Fisheries Management Techniques
FT 211 Exam 1 Review

Course Overview
Course Layout
- **Know where to find things on the course site and where to post homework etc.**
  - You guys should be pretty good at this by now
- Know the course topics, and what you will be graded on
- Know the course texts and where to find them

Planning for Sampling
Why do we sample or collect information
- Answer questions, solve problems, etc

What types of information do we collect?
- Environmental, biological, human
  - Know what each of these are

Know the difference between fisheries management and research

Poor planning will result in……

Understand the differences between objectives and goals

How do we justify sampling or a study?
- Justification given before sampling done.
- Address problem that cannot be solved with available information
- Clientele made to realize problem

Know the steps of a fishery investigation (broadly)
- If given the steps be able to place them in correct order
  - Problem Identification
    - Best if user identified
  - Research Question
    - Comes from the problem
  - Existing Information and Theories
    - Use this to help inform questions, not to repeat work
    - 2 review types (literature & Historical data)
      - Know where to find the above information (library, google scholar etc)
  - Prediction, Hypothesis, & Objectives
    - Problems, questions and reviews allow you to make these
    - Keep these narrow and specific – vague is bad
  - Data statement
    - Important for understanding the type of data to collect
    - Statistical review is critical
  - Planning for sampling
    - Often involves proposal/grant writing
  - Preparing for sampling
    - Buying stuff, organizing equipment, maintenance
    - Inform important parties of sampling (adfg, noaa, etc)
  - Data collection and processing Sampling

- o Sample = infer about whole from little
    - Environmental sampling – examples of information collected
    - Biological sampling - examples of information collected
    - Human sampling - examples of information collected

    - **Logistics of sampling**
        - ° Equipment – test, calibrate, maintenance, batteries, assign to folks
        - ° Permits –lots potentially needed – IACUC, ADFG Fish Resource,
        - ° Prepare for emergencies – tools, training, manuals, communication
    - **Crew** – most important piece of equipment
        - ° Appropriate #, duties, chain of command, leaders are important
- o Data Collection
    - One person, Experienced, Suitable paper, Feld notebook/journal, Back up data sheets/electronic, electronic is better
    - Take Photos – can look back at photos, refresh memory
- o Analysis
    - Requires Training, Experience, Statistical background
- o Evaluation & Interpretation
    - After data analysis
- o Synthesis and inference
    - Combine into larger breadth of data / understanding
- o Communication of results
    - Essential
    - Good Writing, speaking, presentation skills are necessary
    - Know some places where results should be communicated in this era
        - ° ppt isn't enough, movies, facebook, twitter, etc

Safety in Fisheries

Fisheries can be hazardous

Flying in Alaska, Boating in Alaska, Environment, Animals, Lab work, Office Work

    AFS Safety Handbook

    Safety Attitude – responsibility of everyone

    Accidents

        Breakdowns in safety – caused by a chain of events

            Task, Materials, Environment, Personnel, Management

    SAFE Stands for?

        Skills, Attitude, Facts, Equipment

    Know some of the health risks associated with fisheries

        Exposure, Disease & Sickness, Trauma, Wildlife, Drowning, Electric Shock, Chemicals

    Trainings available

    First Aid/CPR

        Various levels available, remote aid?

        Legal issues – good Sam law

        Universal Precautions – Gloves, wash hands, disinfect, disposal

    Survival

        Building shelter, fire, signaling (tools are what you have on you)

    Boating Safety

        Float planning, what is it, who to file with?

Weather – why and where to check?

Cargo – balance, don't overload, less in rough waer

Safety Equipment – Know these well and be able to identify

Safe Boating = good sense, respect, experience

Swiftwater / Wading

Know wading techniques – slow and methodical

PFD, throw rope, waders, foot ware

Waders and wading shoes

Vehicle Safety

Road conditions, vehicle, cargo – know what to look out for

Towing/trailering

Load, hitch, brakes, lights, experience all important

Watch out for overloaded vehicles/trailers

Aviation Safety

Know some common aircraft in AK (don't need to memorize)

What is telemetry and what is it used for

Flight Planning, Weather, Weight & Balance, Safety Equip (know these) Personal
equipment

Underwater simulation training

Bear Safety

Avoidance is key

Keep attractants away

Large groups 3 or more

Behavior- body language

Protection (pepper spray – gun)

Guns vs pepper spray study – what is outcome

Firearm Safety – Be familiar with general rules and types of training available

Office and Lab

Chemicals, fumes, flamables

PLP Keeps things safe

MSDS – what is it?

Sprains and other

Small can lead to large

SAFETY – has to be a conscious effort

Data Management and Statistics

What is a manager's role?

- enumerate change, assess management actions, quantify human influences – need stats to do

What are data?

- Plural?

What is statistics?

- collection, analysis, interpretation, presentation, and organization of data
- Is it more important than Calculus (based on our opinions and the ted talk)
- "There are liars, damned liars and statisticians." Quote by Whom?

Always ask a statistician

Data and Databases

DATA

- Data are expensive to collect
    - record accurately, keep it safe, quickly if possible
- Know about field data sheets – waterproof, pencils, write legibly etc
- Electronic data collection
    - Know examples of these

DATA MANAGEMENT
- Most organizations use databases, need to know how to use them
- What are databases?
- Know examples of common databases
- Quality control data – IMPORTANT
    - Know a simple method for controlling data

DATA VISUALIZATION - Graphs
- Be able to identify pie chart, bar chart, histogram, scatter plot & line graphs
- Know difference between histogram and bar chart
- X (independent variable) on horizontal axis, Y (dependent variable) on vertical axis
- Understand precision, accuracy, and bias

Data characteristics
- Quantitative vs. qualitative data
- Know what normal, skewed or bi-modal distributions look like
- Population vs. sample
- Sampling design
    - Random sample, stratified random, cluster, systematic sampling
- N = sample size
- What is sample size? Bigger is better

Descriptive stats – describes data
- Mean, Median, mode – all central tendencies, know how they vary
- Range variance – measures of dispersion

Inferential – make inferences about population
- Hypothesis testing – are two groups different (typically means)
- Regression analysis – are two variables related (temp + growth for example)

Types of study – observational vs Experimental

Aquatic Habitat Measurement

Why do we measure Habitat?

Inventory, assess quality, effects of land use, assessing improvement

Habitat Measurements include

Physical, Chemical, Biological

Habitat quality is important – impacts number, size, species of fish present

What parameters to measure depends on study design

Objectives – relative characteristics – appropriate method – standardize method

Techniques should be? Repeatable etc

PHYSICAL HABITAT

Use Existing maps – what are some sources?

What is a TOPO Map?

What is GIS

What is the most accurate way to measure locations today?

What can be mapped with GPS?

Watershed Area

    How is it measured and what does it impact?

What are these (important)?

    Drainage Density

    Stream order

    Stream gradient

    Sinuosity

What is channel classification and what designated differences

Velocity, flow, and discharge – know the difference and how calculated

Substrate composition

    How can it be classified and what does it impact?

        McNeil sampler, freeze corer

Water Quality

    Temp, dissolved, pH Nutrients, Chlorophyll, TSS, Salinity

Erosion and sedimentation

    Repeated measures and scour chains

Cover/Protection

    LWD – what does it do?

    Stream shade measures

Lakes / Reservoirs

    Area, Shoreline length, Depth, Volume

    Water quality measurements

        At depth intervals (eg 1m)

    How to measure transparency?

    Oligotrophic vs. Eutrophic (know difference)

        What causes eutrophic? – PO

KNOW WHERE TO LREARN MORE ABOUT AQUATIC HABITAT AND ECOLOGY

    Study Hard,

    Good Luck