WF4133-Fisheries Science

Class 1:Introduction to class, fisheries profession, & fisheries science

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Announcements

- Will be lab today @ 1pm.

Course preliminaries

1. This is Fisheries Science
2. Fisheries Science ≠ Fisheries Techniques

I endeavor to expose you to techniques when possible but do not that this class will be a techniques class

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Course Website

https://mcolvin.github.io/WFA4133-Fisheries-Science/

WF4133 Fisheries Science

Syllabus
Course syllabus
Class overview

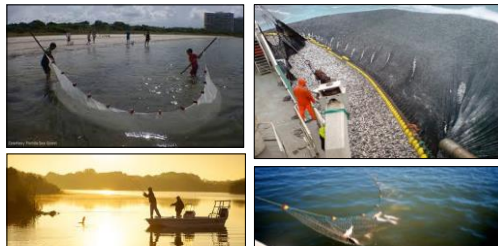## A recent job interview

PART 1: INTERVIEW (200 POINTS)

Note: Each question should be scored 10, 5, 2, or 0.

1) What is the product of fisheries management?
   - 10- the opportunity to go fishing and/or catch fish
   - 5- something about conservation with some mention of fishing
   - 2- resource conservation with no mention of fishing
2) Explain the difference in accuracy and precision.
   - 10- Accuracy is the nearness of a measurement to the actual value of the variable being measured. Precision refers to the closeness to each other of repeated measurements of the same quantity.
   - 5- Something close, possibly describing the common bulls-eye illustration without specifically answering the question
3) What is gear selectivity and what are some factors that might affect it?
   - 10- the bias of a sample obtained with a given gear. Selectivity may occur for species, sizes, sex, etc. Factors affecting may be gear design or gear deployment (location, depth, time, season, etc.).
   - 5- some of the above
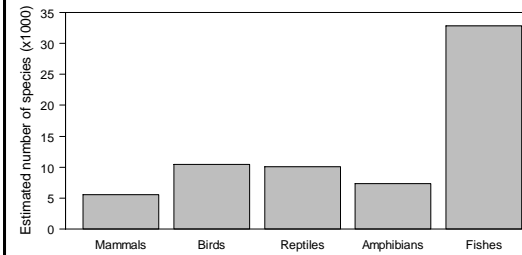   - 2- little of the above

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Syllabus overview

WFA4133 Fisheries Science

WFA 4133 Fisheries Science (Spring 2017)

Instructor: Dr. Michael E. Colvin
Office: Thompson 219
Office phone: 662-325-3592
Email: michael.colvin@msstate.edu
Teaching Assistant: Chelsea Gilliland
Office hour: By appointment
Lecture: 9-9:50am Mon. and Wed.
Lab: Monday 1:00-4:50 pm
Location: Thompson 132

Catalog description
Study of the biological parameters of fish populations.

Required textbook
There is no required textbook. Additional supplementary PDFs will be provided as needed.

Course background
Contemporary fisheries scientists require diverse skills and abilities to properly design and implement research projects to understand the effects of fishing on fish populations, their habitats, and anglers. Fisheries professionals also must:

https://mcolvin.github.io/WFA4133-Fisheries-Science/syllabus.html

Slide 1

WHY IS THIS FISHERIES SCIENCE & THIS CLASS IMPORTANT?

Slide 2

There are lots of fish…

Slide 3

And there are new fish being found…

- Terapontidae (grunters) 16 new
- Eleotridae (gudgeons) 3 new
- Atherinidae (hardy heads) 1 new

Slide 4

There are lots of fisheries associated with those fish

Figure 1
World fish utilization and supply/Utilisation et disponibilités mondiales de poisson/Utilización y suministro mundiales de pescado

Slide 5
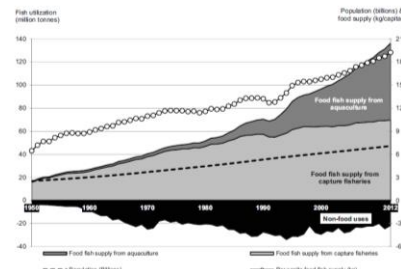
Fish are worth money…

- Tsukiji market in Tokyo-*Sprawling wholesale fish market with an array of seafood & viewing areas for a popular tuna auction.*

Slide 6

Fish are worth money…

Kiyoshi Kimura, president of restaurant chain Sushi-Zanmai, poses with a 200-kilogram bluefin tuna he bought for $117,000 in Tokyo on Tuesday.—Reuters (*5 January 2016*)

Fish are worth money…

Bluefin tuna sells for £500,000 at Japan auction amid overfishing concerns

Huge fish sells for 74m yen as conservationists call for moratorium to help stabilise plunging Pacific stocks

74200000 Japanese Yen equals
636964.7060 US Dollar

The Guardian (*5 January 2017*)

A bluefin tuna has fetched 74.2m yen (£517,000) at the first auction of the year at Tsukiji market in Tokyo, amid warnings that decades of overfishing by Japan and other countries is taking the species to the brink of extinction.

https://www.theguardian.com/world/2017/jan/05/bluefin-tuna-sells-for-500000-at-japan-auction-amid-overfishing-concerns

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World capture fisheries production in 2006 was about 92 million tons, with an estimated first sale value of $91.2 billion, comprising about 82 million tons from mar-ine waters and 10 million tons from inland fisheries.-FAO

http://www.un.org/depts/los/convention_agreements/reviewconf/FishStocks_EN_A.pdf

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Fish are worth money here in Mississippi …

- Dockside value of caviar: $350K ($60 per pound)
- Retail value of caviar: $1.6 mil. ($228 per pound)

Fishing is worth money in Mississippi…

- Recreational fishing
- 773 Million USD
  - 772.6 Freshwater
  - 46.3 Marine
- 12.8k Jobs

Henderson, J.E., S.C. Grado, I.A. Munn, W. D. Jones 2010. Economic Impacts of Wildlife- and Fisheries Associated Recreation on the Mississippi Economy: An Input-Output Analysis. Forest and Wildlife Research Center, Research Bulletin FO429, Mississippi State University. 21 pp.

What can I expect as a practicing fisheries biologist & scientist?

AN INTRODUCTION TO THE FISHERIES SCIENCE PROFESSION

You can expect…

Volunteer opportunities

- Paddlefish at the Refuge
- Enid habitat additions

To move around!

Work for interesting folks!

Interdisciplinary

"For fishery science is interdisciplinary. Rigid educational backgrounds for fishery biologists are impractical, and the continually increasing mass of scientific data makes it more and more likely that the solution of future problems will come from teams of specialists— teams that might include experts like the biometrician and the water chemist, whose cooperation is commonplace in fishery agencies today. "
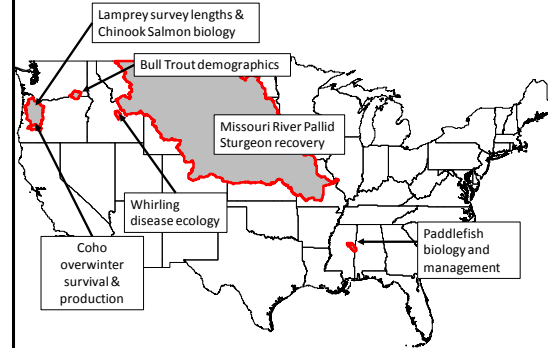
Everhart et al 1975

Interdisciplinary & teams

- Work with others:
  - Within agency
  - Among agencies
  - Stakeholders: lake associations, fishing clubs
  - Disciplines: fisheries, wildlife, water quality
- Do more with less
  - Distance teams
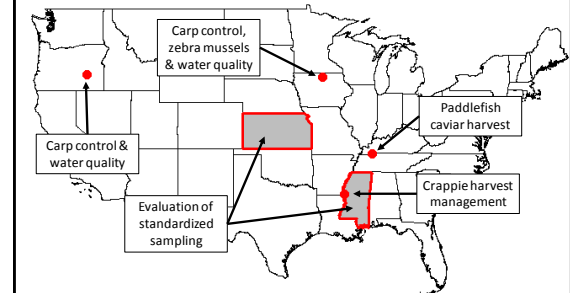 - Webex, Skype, conference calls

Work with interesting folks

- Federal agencies: Army Corps of Engineers, Forest Service, Bureau of Reclamation,
- State agencies: MDWFP
- Conservation entities: Nature conservancy, Trout Unlimited, American Rivers
- Private companies: Cramer & associates, Battelle, Timber companies

Work on streams

Lamprey survey lengths & Chinook Salmon biology · Bull Trout demographics · Missouri River Pallid Sturgeon recovery · Whirling disease ecology · Coho overwinter survival & production · Paddlefish biology and management

Work on lakes and reservoirs

Carp control, zebra mussels & water quality · Carp control & water quality · Evaluation of standardized sampling · Paddlefish caviar harvest · Crappie harvest management

Work in urban environments

Use things like this…?

$$\frac{dB}{dt} = -Z \cdot B$$

Fisheries textbooks…

Fisheries science textbooks…

Fisheries science textbooks…

Fisheries science textbooks…

A plea for models

E. O. Wilson's (1998:269) observation that ''we are drowning in information'' and that successful conservation and resource management depend ultimately on the rigorous synthesis of information.
- *Ainsworth et al. 2010*

Ainsworth, C. H., I. C. Kaplan, P. S. Levin, and M. Mangel. 2010. A statistical approach for estimating fish diet compositions from multiple data sources: Gulf of California case study. Ecological Applications 20(8):2188-2202.

Wilson, E. O. 1998. Consilience: the unity of knowledge. Alfred A. Knopf, New York, New York, USA.

http://www.pbs.org/moyers/journal/07062007/profile.html

What others think…

- Modeling is a great and perhaps necessary way for scientists to force themselves to think clearly and to put claims to understanding on the table in the form of specific predictions
- Prediction in some form is required for management choice
- There are some predictable regularities in the way natural populations and ecosystems respond to human disturbance, so … some kinds of useful predictions are not as likely to fail as they appear

Walters and Martell 2004 p. 3

- "It is useful to test prospective management strategies against ecosystem models: if they don't work on simple models why should they work in reality"

Keith Sainsbury (ICES/SCOR Conference, Montpellier March 1999)

AEcl 520 Fisheries Science - Fishery Models

"…we make no apologies for demanding that people who would engage in fisheries assessment and management should at least be able to read and understand some basic mathematics. (Walters and Martell 2004, Preface)"

Walters, C. J., and S. J. D. Martell. 2004. Fisheries Ecology and Management. Princeton University Press, Princeton, NJ.

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Slide 1:

If you want to be successful, here are four things you need to "get":

Get ready for math. Few of us get into natural resource science simply because we enjoy math. Most of us just want to be outside, on a boat or in the creek doing field work. Believe me, there will be plenty of that…but fisheries science is *way more interesting* than 'just being outside'.

Learning solid field methods is critical, but all that time on the water won't mean anything unless you know how to analyze your data.

And trust me—once all those number actually *mean something*, you'll enjoy it much more. Statistics are one of scientists' most powerful tools. Without stats, we can't do our jobs.

http://thefisheriesblog.com/2014/09/22/4-must-get-items-for-freshman-fisheries-students/

Slide 2:

Will you spend time at a computer?

Yep, you betcha…

Slide 3:

Work with others?

Yep, you betcha…

Slide 4:

Permanent
Related Categories

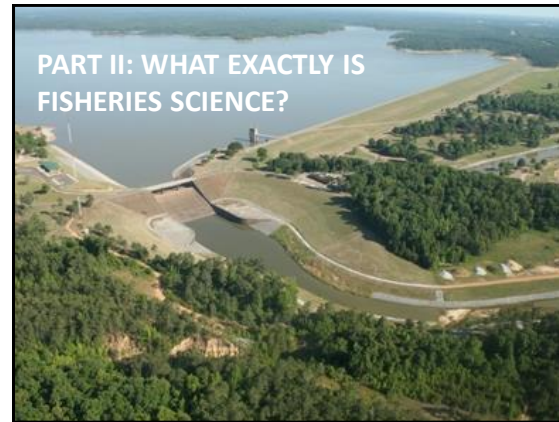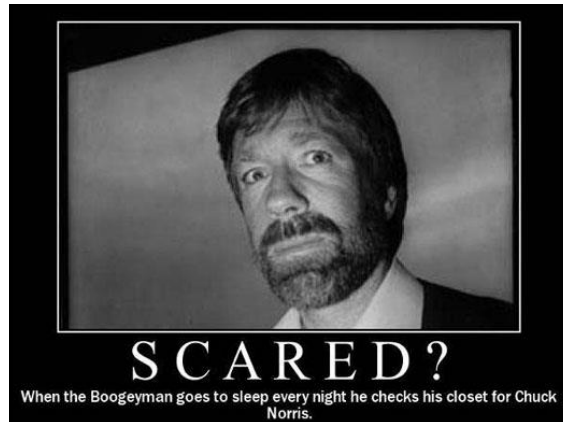| Job #	Title	Agency, Location	Category
11504	Fisheries Management Biologist	Missouri Department of Conservation	Permanent
11503	Wildlife Staff Biologist – Deer and Elk	Idaho Dept. of Fish and Game/ Boise, ID	Permanent
11502	Fish Hatchery Manager 2	Idaho Dept. of Fish and Game / Grace, ID	Permanent
11499	Executive Director	LUMCON / Louisiana	Permanent
11498	Hatchery Manager	TPWD Dundee State Fish Hatchery, Electra, TX	Permanent
11497	Energy Program Coordinator	Oregon Department of Fish & Wildlife	Permanent
11496	State Division Administrator	Michigan DNR Fisheries Division	Permanent
11495	District Mgmt Supervisor/Fisheries Mgmt Biologist	TPWD; San Angelo, TX	Permanent
11493	West Region Fish Research Program Manager	OR Department of Fish and Wildlife	Permanent
11492	East Region Fish Research Program Manager	OR Department of Fish and Wildlife	Permanent

Prepares management plans, fishery status reports, operational project plans, special project reports for public streams, annual fishing prospects, news releases, responses to public information requests, and other written communications as required. Assists in budget preparation and is responsible for implementation of an annual operational work plan. For complete details visit website.

Slide 5:

(same table as Slide 4)

Requires five years' biological experience with at least three years' experience at a technical/professional level performing activities in a fish/wildlife program such as **researching and analyzing data, conducting investigations,** applying pertinent laws and regulations, or coordinating and monitoring project activities; AND a Bachelor's degree in Fisheries or Wildlife Science or a closely-related Bachelor's degree or three additional years of biological experience. A Master's/Doctorate degree in Fisheries/Wildlife Science or closely-related degree may substitute for some experience..

Slide 6:

(same table as Slide 4)

This position is responsible for planning and conducting surveys on freshwater impoundments and streams and all fisheries management and/or research activities. **Analyzes and interprets survey data, implements approved applications, and plans and conducts management related research.** Writes technical reports and scientific publications on significant results and findings. Designs and implements outreach programs. …

SCARED?
When the Boogeyman goes to sleep every night he checks his closet for Chuck Norris.

PART II: WHAT EXACTLY IS FISHERIES SCIENCE?

State of World Fisheries

- **Ray Hilborn- University of Washington**
- Mentally keep track of terms and related terms you frequently hear
- https://youtu.be/lXMheis4CkI

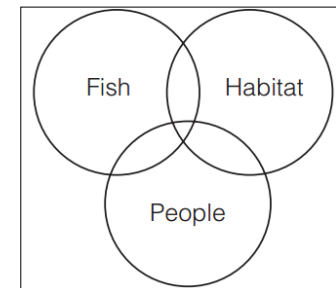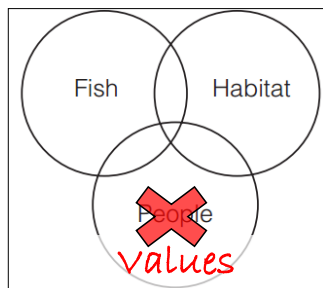## State of World Fisheries- Part I

Frequent terms?

State of World Fisheries-

- State of World Fisheries- Part I
- State of World Fisheries- Part II
- State of World Fisheries- Part III
- Links on class website

The classic model

Fish   Habitat

People

The classic model

Fish

Habitat

~~People~~

values

The boxes are related

Value

Fish have social & economic value

Fish

Fish need habitat

Fish can influence habitat

Habitat