Queensland **the Smart State**

Fisheries Long Term Monitoring Program

Summary of tailor *(Pomatomus saltatrix)* survey results: 1999–2004

January 2006

Queensland Government
Department of **Primary Industries and Fisheries**

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Acronyms

APE	average percent error
CV	coefficient of variation
CFISH	Commercial Fisheries Information System, DPI&F
DPI&F	Department of Primary Industries and Fisheries, Queensland
LTMP	Long Term Monitoring Program, DPI&F
RFISH	Recreational Fisheries Information System, DPI&F

Summary

Tailor (*Pomatomus saltatrix*) is a schooling species with a world-wide distribution in subtropical waters that inhabits the coastal waters of southern Australia (Williams 2002). Its distribution in Australian waters ranges from the northern tip of Fraser Island in Queensland to Onslow in Western Australia (Kailola *et al.* 1993).

Queensland commercial and recreational fishers target these schools on ocean beaches between Fraser Island and the New South Wales border, during their annual spawning migration between late winter and spring (Leigh and O'Neill 2004). The estimated harvest of tailor for the commercial sector is 155 t (2004–05), and between 450 and 540 t (2002) by recreational fishers.

The Queensland tailor fishery is managed by the Department of Primary Industries and Fisheries under the *Fisheries Regulation 1995*. The current management arrangements include spatial and seasonal closures, minimum legal size limit, limited commercial entry, annual commercial quota and recreational possession limit.

The Long Term Monitoring Program (LTMP) monitors the tailor stock by investigating the length, weight, sex and age of the commercially and recreationally caught tailor from the ocean beach sector. This report presents a summary of the data collected from 1999 to 2004.

Since 1999, the LTMP has collected 14 486 tailor with over half of those fish collected from zones not included in the seasonal closures. The modal length frequency of tailor was between 300 and 370 mm for all years, sexes and regions. There was a significant relationship between length and weight of tailor, yet no difference between sex or region. The majority of tailor collected were aged as one and two year olds, with very few tailor collected of age three or older. The growth of tailor was similar for both sexes and all regions.

The majority of the length and age frequency data are representative of the recreational ocean beach fishery on Fraser Island, which is only part of the fishery. It is therefore suggested to extend the monitoring of the commercial catch samples and the recreational catch samples to other regions of the sampling area. There were also limited samples collected of tailor larger than 500 mm and at the age of three years or older. Any extension of the program should also focus on acquiring samples of larger fish to help complete the tailor growth curve.

Long Term Monitoring Program background

The Department of Primary Industries and Fisheries (DPI&F), Queensland, manages the State's fish, mollusc and crustacean species and their habitats. As part of this commitment, DPI&F monitors the condition of, and trends in, fish populations and their associated habitats. This information is used to assess the effectiveness of fisheries management strategies and helps ensure that the fisheries remain ecologically sustainable. DPI&F also uses the information to demonstrate that Queensland's fisheries continue to comply with national sustainability guidelines, so that they may remain exempt from export restrictions under the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999*.

DPI&F initiated a statewide Long Term Monitoring Program (LTMP) in 1999, in response to a need to collect enhanced data for the assessment of Queensland's fisheries resources. The LTMP is managed centrally by a steering committee with operational aspects of the program managed regionally from the Southern and Northern Fisheries Centres located at Deception Bay and Cairns respectively. The regional teams are responsible for organising and undertaking the collection of data to be used for monitoring key commercial and recreational species, and for preparing data summaries and preliminary resource assessments.

A series of stock assessment workshops in 1998 identified the species to include in the LTMP. The workshops used several criteria to evaluate suitability including:

- the need for stock assessment based on fishery independent data
- the suitability of existing datasets
- the existence of agreed indicators of resource status
- the practical capacity to collect suitable data.

Species currently monitored in the LTMP include saucer scallops, spanner crabs, stout whiting, mullet and tailor in southern Queensland, tiger and endeavour prawns and coral reef fish in northern Queensland. Species with statewide monitoring programs include mud crabs, barramundi, spotted and Spanish mackerel and freshwater fish. Various sampling methodologies are used to study each species. The incorporation of fishery independent techniques is preferred, with combinations of fishery dependent and independent techniques being used where appropriate. Data collected in the monitoring program are maintained in a central database in Brisbane.

The primary aim of the LTMP is to collect data for resource assessment (ranging from analyses of trends in stock abundance indices to more complex, quantitative stock assessments) and management strategy evaluations. The greatest value of the growing datasets for each of the species and associated habitats is in the long time series generated by continued sampling, something that is usually required for accurate assessments but is rarely available.

Stock assessment models have already been developed for saucer scallops, spanner crabs, stout whiting, mullet, tailor, barramundi, tiger and endeavour prawns, and spotted and Spanish mackerel. In some cases management strategy evaluations have also been carried out. The data collected in the LTMP have been integral to these activities.

The assessments and evaluations have, in turn, allowed options for improvements to the management of Queensland's fisheries resources to be considered. Enhancements to ongoing monitoring have also been identified, particularly to address the increasing demand for high quality data for dynamic fish population models.

Through the ongoing process of collecting and analysing LTMP data and incorporating these data into regular assessments and refining monitoring protocols as required, DPI&F is enhancing its capacity to ensure that Queensland's fisheries resources are managed on a sustainable basis.

Introduction

Tailor (*Pomatomus saltatrix*) is a schooling species with a world-wide distribution in subtropical waters that inhabits the coastal waters of southern Australia (Williams 2002). Its distribution in Australian waters ranges from the northern tip of Fraser Island in Queensland to Onslow in Western Australia (Kailola *et al.* 1993).

Tailor is a schooling fish most commonly caught along ocean surf beaches and adjacent to rocky headlands. Adult tailor can also be found in estuarine and brackish water (Kailola *et al.* 1993). Tailor form schools of similar sized fish and enter the fishery sexually mature in their second year of life. On the eastern coast of Australia they undertake an annual spawning migration (Leigh and O'Neill 2004). Schools of fish move north to spawning grounds between late winter and spring, although the extent of the migration is currently unknown (Kailola *et al.* 1993). Queensland commercial and recreational fishers target these schools on ocean beaches between Fraser Island and the New South Wales border.

The commercial catch of tailor in 2004–05 was estimated at 155 t (including incidental catch of 100 kg or less), with a Gross Value of Production of approximately half a million dollars (CFISH database, September 2005). The level of recreational fishing activity is estimated to be as much as 3 to 4 times the commercial sector (Leigh and O'Neill 2004), with estimates of the recreationally harvested catch in 2002 between 450 and 540 t[1] (RFISH database, September 2005).

Commercial fishers target tailor with beach seine or haul nets up to 500 m long, along the ocean beaches. Heavy ply multifilament nets are used, as tailor can damage monofilament nets with their sharp teeth. In protected bay and estuarine areas, gill/mesh nets and tunnel nets are the usual commercial fishing methods used, however, some haul nets are used where the structure of the shoreline permits. Tailor are also taken as bycatch in the ocean beach mullet fishery. Fishers try to avoid tailor bycatch because of the damage they cause to the monofilament nets used to catch mullet.

Commercial ocean beach fishers track schools of tailor until they reach a section of beach where the boat can set a net around the fish. Once set, nets are hauled by hand or with a vehicle onto the beach. During hauling, captured fish are concentrated in the codend of the net. Once on the beach, they are loaded by hand for transport to onshore processing facilities.

The commercial catch of tailor is predominately sold on the chilled fresh fish market. In the 1960s and 1970s the Queensland commercial tailor catch peaked at around 400 t. However, since then the total catch has decreased, apparently for reasons other than overfishing such as low market demand. The market demand on the tailor fishery is currently variable and has been generally decreasing since the mid-1970s (Leigh and O'Neill 2004).

Recreational tailor fishers typically fish the ocean beach gutters using three or four ganged 4/0 hooks connected by heavy monofilament or fine wire trace to a relatively light (15–20 lb, approximately 7–9 kg) main line. Tailor are usually the main target in addition to less seasonal species such as dart (*Trachinotus botla [=coppingeri]*), yellowfin bream (*Acanthopagrus australis*) and dusky flathead (*Platycephalus fuscus*).

[1] RFISH estimated annual harvest of tailor was converted to weight of fish by utilising the average weight of recreationally harvested tailor from this survey.

The Queensland tailor fishery is managed by DPI&F under the *Fisheries Regulation 1995*. The current management arrangements include the following:

- commercial fishery—limited entry, spatial and seasonal closures (Figure 1), annual quota and minimum legal size limit
- recreational fishery—minimum legal size limit, spatial and seasonal closures, and possession limit.

A preliminary stock assessment undertaken by Dichmont *et al.* (1999) indicated that the tailor stock could be subject to unsustainable levels of fishing mortality. In response to this finding DPI&F instigated fishery dependent monitoring of the tailor stock. This monitoring was designed to complement the Commercial (CFISH) and Recreational (RFISH) Fisheries Information Systems monitoring projects already taking place. The annual monitoring of tailor population structure by the DPI&F LTMP began in 1999.

Objectives

The LTMP objective is to collect data on the tailor stock that are representative of the recreational and commercial ocean beach catch, to investigate:

- length structure
- length–weight relationship
- sex structure
- age structure.

This report aims to present a summary of the tailor data collected by the LTMP from 1999 to 2004.

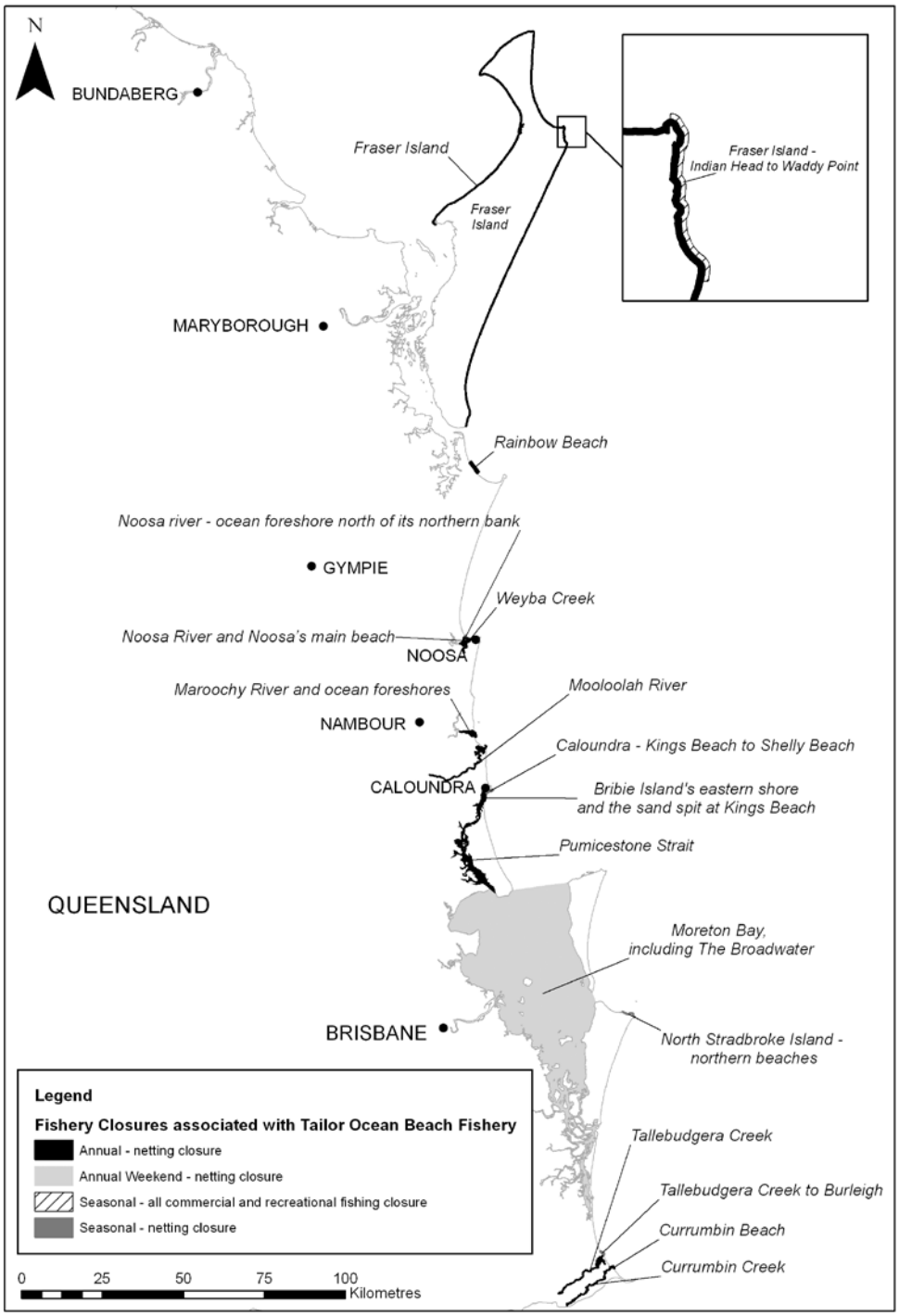

Figure 1. Management and closure areas of the commercial and recreational tailor fishery.

Methods

Sites

For the purposes of the survey, the main Queensland tailor fishing area extending from the Queensland – New South Wales border north to Breaksea Spit on Fraser Island, was divided into 26 smaller zones (Figure 2). These 26 zones were grouped into three regions where fish were collected. These regions were:

- Stradbroke—Queensland–New South Wales border to Comboyuro Point (zones 1–14) including Stadbroke and Moreton Islands
- Sunshine—Bribie Island to Inskip Point (zones 15–19) including Double Island Point
- Fraser—Hook Point to Sandy Cape (zones 20–26).

Tailor were sampled on a fine spatial sampling scale by zone because they exhibit size specific schooling. This means that fish of the same size tend to school together, increasing the spatial complexity of the stock. It was therefore assumed that tailor collected from a particular zone during either a morning or an afternoon fishing session were likely to be from one school.

Samples have been collected directly from recreational fishers on Fraser, Moreton and Stradbroke Islands and at Double Island Point. Except for Fraser Island, these areas yielded few samples due to the few fishers targeting tailor, and during competitions many of the fish were kept whole for weighing and were not available for scientific study. Sampling was therefore concentrated on Fraser Island (zones 20–26) with two six day sampling trips conducted each year until 2001. A third trip was conducted in 2002, 2003 and 2004 following the extension of the seasonal closure to include August.

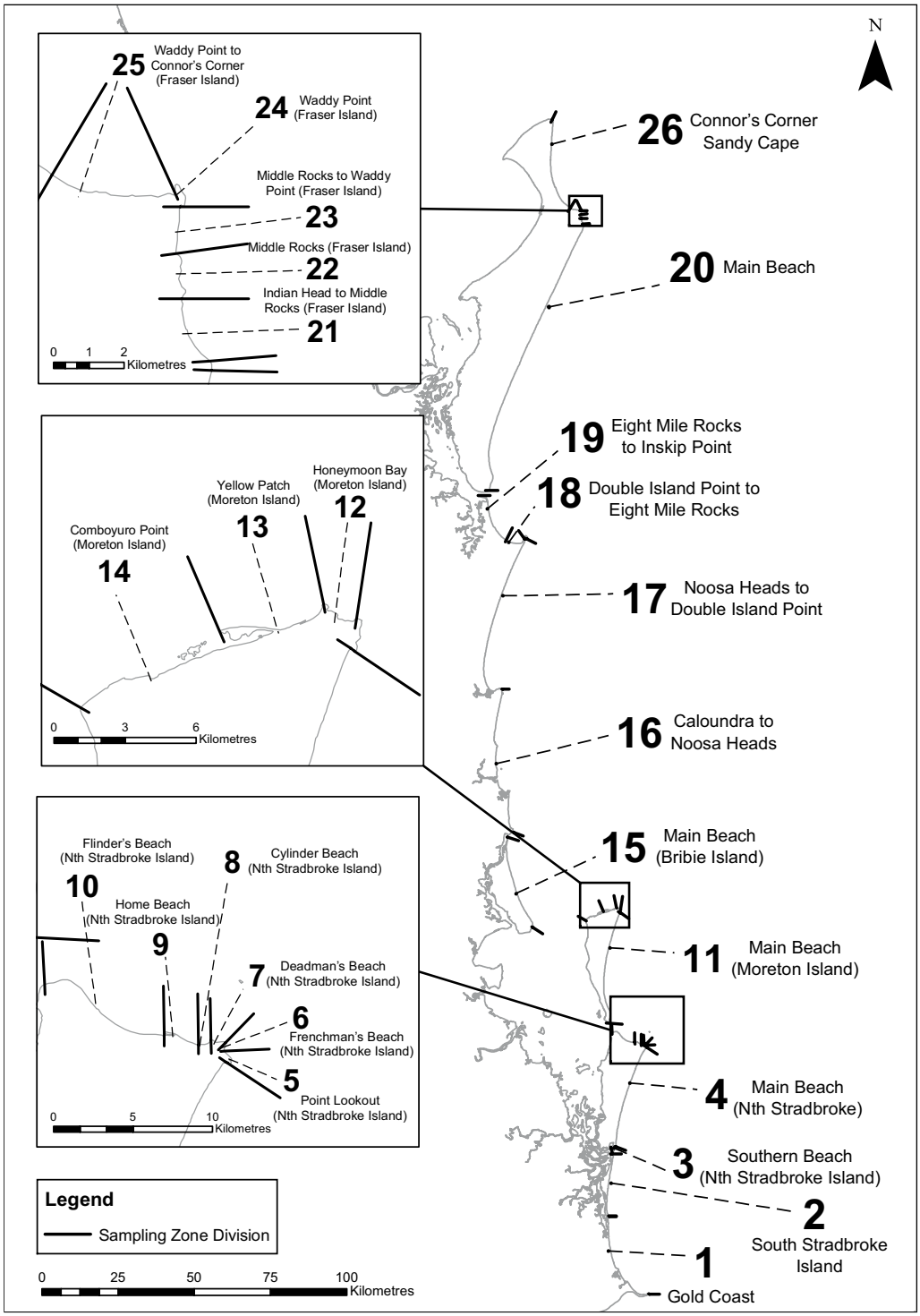

Figure 2. Main fishing area of the ocean beach tailor fishery divided into 26 Long Term Monitoring Program sampling zones, based on geomorphological characteristics.

Times

Tailor samples were collected throughout the peak fishing season (Table 1), starting in July and finishing in late October. Commercial samples were collected haphazardly when available. Recreational sample collection from Fraser Island coincided with pulses in recreational fishing effort. Samples were collected each day in both a morning and an afternoon fishing session, when fishing effort was greatest.

Table 1. Recreational tailor fishery sampling times on Fraser Island (note the spawning closure was extended to include August as well as September in 2002).

Year	Trip 1	Trip 2	Trip 3
1999–2001	Early August—week of the Brisbane Exhibition public holiday	Last week of August—before the seasonal spawning closure	None
2002–2004	Early August—week of the Brisbane Exhibition public holiday (seasonal spawning closure in place around Indian Head–Waddy Point)	Last week of August (seasonal spawning closure in place)	Last week of October in 2002 First week of October for the reopening of the spawning closure in 2003 and 2004

Recreational sampling was also conducted at Moreton (August 1999, July 2000) and Stradbroke Islands (August 2000, 2001), and at the Double Island Point fishing competition (July 2000).

Sampling regime

The current annual survey aimed to collect 1200 individual fish for age determination and as many length frequency measurements as practical for each fishing season. In each fishing session, morning or afternoon for a particular zone, the first 30 fish were retained. Any additional fish collected contributed to the length frequency data only.

The following sources were used to obtain ocean beach caught samples:

- recreational fishers—frames collected from or supplied by:
  - recreational fishers approached by the LTMP survey team
  - recreational fishing clubs.
- commercial fishers:
  - whole fish purchased from commercial ocean beach fishers
  - whole fish or frames supplied by or purchased from processors.

Data collection

The LTMP Tailor Sampling Protocols are described in detail in DPI&F (2005). For every sample collected the information about catch location, fisher details and date caught were recorded.

For all retained fish, the length (caudal fork length to the nearest 5 mm) and sex (male, female or unknown) were recorded. For whole fish, when available, weight (total weight to the nearest gram) was also recorded. The sagittal otoliths were removed, cleaned in water and dried (DPI&F 2005). Estimates of readability were recorded according to protocols detailed in DPI&F (In Prep.).

From 1999 to 2003, each fish was aged three times by two readers. One reader aged each fish twice allowing at least one week between readings. The second reader aged each fish once. In 2004, one reader aged each fish once and then randomly selected 25% to re-read. Each reading was done without prior knowledge of capture data, size or sex. Readers undertook training and calibration readings on a standard sample of tailor otoliths from the reference collection before commencing. All estimates have been made from viewing whole otoliths. In 2004, the appearance of the otolith edge or margin width was also recorded.