Knowledge of kaimoana

Philosophy of partnership

• Tangatawhenua have detailed local knowledge of the kaimoana resources of a stretch of coastline often going back generations

• Research providers often have no knowledge of particular parts of a coastline but may provide knowledge at a broader scale and have access to useful tools and techniques

• In partnership we may find solutions more quickly than working alone

This presentation will briefly cover:

- Defining the question(s) of interest

- Gathering together existing data

- Visualising the existing data

- Making the most of existing data sources

- Collecting new data

- Standardisation of data collection

- Data analysis

- Data storage

- Leadership and resources

Defining the question of interest

- This is the hardest aspect of any investigation

- May take considerable time and energy to agree

- It sets the methods or approach needed to address it

Defining the question of interest

• Is it to determine year by year the abundance and average size of the legal sized population so that you can tell if there is an increasing or decreasing trend?

• If this is the case then estimates of density and size frequency at key sites might be adequate.

• If you also want to know if these trends are different to those occurring in the general region then similar areas nearby will also need to be sampled.
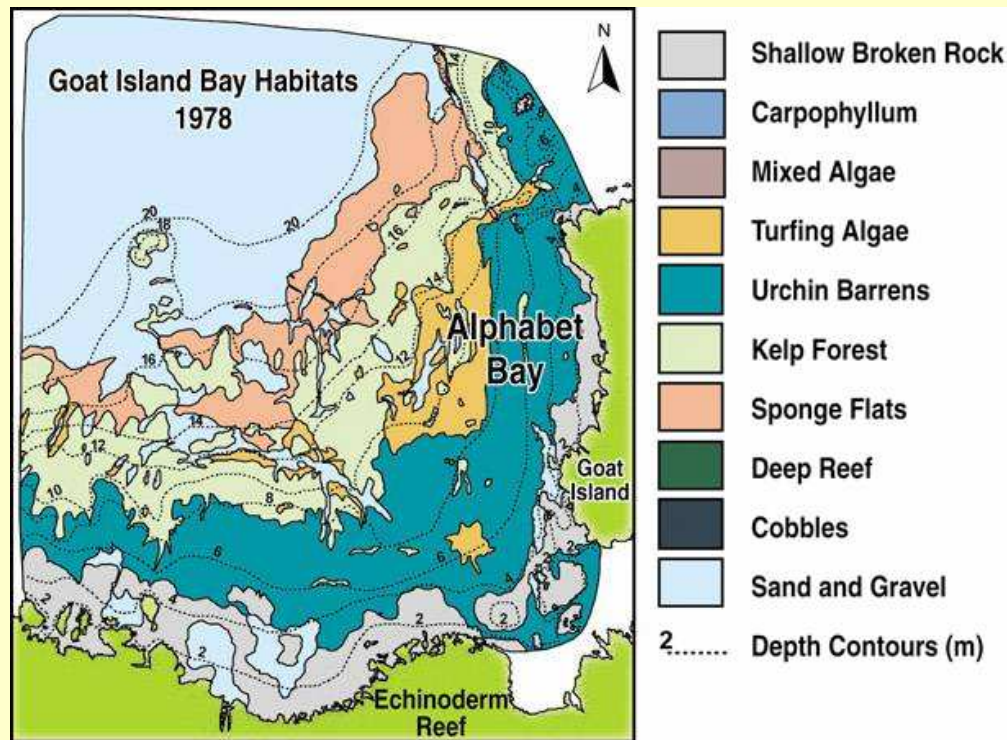
Defining the question of interest

Alternatively, is your objective to determine the overall number and weight of paua or kina in your area so that you know what proportion might be available for recreational and customary use?

If this is the case then you will need to use a method like diver counts that yields estimates of actual abundance per unit area of reef and in addition have a good estimate of the area of suitable reef or habitat for paua and/or kina.

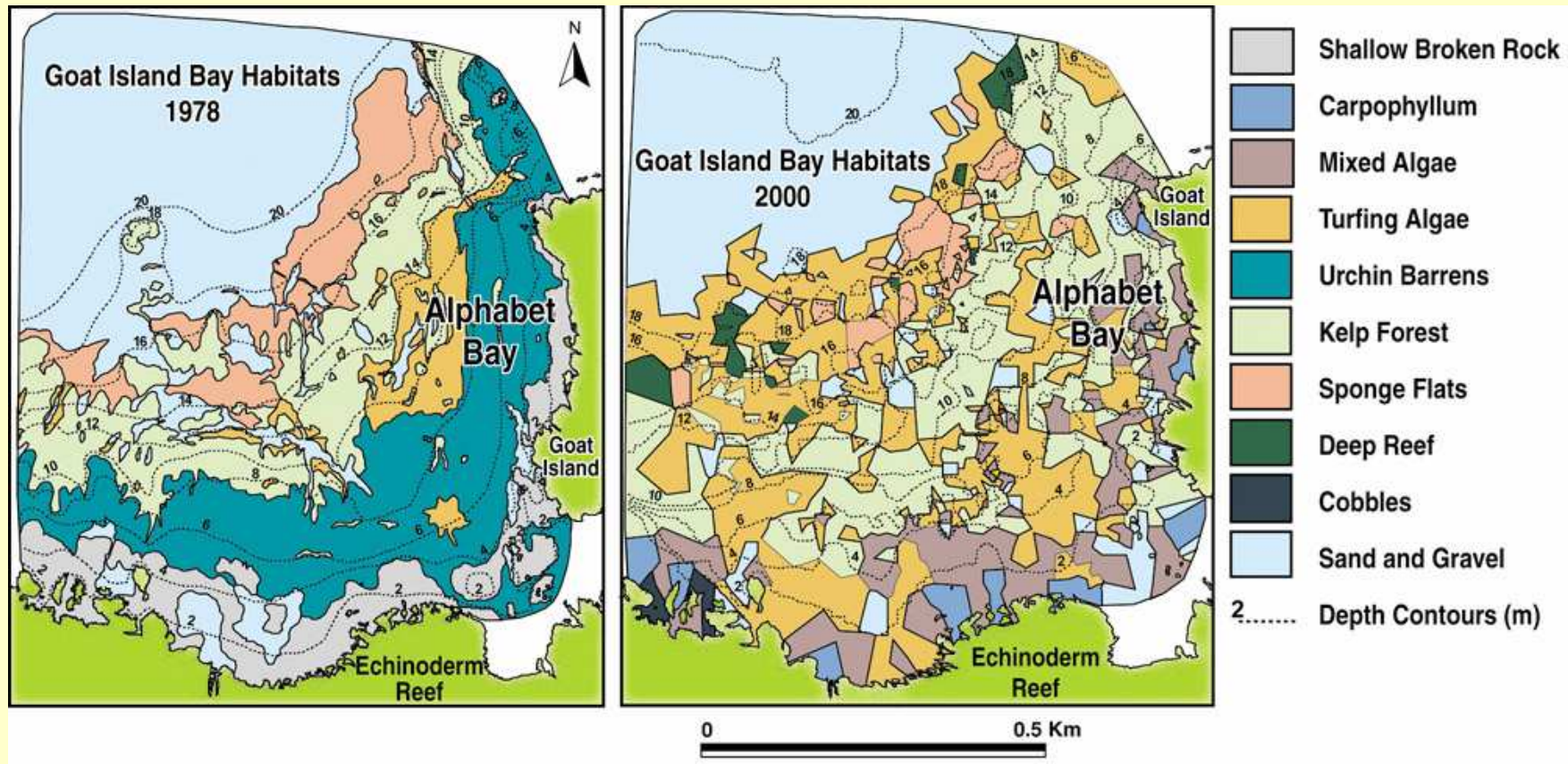# Gathering together existing data:

- There is often a wealth of information about the location and abundance of kaimoana stocks in peoples heads, old fishing diaries, reports, evidence put before Waitangi Tribunal Hearings

Visualise the existing data - produce a map

Goat Island Bay Habitats 1978

Legend:
- Shallow Broken Rock
- Carpophyllum
- Mixed Algae
- Turfing Algae
- Urchin Barrens
- Kelp Forest
- Sponge Flats
- Deep Reef
- Cobbles
- Sand and Gravel
- 2....... Depth Contours (m)

- Maps are a great way of bring together data from a variety of sources in an easy to understand form
- Maps are data rich and able to be mined for information at a later date
- If in doubt map the largest area with the greatest detail possible

Or a time series of maps…

These clearly convey changes

Make the most of existing data sources to build a time-series
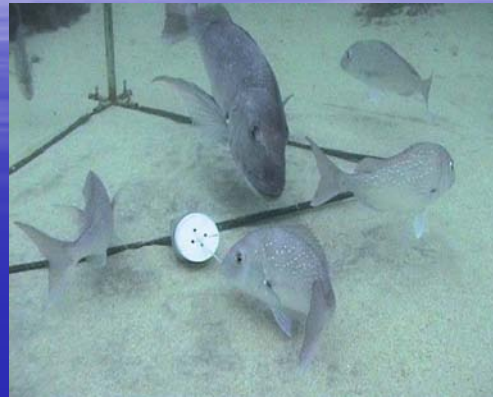
- **Existing commercial fisheries in your area may yield useful information about the state of the local stocks**

- **Request them to provide records of effort, catch size and composition**

- **Keep detailed records of customary take including date, time, effort (person hours), method, location, catch of each species and size and size/sex composition**
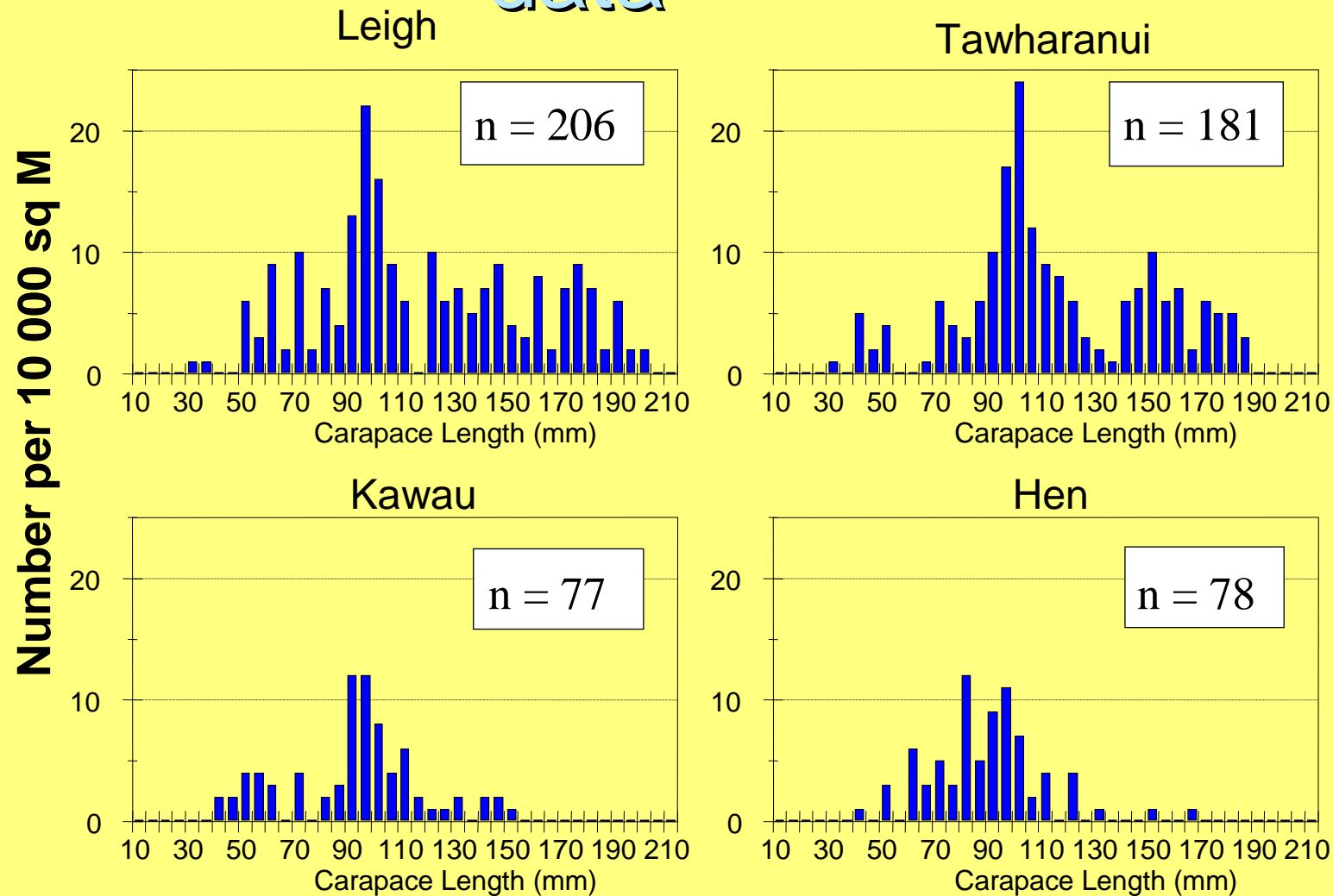
Collecting fisheries independent data
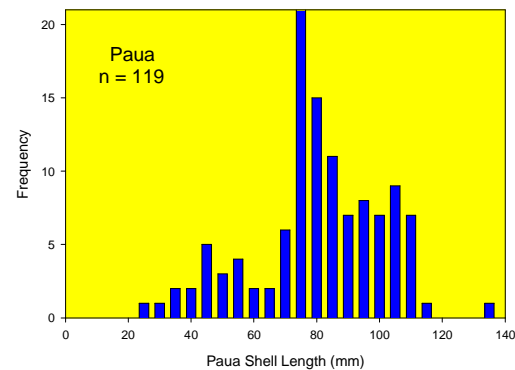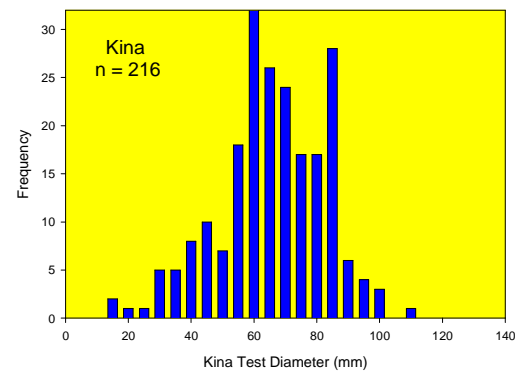## A wide variety of data collection methods

- Baited underwater videos

- Hook catch surveys

- Underwater counts

- Intertidal surveys

These all yield high quality data

Leigh — n = 206; Tawharanui — n = 181; Kawau — n = 77; Hen — n = 78. Number per 10 000 sq M vs Carapace Length (mm).

These all yield high quality data

Size frequency information collected by members of the Porangahau community from an intertidal reef in three hours in February 2002

If repeated on a regular basis then a time-series can be built

- **Time-series of abundance or catch / effort data provide a powerful insight into the trend of change**

- **May enable biomass to be calculated**

- **Start a time series sooner with today's technology rather than later with tomorrows promise**

Standardisation of data collection

- **Need to do this across years to establish a time series**

- **Standardisation of approach among adjacent hapu/ iwi will allow regional trends to be described**

Analysis

- Can vary from simple description of patterns of abundance or catch per unit effort and size distribution….

- To highly sophisticated yield models

- The analyses used are generally set by the initial questions of interest

- Will generally start simple and become more sophisticated as the data to address more complex questions accumulates
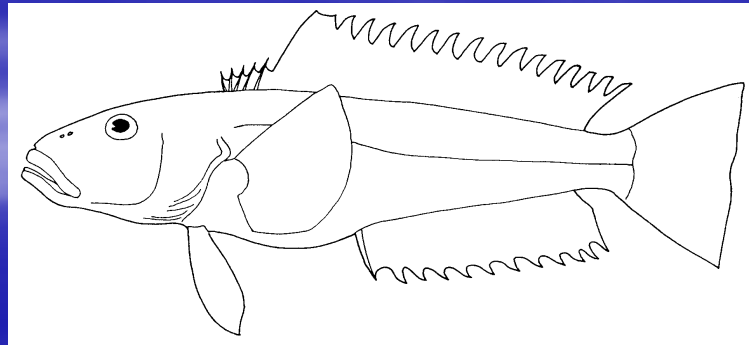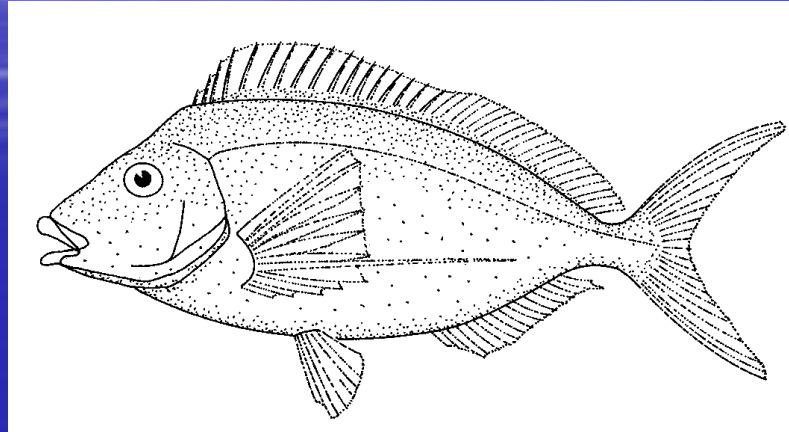
Data storage

- **Data becomes a highly valuable asset**
- **Long-term safe storage of data is critical**
- **Thought needs to be put into how and where data should be stored**
- **Data needs to be backed up on a regular basis and transferred to new storage protocols as the technology changes**

Leadership and resources

- These are both critical elements to the success of customary coastal management

- Most leaders who may provide governance are also heavily involved in most other aspects of their community and have little time to be involved in day to day aspects of data gathering, analysis or management

- Resources need to be forthcoming from local and central government agencies or built into research funding to support local coordinators and collators – some good examples exist

Measuring fish

Estimating fish abundance

- **Line fishing with standardised gear**

- **Standardised fish traps or pots**

- **Baited video**
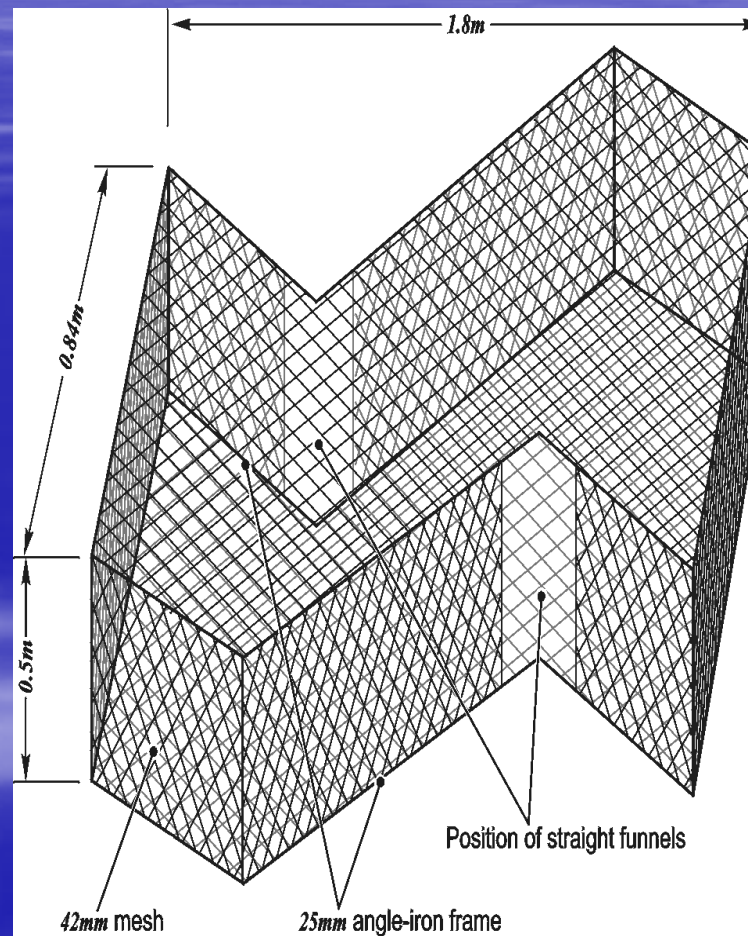
- **Diver transect counts**

Disadvantages of line fishing

- **Fish may be damaged by hooks or by swim bladder expansion**
- **May be biases among species**
- **Catch rate may be biased if changes in behaviour toward hooks occur over time**
- **Difficulties with the different skill levels of fishers**
- **Only targets carnivorous fishes**
- **Large (>6 people) parties and hence large vessels required**

Advantages of line fishing

- **Equipment is cheap**
- **No specialised equipment or training needed**
- **Size and catch rate information may be available**
- **Capacity for many people to participate**
- **Fish may be released after capture**
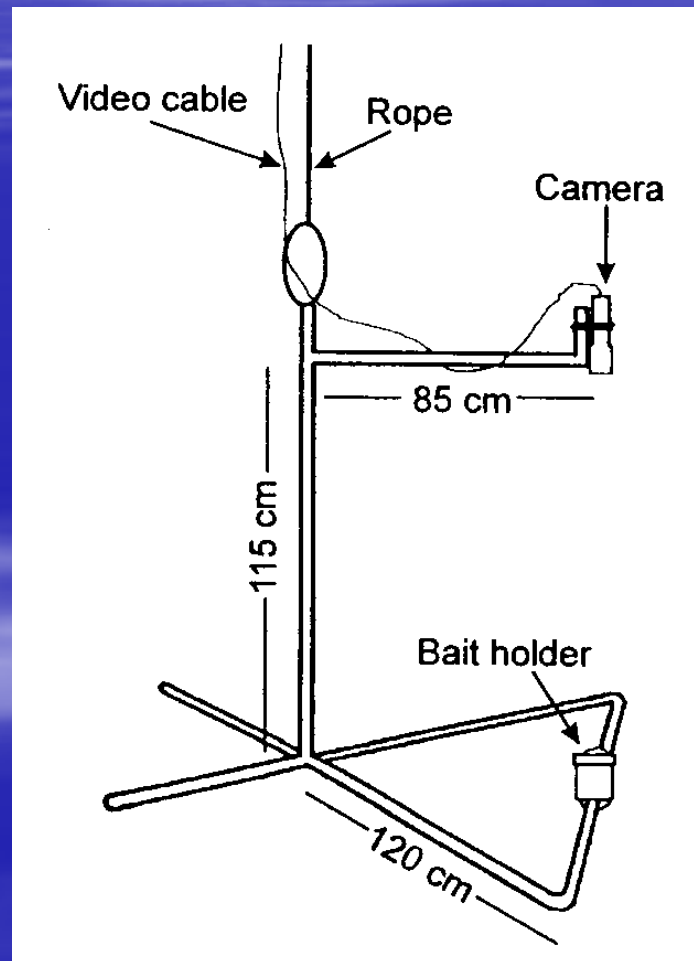
Fish traps or pots

Disadvantages of fish traps or pot

- **Require large deckspace and hauling gear on vessel**
- **Equipment not cheap**
- **Only targets carnivores**
- **Traps may damage seabed species**
- **Catch rates may depend on currents**
- **May be interactions at the pot that modify catch rates**
- **Need reliable bait source**

Advantages of fish traps or pots

- **Catch can be released**
- **Accurate size information**
- **Numerous pots can be set**
- **Few people needed in field**
- **No specialised training needed**
- **Vessel can leave site**

Baited video

Disadvantages of baited video

- **Requires costly, specialised equipment**
- **Requires vessel to be stationary**
- **Sea conditions need to be fairly calm**
- **Only targets carnivorous species**
- **Currents may modify attraction range**
- **Need reliable bait source**
- **Interactions among fish at the bait may make it biased**
- **Lengthy analysis onshore that may require specialised equipment**

Advantages of baited video

- **Fish not harmed**
- **Video is good to show others the area**
- **Lab analysis provides opportunity for non sea-goers to be involved**
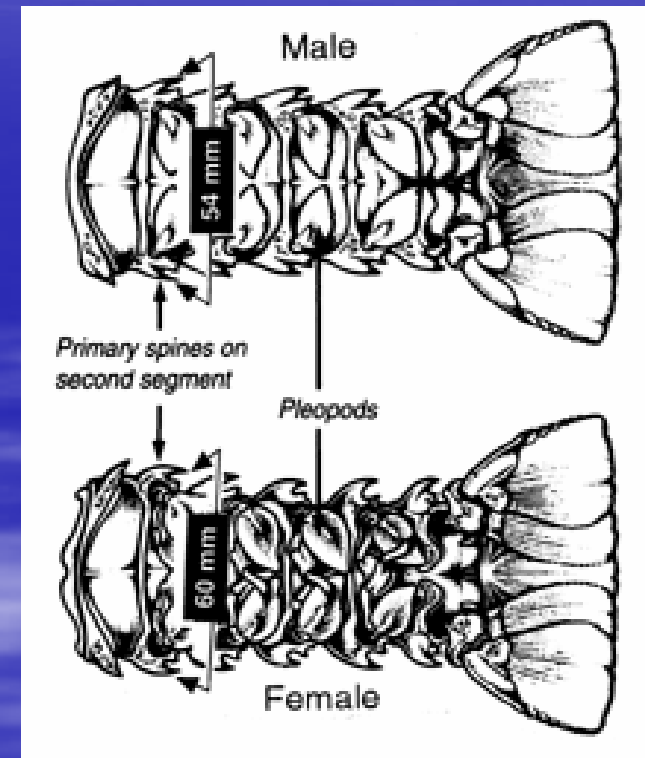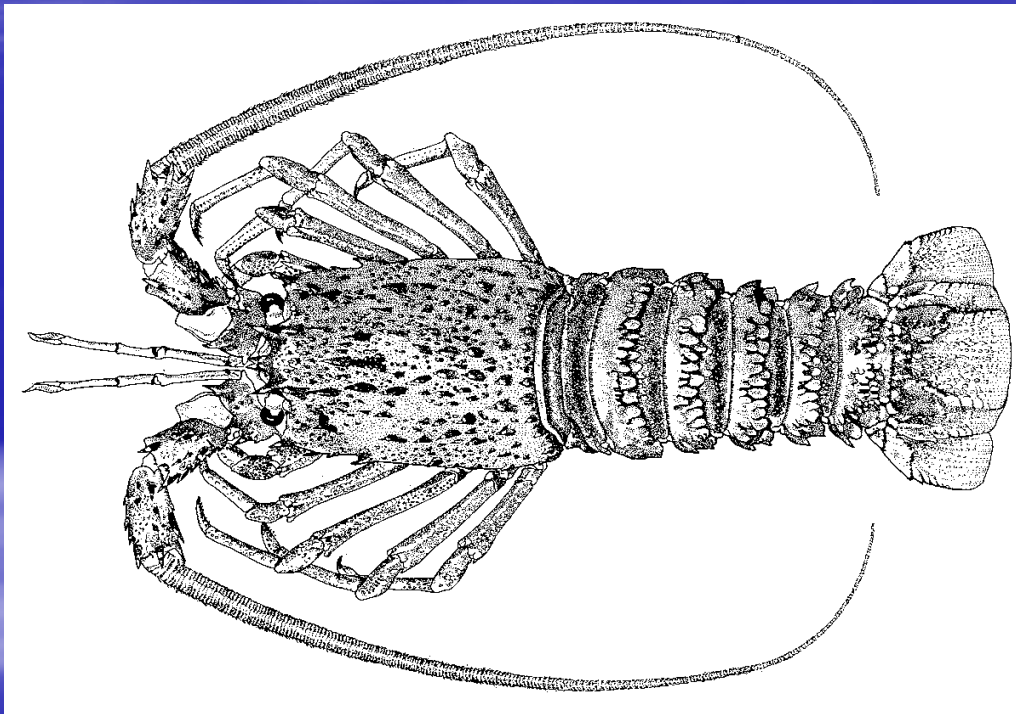- **Have times on-screen so can get time-course of entry to pots**

Disadvantages of diver transect

- **Requires SCUBA gear (though this is generally available)**
- **Requires clear water**
- **No catch for koha**
- **Requires training and experience to be reliable**
- **Size estimates may be unreliable**
- **Behaviour of fish toward divers may change through time**

Advantages of diver transect

- **Relatively small vessels can be used**
- **Can sample most species**
- **Only way to sample some fish (e.g. butterfish).**

Measuring crayfish

Male

54 mm

Primary spines on
second segment

Pleopods

60 mm

Female

Estimating crayfish abundance

- **Potting:**

  - Relatively cheap

  - Yields index of abundance only

  - Size frequency biased

  - Could use existing commercial
     voluntary logbook scheme

  - Could use own pots

Estimating crayfish abundance…..

- **Diver transects:**

  - Obtains direct estimates of

    abundance and size frequency

  - Requires SCUBA equipment

  - Training is necessary to calibrate

    size estimation

Estimating crayfish size

- **Capture and measurement of every lobster encountered**

    - time consuming

    - biased against some sizes

    - increases air consumption

Estimating crayfish size...

- **Visual estimates**
    - less precise
    - unbiased
    - quick
    - pre-survey training required

Calibration of crayfish visual size estimates

- **Estimate**
- **Capture**
- **Measure**

- **Keep records for each diver so that corrections to survey data can be made if necessary**