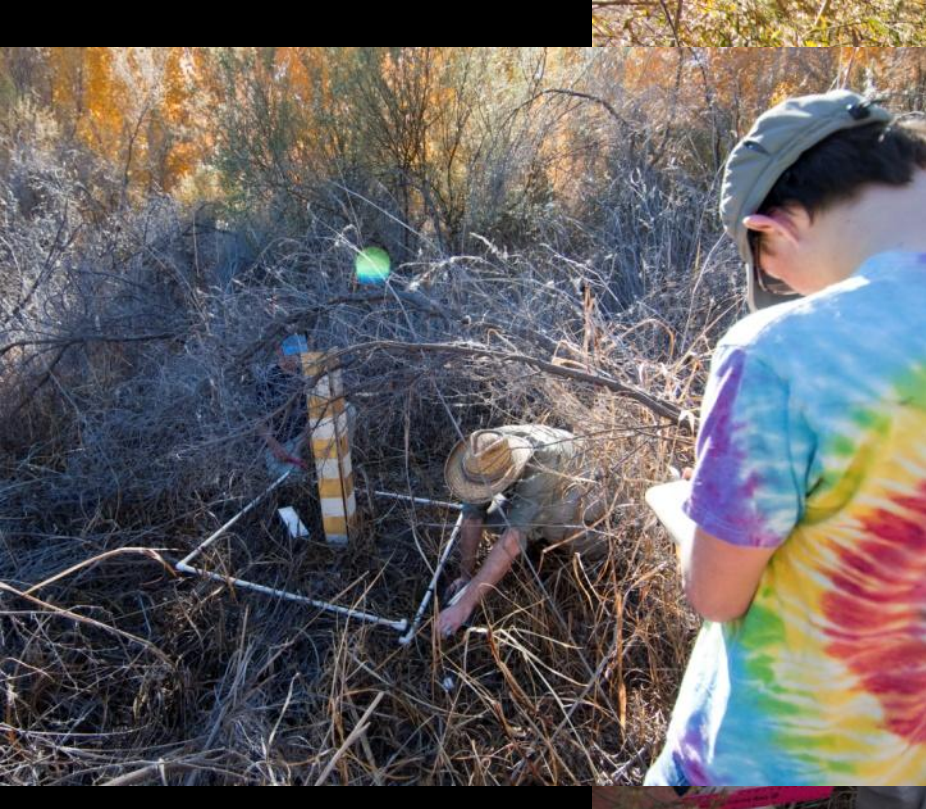
























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