Fisheries Management Techniques
FT 211 Exam 2 Review

Care and Handling of Fish (Week 7)

Permits are important

    Who issues them?

        IACUC – Universities

        ADFG (Most)

            Fish Resource - Required for any activity to collect fish, shellfish, or aquatic plants

        Fish Transport – for transporting fish

        FWS – Endangered Species

    Permits Take Home - Apply Early, File Reports, Reduce fish kill

Care and handling of live fish

    Follow guidelines, Minimize stress, Acceptable water quality, Proper use of anesthetics, Overseen by professional

    Stress in Fish - Cannot maintain normal physiological state

        Reduces survival & ability to handle other stressors

        Causes-Handling, Environment (WQ), Crowding

    Handling fish

        Keep handling time to the minimal

        Avoid handling with bare hands (Why?)

            Slime Layer – what does it do?

        Keep fish in water

    Environmental factors & Fish

        Dissolved Oxygen

            Temp vs DO?

            How to increase DO?

            What is Low DO? (what are the signs?)

        Temperature

            Impacts other parameters

            How to control for?

        Light – direct sun is bad AVOID

        Salinity – important for marine spp.

            Increasing salinity can help stressed freshwater spp

        Ammonia / pH

            Comes from fish waste – very important in closed systems

    Capture adds stress – shorter holding is better

Mitigating stress and Anesthetics

    Anesthetic process

        Tranquilization

        Non-response to external stimuli

Loss of equilibrium

Cessation of ventilation

Death

Commonly used Anesthetics

MS-222 - white powder, easy, quick recovery, carcinogen

Clove Oil – Natural oil of cloves, Not FDA approved, bad in cold H2O

Typical process - Capture fish, Apply Anesthesia, Perform task, Recovery, Release

Pollutants stress fish also - Chlorine, Detergents, Petroleum hydrocarbons, Ammonia

Holding and Hauling

Stressors include, **Low DO**, Extreme temperatures, Rapid temperature changes,
Diseases, Intense light, Physical shock

Mitigation of stress by – Anesthetics, Starvation prior to transport, Minimization of
crowding, Reduce sloshing, Reduce osmotic costs, Use cool
temperatures relative to species tolerances

Euthanasia what is this?

Pithing

Spinal cord dislocation

Decapitation

Overdose of immobilizing drugs

Ice slurry bath

Fixation and sample preservation

Why do we fix specimens?

What do we include in documentation?

Types of preservation

Fixation – Formalin & ETOH

Formalin is carcinogen

Skeletonization

Freezing

Photography

Genetic Samples use genetic ETOH not formalin

Passive Capture (Week 8)

Capturing fish by not actively moving

Entanglement

Entrapment

Angling

Age of passive techniques?

Entanglement

Gill nets

Trammel nets

Entrapment

Hoop nets

Trap Nets

Pot gear
Minnow traps
Angling
Trotlines
Longlines
Hook n' Line
Gear selectivity - is the bias of a sample obtained with a given gear
Know about this and its pros and cons
Gear Efficiency - the amount of effort expended to capture target organisms
Know what may impact this
Catch Per Unit Effort – CPUE # of fish captured (catch) / set, hour, trap etc
Can be used as an index of the true abundance
Primary assumption - Number of fish captured is proportional to the amount of effort expended
High CPUE = ?, Low CPUE = ?, Change from High to Low CPUE = ?
Advantages of Passive gear?
Disadvantages of Passive Gear?
GEAR TYPES (know what they look like and be able to identify)
Gill nets
Fish are caught by?
Net construction and materials?
Led line, corks, webbing
Net size – bar vs. stretch
How to deploy?
Types of sets? – Bottom, midwater, surface, verticle, drift
Trammel Nets
Fish are caught by? (pocket of netting)
Net construction and materials?
Led line, corks, webbing
small mesh sandwiched between two large mesh
Hoop Nets
Fish are caught by? (cone trap style)
Net construction and materials? Copllapsable Cylindrical or conical frames covered by mesh, Collapsible, Square or finger throat, Cod end,
Where to set?
Fyke Nets – hoop net with wings
Fish are caught by? (cone trap style)
Net construction and materials?
Target out-migrating or slow swimming fishes.
Pot Gear
Rigid traps with throats
Box or cylinder with conical funnel
Usually with door for easy removal
Usually over the side of boat, with float attached

Minnow Traps
    Construction, bait, placement
Ghost fishing and pot gear
Trot Lines – Longline anchored to shore
Long Line – a long line with baited hooks set on the bottom
    Snap vs fixed hooks
    Anchors, buoys, and hooks set in "Skates" of gear
Hook and Line…Probably more Active

Active Capture (Week 9) Know these and what they look like!!
        Moving nets or gears to collect fish
    Main gear types enclose or sweep specific area/volume (fish / volume of water)
    Accurately define sampling effort is very important
        Standardize effort so we can repeat systematically.
    Active vs passive gears (know traits of each and pros/cons)
    Active Gear - shorter sampling periods = more samples, better idea of distribution, time
        of capture is more precise
Requirements - Larger boats, More manpower, Less sampling time than passive gear
    3 Main Gear types
        Towed Nets
        Dredges
        Surrounding Nets
    Science is smaller commercial versions
    Mesh Size Know this…
Trawls
    Funnel-shaped with cod-end (narrow backend)
    Surface, Midwater, bottom
    Beam or otter trawls
    Parts of a trawl
        Doors, foot rope, headline, Cod End, sweeps, tisklers
    Know adv and disadvantages (rough bottom, bycatch, systematic etc.)
Beam Trawls
    Fixed width, Sweep fixed area consistently, Somewhat cumbersome if beam is large
Otter Trawls
    Otter Boards (doors) hold net open
    Mouth width depends on water force (inconsistent)
Midwater Trawls
    Depth determined by boat speed, angle, and pressure sensor
Evaluating gear performance
    How do we do this?
    What technology do we use?
Surrounding or Encircling
    beach seines, purse seines

Trap fish inside fence of mesh
Fish are caught by?
Net construction and materials?
Led line, corks, webbing, Bag of net
How to deploy? Near shore, no obstructions, semi circle
Stick Seine / Minnow seine – like beach seine just smaller
Purse Seines
For pelagic (open water) species
Closes up like a purse
How to deploy? Encircle fish, pull purse lines, haul net onboard
Other active Gears (be able to identify)
Push net
Neuston Net – samples surface waters
Lift nets – Crab Rings
Pop Nets – floating pop up style
Dip Nets – like on the Kenai or Chitna
Fish Wheel – Ferris wheel of death for fish
Cast Nets – thrown by hand
Angling/spearfishing
Gear Selection – know things to consider
Environment
Life history of fish – demersal vs pelagic
Gear Selectivity – think about active techniques and how to mitigate these or let them work in your favor
What ate some problems associated with active gears?

Length, Weight & Associated Indices (Week 10)

Length and Weight information provides estimates of:
Growth
Standing Crop
Production (tissue Growth kg/ha/yr)
Length restrictions applied in AK (know a little about these examples)
Halibut for guided anglers
Eastern Bering sea Tanner crab
History of L & W and indices
Where did L&W info start to be collected?
Mosquitos, malaria, fish, fish for food, maximize production
Numerous ways to measure length
Fish mouth closed, head left, tail right
Standard Length -Tip of snout to base of caudal peduncle
Fork Length - Tip of snout to fork in tail
Total Length - Maximum length of the fish, with the mouth closed
Why so many fish measurements?

Spawning physical distortion, swordfish, missing body parts (still compare length)

Other species?

Crabs, Clams, Urchins, Cucumbers, Shrimp (all different techniques)

Girth in Fish

Measured with cloth tape or string

Measured around fattest part of the fish

Measuring Devices

Measuring boards, Calipers Measuring tape, Electronic measuring boards, DIDSON, Video

Know what these look like and roughly how they work (and what you would target eg. Juvenile salmon – calipers or small measuring boards)

Fish Weights – more challenging than length, Smaller fish are harder!

Remove excess moisture on fish

Periodic calibration of scales

Remove excess moisture on scale

Tare often

Account for wind & fish, boat motion

Measuring Preserved Specimens

Weight goes up about 8%

Length goes down about 2%

Use fresh specimens if possible

Length weight relationships and Fish Condition

When these are correlated know where good and poor condition fish would be

Length Frequency histograms

Group fish lengths into bins and count number of fish

Can give us info on

Reproduction

Recruitment

Growth

Mortality

Age

Know in general how to identify different age classes ('modes' or peaks in the histogram)

Good Luck!!