Censusing Wildlife Populations

ESRM 304

Censusing Wildlife Populations

- Although several population parameters are of interest for different reasons (survivorship, movement patterns), we will focus on different approaches for censusing natural populations.
- We will concentrate on terrestrial vertebrates, but recall that by Washington State law insects, their eggs, and larvae are also protected wildlife.
- Methods vary as functions of species natural history, and because of this, the techniques are grouped by taxonomy and life style.

Amphibians

- Pond-breeders
  - Most frogs & toads, some salamanders
  - Live at ponds or migrate seasonally between them and upland habitats
  - Have pond-adapted larvae

Amphibians

- Stream-breeders
  - Some salamanders and one frog
  - Live in or near streams
  - Have stream-adapted larvae

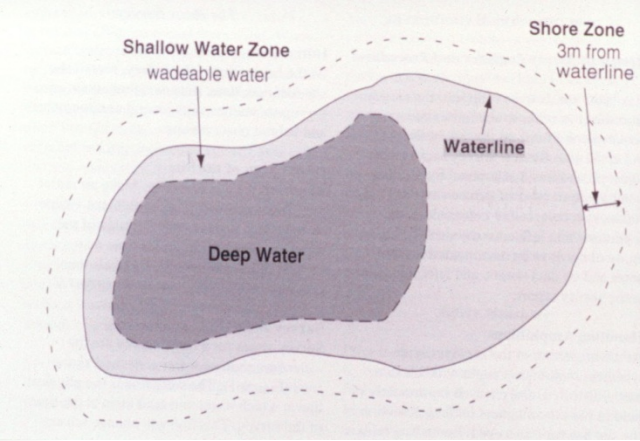
Amphibians

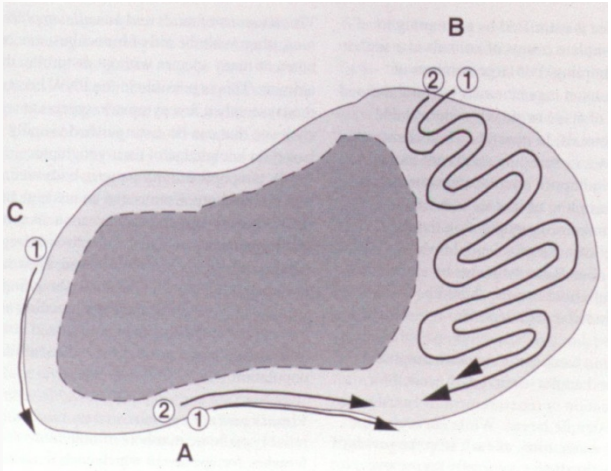
- Upland breeders
  - Several salamanders
  - Lay eggs on moist sites on land
  - Full development in egg
  - Fully terrestrial—no aquatic larval stage

Amphibians: Pond Surveys

- Pond-breeding frogs and salamanders
  - Season: spring breeding period
  - Equipment: rubber boots/waders, dip net, holding bucket, ruler and spring scale
  - Targets: adults, eggs, and larvae

Amphibians: Pond Surveys





- Search mode by pond zone
  - Shore: Visual Encounter Surveys (VES) for adults
  - Shallow water: VES and net capture of adults, eggs, & larvae
  - Deep water: trapping, diving for adults & larvae

Amphibians: Pond Surveys

- Aquatic traps
  - Galvanized minnow trap
  - Collapsible net trap
  - Pop bottle trap
  - Pond surveys yield CPUE estimates

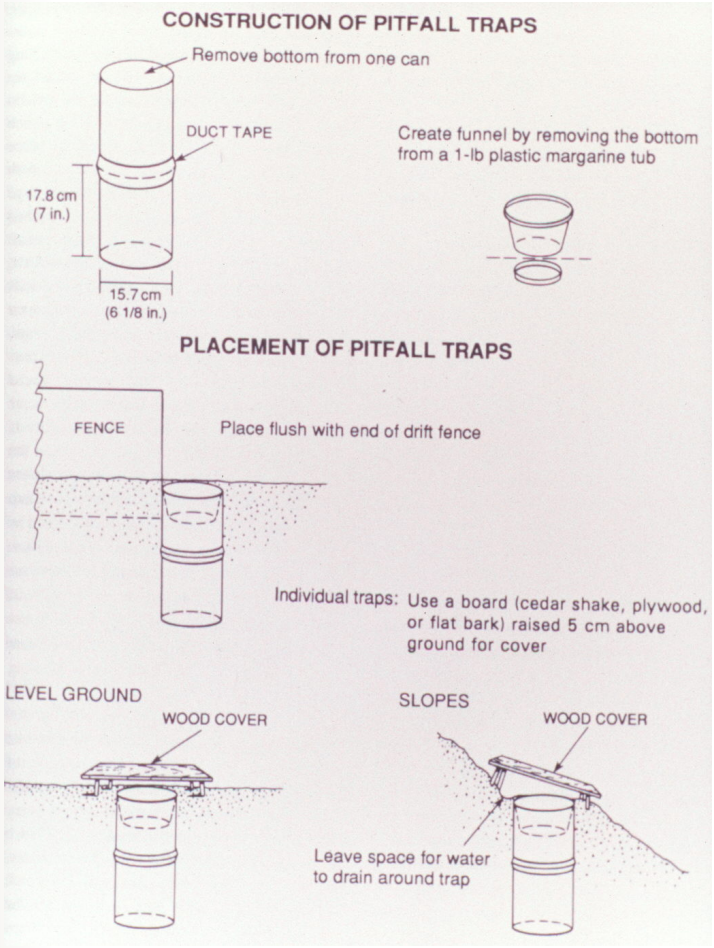
Amphibians: Stream Surveys

- Stream-breeding frogs & salamanders
  - Season: late summer
  - Equipment: rubber boots/waders, small nets, wire screens, hand rakes, holding bucket, ruler, spring scale
  - CPUE estimates and density for larvae

Amphibians: Terrestrial Searches

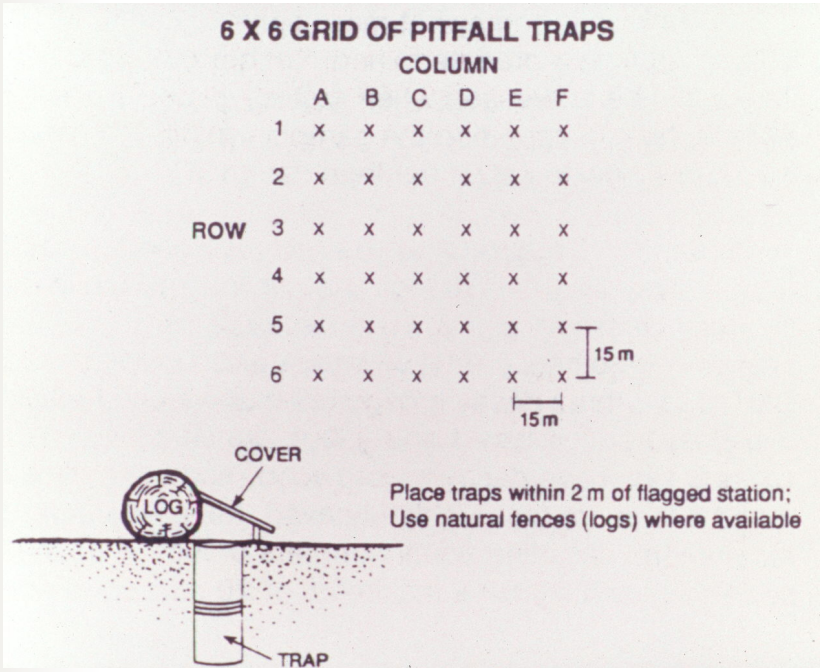
- Upland and pond-breeding salamanders
  - Searches constrained by time or area
  - Season: after spring or fall rains
  - Equipment: potato or hand rakes, plastic bags, ruler, spring scale

Amphibians: Pitfall Trapping



- Upland and pond-breeding salamanders
  - Season: after spring or fall rains
  - Equipment: posthole diggers, cans, lids, margarine tubs, covers, ruler, spring scale
  - CPUE estimates

Amphibians: Pitfall Trapping



- Pitfall arrays
  - Often placed in grids with various spacing
  - Allows thorough coverage of an area
  - Arrays operated for various time spans (1-4 weeks common)

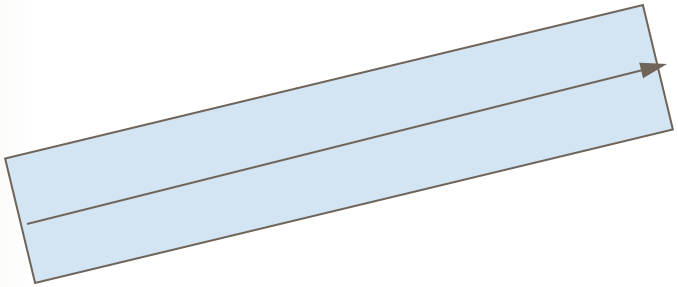
Reptiles

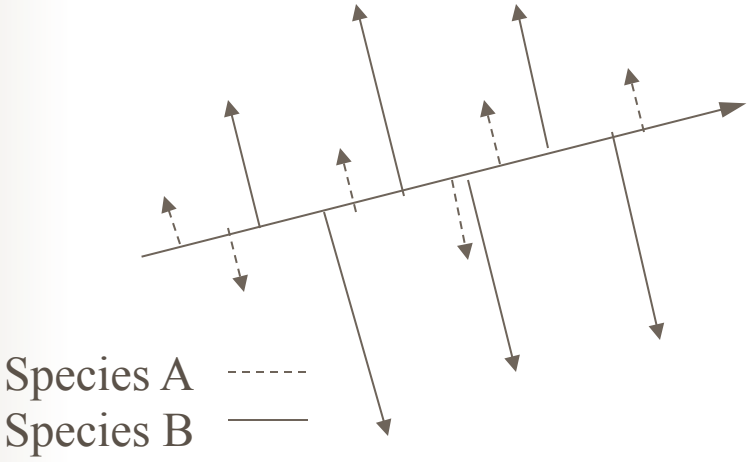
- Snakes, lizards, and turtles
  - Time and area constrained searches
  - Pitfall trapping with drift fences
  - Road night driving
  - Diving for turtles in ponds and rivers

Birds

- Identification issues
  - Need to know birds by call because many species are hard to see in forests or hard to identify to species
  - Censuses rely on ID by sight (10%) and ear (90%)

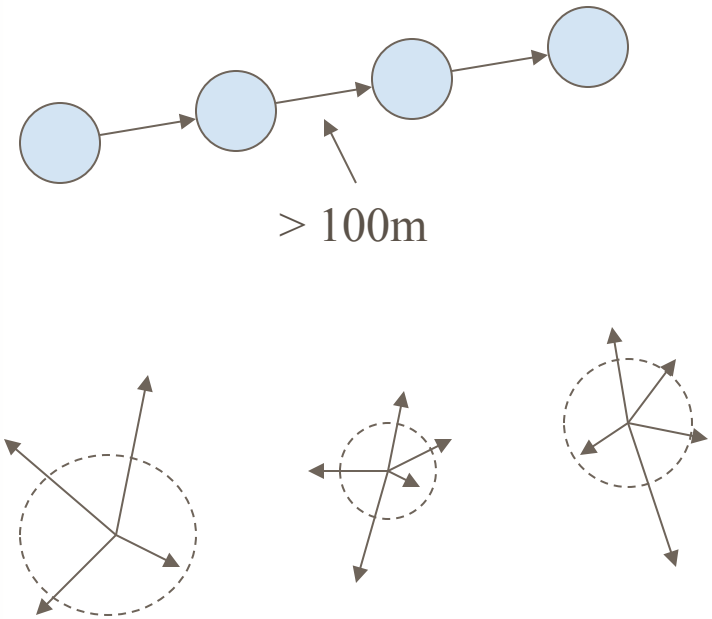
Birds: Transect Censuses





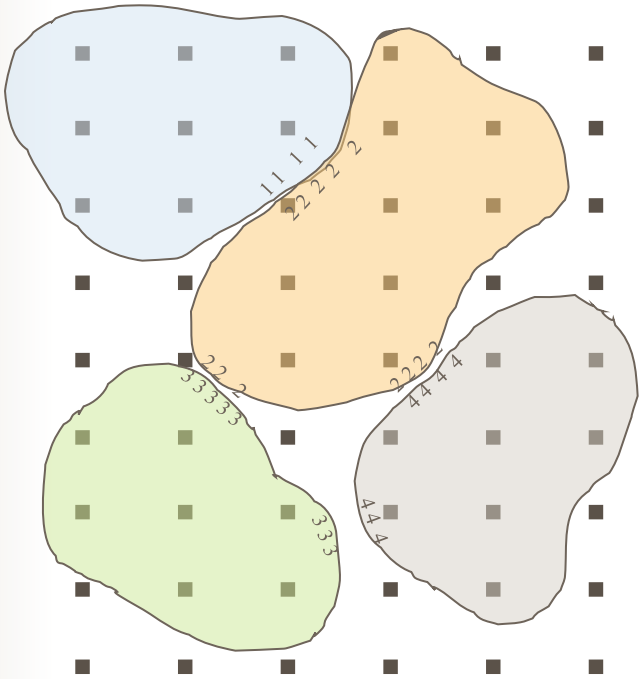
- Useful in relatively simple environments both land and sea
  - Fixed width: simple, but biased against birds with low detection
  - Variable width: adjusts width as a function of detection

Birds: Circular Plots



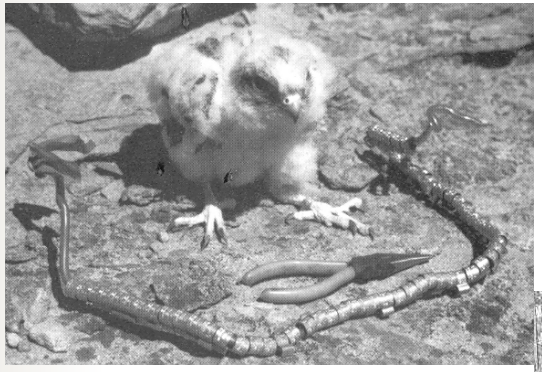
- Useful in complex environments
  - Fixed radius plots: similar to fixed width transects
  - Variable radius plots (VCP): allow for detection functions
  - Plots arrayed uniformly or at random points

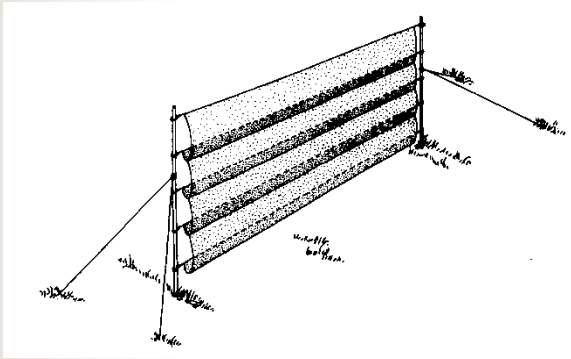
Birds: Spot Mapping

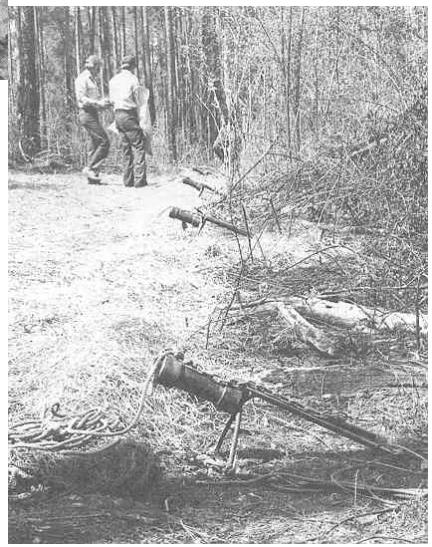


- Breeding territory mapping
  - Locate singing males and disputes along boundaries
  - Over repeated visits edges of territories become clear
  - Yields breeding pair or territory density

Birds: Banding





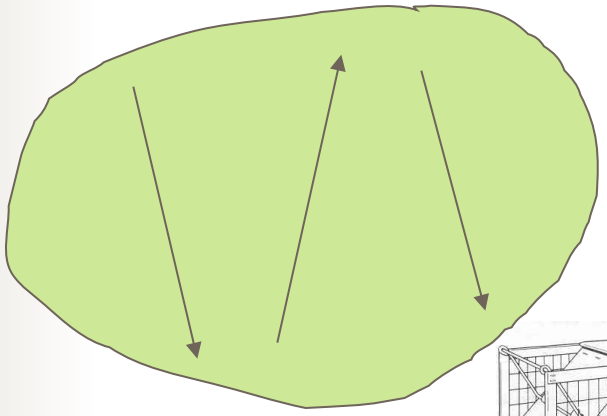


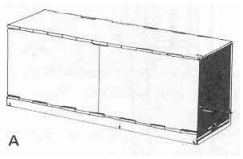
- Numerically- and color-coded bands
  - Provides individual marks for C/M/R, survivorship, and site fidelity records
  - Metal or plastic tags
  - Capture with mist nets, canon, or drop nets

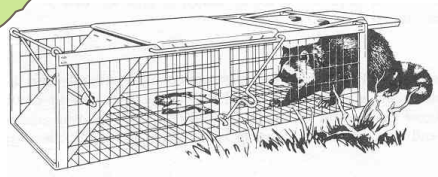
Mammals

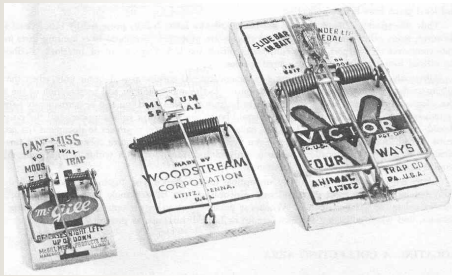
- Diverse natural histories require different approaches
- Removal or C/M/R trapping common for small mammals
- Capture and radiotelemetry for large mammals

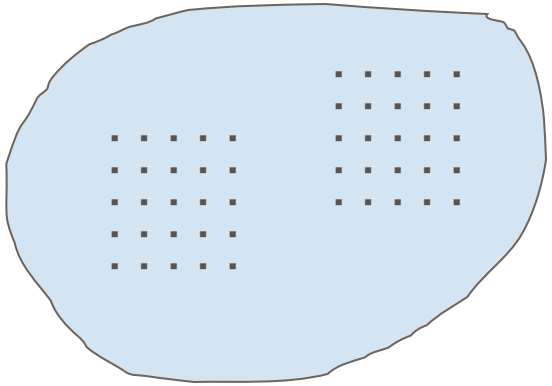
Mammals: Trapping Small Mammals





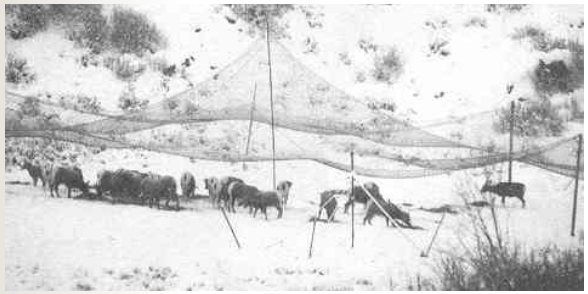






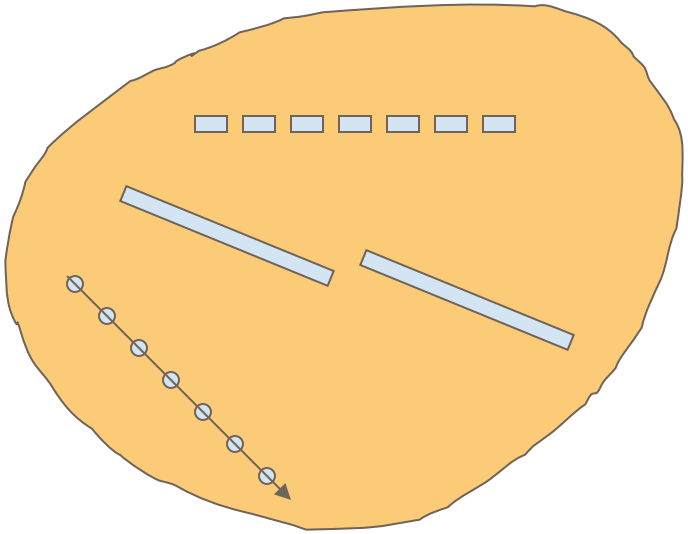
- Removal or C/M/R
  - Results often reported as # caught/ 100 trap nights
  - Trap transects allow rapid CPUE indices
  - Grids allow CPUE or density estimates
  - Traps: box, snap, pitfall

Mammals: Trapping Large Mammals



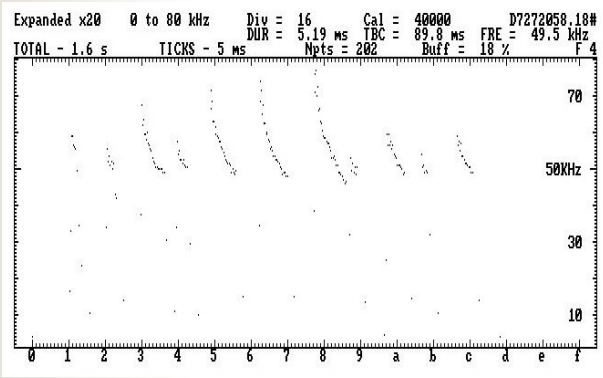
- Traps set in areas of congregation or visitation
  - Often radio-collared
  - Traps: Clover, culvert, drop nets, corral traps
  - Hounds especially effective for treeing bobcats and mountain lions

Mammals: Pellet Plot Surveys



- Pellet plots
  - Involve periodic counts of pellet groups on permanent plots
  - Yield an index of use for an area
  - Plots are variously shaped and arrayed depending upon habitat

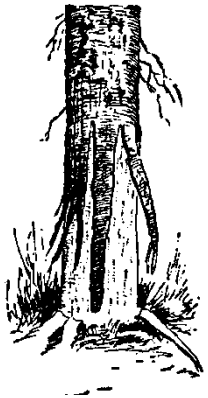
Mammals: Bats



- A challenging group
  - Direct capture with mist nets, harp traps for C/M/R estimates
  - Echolocation detectors for use or activity indices
  - Exit counts at day roosts (buildings, caves) for colony estimation

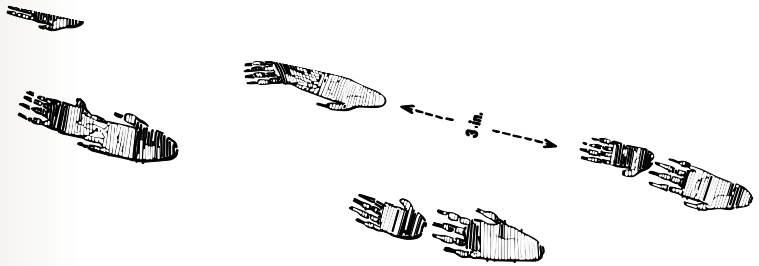
Mammals: Artifacts

European rabbit
Burrows at San Juan Island



- Take advantage of sign of presence
  - Can count artifacts to index territories: red squirrel middens, woodrat nests
  - Artifacts can indicate presence in an area: fresh burrows of many species, “bear trees”

Mammals: Tracking and Call Surveys



- Tracking
  - Tracks in snow, sand, and on tracking plates signal presence and can yield use indices
- Vocalization
  - Calling routes index presence of vocal species: squirrels, esp. coyotes, wolves

References on Sampling

- Silvy, N.J., ed. 2012. The wildlife techniques manual, 7th edition: vol. 1: Research. Vol. 2: Management. Johns Hopkins University Press. 1,136pp.
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