

Applied Population Dynamics

WILD 5700/7700

Richard Chandler



HCO ScoutGuard

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CENTRAL QUESTIONS

1. What causes spatial and temporal variation in population size and structure?

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1. What causes spatial and temporal variation in population size and structure?
2. How do environmental change and human activities (including management actions) affect populations?

By the end of the semester, you should be able to:

1. Develop a population model that

- ▶ Describes variation in demographic parameters over time
- ▶ Predicts how a population will respond to management/conservation actions

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 - ▶ Describes variation in demographic parameters over time
 - ▶ Predicts how a population will respond to management/conservation actions
- 2.** Design a study to collect the data necessary to estimate the demographic parameters of the model
- 3.** Use software (e.g., PRESENCE, DISTANCE, MARK) to estimate parameters from field data

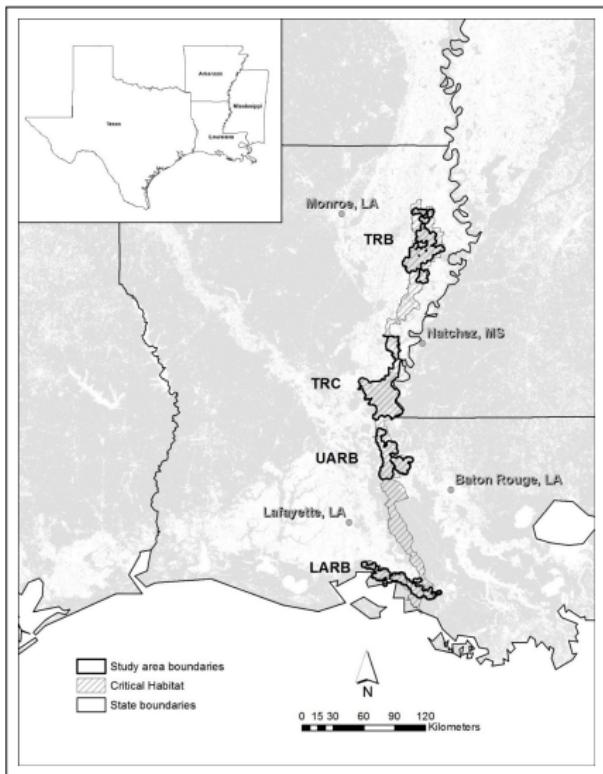
Theory

- Population models

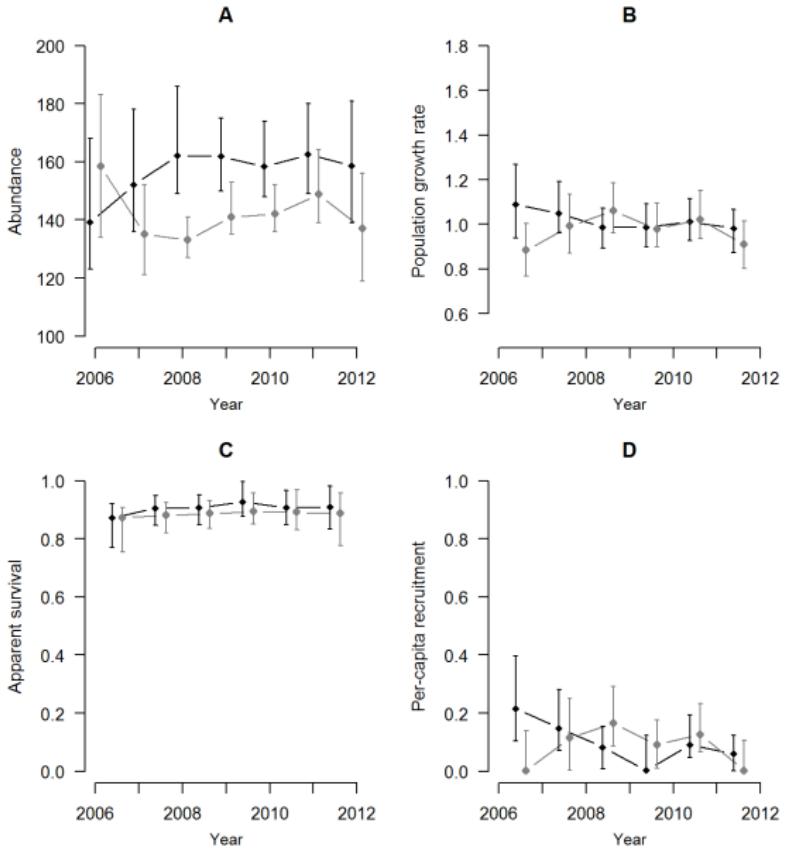
Practice (Application)

- Study design
- Data collection
- Parameter estimation
- Harvest management
- Small population management
- Population viability analysis

EXAMPLE I – LOUISIANA BLACK BEAR

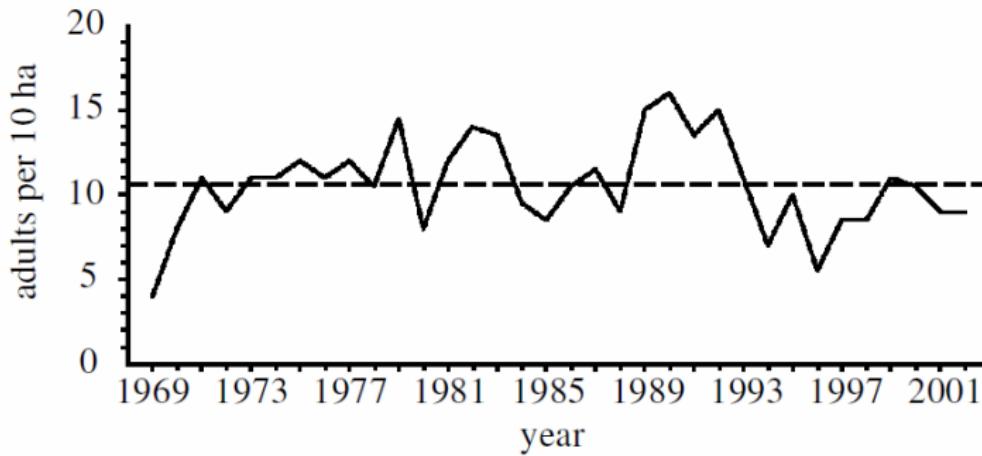


ESTIMATED DEMOGRAPHIC PARAMETERS



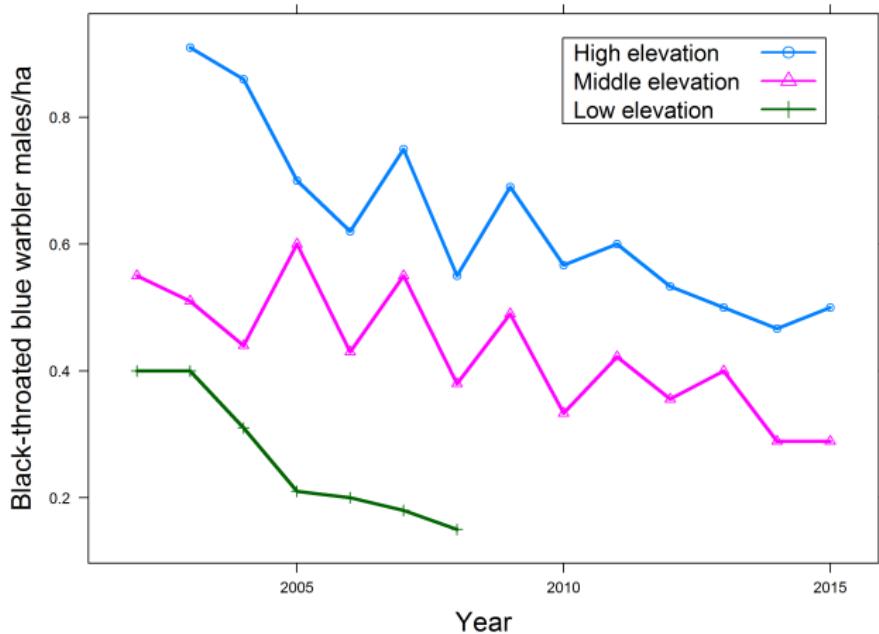
EXAMPLE II – BLACK-THROATED BLUE WARBLER

(a)



Rodenhouse et al. (2003, Proceedings of the Royal Society)

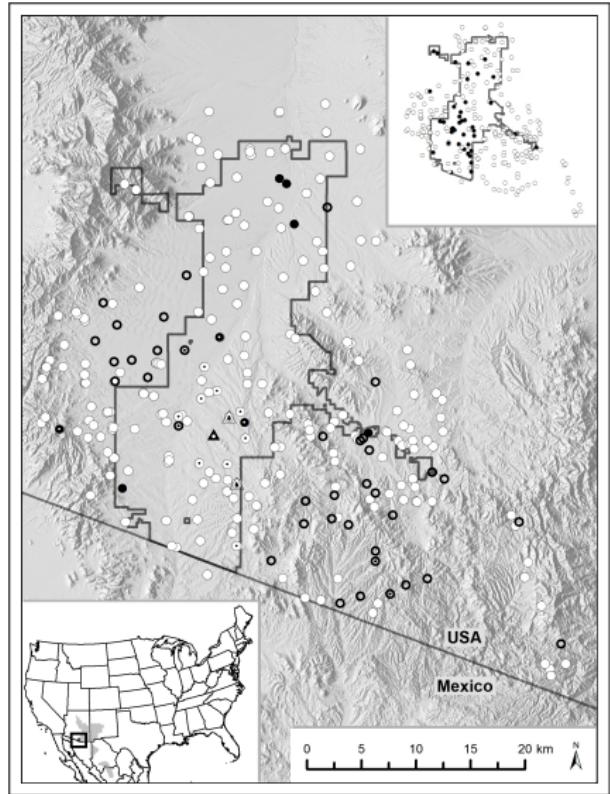
EXAMPLE II – BLACK-THROATED BLUE WARBLER



Why are dynamics so different in the southern part of the range?

Data courtesy of Dr. RJ Cooper

EXAMPLE III – CHIRICAHUA LEOPARD FROG



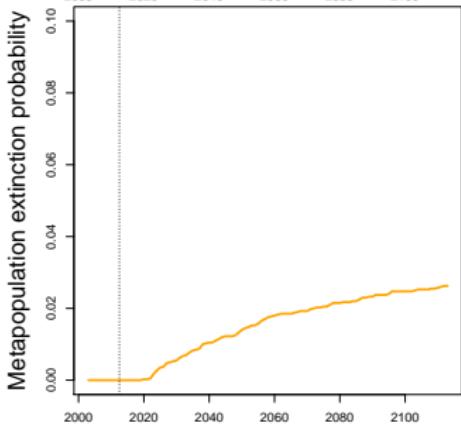
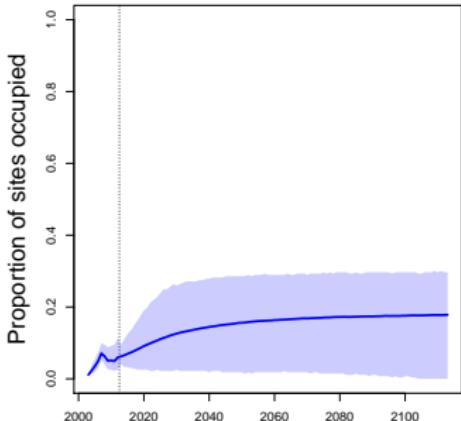
RECOVERY PLAN

The image shows two side-by-side Adobe Acrobat Professional windows. The left window displays the title page of the 'Chiricahua Leopard Frog Recovery Plan'. It features a green frog with brown spots resting on a rock. Below the image, the title 'CHIRICAHUA LEOPARD FROG' is followed by its scientific name '(*Rana chiricahuensis*)' and the word 'RECOVERY PLAN'. The right window shows the 'TABLE OF CONTENTS' for the same document. The table of contents lists various sections and their page numbers, including a section on 'Population and Habitat Viability Analysis' which is circled in red.

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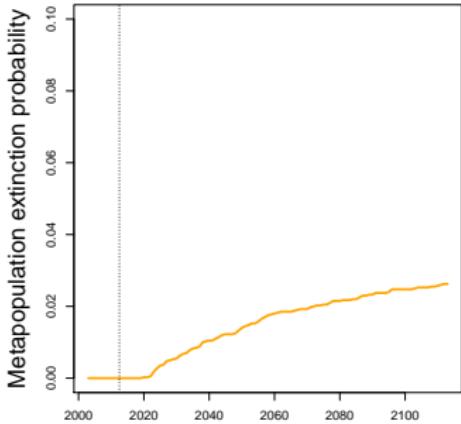
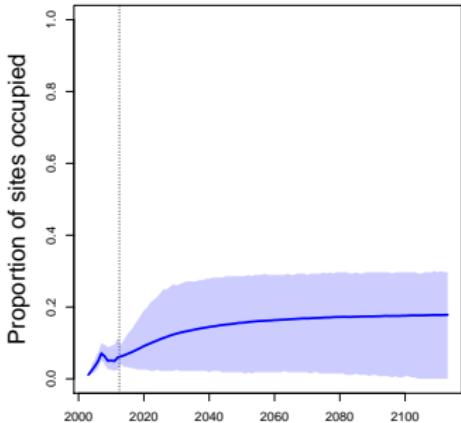
ESTIMATED EXTINCTION RISK

- We estimated extinction probability to be 2% by 2100



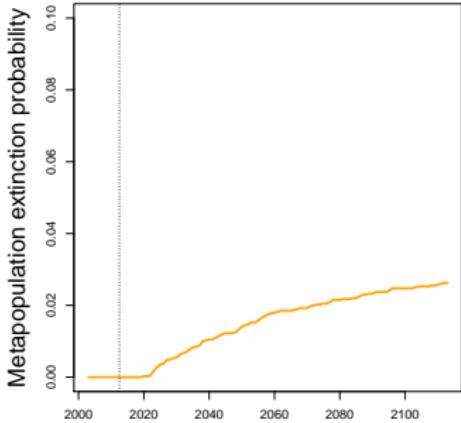
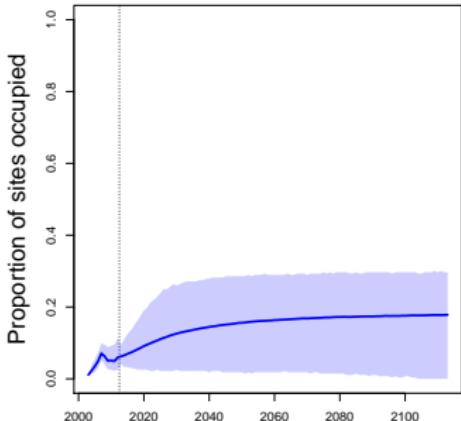
ESTIMATED EXTINCTION RISK

- We estimated extinction probability to be 2% by 2100
- What can be done about it?



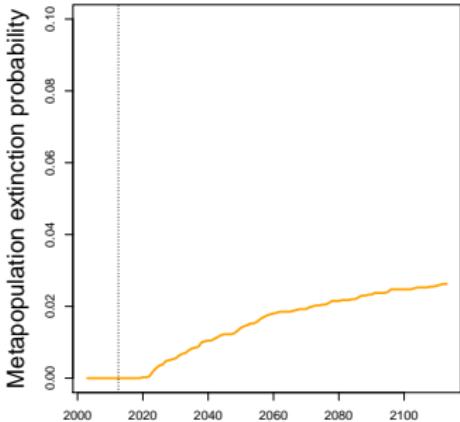
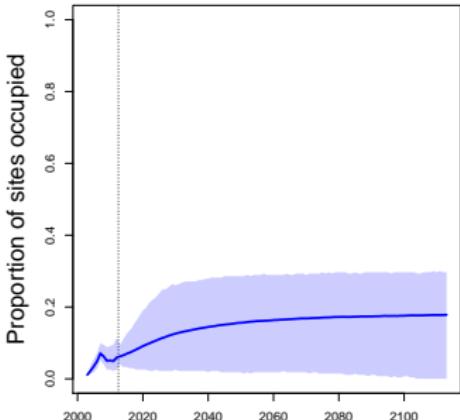
ESTIMATED EXTINCTION RISK

- We estimated extinction probability to be 2% by 2100
- What can be done about it?
 - ▶ Control predators



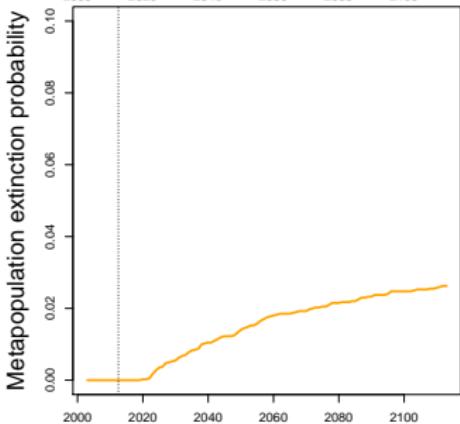
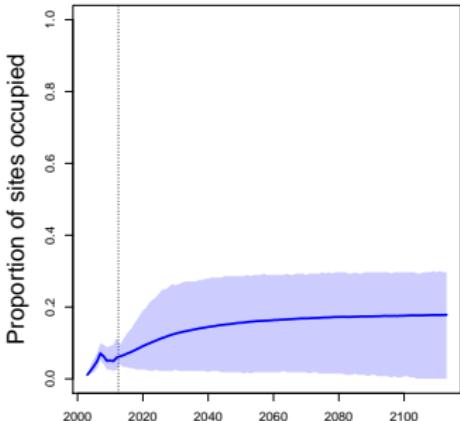
ESTIMATED EXTINCTION RISK

- We estimated extinction probability to be 2% by 2100
- What can be done about it?
 - ▶ Control predators
 - ▶ Increase hydroperiod in existing wetlands

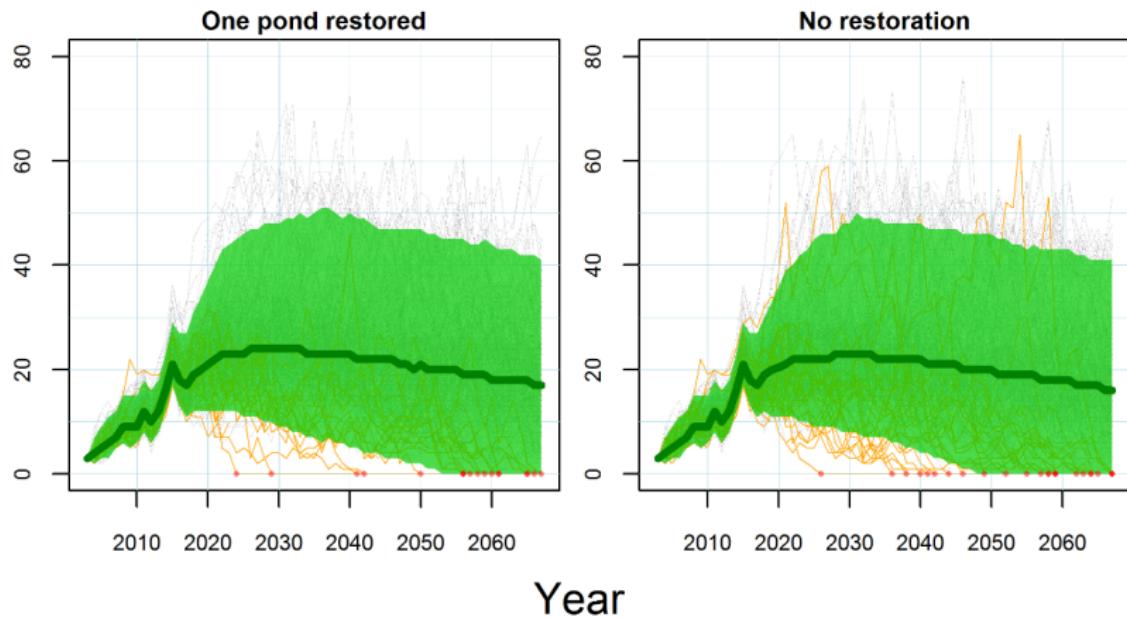


ESTIMATED EXTINCTION RISK

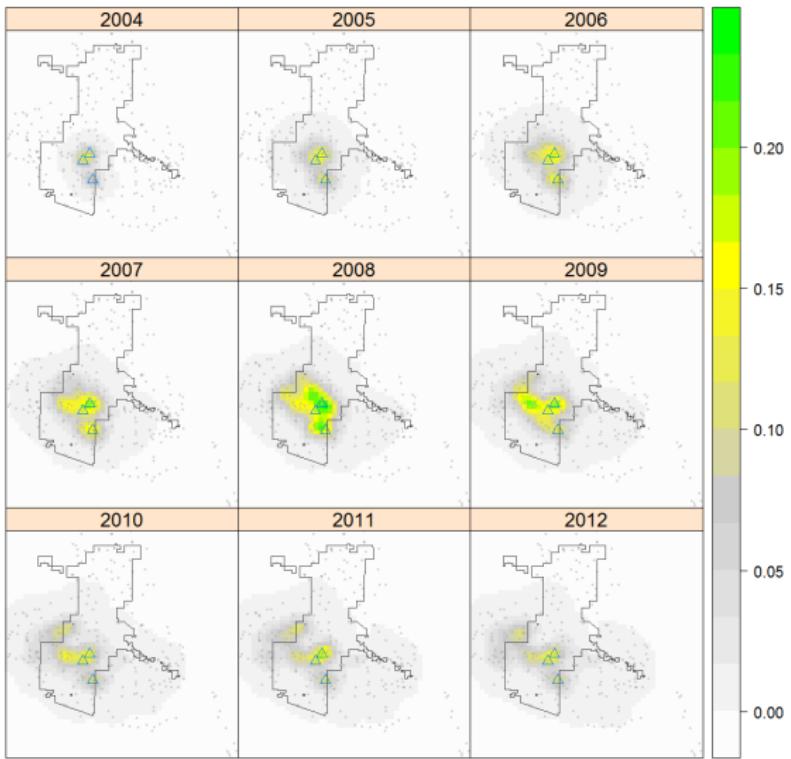
- We estimated extinction probability to be 2% by 2100
- What can be done about it?
 - ▶ Control predators
 - ▶ Increase hydroperiod in existing wetlands
 - ▶ Create new wetlands...



EXTINCTION RISK



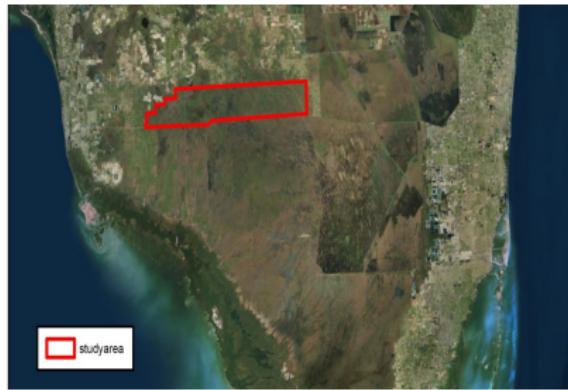
COLONIZATION PROBABILITY MAPS



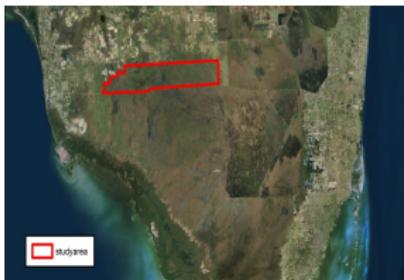
EXAMPLE IV – SOUTH FLORIDA DEER STUDY

Objectives

1. Understand effects of hydrology, hunting, and predation on deer population dynamics
2. Develop a camera trapping study for large-scale investigation and monitoring of deer populations



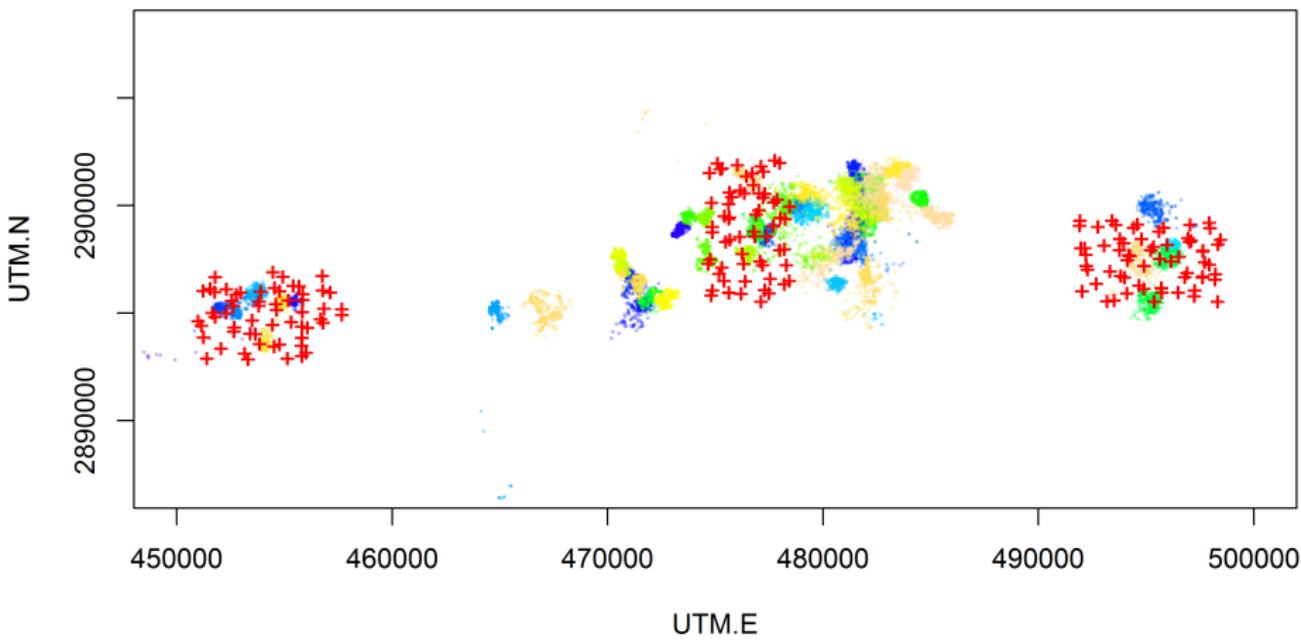
CAMERA STUDY



- 180 cameras
- Operated Jan 2015 – Jan 2018
- Spanning hunting and hydrology gradients

TELEMETRY DATA

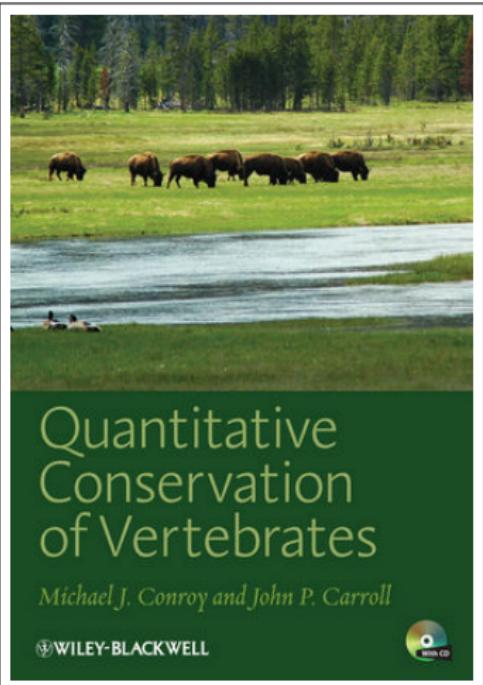
>250 deer collared since January 2015



ASSIGNMENT

1. Read Chapters 1 and 2 of Conroy and Carroll
2. Complete the introductory “quiz” found here:

<https://goo.gl/forms/0pmugP5lmMrrXTIY2>



SYLLABUS

APPLIED POPULATION DYNAMICS		
WILD 3700/5700L, 7700/7700L		
Lecture: Mon, Wed 9:10-10:00 AM; Room 1-304		
Lab: Wed 1:50-4:50; Room 1-304		
Instructor	Teaching Assistants	
Dr. Richard Chandler Phone: 706-542-5818 email: rchandler@waren.uga.edu Virtual office hours: Mon 10:00-11:00 & Thus 2:00-3:00	Danielle Bradke danielle.bradke25@uga.edu	Lydia Stiffler lstiffler@uga.edu Tues 2:30-3:30 Wed 10:00-11:00
Course Description		
This course will present the theory necessary for understanding wildlife population dynamics, and it will explain how to use theory and data to inform management and conservation efforts.		
Course Objectives and Learning Outcomes		
By the end of the course, students should know how to develop models to forecast the impacts of environmental change and management actions on wildlife populations. Students will learn how to design wildlife studies, collect data, and estimate parameters such as abundance, survival, and recruitment.		
Textbook		
Conroy, M.J. and J.P. Carroll. 2009. Quantitative Conservation of Vertebrates. Wiley-Blackwell. Digital copies are available for free through the UGA library: http://preproxy-galib.uga.edu/login?url=http://onlinelibrary.wiley.com/book/10.1002/9781444303155		
Grading	Quantity	Grade percentage
Quizzes	10	10%
Lab assignments*	13	35%
Final paper**	1	20%
Exams	3	30%
Class participation		5%
*Late assignments will be penalized 3 points/day		
**Graduate students will analyze a real dataset and summarize the results in their final paper.		
The plus/minus grading system will be used, according to UGA policy, and assigned following this plus/minus grading scale: A = 93-100, A- = 90-92.9, B+ = 87-89.9, B = 83-86.9, B- = 80-82.9, C+ = 77-79.9, C = 73-76.9, C- = 70-72.9, D = 60-69.9, F = <60.		
Attendance		
Attendance is optional, but it will be impossible to succeed in the class if you don't participate in either in-person or online lectures. Quizzes will be taken during lectures.		
1		