

Gulf of Carpentaria Prawn Survey 1963-1965, a collaboration that spawned the Northern Prawn Fishery

The tracks of two years. *Rama* and her team made 122 voyages and 2324 experimental trawls from 1963–65, updating navigational charts and collecting information on tides, currents, sediments and depth contours, and the behaviour, biology and distribution of prawns and other marine species.



A 40-YEAR research partnership that spawned and sustains the northern prawn fishery (NPF) was celebrated in June 2005 at the CSIRO Marine Laboratories south-east of Brisbane.

The fishery was declared a commercial prospect in 1965 after an extensive survey of prawn stocks in the south-eastern Gulf of Carpentaria backed by government and industry

It is now one of Australia's largest and most valuable fisheries, averaging more than \$100 million a year from the export of high-quality tiger and banana prawns to Asia.

Scientific foundation

"The NPF is one of the few commercial fisheries to begin with a scientific investigation," CSIRO Marine Research chief, Dr Haymet says.

"It remains one of our most intensively studied fisheries, with a strong scientific basis to its management, thanks to the continued collaboration of science, government and industry."

Northern waters beckon

The two-year Gulf of Carpentaria Prawn Survey began in 1963 and involved CSIRO, the Queensland Department of Primary Industry and the Queensland Department of Harbours and Marine. Fishing and export company Craig Mostyn and Co provided processing and additional fishing facilities.

"East coast prawn fisheries were reaching their limits and the Commonwealth and Queensland governments were keen to develop the unexploited north," Dr Haymet says.

"Conditions in the gulf looked similar to rich prawn fishing grounds in the Gulf of Mexico so a team of scientists was sent to investigate."

Humble beginnings

The scientists set up a field station in the remote, one-pub town of Karumba and chartered the 14.6-metre wooden trawler *Rama*.

Their equipment was rudimentary and the prawns frustratingly elusive. Their sea charts were based on ones drawn by Matthew Flinders in the early 1800s. Initially they encountered more cyclones, crocodile hunters and pirates than prawns.

Nearly a year into the survey, the team's persistence was rewarded with the first major haul of banana prawns. From then on the catches became more frequent.

Commercial fishing operations based on the Port of Karumba began in 1966 and spread to other parts of the gulf in 1967. The fleet numbered 200 boats by 1970. As well as injecting new life into prawning industry, the survey collected a unique set of biological and environmental data in an area virtually untouched by human activities, providing a baseline for later research.

KARIIMRA

Seeking sustainability

Dr Haymet says the research partnership has since progressed from a focus on the biology and assessment of prawns to understanding and managing the effects of fishing on other species and the environment.

"The fishery is managed for environmental and economic sustainability in every sense," he says.





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Ian Munro, leader of the Gulf of Carpentaria Prawn Survey

Prolonged sea change for man of fish

WHEN the late lan S.R. Munro agreed to lead the Gulf of Carpentaria Prawn Survey in 1963, he had no idea the task would consume his life for two decades.

Until that day he had been preoccupied with fish taxonomy: establishing the Australian National Fish Collection at CSIRO and completing manuscripts for *The Fishes of New Guinea* and the *Handbook of Australian Fishes*.

Neither he nor his CSIRO technical assistants had any familiarity with prawns other than gastronomic.

With a pound of prawns from a fish shop near the CSIRO laboratories at Cronulla they took their first lesson in prawn anatomy. When the field work ended in 1965, Munro was left to tackle the massive accumulation of data.

To his preferred discipline of systematic ichthyology, he adeptly added the skills of analyst, cartographer, hydrologist, sedimentologist, prawn biologist, ecologist and taxonomist.

He was to publish a three-part atlas of operational, environmental and biological data from the survey and a report on demersal fish and cephalopod communities of the gulf region.

AUSTRALIAN FISHES

Tracing tides and gutters where prawns ride and hide

NEARLY a year into the survey, in late May 1964, *Rama* lifted her first significant quantity of prawns, a 600 pound 'ball' that turned up near the centre of the survey area.

Trawl shot number 981 is etched into the memories of all the survey participants. Until that time, they had been struggling to fathom any pattern to the distribution of prawns in the south-eastern gulf.

lan Munro's analysis of the meticulously recorded data started to show up slight variations in a seemingly featureless bottom. There were shallow, wide channels running out from the mouths of the major rivers

It became evident that the banana prawn schools would 'ball-up' along the



The under-cottage reference collection. (Munro 1972)

Acknowledgements

Text and images sourced from CSIRO archives, publications listed below, and personal communications with survey participants. Thanks to Mac Storey, Noel Haysom, Roger Clapin, Bob Mostyn, Peter McDonough and Al Graham.

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Haysom (2001) Trawlers, Trollers and Trepangers: The story of the Queensland commercial fishing industry pre-1988. Department of Primary Industries, Queensland.

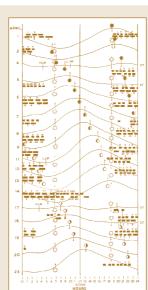
Meredith P (1998) A flair for trade. The history of Craip Mostlyn and Co Ply Ltb. Craig Mostlyn and Co Ply Ltb. Europamenta and Co Ply Ltb. Europamental and Biological Delta from the Guilt of Carpentaria Pawer Suney, 1985-1985 Part 2, Suney Operations CSIR-Marine Laboratories Report 152.

Munro Ian SR (1972) The Fauna of the Gulf of Carpentaria. Fisheries Notes (Nev Series): No. 2. CSIRO.

Munro Ian SR (1956) Handbook of Australian Fishes. Department of Prima Industry, Canberra. edges of these channels at times of least water movement, at slack or high water during or near the neaps or double tides. This occurred on a roughly fortnightly cycle.

The schooled-up prawns would stir up the sediments, creating mud boils that were visible from the surface, albeit much further offshore than similar phenomena on the east coast.

Aerial spotting for mud boils had been attempted at the outset of the survey with little success. It later became a feature of the fishery, but only after scientists and fisherman determined when and where to look.





LEFT: Banana prawn catch data plotted alongside tidal, lunar and solar events. The curve represents the change in tidal height through each day as observed from a tide gauge in the Norman River at Karumba.

The symbol DT indicates double tide days and the black rectangles represent trawl shots. (Graphics from Munro 1984)

Cottage industry practised in lab on legs



The field station at Karumba. (Munro 1972)

SHORE accommodation at Karumba was a tiny cottage on stilts that served as living quarters, lab and office.

There was a small kitchen and bathroom, a dormitory and a tiny room that doubled as office, radio room, chart table, library and bed space for the project leader. Virtually every operation could be undertaken by rotating a swivel chair.

The space below the cottage served as a laboratory and eventually housed a reference collection of local species.

Feeling their way through featureless sea

POSITIONING Rama for the trawling stations relied on steering compass, echosounder and intuition.

The two Admiralty charts showed different coastal outlines, and most of the depth soundings had been taken by Matthew Flinders in 1802–03.

Trawler skippers who traditionally navigated by landmarks were frustrated by low-profile, featureless coasts fringed with mangroves. Most islands and reefs were charted, but sandbanks were a hazard.

lan Munro eventually established a fishing chart that proved a useful tool for early fishermen trying to make sense of the unusual tidal regime and survey data.



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LEFT to RIGHT: The Governor-general Lord Casey (left), with Bob Mostyn (snr) and Karumba manager Jim Farrell at Karumba in the late 1960s with imported prawn unloading equipment. (Pownall 1994, from Australian Fisheries, Canberra)

Craig Mostyn and Co production manager Roger Clapin processes prawns with Mrs 'Dotty' Barnett. (Meredith 1998)

The Laakanuki berthed at Karumba. (Haysom 1988, courtesy Mac Storey)

Faith and dollars bear fruit for founding father

BOB Mostyn (snr), chairman of fishing and export company Craig Mostyn and Co, was convinced the Gulf of Carpentaria held promise as a trawling around

He discussed the region's prospects in 1962 with CSIRO Fisheries and Oceanography assistant chief, Geoff Kesteven.

When the survey began the following year, the company opened a small trawler base at Karumba comprising jetty, fuelling facilities, generating plant, refrigeration and the mother ship *Laakanuki*.

When Rama brought in her first major catch of prawns, a team of locals was recruited by the company to help with the processing. The prawns were exported via Townsville

Craig Mostyn and Co brought in another trawler, Toowoon Bay, in an attempt to double the chances of finding commercial concentrations of prawns,

and encouraged other skippers to try their luck in the region.

Later the company built a processing factory, and took over or created much of the infrastructure at Karumba

An aerial spotting service was added to their services in 1967, greatly improving the success of the trawling. From that point on the factory had more prawns that it could handle



One of the first big landings of banana prawns in the gulf. (Pownall 1994, from Graham White, NT Fisheries, Darwin)

Skippers seek champagne catch

IAN Munro promised the magnum of champagne from behind the bar at the Karumba Lodge to the first skipper to land a substantial quantity of prawns.

At 11.33 pm on 25 May 1964, Peter Lorimer of the Department of Primary Industry spotted a big shadow on the echo-sounder paper, so the skipper of Rama, Noel Sykes, shot away for the 981st time and came up with a net full of banana prawns.

The champagne was never consumed, but the prospect continues to inspire reunions among the survey team

Pioneering prawner

NANANGO, a trawler from New South Wales, was probably the first to fish specifically for prawns in the Gulf of Carpentaria. That was in 1954

Noel Haysom, Ian Munro's deputy during the gulf survey, is pictured below on Nanango on the far left

He is collecting specimens as part of a research program in Queensland's Moreton Bay fishery, which developed in the 1950s



Research aboard Nanango. (Haysom 1988 from DPI collection, from Courier Mail)

Karumba awakens

IN July 1963 the fishing and hunting resort of Karumba consisted of about 20 people, two private homes, some sheds and a hotel

Four years later it had become a busy commercial fishing port



Karumba in the early 1970s (Pownall 1994, from Australian Fisheries, Canberra)

Surveyors caught out with their nets down

THE initial survey team on the Rama had an encounter with a pirate lugger

Communications were poor in the gulf area in the early 60s, but word had spread that an old pearling lugger and

a crew of small-time pirates were on the loose in northern waters While virtually immobilised

by the trawling equipment and

with no radio contact. Rama was approached by an old pearling lugger crewed by about six people under the shade of a tattered canvas awning

In order to gain speed and maneuverability, the skipper of the Rama worked furiously at getting the trawl up

The other two onboard Rama brought an old revolver and a rifle on deck for 'show', and prepared to sever the trawl wires should the lugger come too close.

The lugger came within 100 yards then turned towards the southern coast. There was no more trawling until the lugger was over the horizon

No truck with this transport

THE survey team had to make do with some primitive equipment

The opportunity to share a utility truck operated by the Queensland Department of Harbours and Marine boatman at Karumba seemed a good money-saving opportunity

But the truck turned out to be a mass of rust held together by a few strips of metal, with no lights and a dodgy gear lever. It had been used for trips across the salt plains near the mouth of the Norman River.

A wheelbarrow was commandeered as backup and another vehicle acquired some months later





Gulf of Carpentaria Prawn Survey 1963-1965, a collaboration that spawned the Northern Prawn Fishery

In the past four decades, the focus of NPF research has progressed from the biology and assessment of prawns to understanding the effects of fishing on other species and the environment. The next challenge is to provide the fishery with the knowledge and tools it needs to weigh the ecological consequences of management actions.



Collecting prawn samples from a float-plane in a remote gulf river.

A FIVE-YEAR study in the late

1970s described the life cycle of

stages of most prawn species in

The study found a relationship

recruitment of banana prawns that

became the basis for subsequent

the gulf, and produced models

of egg production and larval

between rainfall and offshore

CSIRO catch predictions

dispersal

banana prawns and the larval

Fishery gets first buoyancy test

IN 1969, banana prawn catches dropped to half that of the previous year, raising concerns the fishery had grown too fast

A CSIRO project was begun to establish what quantities of prawns could be caught without overfishing and predict catches by assessing iuvenile in nurserv areas

Ecological studies hint at sustainable yields

A decade later it was discovered

that banana and grooved tiger

prawns produce two main sets of

recruitment each year, although in

the case of banana prawns, only

one contributes significantly to the

For the first time, estimates were

made of the average long-term

sustainable yields, contributing to

a fleet rationalisation process in

commercial fishery.

the NPF

Small boats were used to sample estuaries in Western Australia. In the Gulf of Carpentaria, float-planes were used to overcome problems of inaccessability.

The planes flew from estuary to estuary, landing on the water and then towing a beam trawl to catch small prawns



Technique or technology?

DESPITE advances in technology since the 60s, scientists engaged in NPF research still face the odd hazard.

In the picture above, John Salini demonstrates the use of prawn lug baskets as shoes during prawn predation research. The technique came in handy while retrieving a gillnet rope from a mangrove trunk in the soft mud of the Norman River.

Try tagging 20 000 tigers

A LARGE-SCALE project at Groote Evlandt in the early 1980s tagged more than 20 000 prawns with plastic streamer tags.

Recapture information was used to calculate growth rates of brown and grooved tiger prawns and shed light on their different migration patterns and habitat preferences



The Southern Surveyor.

The modern quest for ecosystem understandina

IN February 2005, CSIRO, the National Oceans Office and Geoscience Australia joined forces to trace the physical and biological processes that sustain 'soft seabed communities in the Gulf of Carpentaria

One of the goals of the Southern Surveyor voyage was to quantify the effects of prawn trawling on seabed habitats, underpinning the development of modelling and predictive tools to support the fisherv's environmental management



Seagrass beds are critical nursery areas

Grounds for protection

A STUDY from 1992-96 investigated the carrying capacity of nursery habitats for juvenile prawns, and the environmental factors important to seagrass and nursery areas.

Mangroves and seagrasses were found to be critical juvenile habitats. and scientists, industry and managers subsequently agreed on a system of spatial and temporal closures designed to maximise the value of the catch and protect spawning grounds

Safety nets in place for bycatch

SINCE 1990, CSIRO has worked with research partners, management and industry to mitigate bycatch in the NPF

The research has involved observer programs, industry-based data collection, risk assessment, and gear development and trials. Mandatory use of turtle excluder devices and bycatch reduction



species to swim out of trawl nets.

devices has since been successful in reducing catches of turtle, large sharks and rays, sawfish and large sponges.

Life-cycle studies have offered clues to the

sustainability of prawn stocks

The research has helped the industry formulate the first bycatch



Bycatch reduction devices and turtle excluder devices enable larger

action plan for a Commonwealth fishery and encouraged its commitment to the long-term monitoring of bycatch and prawns



Stock assessments prompt industry-backed monitoring

CSIRO assessments of tiger prawn stocks showed the resource to be overexploited in the mid 1990s

The assessments led to a 40% reduction in effort from the tiger prawn fishery after negotiation between industry and managers. and prompted industry support for the long-term, independent monitoring of prawn stocks.

Twice a year, a team of CSIRO scientists now boards commercial

prawn trawlers to survey the size and distribution of prawn stocks in the gulf before the start of the fishing season

The surveys are largely industry funded, with additional support from CSIRO and the Fisheries Research and Development Corporation

The results are made available to industry and the Australian Fisheries Management Authority to assist in the fishery's management



An industry-funded survey assesses prawn sizes and distribution before each season.

