Field sampling in the digital world

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Today:
• Basics about the course
• Design process
• Structure of activities and assignments
• Joys, sorrows, continuing challenges, and infinite possibilities

FW255: Field sampling of fish and wildlife
• "Introduction to sampling populations and communities of vertebrate animals emphasizing sampling design, collection and management of data, and communication of results."
• Major expectations:
  • Learn principles of conducting scientific sampling in a systematic fashion
  • Gain experience with field conditions and sampling methods
  • Understand and apply basic field navigation skills
  • Build basic skills in data entry, handling, and graphical summary with spreadsheets
  • Gain communication and presentation skills

Our "base model"
First core course in the F&W curriculum
Assumes no statistical experience
Traditional on-campus format
• Weekly lecture + 4-hour lab, including field trips
• Lectures cover theory and set up labs
  • Text on writing and presenting science, but few readings
  • Field exercises with selected methods and tools
  • Small-group term project involving collection of field data
  • End-of-term presentations based on field projects
  • (Final exam)

The design process
• Re-visioning the course
• Temporal structure and organization of subject matter
• Laying the groundwork of assumptions
  • “How can we present x so that y will be clear?”
  • Scaling expectations of time & access to resources/tools
• Structuring the activities
• Road-testing, revision, tweaking

Components
• Slideshows
• Readings
• Weekly quizzes
• Discussion Boards
• Homework exercises
• Term-long projects
  • Field journal
  • Field project
  • Final presentation
Equipment and resources

**Required**
- Access to internet and standard programs
- Textbook: How to write and publish a scientific paper – Day & Gastel
- Course packet:
  - B/W copy of topographic map
  - Clear plastic grid reader
  - Waterproof field notebook
- Secure an audience for final presentation

**Recommended**
- Access (1 week, min) to a Global Positioning System (GPS) unit & a compass
- Access to a scanner or digital camera
- Access to field guides for taxa of interest within geographic region
- Tools appropriate to their project (vice-versa)

Learning resources

- **Readings and cases**
  - Text
  - Peer-reviewed articles
  - Website
  - Examples for presentation preparation (good vs. evil)
- **Discussion Boards**
  - Week 1: Introductions, local environment, and initial project concepts
  - 3 more focused on stages through the field project
  - General "catch-all" DB for conversation and clarification
  - Peer review of draft presentations, including file swap on DB

- **Explorations**
  - Video clinic on naturalist observations and sketching
    - Practice on study area
    - Structured homework assignment(s)
  - Library exercise supported by custom Library webpage
  - Clinic on orienteering and navigation skills
  - 3 SLIDESHOWS
    - Mapping concepts, applied map use
    - Demonstrations of compass, map, and GPS use
    - Map exercise & exploration of topographic map for own area

- **Steps and check-ins along the way**
  - Field notebook submissions
  - Stage-specific activities for the field project, e.g.,
    - design and test a datasheet
    - share and compare descriptions of vegetation structure on field site
    - share sampling stratification decisions
    - create summary graphics for main results

Providing support and building community

- "Open" Discussion Board
  - General questions/clarifications
  - Peer advice on field activities
    - Instructor-led threads on topics of common need/interest
  - Real-time virtual office hours
    - >Communication>Collaboration tools
  - Good old e-mail and phone
What we learned the hard way

- Clarity, clarity, explicit clarity!
- Temporal distribution of demands on Instructor
- Routing via the Assignments tool
- Challenges of "guiding" field project conceptualization
- Checking assumptions on inference and "survival skills" level of the audience

But the possibilities are infinite...

- Audience breadth
  - Parents
  - Traditional on-campus students
  - Non-traditional
  - Career switch
  - Post-bacc
  - Military
  - Active
  - Veteran
  - Family member in remote posting
  - Ethnic and socioeconomic background?

- Value of the experience
- Diversity of "adventures"
- Geographic and ecological diversity
- Shared via community

One example...

Question: Does bird diversity differ between sites that are treated with prescribed fire and sites that are not treated?

Hypothesis: Bird diversity will be higher in burned sites than in unburned sites.

Why? Intermediate Disturbance Hypothesis: Biodiversity is highest when disturbance is intermediate in frequency and intensity.

Methods

5 Point counts performed at each field:
1. 3 minutes in duration
2. included fly-overs
3. included visual and auditory detection
4. unlimited in radius

Limitations of Study

Sample size – only 2 samples for each treatment. Ability to generalize severely limited.
No statistical tests performed
Uncontrolled variables – results in bias:
- Time of day/year
- *Weather
- Habitat differences
- Observer error
- Age/sex of birds
- *Species-specific detection variability
- *time since burn
Abundance (total # counted) and richness (number of different species counted) were both higher in the unburned fields – hypothesis not supported.

Bird diversity calculated using Simpson’s Index of Diversity:

\[ D = \frac{\sum n(n-1)}{N(N-1)} \]

- Takes species richness and evenness into account
- Larger D means more diversity

Burned Fields:
D=0.8686
Unburned Fields:
D=0.6615
Bird diversity is higher in burned fields.

Ongoing considerations and conversations...

- There’s still more we would like to add, but...
- Quality of outcomes for students
- Still debating on equipment
- Others...

Thank you!