Amphibian Sampling

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Goal of the Lecture

To familiarize students with common techniques used to capture, measure, and mark amphibians

Reading Assignments: **See Website**

1) **TAMP Protocol**

2) **Burton et al. 2007**

Lecture Structure

1. **What is your Objective?**
2. **Sampling Methods**
3. **Sampling Designs**
4. **Measuring & Marking**

What is Your Objective?

1) Species Occurrence

WHY?

Post-metamorphs:

- Call Surveys
- Cover Boards
- PVC Tubes
- Area Searches

Larvae:

- Minnow & Other Traps
- Dip Netting

What is Your Objective?

2) Relative Abundance, Recruitment, Movement

Post-metamorphs:

- Call Surveys
- Cover Boards
- PVC Tubes
- Area Searches
- Pitfall Sampling

Larvae:

- Minnow & Other Traps
- Dip Netting
- Enclosure Sampling
- Seine Netting

Call Surveys

http://www.state.tn.us/twra/tamp/frprotoc.html

Begin: ≥ 30 minutes after sunset

End: 1:00 AM

Duration 5 min

0 = none heard

1 = individuals can be counted

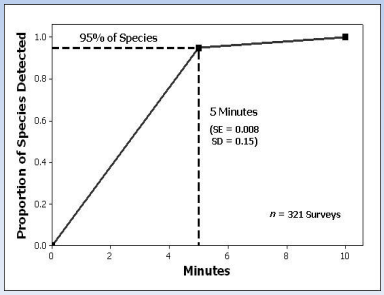
2 = calls overlap but individuals can be distinguished

3 = calls overlap and individuals cannot be distinguished (full chorus)

$700

Call Survey Duration

Burton et al. (2007)

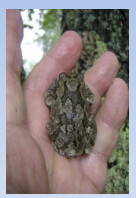


Cover Boards

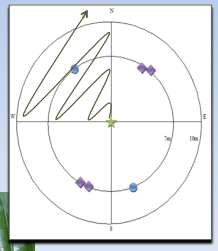
Cover Boards

PVC Tubes

6.4-cm diameter



Area Searches

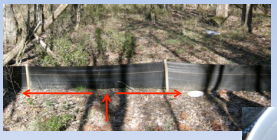


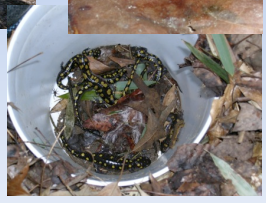
Recorders
Treefrog tubes
Cover boards
Area search

Area or Time Constrained Search

Standardize Effort

Drift Fences & Pitfall Traps



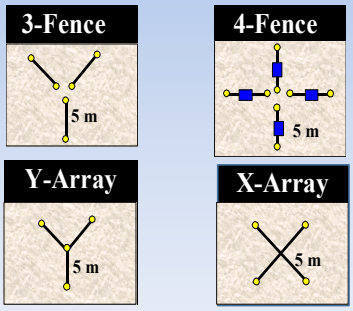


- Intercept during movement
- Provides continuous capture

Drift Fences & Pit Fall Designs

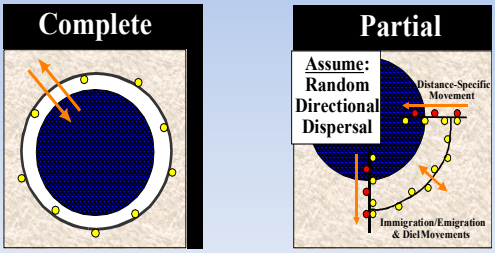
Straight-line Arrays

Foreste d Sites



Drift Fences & Pit Fall Designs

Continuous and Partial Drift Fences



Goal: •Estimate Population Size and Composition

•Estimate Directional Movement

Drift Fence and Pitfalls

Materials and Costs

- **Fence** ($0.35-$1.50 per meter)
  - Aluminum Flashing
  - Hardware Cloth
  - Plastic/Cloth Erosion Fence

24" stakes

- **Pitfalls** ($2.50-$5.00 per bucket)
  - Plastic Buckets (8- or 19-liter) w/ Lids
  - #10 Tin Cans (2 fastened = 8-liter)
- **Shade Covers/Sponges** ($0.25-$1.50 per bucket)
  - Wood or Pegboard Planks with Legs
  - Synthetic Foam or Sponges

Drift Fence and Pitfalls

Installation

Fence Placement:Stratified Random or 5 m above anticipated HWL

Pitfall Placement: Every 10 m and Adjacent to Fence

- Hoe, Mattock, or Ditch Witch ($150/day)
- 12-inch Auger ($75/day)
- Shovels, 3-5 lb Sledges, Tape Measure, Flags ($100)
- Personnel (4 people: 300 m/1-2days [$250/day])



Drift Fence and Pitfalls

Installation

STEP 1: Measure and Distribute Materials


STEP 2: Dig Holes and Install Buckets (top flush w/ ground)


Drift Fence and Pitfalls

Installation

STEP 3: Remove Vegetation and Dig Trench (3-5 inches)


STEP 4: Install Fence

STEP 5: Bury Fence

Drift Fence and Pitfalls

Completely Set Up

5 m Leads

Drift Fence and Pitfalls

Maintenance $200/month

Weather
- Precipitation
- Wind
- Sun

Animals
- Livestock
- Small Mammals

Drift Fence and Pitfalls

Operation

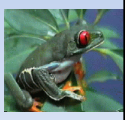
- **Pitfalls should be checked daily (before 1200 hrs)**
  - Reduce Probability of Predation (snakes, raccoons), Desiccation, Drowning, or Ammonia Toxicity
- **Processing time is capture frequency dependent**
  - 15 minutes (0 captures) to 15 hours (14K) for 350 m
- **Processing should be continuous**
  - Reduce Probability of Density-Induced Movement
- **Handling can enhance desiccation**
  - Rehydrate prior to release
- **Closing Buckets (sample alternate days)**
  - Reduce probability of immediate recapture
  - Increases temporal independence

Drift Fence and Pitfalls

Considerations

Pitfalls: Yes or No?

- Research Question (Are pitfalls necessary?)
- System/Terrain (Is it realistic?)
- Funding (What are the costs & benefits?)



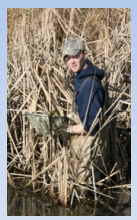
Species-specific Biases

- Differential Capture Rates
  - Climbing, Jumping, Digging Ability
- Differential Trespass
  - Can be quantified
- Location of Fence and Pitfalls

Drift Fence and Pitfalls

Dip and Seine Netting

Dip Nets



Seines

- Mesh size and width
  - 1.5 to 7 mm and 1 to 1.5 m wide
    - Larger and small sizes can be used
  - Seine parallel to shore (2 m)
  - Quarter-haul into shore

Enclosure (Pipe) Sampling

Count Number of Dips

Dip until No Larvae Captured after 10 dips

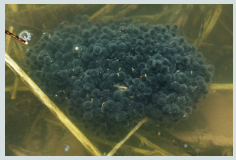
Calculate CPU: Relative Abundance

Collect random individuals for pathogen testing

Minnow Traps and Enclosures




EGG MASS SEARCHES

Pickerel Frog

Southern Leopard Frog

Walk Shoreline or Transects

Every 2 – 4 weeks

Spotted Salamander

EGG MASS SEARCHES


Upland Chorus Frog

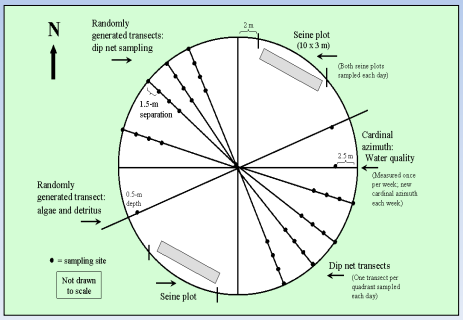
American or Fowler's Toad

Successful Reproduction

Larval Surveys

Spring Peeper

Larval Sampling Schematic



Putting it All Together

Sampling Design

Standardization & Sampling Frequency

Amphibian Marking Techniques

General Biological Information

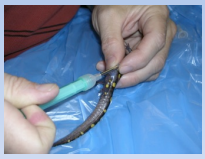
- Species, Age, and Gender
- Snout-vent Length (SVL)
- Weight
- Abnormalities
- Malformations, Tumors, Sores, Parasites

Individual Marking Techniques

- Passive Integrated Transponder (PIT) Tags

- $4.00 - $6.00 per tag
- Readers $500+

PIT Tags



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PIT Tags

- New Antennae Technology

Individual Marking Techniques

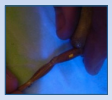
- **Transmitters**

- $160 each
- Limited batteries life

Individual Marking Techniques

- **Coded Wire Tag**
  - Injectable Stainless Steel Tag
  - Etched Binary ID Code
  - 1.1 x 0.25 mm, $15/$6000 wand

- **Alpha-numeric Tag**
  - Injectable Visible Tag
  - Alpha-numeric Code
  - 1.1 x 2.5 mm, $1 each/$100 injector



Mass Marking Techniques

Batch

- **Florescent Elastomers**
  - Injectable Liquid Elastomer (4 colors)
  - $1000 Kit (1000 individuals)

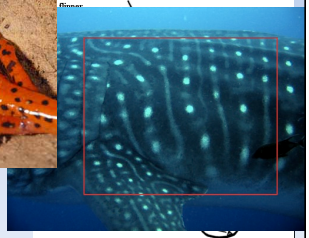
- **Florescent Dyes**
  - Water resistant Dyes
  - Powder and Shake-and-Bake
  - Ultraviolet Light Sensitive
  - $12/lb (1lb/100 individuals)

- **Toe-Clipping**
  - Mass-mark or uniquely ca. 2,000 individuals
  - Rapid and Inexpensive

Batch or Individual

Individual Marking Techniques

- **Natural Individual Markings**



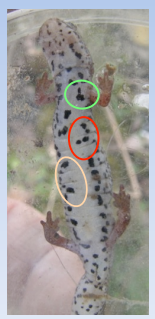
KEY TO MANATEE IDENTIFICATION DRAWINGS

r drawn to show damage
show relation of a scar
flipper

Name PHOEBE

- *Eurycea lucifuga*
- *Desmognathus ocoee*

Individual Marking Techniques



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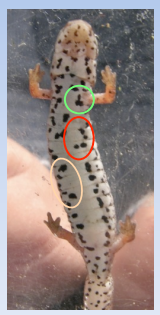

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Additional References