Recreational Fishing Research in Australia and the US

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Australian Government
Fisheries Research and Development Corporation

Government of Western Australia
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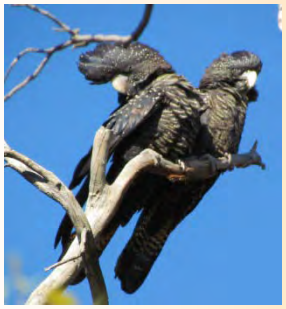

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Western Australia is as far away from here as you can get-12 time zones! Also in the southern hemisphere so seasons are reversed

Australia is the same size as the Continental USA. It is the largest island and the smallest continent in the World. Diverse and Unique Ecosystems.

Fact Sheet

Population of Australia ~ 23 million

Western Australia (State)
Area~ 1/3 of Continent
Coastline approx ~5000km

A Mining Boom State
Iron, Zinc, Gold

Population of WA
~ 2.2 million only
~75% live in Perth
Very Urban Society

Rec Fishing in WA is Popular
~480,000 rec fishers in 2000 (~30% of popn)
~ 100,000 boat fishing licenses sold in 2010 in WA

Rec Fishing is Important. NRC 2006. This is true in all Western Societies.

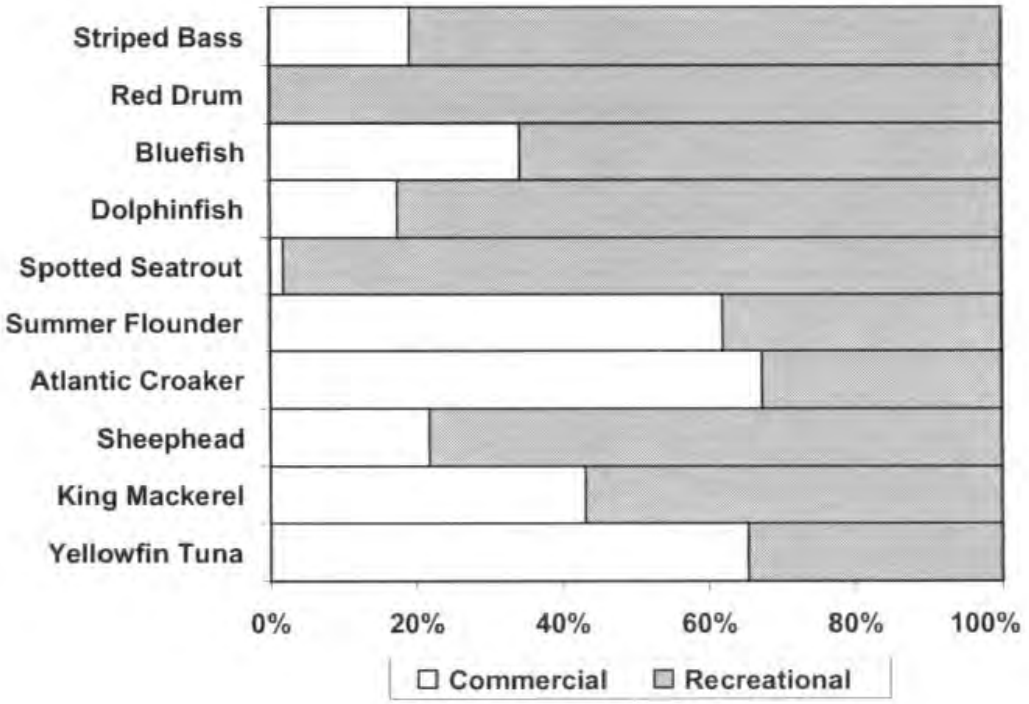


FIGURE 1.1 Top Ten Recreational Species Versus Commercial Harvest for 2004. Comparisons between the top ten species in descending order of abundance by weight for U.S. recreational fish harvests and commercial landings. The figure does not include data for Alaska and Texas because no NMFS recreational surveys are conducted in those states (National Oceanic and Atmospheric Administration, 2005a).

Differences from Commercial Fishing Effort and Harvest Information

- Commercial –small number of fishers so usually carry out a census using mandatory catch reports.
- Recreational-millions of anglers so need to use very complex probability based sample surveys
- Recreational Fishers individually don't take many fish but collectively have enormous impact like commercial fisheries
- It is very important to have reliable information on total effort, total kept harvest, and total released catch from both sectors.

Purpose of Angler Surveys

- To estimate the recreational fishing effort, harvest, and released catch of multiple species of fish occupying a particular region in a particular time frame that are of importance to fisheries management agencies.
- Estimates may become part of fisheries stock assessments that involve commercial and recreational components
- To obtain direct biological information such as length, weight, disease status and other biological quantities on a subsample of the harvest.
- Also indirect angler supplied information may be obtained on released catch size because the harvested & released catch may target different size classes.
- To obtain fisheries information on social and economic variables.

What are We Measuring?

Fishing Effort (E)

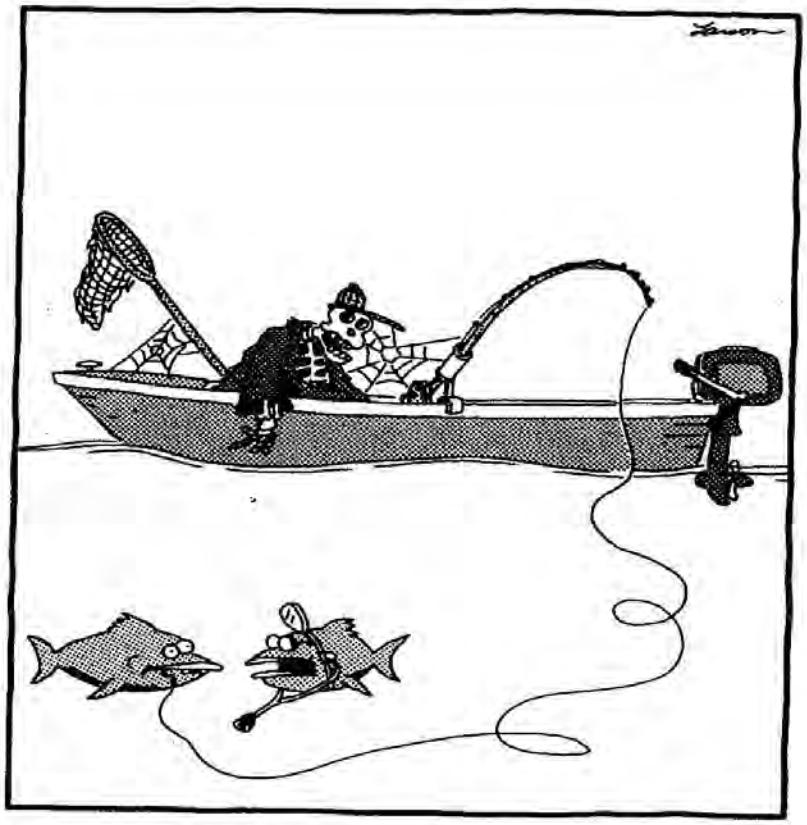
Catch Components

- C_H catch kept (Angler Survey direct inspection or self reported depending on the type of survey)
- C_R catch released alive (Angler Survey self reported)

Catch and Release Mortality (Auxiliary Studies)

- M_H mortality incurred through the catch and release process.

Catch and Release Mortality!



"Well, first the bad news —
you're definitely hooked."

Metrics (What are We Measuring?)

Important Catch Metrics

Total Harvest	$H = C_H$
Total Catch	$C = C_H + C_R$
Total Rec. Removals	$R = C_H + C_R * M_R$

Note- M_R **is the catch and release mortality which has to be estimated in a separate study.**

Note-Total Recreational removals is very impt in stock assessments. It is hard to estimate well though.

Importance of Management Needs, Scale, Cost of Survey

- One crucial aspect of designing angler surveys is deciding on the appropriate spatial and temporal scale. Ideally one should design the survey to match very closely to the spatial and temporal scale of the estimates needed by the managers.

- For example, if one needs to manage with in-season quotas, then one will need to implement a survey with a temporal scale of perhaps a week whereas if regulations will only change the next year then the temporal scale can be much coarser.

- There are similar issues to consider related to spatial scale. Does one want precise estimates at the level of an individual water body, state, region, or only at the national level.

- In practice, costs may dictate the final scale. Where there is a trade off between quality of estimates and cost, then managers may have to adapt the spatial and temporal scales of their management unless their agencies are prepared to pay the much higher costs of very precise estimates at finer scales.

Angler Contact Methods

Off Site

Mail

Telephone*

Email and Web

Logbooks

On Site

Aerial (Effort Only)

Access

Roving

Important Widely Used Designs

Small Scale (Reservoir, Lake, Stream)

- Access-Access (Usually in Traditional Form)
- Roving-Roving (Traditional)

Medium Scale (Regional Surveys)

- Aerial-Access
- Access-Access (Usually in Bus Route Form)

Large Scale (National or Large Regional Surveys)

- Telephone-Telephone (Diary)
- Telephone-Access

Note-Sometimes have to use complemented designs (i.e. multiple contact methods)

Aerial Surveys With Ground Interviews Added Useful design for scales like Estuary

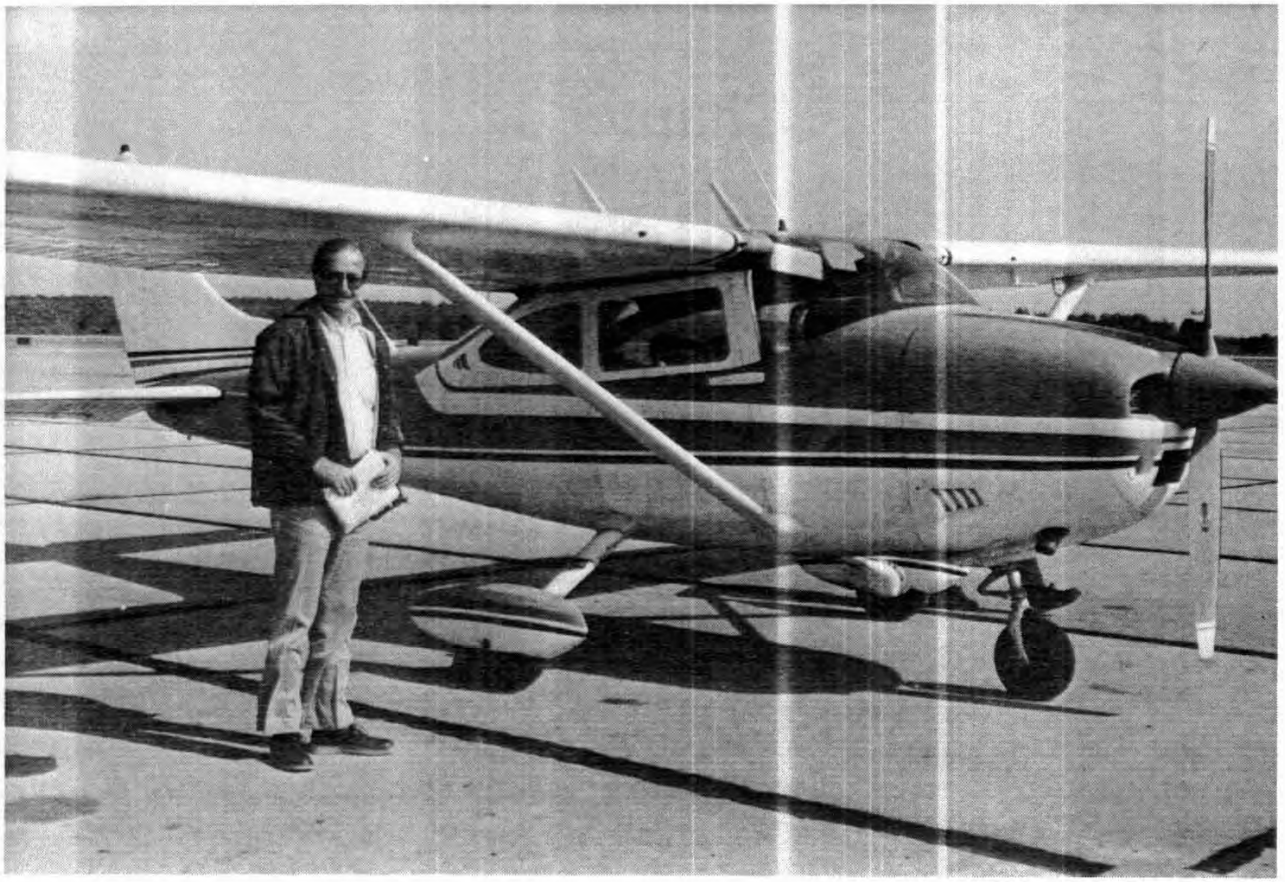
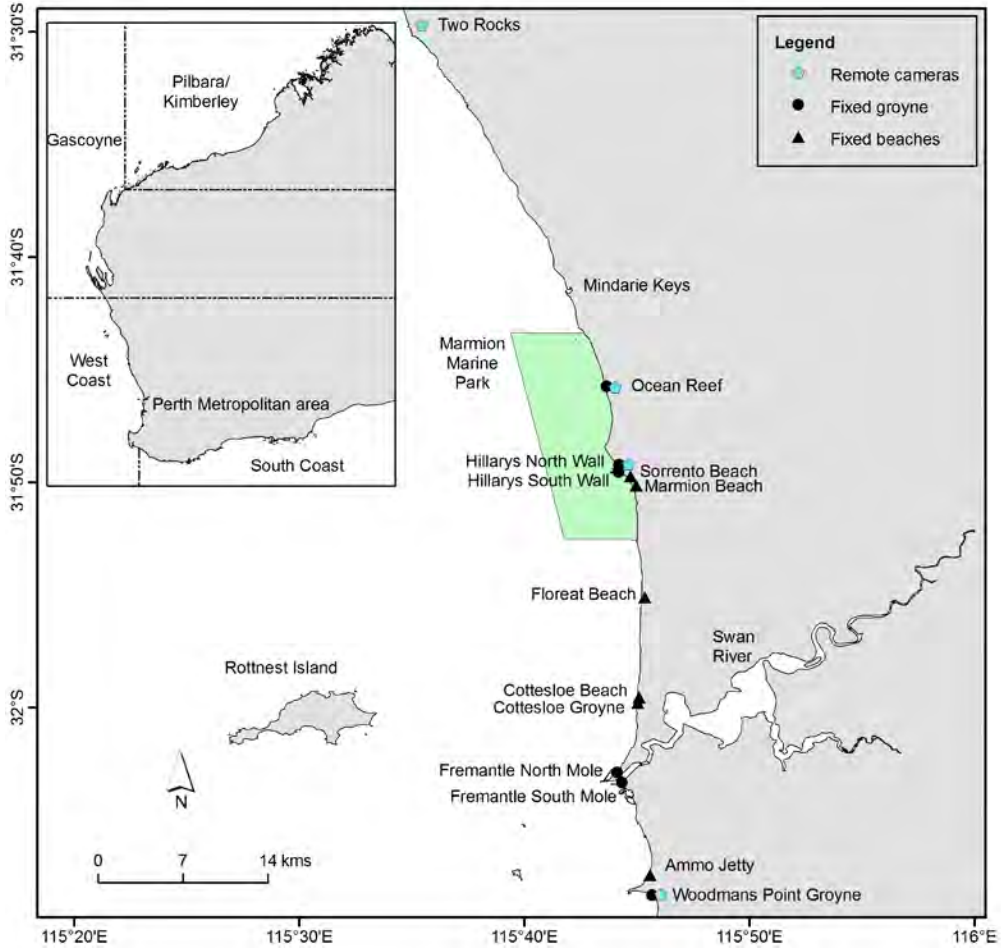


Figure 12.1 Photograph of a small fixed-wing aircraft used in an aerial survey of anglers. This airplane has its wing set above the fuselage, which permits relatively unobstructed views beneath the plane.

WA Aerial Survey augmented with ground interviews and camera counts



Perth Metropolitan area surveyed for shore fishing. Beaches, jetties and rock outcrops.

National or Large Regional Surveys) Telephone-Telephone (Diary) and Telephone-Access

- Telephone Diary Surveys (Australia)
  - National Survey 2000
  - West Australia Boat Fishing Survey 2011-12
- Telephone-Access Surveys (US)
  - MRFSS Survey and now MRIP Survey

W Australia Rec Boat Fishing Survey: Telephone Diary

- Panel survey with a screening survey and then a diary component for 12 months. Frame is boat fishing license.
- Information angler supplied and subject to quality concerns esp. related to catch info. (On Site Validation)
- Material to aid in increasing data quality such as species or species groups identification kits were sent to all participants willing to keep the diaries.
- The diary information was collected by telephone roughly once a month. Good interviewer training and techniques used to keep response rates high and keep response and non response errors low.
- Extremely cost effective in Australian context where enormous coastlines so any on-site component very expensive.

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Tropical and temperate species of fish

The WA Integrated Boat Fishing Survey

1. Large Spatial Scale suggests a telephone diary survey is the best option.

- Initial screening survey Dec 2010-Feb 2011
- Diary panel survey-once a month for 12 months March 2011-Feb 2012.
- Washup survey- April 2012
- Note Response Rate was amazing-- above 90%. Sample size about 3000.

Sand whiting – *Sillago ciliata*
King George whiting – *Sillaginodes punctata*
Yellow-finned whiting – *Sillago schomgurgkii*

The WA Integrated Boat Fishing Survey

2. The telephone survey approach validated by an on-site access point survey in Perth region. This survey is also augmented by camera sampling

West Australian Dhufish – *Glaucosoma hebraicum*

The WA Integrated Boat Fishing Survey

3. Biological Sampling Survey-Statewide.

4. Compliance Survey –An attempt is being made to design a survey to measure compliance with the fishing license regulation. This should be a no brainer but it is hard to get compliance officers to do a probability survey.

Western Rock Lobster
- *Panulirus cygnus*

Angler Survey Key Points

- Western Countries Rec catch is of growing importance.
- It should go without saying that we need sound survey designs based on probability sampling methods so that we know how to expand to estimates of total effort, harvest, and released catch.
- The difficulty of assessing released catch accurately when it may be very important because of high catch and release mortality for a species.
- The importance of more research studies on catch and release mortality. Catch and release mortality varies so much by species
- The importance of having good license file frames with minimal incompleteness due to exemptions.
- Importance of Spatial and Temporal Scales to the optimal survey design needed. Large Spatial Scales will need the telephone surveys as a major component.

Tourism Slide-Go Visit-The Natives are Friendly