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

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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...

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)

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
  – 1\textsuperscript{st} = directed presence survey ($)
    • Broad scale random sampling unnecessary, costly, and ineffective ($$$-$$$$$)
  – If present: 2\textsuperscript{nd} = monitoring ($-$$$)
    • Est. survival and/or population size
      – Determine what is appropriate (e.g. X survival through Y time)

$ = cheap \quad $$ = moderate \quad $$$ = expensive \quad $$$$ = 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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