

Collecting & Survey Techniques

- Sampling Methods
 - Surveys
 - Collecting

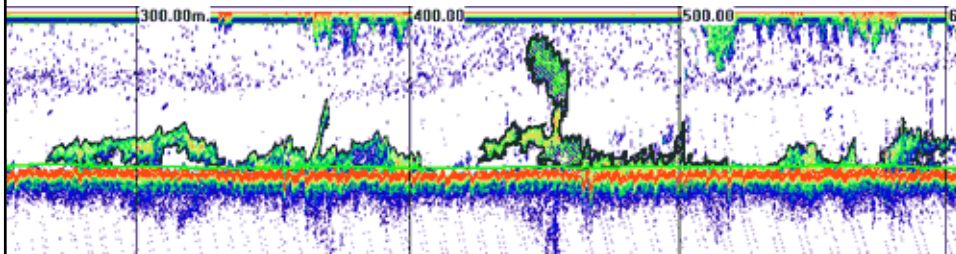
Collecting & Survey Techniques

- Surveys - Visual
 - Underwater Diving
 - Underwater cameras
 - Marine, lakes, can be used in rivers
 - Line Transects



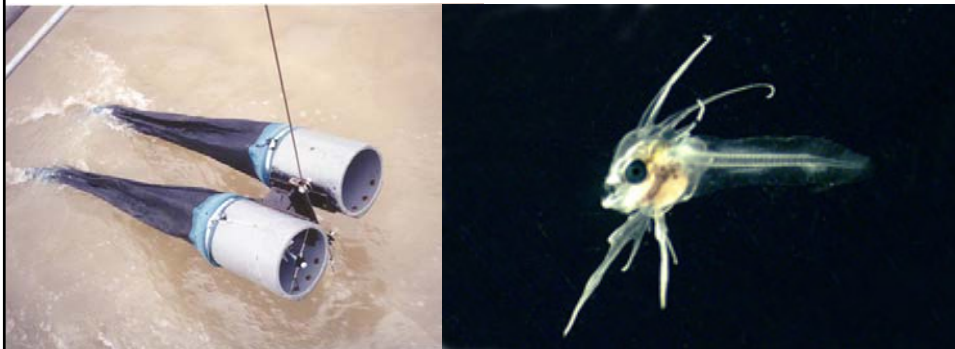
Collecting & Survey Techniques

- Surveys – Acoustic
- Very important stock assessment



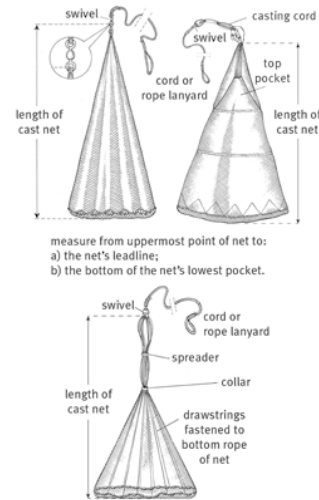
Collecting & Survey Techniques

- Surveys – Egg and larval



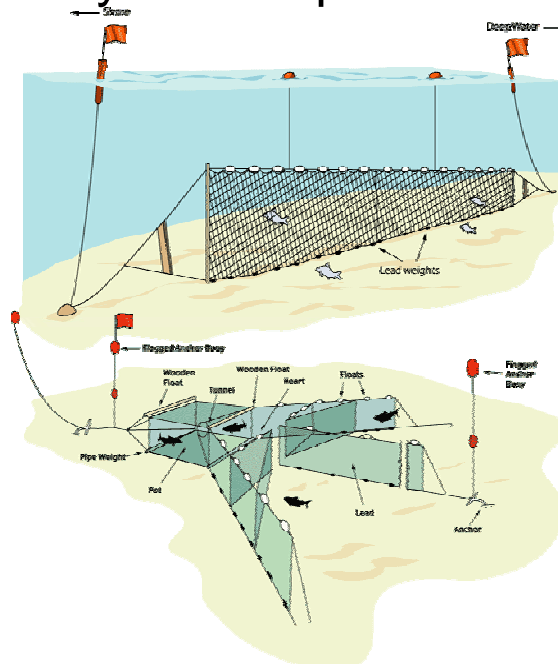
Collecting & Survey Techniques

- Collecting – Fish Capture Techniques
- ACTIVE vs. PASSIVE
- Active – Towed, dragged, encircle, surround, tangle in nets, hook-line
- Active – Anesthetics
- Passive – Fish come to you



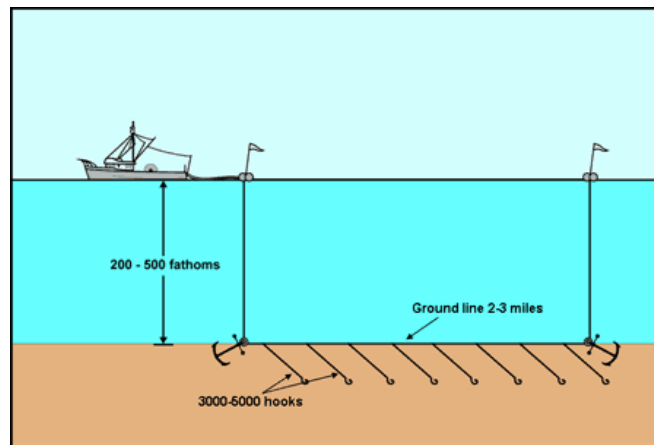
Collecting & Survey Techniques

- Passive
- Entanglement gear – gill, trammel nets.
- Entrapment gear – Enclosed area w/ opening and cannot get out – bait



Collecting & Survey Techniques

- Passive – Fish come to you
- Angler Gear – Sessile lines with hooks – long



Collecting & Survey Techniques

- Gear Selectivity – Bias of sample obtained with given gear
- Gear Efficiency – Amount of effort
- Mesh Size – Bar measure – knot to adjacent knot
- Mesh size – Stretch Measure
- Mesh size – Square Measure

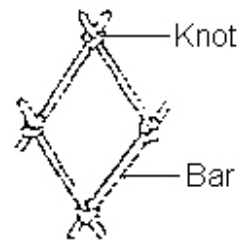


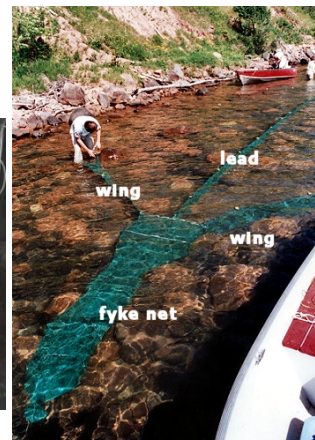
Fig.5 : Mesh

Collecting & Survey Techniques

- PASSIVE
- Advantages –
 - Set quick with minimum labor
 - Fishermen often use
- Disadvantages
 - Fish behavior strongly influences
 - Needs to be in place for hours/days
 - High selectivity for species, sizes, etc.
 - Influenced by environment, color, etc.

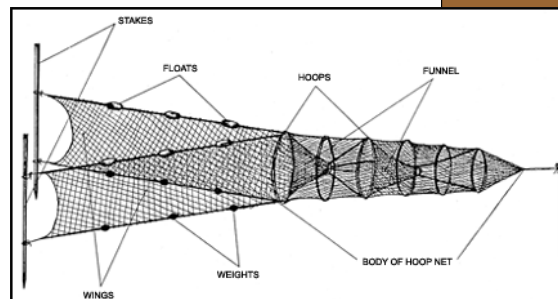
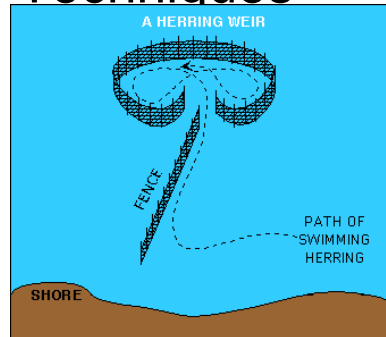
Collecting & Survey Techniques

- PASSIVE NETS
- Gills Nets -
- Trammel Nets
- Fyke and Trap nets



Collecting & Survey Techniques

- PASSIVE NETS
- Hoop Nets
- Pot Gears
- Weirs
- Angling Gear

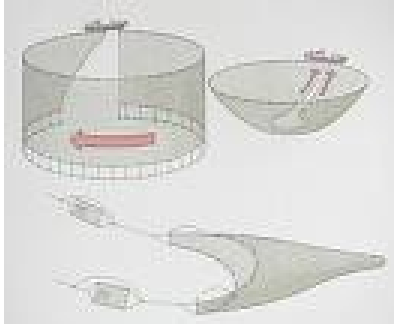


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Collecting & Survey Techniques

- ACTIVE - Advantages
 - Enclose or sweep specific area
 - Mobile in time and space – quick and many locations
 - Larger samples possible – increase statistical precision
 - Cover more area – spatial distribution and habitat use
 - Time of capture and effort precise

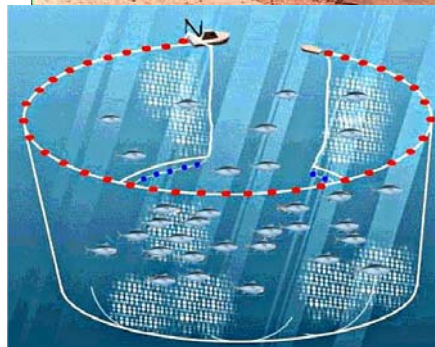
Collecting & Survey Techniques



- ACTIVE - Disadvantages
 - Requires large vessel, effort, people and money
 - Limit to large size areas to be sampled

Collecting & Survey Techniques

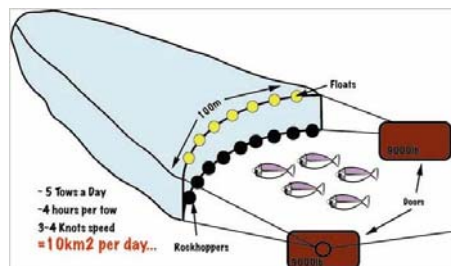
- Active
- TRAWLS (see next)
- DREDGES
- SURROUNDING or ENCIRCLING NETS
- BEACH SEINES
- PURSE SEINES
- LIFT NETS
- ANGLING



Collecting & Survey Techniques

- TRAWLS
- Otter Trawls – Doors, Sweeplines, Chain, Float line, Cod end;
- Rock-hopper/bobbin gear
- Species responses – auditory and visual stimuli
- Coordinate length sweepline, attack angle, vessel speed

Collecting & Survey Techniques



- TRAWLS
- Beam Trawls – Well defined area
- Open Water Trawls

Collecting & Survey Techniques

- ANESTHETICS
- ROTENONE
- MS-222
- Quinaldine
- Clove Oil
- Advantages – small cryptic species, less selectivity, good if you want alive
- Disadvantages – Non-selective, can be long lasting, get out of control, bad PR

Collecting & Survey Techniques

- Electrofishing – remember handout
- Very good for freshwater streams and small lakes
- Alternating current (AC) stuns fish
- Backpack or boat electroshockers
- Shocker and netters
- Disadvantages
 - Species vary in susceptibility to AC
 - Behavior and habitat may influence

Collecting & Survey Techniques

- Electrofishing – factors that influence
- Conductivity (water and fish)
- Fish Size – larger more sensitive
- Temperature – conductivity (fish and water increase with temperature)
- Substrate
- Voltage
- Flow
- Vegetation

Preservation and Curation of Collections

- Preservatives and Storages
- 10% buffered formaldehyde (formalin)
buffered w/ calcium or potassium carbonate
- Inject or slit; 1-7 days
- Store in 70% ethanol or 45% isopropanol
- Jars
- Replace fluids – pour old into bucket and check with hydrometer

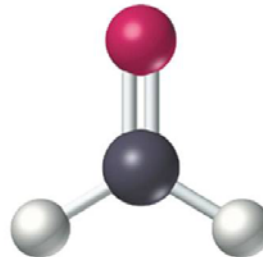
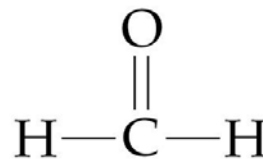
Preservation and Curation of Collections

- **Preservatives and Storages**
 - 10% buffered formaldehyde (formalin) buffered w/ calcium or potassium carbonate
- **Inject or slit; 1-7 days**



Formalin

- Formaldehyde = gas (HCHO – CHO = aldehyde group)
- Dissolves in water to form Methylene hydrate $\text{HO-CH}_2\text{-OH}$
- Water + Formaldehyde form polymers $\text{H}_3\text{-O}_n\text{-OH}$ – most low polymers $2-8 = n$
- High Polymers (n up to 100) = Paraformaldehyde



Formalin

- Formaldehyde = sold 37% in solution
- To be fixative – must contain monomeric formaldehyde (methylene hydrate)
- Methanol added to slow down polymerization (formaldehyde to paraformaldehyde)

Formalin

- 10% Formalin – refers to 37% formaldehyde w/ water and methanol (10%) diluted = 3.7% formaldehyde
- Paraformaldehyde – need to heat (to 60 degrees C) and buffer (KOH or Ca or K Carbonate)

How does formalin work?

- Aldehyde group combine with nitrogen of proteins
- Forms – cross linkage – Methylene Bridge (tanning)
- Largely completed within 24 hours – why 1-7 days?

Preserve Color

- Erythorbic acid
- Ionan CP-40
- (1% in 10%)



Preservation and Curation of Collections

- *Best – series of water:ETOH rinses – 25% ETOH, 50% ETOH, 70% ETOH*
- *Store in 70% ethanol (freshwater) or 45% isopropanol (marine)*

Preservation and Curation of Collections

- *Jars*
- *Replace fluids – pour old into bucket and check with hydrometer*

Preservation and Curation of Collections

- *Field Notes – Field number and Field Journal*
 - *All specimens collected at one locality, usually one day*
 - *Double/triple tag specimens*
 - *Label makers and water proof paper,*
 - *Indelible Ink - Sharpies, india ink and PENCIL*

Preservation and Curation of Collections

- *Catalog Numbers*
- *Identify and Sort Specimens*
- *Sort by lots = all individuals from one species from one collection*
- *Give each lot a catalog number (unique for collection that identifies lot)*

Organizing

- Assign Fish to Families and Orders
- 445 Families – Follows Nelson

Collections

- Fish – Lots and wet alcohol storage, some skeletons
- Herps – Individuals and wet alcohol storage
- Mammals – Individuals (skins and skulls) and dry storage
- Birds - Individuals (skins and skulls) and dry storage (paradichloro-benzene)
- Inverts – Wet in Alcohol, some dry, some in alcohol only

Catalog of Collections

- Catalog Numbers
- Database – BIOTA
- Mega databases – FISHNET, ORNIS, HERPNET, MANTIS, CONABIO, etc