

**A REVIEW OF CONCERNS RELATING TO THE OFFSHORE GILLNET FISHERY
IN INSHORE WATERS OF THE GREAT BARRIER REEF MARINE PARK**
in relation to the
**GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE
MANAGEMENT OF FISHERIES:**
with recommendations for early intervention

Prepared by the Network for Sustainable Fishing



Fisheries have rarely been 'sustainable'. Rather, fishing has induced serial depletions, long masked by improved technology, geographic expansion and exploitation of previously spurned species lower in the food web. With global catches declining since the late 1980s, continuation of present trends will lead to supply shortfall, for which aquaculture cannot be expected to compensate, and may well exacerbate. Reducing fishing capacity to appropriate levels will require strong reductions of subsidies. Zoning the oceans into unfished marine reserves and areas with limited levels of fishing effort would allow sustainable fisheries, based on resources embedded in functional, diverse ecosystems. (Pauly et al, 2002, *'Towards Sustainability in World Fisheries'*)



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Report prepared by the Network for Sustainable Fishing (NSF).

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STATEMENT

The Network for Sustainable Fishing is an informal network of fishers and others along the urban coast of the Great Barrier Reef Marine Park passionately committed to sustainable fishing, whether commercial, recreational or charter. In comparison to our offshore fisheries, which appear to us to be in a reasonably healthy condition, we are aware of significant and ongoing reductions in the diversity, numbers and sizes of our catches of inshore species to the extent that many species can now be classified as overfished. Better management of inshore fishing should lead to better sustainable catches for both the commercial and recreational fishing sectors and should boost job opportunities, tourism and the economy.

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- (i) Two offshore gillnetters meet whilst fishing the inshore waters of Cape Kimberley and Snapper Island.
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1 August 2010.

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LIST OF ABBREVIATIONS

DEWHA	Department of the Environment, Water, Heritage and the Arts
DPI&F	Department of Primary Industry and Fisheries (Queensland)
ECIFF	(Queensland) East Coast Inshore Finfish Fishery
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ESD	ecologically sustainable development
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
NCP	National Competition Policy
NSF	Network for Sustainable Fishing
FQ	Fisheries Queensland
WTO	Wildlife Trade Operation

GLOSSARY

carrying capacity: maximum standing stock that can be supported by the available habitat

catch per unit effort (CPUE): the amount of fish caught for a given amount of work

effort creep: where there is an investment in an unregulated feature of the fishery with the effect of increasing catch per unit effort, e.g. the move in the ECIFF from hand hauled gillnets to labour-saving hauling by hydraulic drum winches. This may have the effect of increasing apparent CPUE whilst stocks are actually declining.

hyperstability: where evidence of declining fish stocks is not apparent from the CPUE or total annual landings, even though stocks are in serious decline. This can occur when aggregating stocks are fished by highly efficient gear such as nets.

input controls: direct regulation of fishery effort, time, place and gear rather than regulation of catch

output controls: regulation of what the fishery produces e.g. size limits, quotas

production: amount of new fish added to the population over a given period of time

standing stock (biomass): the total weight of fish that exists at a given point in time

PREFACE

The need for this review stems from the rising concerns relating to a region-wide perception of declining inshore fish stocks in the World Heritage waters of the Great Barrier Reef Marine Park and adjoining estuaries. These concerns are being expressed by communities from Rockhampton in the south to at least as far north as Cooktown.

The Hon. Peter Garrett AM MP, Minister for Environment Protection, Heritage and the Arts approved the Queensland East Coast Inshore Finfish Fishery (ECIFF) as a Wildlife Trade Operation (WTO) in February 2009, under the ***Environment Protection and Biodiversity Conservation Act, 1999***. However this approval noted significant weaknesses in the fishery and imposed conditions and recommendations in an attempt to make the fishery comply with the Act.

It is clear to those of us who have successfully fished our local inshore waters for many years that the recent changes to fisheries management regulations in response to these requirements are unlikely to reverse the on-going trend of inshore fish stock depletion along our iconic World Heritage coastline. Various recent concessions to gillnetters may actually exacerbate the depletion process.

Queensland's fisheries authorities have the daunting task of administrating a multitude of marine species stretching over about 3,000 km of coastline running approximately north south and including numerous islands. With limited financial and manpower resources, adequate management of fisheries under these conditions will be at best difficult, but probably impossible without good community support. At present this support has been largely lost from significant proportions of the recreational and charter fishing sectors from Rockhampton to Cooktown as well as many commercial line fishers. The observations summarised here attempt to represent the experiences, findings and recommendations of these people.

The purpose of this document is to make available to both the Commonwealth and State Fisheries authorities a permanent and defensible record of the stage we have reached by mid 2010, both with regard to qualitative assessments of fish stocks and community attitudes. The problems we identify here must be formally recognized. Only then can appropriate new regulations be introduced to reverse the ongoing damage that our communities can see is being done to our fisheries ecosystem. If this is not achieved, then the management of the ECIFF will fail to meet the standards demanded for ecologically sustainable development and the WTO, while also falling short of the realistic expectations of our communities.

By the very nature of the material presented here, we do not suggest this document can be treated as a scientific paper subject to rigorous scientific review. Rather we are very aware that some scientific studies which would help improve management of our multispecies fishery simply have not been done. As active fishers liaising cumulatively with thousands of other active fishers, we are acutely aware that our inshore resources are seriously depleted. Steps must be initiated as soon as possible to reverse this trend. The obvious place to start is the removal of the fishing effort that benefits the least number of people whilst presenting the highest risk of damage to stocks and bycatch.

All the work for this report has been undertaken on a voluntary basis and there has been no financial sponsorship. Whilst it would be impractical to acknowledge all the people who have contributed to the information and views presented here we, the five undersigned, accept responsibility on behalf of our communities and the Network for Sustainable Fisheries for this representation of the situation as we see it. We do of course thank all those who have helped us reach this stage; they know who they are.

Kim Martin, Rockhampton
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SUMMARY

There are high levels of concern amongst communities living along the shores of the Great Barrier Reef Marine Park from Rockhampton to Cooktown (referred to here as the urban coast) in relation to what is to many, the obvious depletion of stocks of inshore fish species. Numerous factors will have contributed to this decline in abundance, including loss of nursery areas, death of juvenile fish in trawl, beam-trawl and bait nets and the overall rise in all fishing pressure as a result of increases in population.

Current recreational catch rates along the urban coast are unacceptably low and people are turning away from fishing whilst tourism opportunities are being forfeited by communities. All along this coastline communities have recognized a loss of tourism opportunities, jobs and potential income that could otherwise be generated by a more productive recreational fishery. People are also aware of a loss of quality of lifestyle and loss of sufficiently rewarding recreational opportunities for all age groups, leading to youths dropping out of one of the healthiest recreational pastimes there is.

It is a legislative requirement that any fishery with an export component must be certified under the EPBC Act and the WTO. This was last done for the ECIFF in 2009. Although approval was awarded, a review of the fishery noted significant weaknesses in its management and imposed conditions and recommendations aimed at bringing the management of the fishery in line with the requirements of the Act.

We have carried out an assessment of the activities of the larger, live-aboard gillnetters that are targeting inshore pre-spawning aggregations of grey mackerel against the '*Guidelines for the sustainable management of fisheries, 2007*' and find that they fail to satisfy any of the 17 Principles, Objectives and Guidelines. They should therefore not be certified under the EPBC Act nor under the WTO.

Meanwhile urgent measures are recommended to reduce the risk of permanent damage being done to certain inshore stocks, in particular grey mackerel, threadfin salmon, fingermark, grunter and some probably any other large species which tend to return to the same area to spawn in easily netted aggregations. These measures include:

- Grey and school mackerel added to line only species, as spanish and spotted mackerel already are, i.e. all mackerel line only, hence less vulnerable to overfishing.
- Port Douglas Smooth and Partially Smooth Waters made a line-only fishing area.
- Port Douglas Smooth and Partially Smooth Waters closed to all fishing of grey mackerel for two years or until stocks recover, with in-possession allowance of one grey mackerel to allow for bycatch. Thus when the fishery is re-opened it would be line only as it had been for 30 years prior to stock depletion by netters.
- A Recreational Fishing Branch created within FQ to focus attention on opportunities for more jobs and the increased economic opportunities to be gained from rebuilding inshore fish stocks and better managing inshore fish habitats, including nursery areas and pre-spawning and spawning aggregations.
- The next assessment of the ECIFF should address and respond to all issues raised in this review.
- FQ be given the resources to formulate and administer plans to zone the coastline at an appropriately fine scale to meet the management requirements of those local stocks which always return to the same small area to breed. All fishers need to be restricted to operating within the single zone for which they would be licensed. The resources provided to FQ should enable the development and functioning of effective collaborative arrangements with national and international world leaders in fisheries stock assessment and management.

The “offshore” gillnet fishery in action along the inshore waters of the Daintree Coast



Plate 1: Offshore drum netters meet for a chat whilst fishing inshore waters just off the World Heritage Daintree estuary at Snapper Island National Park, August 2007; NB: drum net hauler not visible on the black barge, but it is present. They are fishing the grey mackerel aggregating grounds that locals had kept line-only for 35 years.



Plate 2: Drum netter fishing 600m of bottom-set, monofilament gillnet working day and night in inshore World Heritage Waters along the Daintree Coast in depths down to 2 m.



Plate 3: Drum netter hauling a hammerhead shark and two grey mackerel at Snapper island just off the Daintree River estuary and Cape Kimberley.



Plate 4: Large spanish mackerel are an inevitable bycatch when netting greys at Cape Kimberley and are usually landed dead but none may be kept when taken by nets (*Fisheries Regulations Ch.2 Part 10, Div. 2 page 93*).

Various iconic inshore fish species caught by offshore gillnetters

Inshore fish species are found mostly or only in our inshore waters, especially around estuaries and other relatively turbid or silty waters and not on clear water reefs. They are of high economic value to the recreational-fishing tourism industry and locals alike, being of iconic status in the region.



Plate 5: The distinctive tapering Grey mackerel outline; this spot near the Daintree estuary was, until recently discovered by the drum netters, where the schools of greys used to reach the size of two football fields.



Plate 6: The grey (or broad-barred) mackerel has bars (above) similar but broader than a spanish mackerel's bars, both have a glorious lilac sheen. In the grey the bars fade more quickly after death than the spanish.



Plate 7: Grey mackerel, 87 cm total length, after the bars have faded, they have proportionally larger fins and a deeper, more tapering body than the similar spanish mackerel, and a slightly concave head profile. It is endemic to northern Australia and possibly southern waters of West Papua; maximum length to over 1.1 metre.



Plate 8: Golden snapper, or fingermark, only 50% of females mature by 8 years; spawning schools can be readily netted on inshore grounds throughout their breeding season; numbers and sizes now much lower.



Plate 9: Giant queenfish, large schools were so common near the Daintree estuary they were almost a pest but are now depeleted being highly vulnerable to all netting, incl. beach bait-seining of juveniles.



Plate 10: Blue threadfin, researchers have found the species to be philopatric¹ and must therefore be managed as local populations (Zischke *et al*, 2009)



Plate 11: King threadfin, confined to muddy seabeds and estuaries, likely to be philopatric, population doubling time low: 4.5 to 14 yrs, highly vulnerable. Like barramundi, only the big ones are females.



Plate 12: Snub-nosed dart, used to be fairly common in schools, these too have failed.



Plate 13: Golden trevally, used to be fairly common in schools, these schools too are no longer encountered.



Plate 14: Barramundi, anglers are outraged that about 98% of the barramundi they catch in Douglas waters are now undersized, a sure sign this **Icon of the Far North** is now seriously overfished. *How do offshore netters avoid them in the closed (spawning) season?*



Plate 15: There are two species of Javelin, this is the barred (also known as spotted grunter), there is also the silver javelin (small spotted grunter). Both may be philopatric, numbers and sizes now at an all-time low. Vulnerable to netting during their spawning season.

¹ 'Philopatric' – returning to their birthplace, e.g. to breed and to live, see Section 5.3

1. INTRODUCTION

The Network for Sustainable Fishing (NSF) is an informal network of people centred on but not restricted to the urban coast of the Great Barrier Reef Marine Park (GBRMP) from Rockhampton to Cooktown. Members have serious concerns about the condition of our inshore fish stocks and the affect some types of fishing may be having on the inshore marine ecosystem, especially relating to regular reports of bycatch of turtle and dugong from commercial gillnets and the apparent risk to two species of inshore dolphin and humpback whales, including Migaloo. Currently regional nodes of the NSF are expanding in the Rockhampton, Mackay, Cairns, Douglas and Cooktown areas.

The need for the NSF has arisen because of widespread community disappointment following the East Coast Inshore Finfish Fishery (ECIFF) consultation exercise undertaken by Queensland Fisheries. The new fishing regulations which were introduced in 2009 are widely regarded as giving preferential treatment to netters at the expense of already precarious fish stocks, threatened turtle and rare dugong. In Rockhampton this disappointment was followed by protest action, namely the disbanding of the local branch of Sunfish, the peak body representing recreational fishers in Queensland.

Cook (2008) records community observations and concerns regarding the rapid decline in the local grey mackerel fishery at Snapper Island just two kilometres off Cape Kimberley and a few kilometres north of the Daintree Estuary in Far North Queensland in this case study. Over the course of a few years the seasonal schools of grey mackerel in the area dropped rapidly in size to no schools at all in 2008. This decline in mackerel numbers followed the commencement of large net boats, like those shown in Plate 1, using 600 metres of monofilament, bottom set gillnets to target grey mackerel in the inshore waters of the region.

An independent review of the ECIFF was commissioned by the Hon Peter Garrett MP, Minister for the Environment, Heritage and the Arts in 2008. This is entitled: "Proposed Management Arrangements for Queensland's East Coast Inshore Finfish Fishery" (Gunn, Meere and Stevens, October 2008). The review follows the requirement that any Australian fishery with an export component must be certified by the federal minister as being "managed in an ecologically sustainable way" (see Ch.2).

Following the release of a series of new fisheries regulations in 2009, continuing liaison between NSF members revealed widespread concerns from Rockhampton to Cooktown that certain aspects of the ECIFF continue to fall well short of the standards required for ecologically sustainable management of the fishery. Members are concerned that the non-selective nature of gillnetting may inflict serious damage on local populations of some inshore fish stocks where these are confined to limited areas.

These concerns together with some conclusions and recommendations are presented here for consideration by Queensland Fisheries, by Great Barrier Reef Marine Park Authority (GBRMPA) the peak body responsible for ensuring world heritage values are maintained throughout the GBRMP, and also by the Department of the Environment, Water, Heritage and the Arts (DEWHA) prior to the next federal assessment of the fishery (due by 2012).

2. Guidelines for the Ecologically Sustainable Management of Fisheries, 2007

The Australian Commonwealth Government's Department of Environment and Water Resources issued 'Guidelines for the Ecologically Sustainable Management of Fisheries', Edition 2 in 2007, available from: www.environment.gov.au/coasts/fisheries/publications/pubs/guidelines.pdf. These will be referred to here as "**The Guidelines**". The preamble to **The Guidelines** includes the following statements:

"It is well recognised that many of the world's fisheries are being exploited at, or beyond, their sustainable yield, with many fishing fleets overcapitalised, and the status of many fish stocks unknown... some species and fisheries are overfished, many are fully-fished, some are underfished and many have an uncertain status due to inadequate or inappropriate information to form a reliable assessment of status.

High levels of uncertainty extend to bycatch and by-product species, and the impact of fishing on the marine environment in many fisheries.Those who depend on our oceans for their social, economic and cultural requirements recognise the need for ecosystem based fisheries management, particularly the need for precautionary management of fisheries².

Ecological sustainability of Australia's fisheries is essential not only for long-term species and ecosystem viability but also to underpin economic sustainability. Management practices must be set so as to maintain ecological processes and conserve ecosystems for the benefit of future generations, while meeting the needs of Australian's today.

... To achieve ecologically sustainable development, decision-makers must ensure that fishing activities do not pose a risk of unsustainable or unacceptable impacts on the marine ecosystem. ... Ecological sustainability can only be achieved and maintained through an integrated approach to fisheries management that considers all the natural and anthropogenic impacts on ecosystem components, including bycatch, by-product and ecologically related species.

... To ensure an ecosystem approach to fisheries management the Commonwealth has incorporated ecological sustainability requirements into Commonwealth environmental and fisheries legislation.

*... Under the **Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)** the Australian Government, through the Minister for the Environment and Water Resources, holds a legislative responsibility to ensure that:*

- 1 all Commonwealth managed fisheries undergo strategic environmental impact assessment before new management arrangements are brought into effect; and*
- 2. all fisheries, from which product is exported, undergo **assessment to determine the extent to which management arrangements will ensure the fishery is managed in an ecologically sustainable way**".*

*"To assist in this assessment process, the Australian Government developed, after extensive consultation with industry, governments and environmental groups, ... **the Guidelines** which aid in ensuring rigorous and transparent assessments are conducted in close cooperation with fisheries agencies, the fishing industry and the wider community.*

*... Until research on the specific stock provides information, **a precautionary approach should set conservative limits to account for the unknown level of uncertainty.**"*

The outcomes of all assessments carried out under point 2 above are published on the department's web site at: www.environment.gov.au/coasts/fisheries.

3. Further information on *The Guidelines* and the assessment process

Further information can be obtained from: The Director Sustainable Fisheries Section, Marine and Biodiversity Division, Department of the Environment and Water Resources, GPO Box 787, CANBERRA ACT 2601. email: sustainablefisheries@environment.gov.au; Tel: (02) 6274 1917, Fax: (02) 6275 9374.

4. When and what level of assessment required?

To help determine when a fishery is due to be assessed, **The Guidelines** present a table to complete and record whether change has occurred in a fishery that was not covered in annual reports, since a previous fishery assessment. This table is given below having been completed here (*during this assessment*) with the addition of an additional column, being "Nature of Change".

² *Wishful thinking, ed.*

Table 1: Table adapted from *The Guidelines*: it is a means of determining the level of assessment necessary for any fishery having undergone a recognized level of change since its last assessment. Here it is completed with the addition of the column entitled “Nature of Change” for the Far North Queensland commercial offshore net fishery operating in World Heritage inshore waters.

<i>Issue</i>	<i>Area of interest</i>	YES	NO	Nature of Change
<i>Fishery</i>	<i>Has there been any change to management arrangements, and/or fishing practices?</i>	✓		Introduction of new management measures in 2009
<i>External influences</i>	<i>Has there been any change to an environmental issue/ influence outside of the fishery management agencies control?</i>	✓		(i) water quality issues being addressed by new government initiatives, (ii) on-going loss of nursery areas due to ponded-pasture weeds and drainage, (iii) increased migration of people to NQ coastal areas
<i>Interaction with protected species</i>	<i>Has there been any change in the nature, scale, intensity of impact, and/or management response?</i>	✓		Increase in public concern over both illegal and legal netting of protected species, including bycatch of turtle and dugong in licensed commercial nets.
<i>Ecosystem impact (e.g. – habitat, food chains etc)</i>	<i>Has there been any change in nature, scale, or intensity of impact and/or subsequent management response?</i>	✓		Increase in public concern over the depletion of ALL inshore fish stocks, claims this is greatly exacerbated by offshore gillnetters targeting spawning aggregations of inshore species (<i>no spawning closures for inshore species other than barramundi</i>).
<i>Target stock status</i>	<i>Has there been any change in the target stock status? e.g. Increase or decrease in number of overfished or uncertain stocks, limit reference points or performance indicators have been triggered.</i>	✓		No clear definition of target species in this multi-species fishery. The public considers that most inshore species are now seriously overfished. There are no adequate ‘limit reference points’ or performance indicators or indicators of stock abundance for most species.
<i>By-product/ bycatch stock status</i>	<i>Has there been any change in the by-product and/or bycatch stock status? e.g. Performance indicators triggered or risk assessment outcomes show risk levels have changed.</i>	✓		As above, the offshore net fishery operating in inshore waters is very unselective with all larger inshore species caught, as well as inshore dolphin, turtle, dugong and possibly, the protected whale shark catches possibly going unrecorded. Fisheries Queensland (FQ) does not reveal by-catch numbers to the public. One new species of inshore dolphin recently recognized whilst findings may confirm a second new one soon.

The Guidelines indicate that because 4-6 answers in the above table are “yes” an assessment is due requiring a “*comprehensive level of information*”.

5. Understanding Essential Concepts and Processes relating to the ECIFF

Before any authoritative assessment under the EPBC Act and the Guidelines can be undertaken, assessors must be aware of a number of phenomena which are critical to fisheries management along the Queensland coast. All experienced fishers, if not politicians and managers, are aware that fish are not distributed randomly over the seabed, along our coastline and out to sea. Rather different species are restricted in occurrence by limiting habitat and ecological requirements. For example all inshore fish species shown in Plates 5 to 15 breed only in inshore waters readily accessible to offshore netters and spend either all or the majority of their lives in inshore waters. Where given species are composed of a series of distinct populations (see 5.3 Philopatry, below) between which there is very little or no mixing, then clearly these populations need to be managed on a correspondingly fine regional scale.

Unfortunately in Queensland the population structure of most inshore fish species is still poorly understood. Grey mackerel for example aggregate in easily accessible inshore areas for about three and a half months of the year to feed up on bait fish prior to and during spawning. They then disperse for the remainder of the year. As small numbers continue to be caught throughout the year in Douglas inshore waters (J. Beitzel, *pers. com.*) this may simply be a local dispersal where individuals are no longer found in schools.

5.1. The Precautionary Principle

As explained in the chapter on **The Guidelines**, above, EPBC legislation now requires all fisheries with an export component to be assessed to determine the extent to which they are managed in an ecologically sustainable manner. **The Guidelines** require that:

“... Until research on the specific stock provides (sufficient) information, a precautionary approach should set conservative limits to account for the unknown level of uncertainty.”

David Cole (2005) explains that the precautionary approach as outlined by the precautionary principle and in the context of environmental protection is essentially about the management of scientific risk. It is a fundamental component of the concept of ecologically sustainable development (ESD) and has been defined in Principle 15 of the *Rio Declaration (1992)* as:

“Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.”

The term "measures" has generally been accepted to include actions by regulators such as the use of statutory powers to refuse environmental approvals to proposed developments or activities and the limiting of harvesting of natural resources.

Australia has adopted ESD as a guiding principle of environmental management. The *National Strategy for Ecologically Sustainable Development (1992)* adopts the precautionary principle as a “core element” of ESD as does the Inter-Governmental Agreement on the Environment, which is the basis for the current distribution of governmental responsibility for environmental management in Australia. Hence **The Guidelines** have been developed to cater for the need to follow the precautionary principle.

It therefore follows that fisheries authorities do not need to rely solely on the best scientific advice for their efforts to manage fisheries but, where scientific advice is lacking, on the best available evidence.

5.2. Use of observations and records from the recreational fishing sector

The Guidelines were designed to: **“aid in ensuring rigorous and transparent assessments are conducted in close cooperation with fisheries agencies, the fishing industry and the wider community.”** Where a sector of that “wider community” has extensive experience in the fishery and serious concerns relating to stocks, based on that

experience, (even though external to the fishing industry as such) it is a legislated requirement through the precautionary approach and ESD that these experiences and concerns are adequately taken into account during any assessment of the fishery. In short, any assessment must seek out and use the best available local knowledge about fish stocks in order to be sufficiently thorough when full scientific data are lacking.

5.3. Philopatry

Hauser and Carvalho (2008) amongst others have shown that:

“By providing new approaches to the investigation of demographic and evolutionary dynamics of wild populations, molecular genetics has led to fundamental changes in our understanding of marine ecology. In particular, genetic approaches have revolutionized our understanding in three areas:

- i most importantly, they have contributed to the discovery of extensive genetic population structure in many marine species, overturning the notion of large, essentially homogenous marine populations limiting local adaptation and speciation.*
- ii Concomitant differences in ecologically important traits now indicate extensive adaptive differentiation and biocomplexity,*
- iii A compilation of recent published research shows estimated effective population sizes that are 2–6 orders of magnitude smaller than census sizes, suggesting more complex recruitment dynamics in marine species than previously assumed.*

... In our synthesis, we emphasize the implications of these discoveries for ... the management and conservation of exploited marine fish populations. An important implication of genetic structuring and the potential for adaptive divergence is that locally adapted populations are unlikely to be replaced through immigration, with potentially detrimental consequences for the resilience to environmental change – a key consideration for sustainable fisheries management”

Such “*locally adapted populations*” arise through the behaviour known as philopatry, where individuals in a population remain in, or return to, their birthplace, e.g. all fish of a given species from around a given estuary may return to that area to spawn and may not migrate to other distant areas. For species which display this behavioural trait there are clearly strong implications for the type of regional management to be followed. The stock must be managed as a distinct entity and not as part of a total allowable catch for that (and other) species over a much wider area.

Recent work by Zischke *et al* (2009) in Queensland has found that geographical movement of blue threadfin “*may be limited due to their biology and ecology, as well as the distances and oceanographic boundaries that separate habitats. Contrary to current management definitions, the stock structure of (blue threadfin) on the east coast of Queensland appears to be geographically differentiated at a small spatial scale.*”

Most of our other iconic inshore species that are restricted to the nutrient rich, muddy inshore waters in and near estuaries are also likely to have their distribution and movements limited by the “oceanographic boundaries” mentioned above. These “boundaries” occur where the muddy seabed changes to a sandy coast or rocky headlands, offering very different feeding opportunities. Species such as king threadfin, our two common species of javelin and golden snapper are limited to turbid, nutrient rich waters with muddy estuary or seabed and so are especially likely to be philopatric.

Recent work by Welch *et al* (2009) has found a similar condition in grey mackerel in North Queensland. They write “*the management implications of these results indicate the possible³ need for management of grey mackerel fisheries in Australia to be carried out on regional*

³ the word ‘possible’ in this context is redundant, ed.

scales finer than are currently in place” and note that on “*the east coast, (of Queensland) managers should at least monitor fisheries on a more local scale dictated by fishing effort and assess accordingly. Stock assessment (and management, ed.) should also consider the stock divisions identified, particularly on the east coast*”.

Welch *et al* go on to “*emphasise that where we have not identified different stocks does not preclude the possibility of the occurrence of further stock divisions*” and “*until such time as these priorities are addressed, the management of grey mackerel fisheries should be cognisant of these uncertainties*”.

European and North American fisheries managers have been aware of this phenomenon for decades and have attempted to allow for it in many of their management strategies. However the history of fisheries management is littered with collapsed or extinct local populations of various species as a result of management not having adequately taken this feature of fish behaviour into account. Very often this is because politicians have failed to act on scientific evidence and advice presented by their fisheries stock assessment specialists.

5.4. Catch per Unit Effort and Hyperstability

McPhee (2008) considers that:

“as an example of indicators and reference points, all things being equal, catch per unit effort (CPUE) may be used as a crude indicator of the biomass of the targeted stock – therefore, the larger the biomass the higher the CPUE and the smaller the biomass the lower the CPUE”.

This would appear to be an oversimplification, given that there is no qualification relating to the complexities introduced when fishing aggregating stocks with very efficient gear as noted by Hilborn and Walters (1992) in their well respected text book ‘Quantitative Fisheries Stock Assessment. Hilborn and Walters note that:

“It is simply irresistible to try to use catch per unit effort data to estimate or as an index of fish abundance” and ask “what type of relationship should we expect between CPUE and abundance?”

Hilborn and Walters explain that there are three possible relationships between CPUE and abundance. Of concern in the ECIFF is the relationship where CPUE stays high whilst abundance drops, Hilborn and Walters state:

“We call this type of distribution hyperstability. ... It can be expected in almost any fishery where search is highly efficient, so that most effort concentrates on the areas where fish are most abundant, and the fish remain concentrated as abundance declines. ... purse seining for easily discovered schools of clupeoids would be expected to result in hyperstability”.

Without adequate stock assessment trainers, and as noted above, commercial fishermen, politicians and even fisheries managers may mistakenly assume that if annual catches and catch rates are relatively stable then the condition of their fish stock must be satisfactory. At first glance this seems a reasonable assumption. However Hilborn and Walters warn against the dangers of overlooking the very real possibility of hyperstability.

The grey mackerel fishery is based on aggregations and uses a highly efficient fishing gear, e.g. gillnetting of pre-spawning and spawning grey mackerel. They are targeted only over about three and a half months of the year when they aggregate prior to spawning (apparently multiple spawning, according to local observations, e.g. Col Patterson, *pers. com.*, a Daintree commercial grey mackerel line fisher, still to be confirmed by the researchers).

On closer examination it is evident that other, complicating factors come into play when all sexually mature individuals form schools (aggregate) at a predictable place and time, usually according to season, and are fished with relatively constant effort. Under these conditions

catches may remain relatively stable whilst school sizes drop to crisis level, even to local extinction.

To understand this concept in its simplest form, consider if a given population of say, grey mackerel has a standing stock (size) of 500 tonnes at the commencement of the fishing season and that this size of a population, for sake of this discussion, has a production (i.e. normally produces) about 100 tonnes annually through reproduction and growth that is not taken by any means other than fishing. In theory the fishery could take 100 tonnes per year without any decline in population, other things being equal.

However if the fishery increases its capacity to take 150 tonnes per year, it will be taking more fish than can be replaced by reproduction and growth in any one year and the population size will inevitably start to decline. However this may not be noticed by the netters as they fill up their ice boxes, never needing to check apparent school size. Because the fish aggregate at predictable spots at predictable times, the netters can repeat their landings of 150 tonnes per year without noticing any warning signs, until the entire local stock drops to below 150 tonnes. That year the netters may 'clean up' making a smaller catch than usual and, because of the highly efficient nature of the gear, take the majority of the remaining population.

This may cause the local extinction or near extinction of a philopatric stock, as apparently happened to the Reywards Reef grey mackerel fishery, near Bowen in 1971 and as described by De Lacey (2005) and Allan Petersen (pres. com.). This took many years to recover, if indeed the grey mackerel now being landed at Bowen comprise the same stock as aggregated at Reywards reef. This may also currently be happening to both the Cape Kimberley Snapper Island spawning aggregations (Cook, 2008) and Lady Elliott Reef stock near Lucinda (Al Goodwin, pers. com.).

A good line fisher of grey mackerel who makes intelligent use of his echosounder however gains a totally different perspective on the fishery when 'hyperstability' is lulling the gillnetters into a false sense of confidence. Line fishers make their catches by being highly mobile and searching for, and actively fishing the schools whilst they are feeding at or near the surface (they remain on the bottom for considerable periods, easy targets for netters). Line fishers become highly aware of the school size, both as they break the surface chasing bait fish and from observing their fish finders (echo sounders) as they 'work' the schools with their troll lines. Effective and experienced grey mackerel line fishers should soon know whether they are fishing a large or small school as they are constantly passing over that school as they fish whilst observing apparent school size on their echosounders.

At Cape Kimberley line fishers have watched the school size steadily and rapidly reduce from the size of two football fields to table tennis table size to nil in 2008 (J. Beitzel, C. Patterson, M. Harris, G. Pitt, *pers.com.*). Thus line fishers would appear to be more aware of declining stock size, prior to the actual crash, than netters.

All fisheries managers and net fishers should become familiar with this concept. It would be useful if FQ were to ensure netters are made aware of the phenomenon and recognize the need to develop indicators of stock abundance other than relying on the simple but potentially misleading figures of annual catch rates and catch per unit effort.

5.5. Indicators of Stock Abundance

Fisheries stock assessment is a very inexact science. It's like trying to measure something you cannot see with a very inaccurate scale. As a result some fisheries are managed with little awareness of stock size. This is often not too serious provided managers have a means of determining whether stock size is increasing or decreasing, i.e. an indicator of stock abundance. As seen above this must be independent of actual catches and catch rates if the fishery is based on aggregating or schooling stocks. If independent indicators of stock abundance suggest that stock size is declining over a period of years it would be incumbent

on regulators to reduce the amount of fishing effort and annual catches in order to allow stocks to recover to optimum sizes.

Cameron and Begg (2002) warn that grey mackerel stocks in Queensland “should be managed with extreme caution” and recommend that government accepts as a priority the need to develop indicators of stock abundance for grey mackerel. So far this has not been achieved.

Whilst the authorities have so far failed to develop useful indicators of stock abundance for grey mackerel and indeed most other inshore species in the Great Barrier Reef Marine Park, the concept of indicators of stock abundance is a very simple one to any skilled recreational or charter fisher who has fished the same area for years.

In a number of coastal species, school size is a feature which may be checked visually for those species which break the surface in feeding frenzies or are otherwise visible from the surface, or by echo sounder. This feature has been reported by the Douglas Region for grey mackerel, see 4.3, above. Although small schools were detected in 2009, numbers were clearly well down on what was previously an ‘average’ year. To this effect, good recreational fishers can display considerably more knowledge of the state of their local stocks than do government researchers and even offshore gillnetters. Researchers must make more effort to effectively tap into and record this source of knowledge.

Outside of the breeding season many inshore species disperse in either smaller groups or as individuals. When such species are dispersed, catch-per-unit-effort may well be a good indicator of stock abundance, especially if fishers are highly skilled in fishing a given species and especially where they have built up solid experience fishing a given area for that species.

Fisheries authorities therefore need to be aware of the pitfall of simply checking the netters’ landings and claiming there is not a stock depletion problem and that it is merely “*an allocation issue – the netters are catching the fish before the recreational fishers because the pros’ gear is more efficient*”. It is a fundamental flaw in any fisheries management strategy to dispute the findings of highly skilled charter and recreational fishers who have years of experience successfully fishing their home waters on the grounds that “*it’s only anecdotal evidence*”.

It is therefore incumbent upon fisheries managers to develop indicators of stock abundance independent of the landings of net fishers. Without such a tool they will remain unable to adequately manage that fishery. Whilst they remain without indicators of stock abundance for each species likely to be significantly affected by netting, it is essential that the combined knowledge and experiences of local communities, including highly experienced anglers with many years experience fishing their local areas, are taken into account when making fisheries management decisions and when undertaking assessments under the EPBC.

5.6. Serial Stock Depletion

Pauly et al (2002), as quoted on the cover of this assessment, have found that “*fishing has induced serial depletions, long masked by improved technology, geographic expansion and exploitation of previously spurned species*”. The *Law of the Commons* recognizes that some fishers will inevitably take what they can, where they can, and for maximum profit. It is only human nature for fishers to target spawning aggregations where this is legal, take what they can, when they can, whilst catch rates are good and then move on. The need to nurture a local resource to ensure it remains productive over generations does not exist for fishers with big, live-aboard boats (N4 symbols) that are free to travel long distances in the East Coast Inshore Finfish Fishery (ECIFF). In this case the arguably ‘sensible’ strategy, from the netters’ viewpoint is to maximise catches for minimum travelling time, inevitably leading to serial stock depletion when fishing philopatric stocks.

Where breeding aggregations are targeted, inevitably maximum catches will be made before the targeted stock has had time to spawn. This is particularly serious for species which spawn for the first time at sizes above the minimum take size, such as grey mackerel (minimum size which may be taken is 60 cm total length (TL) but 50% female maturity is not reached until 86 cm TL and golden snapper, minimum size 35 cm TL but 50% sexual maturity is reached at 62 cm fork length (FL) equivalent to about 64 cm TL. This is even more serious for species likely to be philopatric and which are also protandrous hermaphrodites, i.e. are males first and then change to females when larger, e.g. king threadfin.

Where fishing effort on aggregating stocks is not managed on a fine local scale the operations of the N4 boats in particular this will inevitably lead to hyperstability and eventually depleted stock through both *growth overfishing* and *recruitment overfishing* (Pauly, 1994). The seriousness of this situation is compounded when local populations are philopatric. The netters will be forced to move on, leaving depleted stocks which may fail to recover for many years, e.g. the rich grey mackerel fishery which collapsed at Reywards Reef off Bowen in 1971 following intensive netting (De Lacey 2005) and which took many years to recover, if indeed the grey mackerel now landed into Bowen are descendants of that stock.

5.7. Exploitation of previously spurned species and failure to record these at species level

When stocks of key target species, i.e. those of highest market demand within the range of net fishers, are fished down to levels where continued effort does not provide the expected monetary returns, the history of overfished fisheries resources worldwide suggests that net fishers will inevitably turn either to fishing grounds further afield and/or commence targeting alternative, lower value species. This has been referred to as '*exploitation of previously spurned species*' (e.g. Pauly *et al*, 2002; see cover).

Including "previously spurned species" as target species under the label 'mixed estuary fillet' has the potential in the Queensland ECIFF to mask local stock depletions when landings are not accurately recorded by species. Classic examples of such, until recently, previously spurned species are queenfish, snub nosed dart and trevally which were previously spurned in favour of more popular species such as barramundi, king salmon, grouper and four species of mackerel.

From an ESD perspective, a non selective fishery such as gillnetting, where catches are not all recorded to species level, has a fundamental flaw. One preferred fish species, e.g. a species listed as highly vulnerable such as the king threadfin (see www.fishbase.org) may be fished to virtual to local extinction by targeting local spawning aggregations whilst other species sustain catches and therefore the income of the fisher. The authorities have no indicator of stock abundance for the local population of king salmon and netters just assume it is a 'bad year' for the species. Supporting a fishery where this may so easily happen is in complete contravention of the principles of ESD. Fortunately mesh size limits are set which reduce the number of susceptible species, however fingermark, queenfish, trevallies, snub-nosed dart and spanish, spotted and grey mackerel are all highly susceptible to being caught in barramundi nets depending on where and when they are set.

5.8. Claims of low fisheries production within the GBRMP

Authorities have been criticised in the popular press for over-managing the fisheries of the GBRMP and not permitting a sufficiently large take on an area basis, in comparison to the overfished waters of South East Asia. However the GBRMP is rich in species which are still spurned by the Australian market but widely consumed at similar latitudes elsewhere in the Indo-Pacific where many of the top predators, preferred by Australian markets, have long since been depleted.

Species widely consumed by the Asian markets but ignored in Australia include significant and virtually untouched and un-researched tonnages of small tropical and semitropical pelagic species such as anchovies, short bodied mackerel, scads, small trevally species, and from the reef: fusiliers, surgeon fish, unicorn fish, rabbitfish, at least 10 species of rapidly growing small reef grouper species (currently given 100% protection by the grouper minimum size limit) and others.

This is a major reason for the very low fish production figures often quoted for the GBRMP in relation to yield from Asian and Pacific island fisheries. If Australian markets were to be opened up for these “*previously spurned*” species then far higher sustainable yields could be taken per area from the GBRMP.

5.9. Optimising economic yield

Gillnets, unless frequently hauled, normally produce fish of a lower quality than line caught fish other than those caught by long lines. The period between hauling of gillnets is at the discretion of the operator. A conscientious operator of a small boat operation will actively tend his nets, keeping an eye open for turtle, dugong and dolphin which may become entrapped and the fisher will endeavour to release these unharmed whilst also landing premium quality fish.

Clearly if nets are set continuously throughout the day and night, this type of careful tending is highly unlikely throughout the 24 hour cycle. It is reported that the larger, live-aboard N4 net boats commonly set their nets for three or four hours at a time (personal observations, ed.) and often longer overnight (pres. com. Col Patterson). When the nets are hauled, the vast majority of the catch is dead (personal observation, ed.) and likely to have been so for a number of hours as many species of fish are known to die quite quickly when netted. Especially when large quantities of fish are caught, e.g. up to four tonnes of grey mackerel have been caught in one haul (claim by offshore netter, public meeting, Mossman Nov. 2009) the crew of two persons, sometimes only one, will be unlikely to ice down the catch before a significant proportion of it has become very poor quality.

The same species, when individually caught by line fishers, brain spiked and immediately dropped into ice slurry will be premium quality and obtain top local prices. Where sufficient quantities can be provided as a reliable supply, line caught grey mackerel command premium export prices (Col Patterson, pers. com.). Where there is ready access to reasonable markets for good quality fish, far smaller quantities of fish therefore need to be caught by a good line fisher to ‘make a living’ than the operator of the large N4 symbol boats. Thus the fishery, when line only, may support more fishers within a community and so contribute towards optimising its economic yield.

5.10. Value of recreational fishing to tourism and lifestyle

There are a number of studies in the literature which indicate that a flourishing recreational fishery is of great value to a local economy such that the ‘dollar’ value to that community, of a fish caught by a recreational fisher, especially a tourist, is many times that of a fish caught by the commercial fishery. It is therefore of local interest for communities to ensure that local inshore fish stocks are sufficient to support a flourishing inshore recreational fishery. In this way the economic value of the fishery can be optimised over the long term.

Dr Ben Diggles (2010) recently summarised this concept at a talk to ministerial meeting in Cairns last month as follows:

“At this point I would like to bring the audience’s attention to some relevant overseas data on the economic value of sport fishing. My first example relates to the Florida Keys bonefish census. Now bonefish are a relatively small fish that look a bit like a whiting, ... As their name implies, they are full of bones and thus are almost inedible, but in Florida, scientists spend a lot of time and grant money studying bonefish with methods such as bonefish censuses and tagging them with satellite tags. Why?”

Because it just happens that a population of 300,000 bonefish underpins a sport fishery worth one billion US dollars to the Florida economy (Ault et al, 2008). Yes, that's right, that's the amount of money spent in Florida each year on fishing trips that just target bonefish.

To save you the sums, that's \$3500 per fish, per annum. However there's more. Sport fishers in Florida release 99% of their bonefish – they are no good to eat and there are size limits and a strict bag limit of one fish anyway, so it's essentially a catch and release fishery. Now a bonefish lives for around 20 years, which means over their lifetime, researchers in Florida consider these fish to be worth \$70,000 each to the Florida economy. Given bonefish average 3 kg or less, that's over \$23,000 per kg. That would make you think twice about eating one in a restaurant, wouldn't it!

Now in Australia, we also have bonefish, and other sportfish species such as Aussie permit, giant trevallies, various species of marlin, and many others (e.g. barramundi, threadfin, mackerel, etc. ed.) that can be found throughout the northern parts of the country. So what's stopping us from encouraging sport fishing for these species over here? We can do that here too! Already the Northern Territory is doing this in many respects, but I am amazed that the other states aren't catching on. Particularly when we already know from a study conducted by Ernst and Young (2004) that recreational fishers targeting striped marlin off New South Wales had an economic benefit to the community roughly around 10 times that of the commercial marlin fishery in the same region. But the recreational fishers also released over 96% of their catch, potentially recycling most of the fish. Again, there is no time to provide details of the report, but it's available on the NSW fisheries website, and it's a good read that provides much food for thought.”

“I have one more example of the economic value of recreational sport fishing. This time it's in the Coral Sea itself, where we can compare the gross economic value of the entire Coral Sea (commercial) Fishery, which is managed by AFMA, with the turnover of one Sportfishing charter operation. Now the 17 commercial operators in the AFMA managed Coral Sea Fishery landed 132 tonnes of product in 2007/08, with a landed value of six hundred and forty thousand dollars⁴). Divide that by 132 tonnes gives an average value of \$4.85 per kilo. I know there are other flow on benefits for the fishery, but for the purposes of this argument we'll ignore these for the moment. Now compare this to the sportfishing charter operation, which operates on a “no take away” philosophy – they don't allow anglers to take fish home, and as a consequence of this policy, they release 98% of the fish caught and keep only one or two each night to eat for dinner on the boat. Their annual turnover works out at around \$800 spent for every kg of fish they take to eat, which equates to more than double the total value (and around 165 times the relative value) of the commercial fishery on a “per kg of fish caught” basis.”

5.11. Effects of removing netting from rivers and estuaries

Ley, Halliday & Tobin (2002) report on trial gillnet fishing in mangrove estuaries in North Queensland, some of which had been closed to commercial netting for over five years and others being open to commercial netting. They found that “*in comparison with open systems, catch rates in the largest-mesh research nets in closed systems were 3 times greater for total abundance, 3.7 times greater for the main target species barramundi, 4.4 times greater for juvenile bull sharks and 2.9 times greater for queenfish. ... Reduction in numbers of large barramundi may have had an impact on recruitment of juveniles in the fished estuaries, leading to these lower catch rates in smaller size classes. ... However, since substantially greater abundances of target and bycatch species occurred among replicate mangrove*

⁴ (http://www.afma.gov.au/fisheries/ext_territories/coral_sea/at_a_glance.htm)

estuaries protected from commercial fishing, our results significantly strengthen the case in favour of the effectiveness of reserves in conserving populations of exploited species.”

In similar work, Ley *et al* (2002) found that in comparison with estuaries that were open to net fishing in North Queensland “*relatively higher abundances of target and bycatch species were clearly present within replicate protected estuaries, a potential benefit to the non-commercial fishery in these rivers, and perhaps to catches in adjacent fisheries. These results may significantly strengthen the case in favour of the effectiveness of reserves protected from commercial harvest.*”

As noted by Diggles (above) other states in Australia have recognized that significantly greater economic benefits from fisheries resources can be obtained by communities if certain areas are closed to commercial fishing whilst kept open for recreational and charter fishing. Rather than an overall loss of jobs, this actually creates far more jobs than are lost when gillnetting is excluded and provides communities with numerous economic spin-off benefits.

5.12. Productivity of inshore fish stocks varies by region

A substantial volume of scientific peer-reviewed literature has been generated indicating that the inshore productivity of a region will be proportional to the volume of flow in its waterways and the magnitude of its areas of nursery grounds such as mangroves and small creeks.

The entire catchment of the relatively tiny Daintree River, total length only 120 km, will have a fraction of the flow of some of the rivers further south and those that flow into the Gulf of Carpentaria. The watershed between the Daintree catchment and that of the Mitchell River draining into the Gulf of Carpentaria comes to within 8 km of the Daintree coast because of the proximity of the dividing range to the east coast this far north.

The Daintree river catchment may receive a 24 hr rainfall of say 20 cm and if no further rain falls, the flood will subside within a couple of days. When this happens to e.g. the much larger Fitzroy, the flow is many times greater and floods last for a much longer period. When this rainfall is deposited inland over the Gulf region, the floods take weeks to subside.

Small rivers such as the Daintree have relatively tiny areas of mangroves in comparison to other regions and hence relatively tiny nursery areas for all key target species of inshore fish as well as the food web upon which they rely. This has substantial implications for the different river systems, with those coastal waters adjacent to the larger river estuaries having the largest annual flow, being capable of sustaining far higher levels of commercial fishing than small estuaries such as the Daintree and their adjacent coastal waters.

Once again the principles of ESD would demand in this instance and that the distribution of fishing effort should be managed along relatively fine spatial lines to take this important imbalance into account. However the ECIFF fails to account for this as netting licences are not restricted by area but netters may move freely from one region on the East Coast to the next. Quite simply this is a recipe for serial overfishing of local stocks.

5.13. Demands to ‘open’ closed areas & ‘moral hazard’

Inevitably as/if/when netters fish down local stocks, there may be demands made by the sector to be allowed into previously protected areas such as Dugong Protection Areas and other fishery management areas. Weak or ill-advised management may well give in to such demands, thus compounding the situation so eloquently described by Pauly *et al* (*loc.cit.*). From an ESD perspective it is vital that such areas remain closed to such non selective fishing methods in order to protect populations of those target and non-target species most vulnerable, including dugong, turtle and our two species of inshore dolphins, one of which is endemic and one of which is likely to be endemic (Frere, 2008).

In such cases the authorities need to consider the scenario of ‘*moral hazard*’, where individuals take much greater risks than they would normally do when they feel they are well

insured against any repercussions from the failure of their venture. The authorities must take care not to give the impression they are liable to make cash handouts to the commercial fishing industry if areas need to be closed for reasons of sustainability as there is no legal requirement to do so, rather the opposite (see Section 42 of the Fisheries Act, and below).

Questions needing to be answered include: “if the current levels of netting in inshore waters are sustainable then why would netters need to travel further afield and/or demand to be allowed into new areas?” Surely the ESD approach is to permit a limited number of fishers to fish a given local area only, at a sustainable level and ensure those fishers are at least partly responsible for safeguarding the sustainability of those resources in that given and limited area. If the numbers of licences are matched to the optimum economic value of the fishery then there should not be a problem and fishers would be encouraged to suitably care for the resources for which they should be held responsible.

In short, major changes are required within the ECIFF such that fishing effort is unitised according to the relative productivity of given areas and so be area based. The current practice of roving fishing licences using highly efficient and non-selective fishing gear to target our apparently very fragile coastal ecosystem is anachronistic and must be stopped as soon as possible before (more) serious harm is done to our ecosystem.

5.14. Eligibility for compensation & ‘moral hazard’

The Fisheries Act makes provision for contingencies related to moral hazard. Where fisheries effort has to be curtailed for sustainability reasons, e.g. because of the need to declare a fisheries management zone, no compensation is necessary (Fisheries Act 1994, Part 5, Fisheries Management, Division 1 Management Plans, Subdivision 1, 42C). The following part of the Act refers:

42C No general right to compensation because of amendment

(1) To remove any doubt, it is declared that, other than as provided for under section 42A, no one has an entitlement under or in relation to this Act to claim or to be paid an amount from the State for or in connection with:

- (a) the making, amendment or repeal of a regulation or management plan; or*
- (b) something previously permitted under a regulation or management plan becoming prohibited or regulated because of an amendment to the regulation or plan.*

It can be argued that any experienced fisher who has had to move his normal fishing grounds further afield because areas he or she previously fished have become non productive, **or** has had to change to targeting “previously spurned species” should be fully aware that he or she is fishing unsustainably and therefore is subject to moral hazard. It therefore follows that any justification for paying compensation when sustainability concerns require areas to be closed to netting would need to be carefully examined in relation to Section 42C.

5.15. Black-market and otherwise unrecorded sales of fish and the *National Competition Policy*

A number of NSF contributors have claimed that black-market selling of fish in both the commercial and recreational sectors is rife in Queensland. Claims are made that it is virtually seen as acceptable /normal practice by many in the hotel and restaurant trade to buy prime quality fresh fish fillets from persons without requiring proof of a commercial licence. Payment of course is made usually in cash. These landings and sales are therefore presumably no accounted for when figures for landings and quotas are totalled annually.

Even worse from an ESD perspective is that commercial fishers have a right to land and sell fish direct to any buyer in Queensland. It is understood that this practice was introduced to Queensland under the requirements of the National Competition Policy (NCP) and against the advice of Queensland DPI&F.

The normal practice in most developed countries with more closely managed fisheries, is to land directly into a public, commercial or co-operatively-owned fish market where all catches must be offloaded, weighed and recorded by workers independent of those who have made the catches. This is intended to lead to relatively unbiased and reasonably accurate landing figures, something that is not possible under the present policy.

The impact of following the NCP guidelines is that it lays the recording of fish landings and sales wide open to abuse as there are benefits to the commercial sector from failing to record or under-record landings and income. The results may be a significant cost to the public interest, namely that a very small level of confidence can be applied to landing and sales statistics because they can be so easily manipulated, contrary to the principles of ESD.

The Competition Principles Agreement, a key part of the National Competition Policy (NCP), requires as a guiding principle that legislation (including regulations) should not restrict competition unless it can be demonstrated that—

- (a) the benefits of the restriction to the community as a whole outweigh the costs; and
- (b) the objectives of the legislation can only be achieved by restricting competition.

A close examination of the impact of the NCP guidelines have on the ability of the authorities to manage the ECIFF according to the principles of ESD is required as it is impossible to be confident of fish landings and achievement of quotas by different fishers and for various species under the present arrangement. It would appear that in this case clause (b) above applies, namely that “***the objectives of the Fisheries Legislation can only be achieved by restricting competition***” and requiring all significant finfish landings to be made into prescribed areas where they can be recorded and perhaps sold by an independent authority as occurs in the majority of the fishing industries of the developed world.

5.16. Offshore netting during the Barramundi closed season

The FQ website⁵, (July 2010 [Net fisheries](#)) states that:

“The details of the regulations (for net fishing, ed.) are different for the different species and fisheries: Harvest of barramundi is not permitted ... on the east coast between 1 November and 1 January, effectively closing the fishery to all netting activity.”

However, as far as can be determined, offshore netting (i.e. in inshore waters down to 2 m depth at low water) can be continued by the offshore netters holding N4 symbols e.g. the large drum netters as illustrated in Plates 1 & 2, throughout the barramundi closed season in coastal waters south of a point some miles north of Cooktown to well south of Cairns. This is in complete contradiction to the important point made on the FQ website and will be very misleading to any independent assessor of the fishery who is not familiar with the finer details of the workings of the relevant fisheries regulations.

There is a 120 cm maximum size limit on barramundi above which all fish should be released unharmed as these are all highly productive females, having changed sex from being males commencing at around 75 cm. By the time barramundi have reached 85 cm less than 15% are female (Davis, 1982) and only if the fish are in salt water. As fish landed by offshore gillnetters are usually dead, the question arises as to what happens to these dead and previously highly valuable (to the survival of the fishery) breeders when caught at over 120 cm in length? Again human nature would suggest that there is a huge temptation to fillet these at sea. The size of the fish once filleted, cut up and packed would be very difficult and in practice, virtually impossible to establish by inspecting fillet appearance when they are landed onshore. The alternative would be to throw the dead fish back over the side.

⁵ http://dpi.qld.gov.au/28_16066.htm; ([Fisheries](#) > [Commercial fisheries](#) > [Queensland's commercial fisheries](#) > [Net Fisheries](#))

The problem with managing any fishery where there is a sex change from male to female with age is how to ensure sufficient of the smaller males survive to a size where they are females? As only about 15% of barramundi are females by the time they reach 85 cm it is absolutely essential to ensure that there is no possibility of netters being allowed to target spawning aggregations of barramundi. As it is understood that the N4 boats have the opportunity to continue netting in inshore waters throughout the barramundi breeding season there is a real danger that less scrupulous operators would be tempted to do this. Again, ***unless the contributors to this section have missed something, the system would appear to wide open to abuse***, especially given the alleged incidence of black-market, 'backdoor' and otherwise unsupervised sales of fish in the ECIFF.

5.17. Removal of Subsidies and part-time commercial fishing

The quote by Pauly *et al* on the front cover of this report notes that ***“Reducing fishing capacity to appropriate levels will require strong reductions of subsidies”***. In the ECIFF gillnetting may be a part time occupation, such that e.g. a farmer may hold a commercial fishing licence or alternatively, a commercially licensed fisher may also undertake alternative employment.

This effectively subsidises a fisher's fishing activity to the extent he or she may actually subsidise their fishing activities with income from other sources. Thus fishing may be carried out as more of a lifestyle choice, rather than as livelihood. The danger here is that fishing will continue long after stocks have been depleted to such a low level that they would not support true commercial (fulltime) fishing. Especially where philopatry is a strong component of the fishery, this has very serious implications for local stocks.

The need to phase out all part-time commercial fishing should be closely examined.

5.18. Licence buyback – previous experiences

Reviewers need to be aware that during a past buyback of licences within the ECIFF, in an attempt to achieve effort reduction, a number of fishers who sold their licences back to government reportedly then bought latent licences at much less than they had received from government for theirs and promptly re-entered the fishery. This should have been the subject of an independent enquiry followed by a report of exactly what happened and who were the major benefactors remaining in the fishery.

6. Essential Issues

6.1. Depleted inshore fish stocks

For a full account of a deputation to Queensland Fisheries (Northern Fisheries Centre, Cairns) by commercial, charter and recreational fishers from the Douglas Region to emphasise their concerns about seriously depleted inshore fish stocks see Appendix 2 of Cook (2008) available from the website of Fishers for Conservation (www.ffc.org.au).

There is huge and very genuine concern about observed depletion of fish stocks from Rockhampton to Mackay, Cairns, Port Douglas to Cooktown. Summarising all the available evidence is well beyond the time limits and scope of the editors of Version 1 of this assessment. However there will clearly be a need to document as much as possible to verify and record the validity of these concerns, if appropriate action is not taken by the authorities in response to Version 1 of this document.

All the most experienced and successful of charter and recreational fishers are unlikely to wrong on this issue. The last thing any charter fisher wants to do is to advertise the fact that the inshore fish stocks in his area are depleted. Until FQ formally investigate and recognize

the facts relating to depleted inshore fish stocks in heavily-netted areas, this issue will continue to generate considerable concern. It has reached the stage where all five editors of this Assessment are beginning to question whether the failure to adequately address the seriousness of this issue is based upon political decisions and whether political or even legal action on behalf of all aggrieved stakeholders is required.

It is of serious concern that Campbell et al (2008) found that: *“The primary conclusion drawn from both the standardisation results and the dynamic modelling results is that the data are of insufficient quality to reliably estimate stock biomass or management parameters. This conclusion is based on a number of factors, including (but not limited to):*

- *large fluctuations in the standardised catch rate, which would be biologically implausible if taken as a reliable index of abundance*
- *an inability to find model parameters that lead to a good fit (unless certain parameters are taken past biologically plausible limits)*
- *large uncertainty in parameters estimated from the surplus production model.”*

It is an unfortunate reflection on the quality of data collected by FQ on North Queensland’s most iconic fish species that Campbell et al conclude:

“Given this inherent unreliability in the data sources from which catch rate is estimated, stock biomass and maximum sustainable yield estimates must also be considered unreliable. It is therefore difficult to make specific conclusions about the status of the stock.”

6.2. Inflated reports of inshore recreational catches

NSF contributors have seriously queried the accuracy of estimates of the total landings made by the 750,000 recreational fishers who fish Queensland waters at least once annually. They note that in the telephone interview, upon which such totals are estimated, recreational fishers have a tendency to significantly exaggerate both the numbers of times they get out on the water every year and also the catches they make. This is likely to be a combination of wishful thinking and ‘saving face’, i.e. they do not wish to admit how little they actually catch.

One of the editors of this Assessment runs a boat hire business. Over the previous eight years, the average catch per person when his clients have fished the inshore waters using his boats has been less than 0.4 kg/person/day. For three people hiring a boat for a day’s fishing at these catch rates mean that on hire costs alone they have paid over \$100 per kg for any fish caught. Numerous clients of this business, being visitors to the region, have encountered set nets during their day’s fishing and have announced to the business owner upon returning the boat “That’s it, we are not coming back, the fishing is better back down in Sydney (or wherever)”. This reflects a significant loss in potential income to the Cairns and Far North tourism industry.

Greater effort needs to be made to collate such catch records state wide, for example Holloways Beach Fishing Club in 2006 held 7 inshore competitions with 82 participants catching a total of 31 fish weighing 27 kg. This bears no resemblance to impressive catches that would have been made 15 years ago for the same amount of fishing.

6.3. Under-resourcing of Queensland Fisheries, enforcement and compliance

Community dissatisfaction with the enforcement performance of FQ is widespread throughout the region. The Cairns Post (Daniel Bateman, May 2010) stated that they had obtained the information from FQ that only about 2% of claims of illegal fishing in the Cairns area were ever followed up. There is also widespread discontent in the Douglas Region that claims of illegal fishing, and in one blatant case of a live-aboard offshore net boat illegally

setting two nets a considerable distance apart, as observed by Col Patterson (pers. com.) are rarely investigated. It is very apparent to communities that FQ is under-resourced to ensure adequate surveillance of our inshore waters or perform the necessary enforcement duties. Netting is often most effective at night and this is when there should be regular patrols at least in sensitive areas.

The attempt made by FQ to undertake consultation in the region during its review of the ECIFF and its follow up attempt at introducing management regulations to bring the fishery more in line with requirements for ESD, EPBC Act and certification under the WTO indicate it also lacks sufficient resources to effectively tackle a very real problem.

One solution would be to follow the example of New South Wales (Forrest and Pitcher, 2006) and form a short-term collaborative arrangement with other national and world leaders in fish stock assessment and management. In this way the world's best fisheries stock assessment and management experts could be deployed to 'fix the system' with solutions suited to the requirements of ESD and the modern age and without overstressing the administration of FQ or lumbering them with excessive recurrent salary costs.

6.4. Fine scale management impossible under roving live-aboard gillnetters

Based on observations by charter and recreational fishers and inshore netters of how fish stocks have collapsed since the recent advent of live-aboard offshore gillnetters targeting their inshore waters it is clear that no fine scale tuning of effort management is possible under the existing system of netters all sharing the same fishing grounds the length of the Queensland coast. This is an invitation to the serial depletion of philopatric stocks of species such as grey mackerel, king salmon, javelin, fingermark and barramundi.

6.5. Part time fishing subsidised by other employment

Fisheries managers worldwide are recognizing that to reduce incidences of overfishing managers need to remove subsidies (e.g. Pauly *et al loc. cit.* and as shown on front cover). In Queensland subsidising of commercial fishing is widely practised through individuals being allowed to hold commercial fishing licences whilst partly or fully employed. They may in effect engage in hobby fishing using highly effective commercial gear.

The implications are that even when stocks have been fished down to a level where a commercial fisher would be forced to move elsewhere because of low catches a 'hobby fisher' may continue to fish down stocks even to the point of no return for that local population, whilst funded by his other employment considering he is enjoying a 'lifestyle activity'. This has serious implications for areas where there are easily accessible inshore stocks of philopatric species such as king salmon and (probably) barramundi.

There also seems to be an arrangement whereby someone may fish on another's symbol when that person is not present. Whether this is legal or not is unknown to these writers.

6.6. Black market and otherwise unrecorded sales of fish

Black-market sales of fish caught by a minority of recreational fishers are seen as a means of 'earning a few bucks' and this is apparently acceptable to a fairly significant proportion of buyers. The new regulatory requirement to remove the pectoral fin in an attempt to restrict such trade will have little effect on such persons when the fish is sold as fillet. The implications of any commercial fishers selling on the black-market are that they may earn useful cash without having to declare their earnings to the taxation office and their catch to FQ respectively.

As sources are reliable, this clearly needs to be the subject of investigation as at the moment there is no evidence to indicate whether quantities represent closer to 2 or 20% of total landings. It may be argued that if the quantity sold on the black-market is less than 5% then it probably is not worth spending significant sums of money to follow this up. However this would be an error of judgement. Where highly effective fishing gear, such as gillnets, are

used in a multispecies fishery and on highly vulnerable, aggregating philopatric stocks, persistent black-market, part-time netting of such stocks may eventually wipe out already depleted stocks, especially where the perpetrators aim is “just to earn a few extra bucks”.

A paradigm shift in public education and approach towards black-market purchasing of fish will be required if the principles of ESD are to be established within the ECIFF.

6.7. Offshore netting during the Barramundi closed season

The FQ web pages (July 2010) imply that there is no netting of coastal waters during the barramundi spawning season closure (Nov – January) however the offshore net boats continue to operate at such times. If they so chose they could readily target runs or spawning aggregations of barramundi especially under the cover of darkness.

6.8. Five Boat Rule

The FQ regulations allow for a confidentiality clause that prevents catches made in any area where less than five boats operate being made known to the public. This may have been relevant and defensible when boats were discovering new fishing grounds but in the modern age this rule is anachronistic and needs to be revoked in favour of transparency.

6.9. Refusal to supply samples/frames

Those line fishers who have been calling for the closure of the Port Douglas Smooth and Partially Smooth Waters to offshore gillnetters have done their best over the last three years to supply frames, including roe to FQ/JCU researchers for analysis for stage of sexual maturity and determination of stock and have provided all they could. The live-aboard boats have consistently refused to supply frames whilst declaring they have never seen a ripe grey mackerel. This seems strange as they net the grey mackerel right throughout the spawning season so logic demands that they must catch them at some time when they are ripe. Their motives for refusing to supply frames are therefore open to interpretation.

Douglas region commercial and recreational line fishers have stated that they have caught near ripe grey mackerel as early as June and through until September but since the net boats have been targeting grey mackerel in the Douglas Region no near ripe fish have been caught until late August. One recreational line fisher with 40 years experience fishing for grey mackerel, most of that time with an echo sounder states he has observed that grey mackerel on the spawning grounds go down close to the sea bed where they remain for a number of days without rising to the surface to feed.

6.10. Netting aggregating grey mackerel will catch other line-only mackerel

It is clear that offshore netters target pre-spawning aggregations of grey mackerel using 600m of gillnets in relatively shallow (10 – 20m) water around Snapper Island and Cape Kimberley. Line fishing this area during this period also catches near spawning spanish and spotted mackerel suggesting that these two species which may not be targeted by netters will form a significant part of the bycatch. There is video evidence of two very large spanish mackerel being landed (dead) by a net boat (Cook, *loc. cit.*).

It would be very hard to differentiate spanish mackerel fillets from grey mackerel fillets and in some cases netters either own spanish mackerel line symbol or have family members who own the symbol. Information received is that comprehensive checks for spanish fillets or whole fish amongst grey mackerel are not made. Hence the opportunity exists to flaunt the law and not only keep all spanish mackerel caught but also target spanish mackerel spawning areas, which in the case of the Douglas region overlap in inshore waters.

6.11. Minimum size and size of fish at first maturity

The movements of the golden snapper or fingermark are also not adequately described in the literature. A precautionary approach to the management of these species is therefore essential and it must not be assumed that individuals of given species move randomly up

and down our coastlines. International and now more recently Queensland research findings reveal that only 50% of female golden snappers reach sexual maturity by the comparatively late age of eight years (<http://www.nt.gov.au/d/Fisheries>). This means the species may be highly vulnerable to stock depletion by overfishing as by this time they are well above the minimum 'keeping' size. They are another species that aggregates close inshore to breed and are believed to be targeted by offshore netters and have no seasonal closed season.

King threadfin like barramundi are protandrous hermaphrodites, that is they are males first and when they grow to a larger size change sex to become females. In groupers including coral trout it is the other way around, a much safer strategy for species targeted by any fishery. The implications are obvious for management, especially for species which aggregate to spawn. As fish die quite quickly when held fairly stationary in gillnets, having a maximum size above which fish must be released, to preserve the big breeding females in the population is relatively pointless when all individuals are caught either before they reach the maximum size or are inevitably killed during capture.

There are real fears amongst the recreational fishers that barramundi in Central and North Queensland are on a terminal decline as so few fish seem to be reaching the size for changing sex to female.

Fishbase, the international on-line data base on fish and fisheries (www.fishbase.org;) consider the resilience of king salmon populations to exploitation is low and that they have a minimum population doubling time 4.5 - 14 years and that they have a high to very high vulnerability to overfishing. Again these are subject to non-selective netting both by big live-aboard offshore gillnetters and the part time 'lifestyle' commercial fisher exercising his legal 'right' to subsidise his fishing activities with income from other full time or part time employment.

6.12. GBRMPA Positional Paper

GBRMPA published a very brief (two page) '**Position statement on regional management issues in the Queensland ECIFF**' in 2007. The paper includes the observation that: "*the GBRMPA supports and encourages the QDPI&F to consider how suitable management arrangements can be developed that will facilitate the resolution of:*

- *Resource allocation issues (particularly near larger regional towns) and commercial versus recreational catch share issues; and*
- *Problems that may occur if effort is bought out in an area where acceptable local area management arrangements are developed and there is no mechanism to stop other effort migrating in and thereby potentially negating the local area management arrangements that are in place."*

Here GBRMPA also appear to fail to recognize that the ECIFF has an overfishing problem on its hands in relation to inshore fish stocks but simplistically lump the "problem" into a "resource allocation issue" apparently oblivious to the very real issue of stock depletion that can be observed by inshore fishers who remain in one area.

However in their second dot point, GBRMPA astutely recognize one of the points quoted by Cook (2010) as to why talks on co-management in Far North Queensland failed (see 6.14, below).

6.13. Independent Assessment of the ECIFF, November 2008

An independent review of the "Proposed Management Arrangements for Queensland's East Coast Inshore Fin Fish Fishery" was commissioned by the Hon Peter Garrett MP, Minister for the Environment, Heritage and the Arts; 31/10/2008.

6.14. Failed Co-management talks in FNQ

An account can be found in Cook (2010) of why attempts at establishing co-management to resolve "allocation issues" between commercial and recreational fishers in the Douglas Region failed. GBRMPA, in their position paper (see 6.12, above) noted the absence of any

legislation to prevent other netters moving in to occupy space vacated by those netters involved in any agreement reached. Cook notes that this and the following issues resulted in the failure of attempts to commence co-management in Douglas waters.

- The very small size of the catchment, mangroves, rivers, estuaries and nursery areas as the watershed of the Gulf of Carpentaria comes to within a few kilometres of the coast throughout the region. This results in relatively low nutrient outflow from the estuaries suggesting low annual fish production rates that would be unlikely to support such efficient fishing apparatus as operated by the offshore netters.
- Locals can see that inshore fish stocks are already depleted and more stringent measures are required to ensure stocks recover.
- Locals are angered by the repeated denials of the offshore netters that they are not responsible for the numbers of dead dugong and turtles that have occurred since the offshore netters started to target the Douglas Region. This has caused many in the community to lose trust in some individuals in the fishery.
- Fears that this would just turn into another 'talk fest' that would drag on for two or three years and achieve nothing whilst irreparable damage is done to local fish stocks.

7. BYCATCH: NON TARGET SPECIES VULNERABLE TO GILLNETTING IN NQ

“Because fishery bycatch is such a serious and widespread threat to cetacean populations, there is an urgent need to develop alternative fishing gear and practices, and at the same time to implement immediate mitigation measures, ranging from fishery closures to the mandatory use of acoustic deterrents to keep animals away from nets.” (Reeves et al, in 2002–2010 Conservation Action Plan for the World’s Cetaceans IUCN/SSC Cetacean Specialist Group Dolphins, Whales and Porpoises.

“A complicating factor is that their size makes the carcasses of small cetaceans both easy to handle, transport, and process, and easy to conceal from management authorities” (Romero et al. 1997; Van Waerebeek et al. 1997, 1999b, 2002, as quoted in Reeves et al, cited here.)

Dolphin species at threat from gillnetting in Far North Queensland include two of the 10 most endangered species of whales and dolphins in the world (Jefferson 2010). These are the Australian Snubfin dolphin (*Orcaella heinsohni*) and the Indo-Pacific Humpback dolphin (*Sousa chinensis*). Jefferson is a worldwide authority on whales and dolphins being co-author of the FAO Species Identification Guide, 'Marine Mammals of the World'. In his paper '*The Most-Endangered Cetacean Species*' Jefferson notes that *“There is now no doubt that more cetaceans die incidentally in fishing nets each year than from any other threat, including whale and dolphin hunting.”*

Previously misidentified as the Irrawaddy dolphin, the Australian Snubfin dolphin is endemic to northern Australian inshore waters. Parra, Schick, and Corkeron, (2006) have found that *“Preference by snubfin and humpback dolphins for nearshore, estuarine waters is likely related to the productivity of these tropical coastal areas. This spatial analysis suggests that existing protected areas in this region may not include the most critical habitats for snubfin and humpback dolphins.”*

Parra, Corkeron & Marsh (2006b) *“regard some mortality in commercial gillnets as inevitable because nets are mainly set in waters close to the coast and there is evidence that both genera are vulnerable to gillnetting practices (Amir et al., 2002; Smith et al., 2003). Furthermore, incidental bycatch of these species has been recognised, and discussed with the authors (PJC and HM), by gillnetters elsewhere in Queensland.”*

Parra, Corkeron & Marsh (2006b) continue: *“Recent studies across many vertebrate taxa suggest that the minimum size required for a population to be viable (i.e. the smallest size a*

population can have to have a 99% probability of persistence for 40 generations) in the long-term is thousands to tens of thousands of individuals (Reed et al., 2003). Population viability analysis of well known coastal dolphin species (i.e., bottlenose dolphin, *Tursiops truncatus*, and Hector's dolphin, *Cephalorhynchus hectori*) indicate that populations of less than a hundred animals face very high extinction probabilities (Thompson et al., 2000; Burkhart and Slooten, 2003). Our low estimates (of population numbers for Australian snubfin and the Indo-Pacific humpback dolphins, ed.) raise concerns about the long-term survival of both species in this local region and emphasize the need to **increase research and conservation efforts in Australia if conservation is to be successful**.

They note that "Because of their small population sizes and movement patterns, snubfin and humpback dolphins are particularly vulnerable to local extinction", Parra, Corkeron & Marsh (2006b).

"THE LOW POPULATION NUMBERS OF SNUBFIN AND HUMPBACK DOLPHINS AND OUR INABILITY TO DETECT TRENDS REINFORCE THE ASSERTIONS THAT SCIENTIFIC PROOF OF DECLINE OR INCREASE SHOULD NOT BE A NECESSARY CRITERION FOR ENACTING CONSERVATION MEASURES (Taylor and Gerrodette, 1993; Wilson et al., 1999; Thompson et al., 2000). AGAINST THIS BACKGROUND, THE FIRST PRIORITY OF MANAGERS SHOULD BE TO REDUCE AND CONTROL ALL DIRECT THREATS (e.g., GILLNETS, SHARK NETS) TO LOCAL POPULATIONS WHILE MINIMISING THE IMPACTS OF MANAGEMENT DECISIONS ON DIFFERENT STAKEHOLDER" Parra, Corkeron & Marsh (2006b).

7.1. Australian Snubfin dolphin (*Orcaella heinsohni*).

The Australian snubfin dolphin, (*Orcaella heinsohni*, previously known as *Orcaella brevirostris* under Australian Government legislation and under international conventions, is currently only known from Australia and its status in Queensland waters is very poorly known. Its current conservation status is as follows: **National:** listed as Cetacean under the *Environment Protection and Biodiversity Conservation Act 1999* and as 'Rare' under the *Queensland Nature Conservation Act 1992*; **International:** Listed under [Appendix II](#) of the Convention on the Conservation of Migratory Species of Wild Animals (CMS/Bonn) and under Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

An account of the Snubfin Dolphin is given by the Department of the Environment, Water, Heritage and the Arts online at: www.environment.gov.au/cgi-bin/sprat/public.

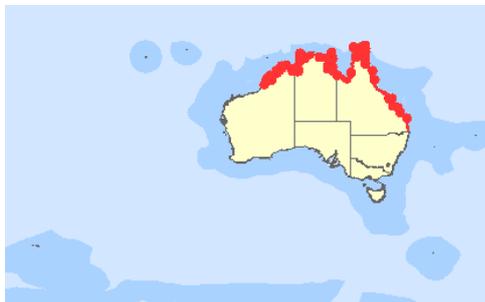


Figure 1: (above) Distribution of the Australian Snubfin dolphin (*Orcaella heinsohni*) a near threatened, listed as rare, endemic species (i.e. found nowhere else in the world – coinciding closely with the area netted by offshore netters operating in inshore waters. NB: previously misidentified as the Irrawaddy dolphin.

Figure 1, showing the distribution of this endemic species is taken from the account of this species on the DEWHA website and corresponds to the areas fished by the

misleadingly termed offshore net fishery. Further relevant extracts from DEWHA's description are presented as follows: *"This species is regarded as a species of priority for management and research by the Great Barrier Reef Marine Park Authority. however incidental catches in gillnets (albeit at unknown levels), plus habitat degradation, may⁶ lead to a reduction of area of occupancy... All available data on the distribution and habitat preferences of Australian snubfin dolphins indicate that they mainly occur in one location (i.e. only one habitat type, ed.): shallow coastal and estuarine waters of Queensland, Northern Territory and north Western Australia. ... There appears to be 'hotspots' of higher Australian Snubfin Dolphin densities along the Queensland coast and preliminary data suggest that they occur in small, localized populations). ... there could be significant threat to the security of Australian Snubfin Dolphins living beyond Australian territorial waters. This threat would primarily consist of incidental capture in gillnets.*



Plate 16: Australian snubfin dolphin, photo by Guido Parra, Townsville area.

... It is likely that the population has been reduced off Queensland and the Gulf of Carpentaria, primarily related to continued incidental capture in gillnets, including shark nets, and continued habitat degradation. However, the number of Australian Snubfin Dolphins taken in gillnets and shark nets at a national level is unknown.

... Future decreases in the Australian Snubfin Dolphin population size are likely to continue due to degradation of the species' habitat, plus some incidental mortality in gillnets"

Ross (2006) in his review of the conservation status of Australia's smaller whales and dolphins note that *"seven Irrawaddy (i.e. snubfin) dolphins drowned in shark protection nets in the period 1996-2001 at Ellis Beach, (on the southern perimeter of the Douglas Region) an event considered likely to have deleted most or all of the local population".* Ross states that *"It is strongly recommended that shark nets be replaced on the Queensland coast with drum lines."*

Ross considers that *"Current threats include incidental capture in nets,"* and continues: *"If this species is philopatric, the prognosis seems poor for the recovery of groups that have lost one or more members in nets (G. Parra, personal communication). A better understanding of whether this species is philopatric or not is important, as the impact of the loss of reproductive females from such small groups is potentially greater than that for species that live in large schools."*

7.2. Indo-Pacific Humpback dolphin (*Sousa chinensis*)

Importantly Frere *et al* (2008) have published the results of their recent research concluding that their results ***"strongly suggest that Australian humpback dolphins are not *S. chinensis* but may represent a distinct species in their own right."*** This

⁶ suggest 'will' would be a more accurate qualifier, ed

still has to be confirmed by the wider scientific community, and until a ruling has been made a precautionary approach clearly needs to be taken in assessing the conservation status of this species.

A summary of current knowledge about the species is given in Parra, Corkeron and Marsh (2006). The Department of the Environment, Water, Heritage and the Arts (DEWHA) www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=50; presents the range, status, habits and threats of and to this species. Some information and opinions presented on threats to the species and mitigation for these threats appears to be both inaccurate and misleading, as explained below.

DEWHA note that the Indo-Pacific Humpbacked Dolphins is found in shallow, coastal waters in northern Australia, extending southwest to Exmouth Bay in Western Australia and southeast to the Queensland-New South Wales border. They are thought to live for more than 40 years and reach sexual maturity at 10-13 years, although little more is known about their reproductive biology. It is listed as rare under the Queensland Nature Conservation Act 1992. The EPBC Act 1999 establishes the Australian Whale Sanctuary and gives high level protection to all whales and dolphins within Australian waters.



Plate 17: Indo-Pacific humpback dolphin (now thought to be a different species, a unique Australian endemic). Photo by Guido Parra, Townsville.

This species of inshore dolphin is very reliant on estuaries and therefore susceptible to impacts from coastal development, agriculture and gillnetting. The only available information on numbers of Indo-Pacific humpback dolphins (not actual population estimates) sighted during aerial surveys, suggests the population is probably declining (DEWHA).

There is no data on the absolute abundance of the Indo-Pacific Humpback Dolphin in Australia. Between 1996/7 and 2002/3, 16 Indo-Pacific Humpbacked Dolphins were caught in the Queensland Shark Control Program; 14 in mesh nets and 2 for which equipment was not recorded (presumably also nets). All captured Indo-Pacific Humpbacked Dolphins died, resulting in an annual average mortality of 2.3 individuals per year for the shark nets.

DEWHA note that “*Continued commercial fishing of prey species is expected to become an increasing threat as fisheries turn their attention to estuarine-associated fish that have previously not been major commercial targets*”. This has already occurred (ed.) and as widely reported in the popular FNQ press (for summary see e.g. Cook, 2008 and Appendix 1) our estuaries are now overfished and there are anecdotal reports that inshore dolphin numbers in the Douglas region are now well down on numbers of just a few years ago (e.g. Marris, July 2010, Port Douglas & Mossman Gazette).

In DEWHA’s section on ‘Bycatch’ they state that “*incidental capture in inshore gillnets set across rivers and estuaries to catch Barramundi (*Lates calcarifer*) and Threadfin Salmon (*Polynemus sheridani* and *Eleutheronema tatradyctylum*) (Hale 1997) often results in drowning in this and other marine mammals. Inshore gillnets occur primarily in the northern part of the Indo-Pacific Humpback Dolphin’s range, although their effect is suspected to be minimal due to low catches, limited permit licences, and their potential reduction through*

implementation of new laws relating to the use of gillnetting (GBRMPA 2000; Parra et al. 2006)”.

This last clause (underlined by the ed.) is not an accurate description of the operations of the offshore netters in inshore waters of the Great Barrier Reef Marine Park. There are over 400 gillnet licences on the east coast of Queensland and these may roam anywhere outside green and yellow zones or otherwise protected areas. This allows particularly the larger offshore drum netters to operate either in or immediately adjacent to the majority of estuaries in the GBRMP.

There is nothing the present authors have found in the “*new laws relating to the use of gillnets*” that will prevent inshore dolphin species from continuing to drown in gillnets. The “*In attendance*” requirement when the net is bottom set in water deeper than 2 metres will achieve almost nothing. This is because as estuary waters are normally turbid and offshore, bottom set gillnets 600m long in waters between depths of 2m and 20m at low water and 1.2 km long in waters deeper than 20m, a fisher does not get to see what is in his net until he hauls his nets at intervals of around four hours. The nets are set overnight and a fisher being asleep in his bunk, or watching a DVD in the cabin of his 50 ft drum netter is “*being in attendance*”.

Again DEWHA’s section on “*Threat Abatement and Recovery*” is would appear to be inaccurate and misleading. DEWHA state that “*threats to the Indo-Pacific Humpback Dolphin could be abated through the implementation of disentanglement workshops and action plans to prevent deaths from gill and shark nets. In the far northern section of the Great Barrier Reef Marine Park, which appears to be a hotspot for Indo-Pacific Humpback Dolphins, the number of gillnet licences has been limited to less than 10 per year, and other restrictions on netting are being implemented. In addition, the fishery is closed for three months of the year, from 1 November to 1 February.*” The text underlined (by the ed.) is inaccurate as indicated below.

Addressing the above claim (underlined), concerning the number of gillnet licences, it must be pointed out that this statement appears to be simply both wrong and meaningless. Just one net boat working its 600 m of nets day and night, 24 hrs a day, throughout the year, in the immediate vicinity of any estuary would, it can be inferred from other statements by DEWHA and others (above) infer that inevitably significant numbers of inshore dolphin species would be drowned in such nets, probably proportional to the number in the area. If this is the case then, based on best available science, just one live-aboard offshore net boat may therefore cause a decline in small local populations of both the Indo-Pacific humpback and Australian snubfin dolphins.

Additionally, whilst there is a closure of three months for the inshore netters during the barramundi spawning season, and from the information provided to the present contributors to this assessment, it appears to be simply wrong to imply that all netting ceases during this period (see Section 4.10) The offshore netters (i.e. those live-aboard boats operating in waters deeper than 2 metres, regardless of distance from the shore) have no closed season and these are the ones where being ‘in attendance’ does not mitigate the risk of drowning marine mammals by any significant level. Again, as noted above, being asleep in one’s bunk on board a drum net boat, fishing over 2 m of water at low tide classifies as “being in attendance”.

DEWHA note that “*Regulations to reduce incidental non-target mortalities, such as net attendance rules and gear modifications, have been introduced but enforcement is lacking in remote areas. The effect is expected to reduce as mitigation measures become more common and better policed.*” Current experience in the Douglas region suggests it would be naive to believe this will be the case as it is apparent that policing is most ineffective and shows no signs of improving.

Soto et al (loc cit) note that “*Incidental entanglement in gillnets is a serious threat to marine mammals, especially for small populations of coastal dolphins.*” They present preliminary results of their behavioural study on the Indo-Pacific humpback dolphin to 10 kHz Fumuda

net pingers designed to keep dolphin away from gillnets. They found that “*Pinger status (active/inactive) had no significant effect on:*

- i the number of dolphin pods entering the area around the pinger array,*
- ii the minimum distance of surfacing dolphins to the closest pinger, or*
- iii the likelihood of dolphins crossing the pinger array at least once.”*

In other words the pingers had no effect on dolphin behaviour so are ineffective at safeguarding dolphins from entanglement in nets. Soto *et al* note that just one death per year by netting in a small local pod of inshore dolphin populations is sufficient to cause the demise of such a population (Wade, 1998 cited by Alvaro Berg Soto *et al*, 2010).

Based on the above freely available information, it is the finding of contributors to this Assessment, that the risks to Far North Queensland inshore dolphin species, being two of the most endangered species of cetaceans in the world (Reeves *et al*), from offshore gillnetting in inshore waters, would appear to be significant within the World Heritage Great Barrier Reef Marine Park.



Plate 18: Dead dolphin in QLD shark protection net.

Plate 19: An overseas gillnet casualty.



Plate 20: An overseas dolphin gillnet casualty.

Plate 21: Another overseas dolphin gillnet casualty.



Plate 22: Small pod of Indo-Pacific Hump-back dolphin fishing a tide line just off the Daintree estuary. They are now believed to belong to a new, endemic species still to be named (D. Cook, photo taken from ultra-light using telephoto, 2007).



Plate 23: Two adult and one juvenile humpback whales on the grey mackerel fishing grounds at Snapper Island, the day after a drum netter had left that very area, they swam though the spot where the net had been set. (D. & J. Cook, from video)

Bycatch is considered to remain *the greatest immediate and well-documented threat* to the survival of cetacean species and populations globally (Northridge and Hoffman 1999; Reeves et al. 2003; Read et al. 2003). Photos of dolphin entrapped in nets are from other regions, whilst the pod of Indo-pacific humpback dolphins was photographed near the Daintree Estuary.

7.3. Humpback whales including Migaloo

The two humpback whales with calf shown in Plate 23 were photographed actually on the grey mackerel aggregating grounds that had been fished by offshore netters for grey mackerel the previous day, just a few hundred metres off Cape Kimberley and within 800m of Snapper Island. The photograph is from a video was taken in August 2007, the day after the netters had left the fishing grounds. The whales were videoed passing directly through the area that had just been netted (personal observation, D. and J. Cook).

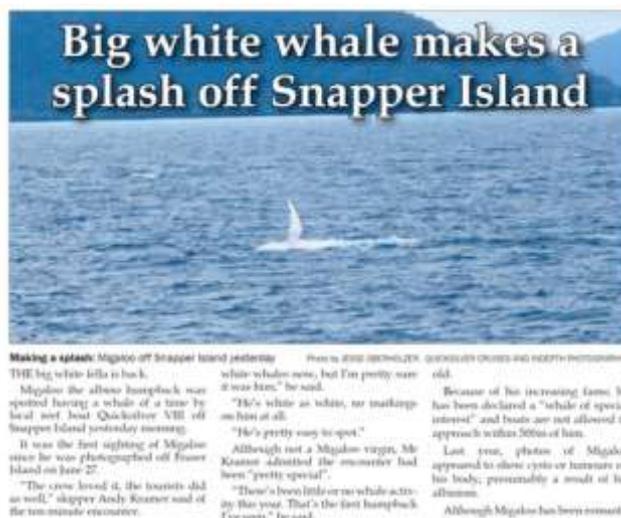


Plate 24: Migaloo near Cape Kimberley and Snapper Island grey mackerel grounds, photo: Jesse Oberholzer, Indepth Video and Quicksilver (P, Douglas and Mossman Gazette)



Plate 25: Migaloo with Low Isle in the background. Photo by Mark McCormack, Cairns Post

Also in August but the previous year (2006) two adult humpback whales were videoed by D. Cook within 200 to 300m of an offshore gillnetter with 600 m of net set at Snapper Island. This was witnessed by Fisheries Inspector Stephen Pollard from the Port Douglas Fisheries Office. As the humpbacks become more common, it is only a

matter of time before one becomes entangled in an offshore gillnet, especially as they may set 1.2 km of netting when in waters deeper than 20m.

Stop Press: As this review was about to be released the Port Douglas and Mossman Gazette, Cairns Post and even the Port Moresby National newspaper (26 July 2010) reported that Migaloo was seen at Snapper Island on 21 July, 2010, right in the middle of the grey mackerel season. As the island is so small, it is highly likely that Migaloo swam through areas that are netted for grey mackerel. The press reported that Acting Climate Change and Sustainability Minister Annastacia Palaszczuk announced the renewal of the Special Interest Declaration which requires that jet skis and other boats have to keep at least 500m away from all white whales.

There is however nothing but chance to stop Migaloo and other whales from becoming entangled in the offshore gillnets set up to 1.2km in length along the migration path of Migaloo and other humpback whales, in the only place where two World Heritage Areas meet.

7.4. Dugongs

Some estimates by academic researchers of dugong indicate that the dugong population along the urban coast of the GBRMP has been reduced to around 3% of its 1960 numbers (Marsh *et al*, 2002). At this rate of decline, the population is highly vulnerable. Being the major herbivore in the system, there are bound to have been significant ecosystem effects, even if unrecorded.

There have been several recent reports of dugongs found either floating or washed up dead in Far North Queensland showing signs of having been caught in nets. The minority have apparently the target of illegal netting and meat sales by a small number of indigenous persons in the Cairns area. However several deaths have been attributed to drowning in fishing nets or being killed in order to be removed from fishing nets.



Plate 26: Two of four dugongs found near Townsville. “It is believed they died in a net and an attempt was made to sink them, using ropes and makeshift anchors” (Townsville Bulletin 22.7.2010)

Press articles in the Douglas region quote both indigenous leaders and local commercial fishers as saying the incidence of dugong strandings has increased significantly since the area was targeted by offshore netters (see Plates 26, 28, 29,

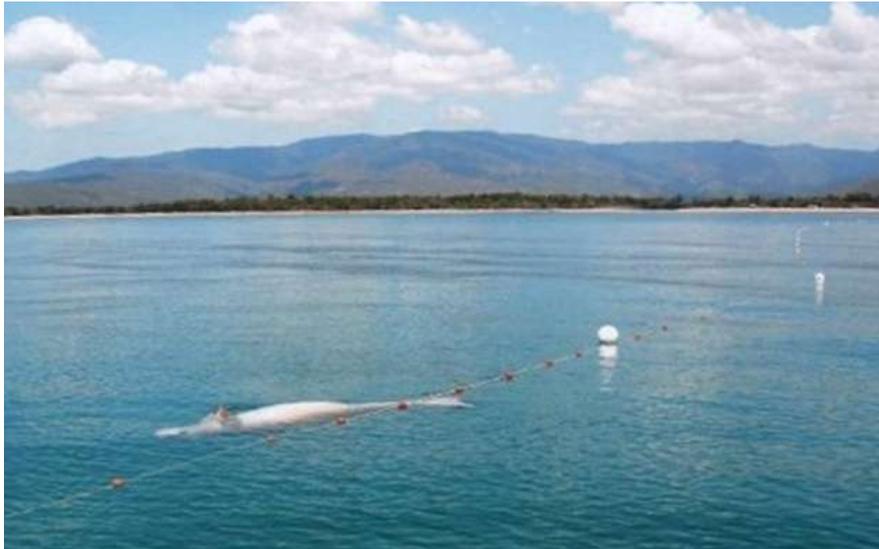


Plate 27: Dead dugong entangled in a surface set commercial gillnet (location not revealed).

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COMMUNITY NEWS FROM WANGETTI TO BLOOMFIELD 51 - EDITION 051, JULY 22, 2010

GILL NET THREAT

SHOCKING photos of a dugong, whose missing tail and flippers were deliberately cut from the live animal before it was dumped back into the sea, were provided to the *FNQ Independent* this week by an unnamed source.

A witness reportedly saw the dugong swimming off a local beach in February shortly before it washed ashore and died.

According to Rocky Point fisherman, Mark "Scrubby" Harris, the amputations, long areas of pink skin and other marks on the animal's body indicate the mammal had been caught, struggled and cut from a commercial or amateur gill net.

"This was not done by traditional hunters or local commercial fishers," Mr Harris said.

The second generation semi-retired commercial fisherman based his claim on a 35 year old "gentleman's agreement" among local fishers to protect fish stocks in waters off the former Douglas Shire, by using line fishing and "setting on their in-shore nets" to closely monitor what's being caught in them.

"We also don't set off-shore nets at all to protect the marine life and manurel stocks," he said. "I can vouch that among the local commercial fisherman not one has killed a dugong since 1980."

Mr Harris said the photographed mammal was one of about a dozen known dugong deaths in local waters that have occurred in the last five to six years by suspected gill nets.

"Three of the dugongs were found this year," he said.

More than 40 dead turtles with similar injuries have also been reportedly found along local beaches since 2008.

Mr Harris said he suspects the most likely users of the damaging nets are commercial fishers from "out-of-town".

"Commercial gill nets are set off the reefs where the dugongs and turtles swim," he said.

The nets are up to 600 metres in length and are left down for hours at a time.

"They're supposed to be pulled out every few hours but some leave their nets in all night. It's a lousy way to fish," he said.

Dugongs can drown in less than 15 minutes and turtles only survive underwater for about half an hour.

Gill netting is not illegal among Queensland's licensed commercial fishers but Mr Harris said boats coming into the waters off Douglas tended to lay their nets at night to avoid being seen - especially by local fishers.

» continued page 2

The tail and flippers of this dugong appear to have been deliberately sliced off while it was still alive and caught in a gill net.

Plate 28: Dugong with its tail hacked off being washed in with the tide, found still alive at Wangetti Beach in 2010. The only plausible explanation is that this would have been done to release the animal from the gill net without causing damage to the net.

30, 31 and 32. Press reports include one case where a dugong had its tail hacked off and left for dead, only to be washed ashore on Wangetti beach where it died, see Plate: 28. Other reports are of a dugong shot in the head, presumably to facilitate release, another with its tail cut off and its belly slashed open by a knife. All display features that would indicate the deaths are not due to illegal hunting for meat.

Of considerable concern is that netters causing these deaths are presumably taking some precautions to avoid killing dugongs in their nets not least because they are working off urban beaches frequented by many people. However there are hundreds of kilometres of shoreline that is almost never or rarely walked and where netters may be tempted to take far greater risks. It would therefore be unrealistic to suggest that today's frequency of recorded deaths of dugongs as bycatch in fishing nets are of insignificant consequence: they are more likely to be just the tip of the iceberg.

The CRC Fact Sheet, 'Dugongs in the Great Barrier Reef, Current state of knowledge' (April 2002) notes that the GBRMP has the largest concentrations of dugongs found anywhere in the world. This was an explicit reason for World Heritage listing of the GBR. Dugongs are the major large herbivore in the GBR ecosystem, and of high cultural value to the Indigenous peoples of the region. Native title holders are allowed to hunt dugongs, even within some no-take zones for traditional purposes but not for sale of meat.

However the Eastern Kuku Yalanji People of the Douglas region have maintained a ban on hunting dugong for over 15 years and are most concerned at recent dugong strandings attributed to netting (Plates 29, 31, 32). The Mossman Elders Justice Network has written to government requesting the area be made a dugong protection area as they consider dugong numbers are so low as to be incapable of supporting the current death rate from netting.

Grech and Marsh (2008) state: "*using a sensitivity analysis, it was found that to decrease risk (to dugong survival, ed.), commercial netting or indigenous hunting had to be reduced in remote areas and the effects of vessel traffic, terrestrial runoff, and commercial netting had to be reduced in urban areas.*"

Note that dugongs are also listed on Appendix I of CITES, and Appendix II of the Convention on Migratory Species (CMS or Bonn Convention). One reason that fishing nets are considered to have been a major cause of population decline is because dugongs are warm blooded mammals that forage in water down to a depth of only about 33 metres and so have not adapted to the need to hold their breath for deep dives: "*dugongs are unable to hold their breath for more than about 12 minutes and therefore easily drown once entangled*" in gillnets.

When "*being in attendance*" of offshore gillnets set over shallow, inshore sea grass areas, or near headlands on known migratory routes for dugong, includes being asleep in one's bunk on a boat within 100 m of a bottom set net, at night, in turbid waters, this "mitigation measure" will clearly have little effect on the numbers of dugong drowned in those nets set by live-aboard boats whether set by day or night.

The CRC Fact Sheet mentioned earlier also notes that "since 1962, shark nets (which have been used since the 1960s to protect bathers) have caught at least 654 dugongs in Queensland, an average of 18 per year. Very few of these dugongs were released alive. Following a review in 1992, many shark nets have been replaced with lines of baited hooks".

The following photographs (Plates 26, 27, 28 and 41) are apparently recent casualties of commercial and/or illegal gillnetters. However the offshore gillnetters steadfastly deny being responsible for them and are quick to blame indigenous or illegal fishers. However indigenous hunters do not cut off tails and leave the animal to die, (Independent, July 2010) and they do not slit the belly and tie "makeshift anchors"

(Townsville Bulletin, July 2010) nor shoot them in the head at close range and leave them to drift away (Mossman Gazette, 2005).

One of the co-authors of this review was responsible for the deaths of two dugongs on separate occasions in Papua New Guinea in 1979, using just 100m of four inch mesh gillnet. Sources working in Yarrabah state that some of the illegal netting of dugong is carried out using the soccer goal post nets stolen from the playing fields. There can be no denying that dugong are extremely vulnerable to any sort of net set in coastal waters in depths up to 35 m.

A local Douglas region inshore gillnetter, whilst agreeing that he has had occasionally to 'roll' a living dugong out of his nets, is adamant that recent strandings of dead dugongs must be the work of one of the out-of-town netters who come in to the area at night, using large boats and set their nets which are removed and the boat gone before first light. One such boat is occasionally visible off Newell Beach, at night from the Rocky Point boat ramp, the flashing net light and drum hauler on the lighted deck visible using binoculars (Harris & Cook, pers. com.).

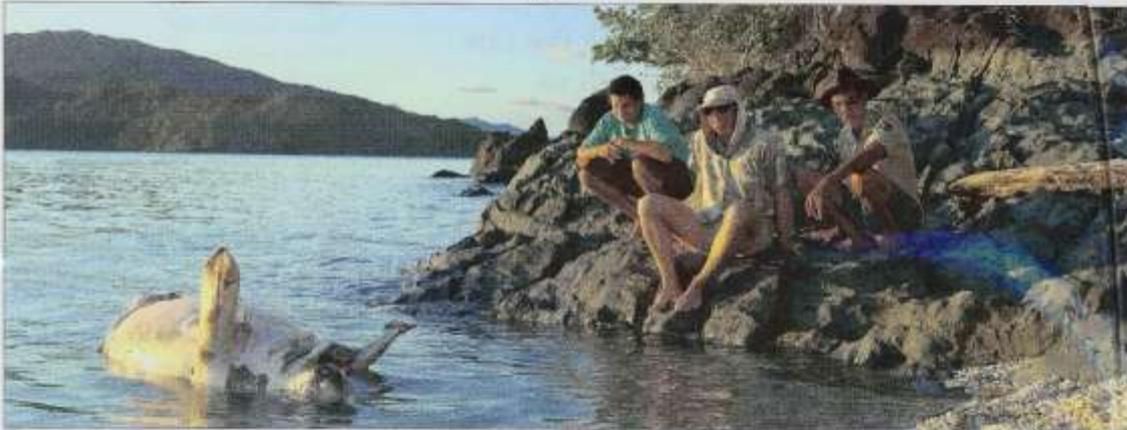
The dead dugong shown in Plate 41 was photographed by Dr Tony Ayling at Cape Kimberley on 3 April 2009, the morning a Cairns-based offshore gillnetter using a live-aboard boat left the area after having fished it for 72 hours, day and night. Dr Ayling remarked he would have been "*highly surprised if the dugong had not come out of the nets of that net boat*" (Ayling, pers. com.). The net boat owner claimed there were strong currents at the time but tide table reveal it was during neap tides and at the end of the calmest period of ten days there had been for months. That was the reason the netter was able to operate around the narrow channel between Cape Kimberley and Snapper, it was a time of minimal currents, despite his claim "there were strong currents at the time".



Plate 29: Dugong found with tail cut off, Rocky Point, near Wonga Beach, Dec. 2005

Port Douglas - Mossman Gazette April 9, 2009 p.7

Dead dugong raises net boat questions



Distraught: Dennis Solomon, Jamie Beitzel and senior traditional owner Dave Solomon examine the carcass of a dead dugong found Friday, April 3

PHOTO BY DAVE COOK

RICHARD KOSER
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THE owner of a commercial fishing boat has denied he is responsible for killing a dugong found floating off Snapper Is on Friday, April 3.

The commercial boat Triton, operating out of Cairns, was spotted by several local fishermen netting the channel between Snapper Is and Cape Kimberley between Tuesday and Friday last week.

"I was on the boat," said Triton owner Bruce Batch.

"I didn't see any dugong."

But traditional owners of the area say they are certain the animal was caught in a wide mesh net similar to those used by commercial fishing boats.

The owners examined the dugong the day after it was first spotted floating in the water.

"I saw marks on the tail, they looked like they were from a net, a big one," said David Solomon.

Mr Solomon said the dugong appeared to be lactating.

"It looked like she had milk," he said.

"It looked like she had a calf."

Mr Solomon said he was not happy with how commercial net boats, which can lay 600m of net, were operating in the narrow

channel between Snapper Is and Cape Kimberley.

"That's right where the dugong travel, along the coast there, turtles too," he said.

"There's a lot of sea-grass there, that's a feeding-ground for turtles and dugong."

"Net boats shouldn't be fishing between Snapper and the mainland."

Mr Batch said he was fishing in deep water away from the sea-grass bed where dugong and turtles feed.

"I haven't caught a dugong in years," he said.

Mr Batch said the dugong could have died any one of in a number of ways.

"It could have been a boat strike, it could have been a shark attack," he told the *Gazette*.

"A herd of dugong died at Yarrabah the day before."

"There was a strong northerly current, it might have drifted up from Yarrabah."

However, Mossman Fishing Club media officer Dave Cook said it was impossible the dugong had drifted from Yarrabah, south of Cairns, all the way to the Daintree.

"The dugong drifted less than a kilometre in 36 hours between the first reported sighting on

Friday morning and when I saw it on Saturday afternoon," Mr Cook said.

Commercial net boats first began heavily fishing around Snapper Is in 2003 and locals say they have seen a massive decline in local fish stocks since that time.

Mr Cook has been a fierce critic of the commercial net boats operating off Snapper Is for years.

"This a tiny watershed, compared to the Cape York fishery, for instance," Mr Cook said.

"It simply can't support the number of big boats that come here to fish these inshore waters."

Local fishing guide Jamie Beitzel said he had trouble catching the previously prolific grey mackerel, and other species were also starting to suffer.

"I reckon this dugong is just the tip of the iceberg," Mr Beitzel said.

"It's a big ocean. It's easy to imagine that there's a lot more going on than we know about."

Mr Solomon said he used to see dugongs on a regular basis.

"Back when I was young, when my brother and I used to travel up the beach on an outgoing tide, we would always see

dugong," he said.

"I haven't seen one in a while."

Mr Batch said the allegation he had killed the dugong was part of an ongoing attempt to exclude commercial net boats from the area.

"Port Douglas is being represented by a bunch of radical rathbags like Dave Cook," Mr Batch said.

"I'm a responsible fisherman, export-approved. I've got a Qld commercial fishing license, which means I can fish there."

"Dave Cook and his mates want to exclude everyone else from their spot."

Mr Batch said he would have been pleased to get the Department of Environment and Resource Management involved to determine the cause of death.

DERM, the former Environmental Protection Agency, was informed of the death of the dugong on Friday, but did not inspect the animal.

The dugong was originally discovered by Tony Ayling, a scientist conducting a survey of coral trout on the Great Barrier Reef.

Mr Ayling was on a field trip when the *Gazette* tried to contact him this week.

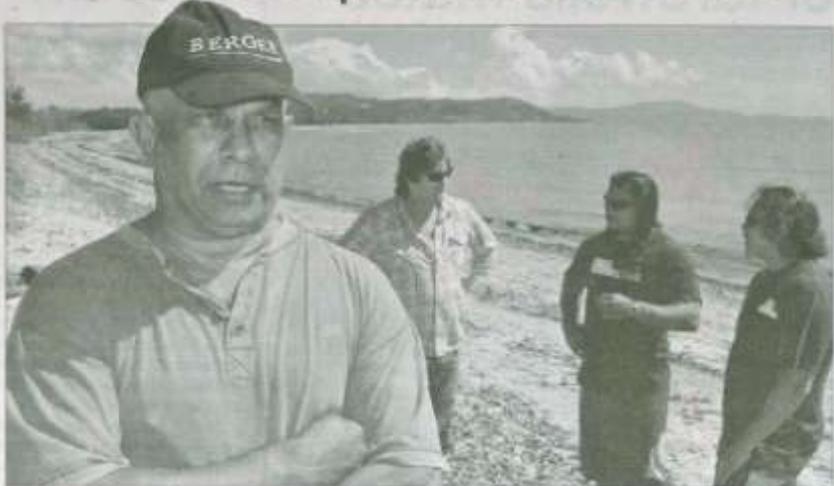
Plate 30: Dead dugong raises net boat questions



Plate 31: Press cutting "Requesting good fisheries management is not radical but common sense"

The Cairns
Weekend Post
OCTOBER 28-29, 2006 • \$1.50

Increased protection needed



Worried: Kuku Yalanji traditional custodian Bennett Walker (front), former commercial fisherman Mark Harris and Mr Walker's sons Brandon and Linc want inshore waters protected to ensure dugong safety. Picture: NARELLE HINE

Shire may lose treasured gem

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DUGONG could be wiped out of Douglas Shire waters within a decade if this year's deaths surge continues, Indigenous leaders say.

Eastern Kuku Yalanji elder Bennett Walker has called for waters from the Mowbray River near Port Douglas north to the Annan River near Cooktown to be legally declared a Dugong Protection Area to bolster a 13-year-old self-imposed Indigenous hunting ban.

Mr Walker attributed recent increased large-scale gill netting, non-local Indigenous hunters and an insufficient fisheries management system to this year's rise in dugong and marine turtle deaths.

At least four dead dugongs have been found at Cape Kimberley, Rocky Point, Muddy Creek and Dickson Inlet since January.



Endangered: Dugongs should be protected.

One was shot with a firearm while another's tail was cut off and belly slit open — a tell-tale sign someone was trying to dispose of the evidence by sinking the protected mammal.

Mr Walker also found the remains of a dugong at Cooya Beach just three weeks ago and said it would not have come from local Indigenous hunters because they would have left nothing to waste.

"If this keeps going I'd say in 10 years' time we'll have nothing left," Mr Walker said.

His sons Linc and Brandon, who regularly comb the habitat for their eco-tourism venture, said fisheries management enforcement needed strengthening to keep non-Douglas Shire Indigenous hunters out of the region's waters.

Autopsies could help identify why deaths were up, they said.

Rocky Point's Mark "Scrubber" Harris, a former second-generation commercial fisherman, said he was shocked at the number of dead turtles washing up recently.

"I've lived here all my life and this is the worst year I have come across for seeing dead marine life," Mr Harris said.

"They're washing up everywhere. We need the Department of Primary Industries and Fisheries to intervene."

Public consultation for a review of the East Coast Inshore Fin Fish Fishery — Queensland's largest — started in Port Douglas on Monday.

Plate 32: Press cutting, Indigenous leaders "Fear Shire may lose treasured gem", the year when the big drum netters first regularly targeted Snapper Island and Cape Kimberley fishing grounds (2006) "at least four dead dugongs" were found in the vicinity.

7.5. Turtle species

All marine turtles in the GBRMP are protected species. When hand lining on inshore reefs in the region, e.g. Bells Reef, Wonga Beach, it was common, at least up until 2007 to be aware of up to two or three turtles surfacing to breathe around one's boat within a 100m radius. It is hard to conceive how it would be possible to gillnet off such reefs and not capture turtle. Win News, Cairns, early 2010, showed video footage taken by a member of the public of a gillnetter knocking a netted turtle out of his gillnet. Again, to those with fishing experience in the inshore waters of the Douglas Region, netting around such reefs will inevitably entangle turtle. The numbers of enmeshed and potentially drowned turtle will be proportional to the numbers of turtle in the area at the time.

Photographs of dead, dying or injured turtle found in the vicinity of Snapper Island, Cape Kimberley, Daintree estuary and Wonga Beach, 2005 – 07, are shown in plates 34 to 39, all photos being taken by one person. Cairns Post quotes professional fisherman, Mark Harris, lifelong resident of Rocky Point, as saying he had never seen so many turtles washed ashore in his life. Mr Harris considers most of them to have come from the nets of the offshore netters and that it would not be possible to net close to the local inshore reefs around Newell beach and Wonga Beach without entangling turtle (Harris, various meetings and to the press, also pers. com.).



Plate 33: Dead turtle just onshore from Snapper Island.



Plate 34: Dead turtle (different) Snapper Is. in background



Plate 35: Turtle with severed fin in Daintree estuary; fins can get stuck in a mesh, the turtle struggles, twists and spins causing the net to wind round the fin. Rather than spoil the net the fin can be cut off to free the turtle.



Plate 36: Sick turtle, Daintree estuary, what is the affect on turtles caused by a prolonged period of net entanglement? Stress levels must be very high. Stress from being restrained is known to kill crocodiles.



Plate 37: Press wrongly reported deaths due to plastic bags but local turtle vet, Jenny Gilbert, disputes this; in over 100 turtle autopsies she has never found a plastic bag to be the cause of death.

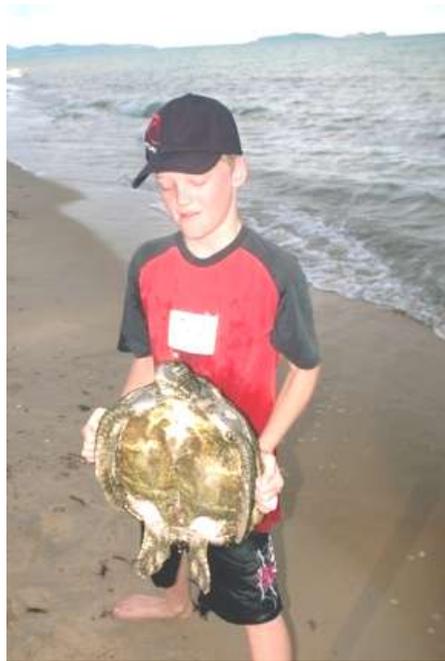


Plate 38: Sick turtle found at Wonga Beach, Snapper Island in background. Was this a net casualty? This cannot be ruled out, there is simply insufficient evidence.

7.6. Threatened, endangered and protected shark

Bensley *et al* (2009) note that “several species of shark are protected within the Great Barrier Reef Marine Park, including grey nurse shark, whale shark, white shark, freshwater sawfish, green sawfish and spear tooth shark”. They state that: “Many shark species in Australian fisheries are caught as bycatch or harvested as byproduct species and as a consequence are typically afforded a lower fisheries management priority. This situation reaffirms the need to concentrate on ensuring, as a priority, that management measures aimed at protecting ‘high-risk’ species are effectively implemented. Mitigating impacts to high-risk shark species is also likely to have flow on benefits for a range of other species. Risk assessment work recently completed or currently underway will be essential references to consider”

Their ‘Shark Assessment Report for the Australian National Plan of Action for the Conservation and Management of Sharks’ concludes that: “Although it is evident there has been considerable work on shark conservation and management since 2001, this report has highlighted that there are a range of issues that are yet to be addressed, many of which were identified in the 2001SAR. Resolving many of these issues relies on the basic need for a general improvement in the quality of shark harvest and bycatch data. Significant data gaps and constraints to improve shark data collection and validation remain in all jurisdictions. Thus, if significant progress is to be made in resolving many of the issues in the long-term there needs to be a general improvement in the quality of data in the short-term.”

Sharks are vulnerable to gillnets and often drown when restrained in such nets. In view of the occurrence of several protected species within the GBRMP, the non-selective operations of the large live-aboard gillnetters is a risk to the protected species as well as to the targeted species.

The real value of shark fishing is in the fins which fetch many times the value of the trunks which are also many times the weight and volume of the fins. By law shark fishers are required to return to port with the trunks to avoid wastage. However the cost of freight from remote areas such as Cooktown is such that there returns on the trunks will be minimal.

Plate 39 (below) shows what one shark netter had apparently been doing, over a period of about two years up to February 2009 when reported, according to the source who provided the photograph of shark trunks in a local Cooktown dump. The source does not want to be named publically but has already spoken to authorities about these observations. The situation was apparently investigated by FQ, but the NSF is unaware of the outcome.



Plate 39: De-finned Shark trunks found dumped near Cooktown, February 2009; unclear whether the white spotted trunk upper right is the protected whale shark or the lesser known bowmouth guitarfish (*Rhina ancylostoma*). Fins command a high price but bulky shark trunks give poor returns from remote fishing grounds due to high freight costs.

8. ASSESSMENT OF THE OFFSHORE GILLNET FISHERY OF THE GBRMP (as conducted by live-aboard boats operating in inshore waters)

Readers are reminded that the inshore waters of the Douglas Region are the only place in the world where two World Heritage Areas meet. One would therefore assume they merit world class management as is required by international convention.

A brief assessment under '***The Guidelines for the Sustainable Management of Fisheries, 2007,***' referred to in this report as the Guidelines, is presented below of how the offshore net fishery currently operating in the inshore World Heritage Waters of the GBRMP performs against its criteria. This assessment is based largely on experience gained within the Douglas Region supplemented by significant input from the Rockhampton, Mackay, Cairns and Cooktown areas and includes information gained from Douglas commercial line fishers, some Douglas and Cairns-based commercial netters, local charter fishers, recreational fishers including regular tourist visitors, as well as Douglas LMAC Members, FQ personnel, researchers, publications, and the personal experiences of members of the NSF including businesses supporting tourism and recreational fishing.

The Guidelines contain two Principles, each with a number of objectives which in turn have a number of guidelines. These are presented below as they appear in ***The Guidelines*** with the observations by contributors to this assessment as at 25 July 2010.

PRINCIPLE 1.

A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover.

OBSERVATIONS July 2010

All inshore recreational, charter and commercial line fishers who have 10 years or more experience fishing inshore waters in NQ are aware of a marked depletion of inshore fish species including barramundi, grey mackerel, queenfish, grunter, trevally species and fingermark over this period. This has been so severe that they now consider these inshore fish species to be seriously overfished.

Part of the history of the NSF bringing these observations and concerns to the attention of the authorities and local press is summarised in (Cook 2008, incl. Appendix 2). The NSF has since expanded to include representatives of recreational and charter fishers in Cooktown, Cairns, Mackay and Rockhampton who all state they are faced by inshore fisheries resources that have been similarly depleted.

It is apparent that the current arrangement of roving offshore net licences operating throughout the year wherever fishers decide, and throughout the spawning seasons for all species, will give zero probability of any recovery of inshore stocks.

Objective 1. The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability.

Observation July 2010: *Offshore gillnets are non-selective operating in a multi-species fishery for those species e.g. those in Plates 4 – 15, which can be caught in a 6.5 inch stretched mesh gillnet. Note that fish and bycatch may be caught by simply becoming entangled rather than gilled. There are no adequately defined target species as opposed to bycatch. The enforcement of any TACs on any given species will be difficult or impossible without radically modifying or closing the entire fishery. Hence any TACs currently in force for large, key species like grey mackerel which are of iconic value to inshore fishers, are virtually meaningless. Community consensus amongst experienced commercial, charter and recreational fishers in most regions in North Queensland is that numbers and sizes of all these species are now at a fraction of what they were 10 to 15 years ago.*

The existing single TAC on grey mackerel is impractical because there are at least two stocks on the East Coast whilst the tonnage chosen has no scientific basis. This level of TAC was chosen based on past catch levels, thereby overlooking the phenomenon of hyperstability (Section 4.3) that has accompanied the collapse of many stocks worldwide.

There is no knowledge of stock size of any of the various target species and the authorities have no indicators of stock abundance of these species so no confidence can be placed on this TAC. The degree of philopatry⁷ is unknown so the damage being done through serial depletion of stocks (Section 4.5) is unquantifiable and may be serious to the extent of inflicting long-term damage, such as is recorded by De Lacey (2005) for the once large mackerel fishery off Bowen, up until 1971.

⁷ philopatry: returning to their birthplace, e.g. to breed and to live, see Section 4.1, page 7

As discussed (Section 4.4) local communities and skilled line fishers **do have their own indicators of stock abundance** and their ability to detect stock depletions of key iconic inshore species is far superior to the ability of the authorities to do this.

The information provided in Section 4.9 on Black market and otherwise unrecorded landings of fish make any reliance on any TAC and data accumulated for fishers logbooks in this fishery, highly suspect.

Information requirements

1.1.1 **There is a reliable information collection system in place appropriate to the scale of the fishery. The level of data collection should be based upon an appropriate mix of fishery independent and dependent research and monitoring.**

Observation July 2010: The ongoing practices of the offshore net fishery make it impossible to implement a reliable information collection system without a high level of onboard data collection by independent observers. Unless it can be proven to be otherwise, the current assessors have formed the opinion that the following applies:

- i *Fishers can land their catches directly to their own processing plant or direct to buyers in any area of FNQ and sell for cash. There is no requirement to land into a monitored fish market where catches are independently recorded as in most other developed fisheries of the world. This is a system wide open to abuse. The commercial offshore netters themselves openly admit it is abused (ref: statement by one commercial offshore fishery at a documented meeting in FNQ, November 2009, where an offshore netter cautioned against closing an area to offshore netters because quote “**then you would get netters from everywhere entering catches in their logbooks for that area in order to be eligible for compensation when they haven’t even been fishing there**”. The likelihood of this happening was then confirmed by another offshore netter present at that meeting.)*
- ii *Fish may be filleted on board, e.g. there are anecdotal reports that oversize barramundi or indeed any size of barramundi may be caught during the barramundi closed season and filleted, boxed and frozen onboard. As the majority of fish are caught dead this presents a very strong temptation. Again anecdotal information suggests such boxes of fillet may be landed at a variety of sites and the likelihood of this being traced or proven appears low.*
- iii *There is a very limited onboard observer system in place covering less than 5% of all trips by offshore net boats. When such observers are onboard the netters may simply adjust fishing practices for the duration of the trip to ensure fishing areas chosen offer minimum opportunity for observers to witness e.g. drownings of dugong, turtle and inshore dolphin species. (The selection of the appropriate type of person to fill the observer role and the need to circulate such observers over a wide range of boats will be critical to the objectiveness of the data collected).*

Any administrator who considers the offshore net fishers’ logbooks contain data sufficiently reliable to base critical management decisions on is misguided. The whole system is open to manipulation by any less scrupulous members of the industry. By members’ own admission (above, recorded FNQ meeting) some figures are manipulated to suit the wishes of some operators.

Assessment

1.1.2 **There is a robust assessment of the dynamics and status of the species/fishery and periodic review of the process and the data collected. Assessment should include a process to identify any reduction in biological diversity and /or reproductive capacity. Review should take place at regular intervals but at least every three years.**

Observation July 2010: A desktop assessment of the fishery was carried out in 2008 by an independent team of consultants based in Canberra. The report, “Proposed Management

Arrangements for Queensland's East Coast Inshore Fin Fish Fishery" by John Gunn, Frank Meere and John Stevens was commissioned by the Hon Peter Garrett MP, Minister for the Environment, Heritage and the Arts; 31/10/2008. The entire text of the independent review of the East Coast Inshore Fin Fishery is available online at: www.environment.gov.au/coasts/fisheries/qld/east-coast-finfish/index.html. The report is actually extremely critical of the management arrangements that the State Government had in place at the time. A summary of this report is attached as Appendix 1.

Messrs Gunn, Meere and Stevens were doubtless aware of the shortcomings of any desktop review of such a diverse fishery conducted over a wide latitudinal range where data are insufficient to make decisions on the "biological diversity and for reproductive capacity". Given the lack of accurate data gathered by the fishery on both catches of target and non-target species and also the unintended, non-reported bycatch of dugong, turtle, inshore dolphin species and protected whale shark, it is absolutely impossible to satisfy the above Guideline No. 1.1.2. On these grounds alone it is not possible to genuinely certify this fishery under the EPBC Act.

This is because authorities have no measurement of the status of the stocks of inshore species that have allegedly been depleted, allegedly by the offshore net fishery operating in inshore waters of the World Heritage Great Barrier Reef Marine Park. Despite a delegation from the then Douglas Shire, of commercial, charter and recreational fishers to the Northern Fisheries Centre Cairns in February 2008, to make the specific point that stocks of the inshore fish species named above have become so depleted they are a fraction of their sizes prior to 2000, FQ refused to accept this point. FQ thereby rebutted the experience of an entire community (see Cook, 2008, Appendix 2 for a record of that meeting; the entire case study and minutes of this meeting as recorded by the NSF are available on line).

1.1.3 The distribution and spatial structure of the stock(s) has been established and factored into management responses.

Observation July 2010: This is clearly not the case, e.g. there are at least two stocks of grey mackerel on the East Coast whilst there is only one TAC for the species. As mentioned earlier there is no scientific basis for this TAC. FQ have no means of assessing the status of stocks of other iconic inshore species such as queenfish, grunter, golden trevally, giant trevally, and king threadfin, not even barramundi. The distribution and spatial stock structure of most of these species is unknown and has **not been factored into any management response**. Recent information received indicates that what has happened at Bowen and Cape Kimberley may also have happened or is happening at Lady Elliott Reef south of Lucinda.

In other inshore species where population studies have been carried out, e.g. on blue threadfin salmon on the Queensland east coast, Zischke, et al, (2009) found that "contrary to current management definitions, the stock structure of *E. tetradactylum* (blue threadfin) on the east coast of Queensland appears to be geographically differentiated at a small spatial scale". There is little to suggest this is the rule rather than the exception for inshore species restricted to estuarine and nearby waters.

Again the management response for Queensland East Coast offshore netting of inshore species fails to satisfy these guidelines.

1.1.4 There are reliable estimates of all removals, including commercial (landings and discards), recreational and indigenous, from the fished stock. These estimates have been factored into stock assessments and target species catch levels.

Observation July 2010: from the above it is evident that nothing approaching this level of sophistication has been achieved. It would be misleading to claim otherwise.

1.1.5 There is a sound estimate of the potential productivity of the fished stock/s and the proportion that could be harvested.

Observation July 2010: from the above it is evident that nothing approaching this level of sophistication has been achieved. It would be misleading to claim otherwise.

Management responses

1.1.6 *There are reference points (target and/or limit), that trigger management actions including a biological bottom line and/or a catch or effort upper limit beyond which the stock should not be taken.*

Observation July 2010: From the above it is evident that nothing approaching this level of sophistication has been achieved. It would be misleading to claim otherwise. The fishery is a non-selective, multi-species fishery where it would be impossible to satisfy these criteria for any given species without closing or radically changing the fishery.

1.1.7 *There are management strategies in place capable of controlling the level of take.*

Observation July 2010: From the above it is evident that nothing approaching this level of sophistication has been achieved. It would be misleading to claim otherwise. Apparently around 400 netters can migrate to any 'nettable' area on the East Coast at any one time and land to any one of a number of unsupervised landing sites. In theory they could all come to fish a single area all at the same time. **This is not even approaching acceptable levels of fisheries management.**

1.1.8 *Fishing is conducted in a manner that does not threaten stocks of by-product species. (Guidelines 1.1.1 to 1.1.7 should be applied to by-product species to an appropriate level)*

Observation July 2010: *This is not the case, as the gillnets are non-selective for the size range they target, they catch all species of shark including protected species such as one species of threatened saw shark.*

1.1.9 *The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.*

Observation July 2010: from the above it is evident that nothing approaching this level of precautionary approach has been achieved. It would be misleading to claim otherwise.

Objective 2. Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes.

Observation July 2010: There is no reference point for this multi-species fishery and any attempt being made to establish levels of stocks which would be considered ecologically viable for a range of inshore species including: barramundi, grey mackerel, spotted and barred grunter, queenfish, golden trevally, giant trevally and other species. Local fishers with extensive experience in their local FNQ inshore fisheries are aware that the populations of all these species have become seriously depleted in recent years. There is no evidence of any management measures that will reverse these trends.

Various regulatory measurements were introduced in 2009 in an attempt to bring some level of sustainability to the grey mackerel fishery "in order to take a sufficiently precautionary approach to this fishery". These include:

- *a single total allowable catch (TAC) for grey mackerel* (despite there being at least two stocks of greys on the east coast and the State having no indication of the size of the stock or where they breed and the TAC having no valid scientific basis)
- *min. 60 cm total length (TL) for grey mackerel*, despite size of 50% of the female population at first breeding being 70 cm TL and 95% maturity being 80 cm TL (Welch et al 2009),
- *min. mesh size of 6.5 inch* (despite this already being the size used in the Douglas Region to fish pre-spawning aggregations of grey mackerel round

the clock throughout the breeding season and is considered to have caused a steep decline in the breeding population of this species at Cape Kimberley/Snapper Island),

- *compulsory attendance at offshore nets* (asleep in one's bunks whilst dugongs drown in the night in bottom set gillnets in turbid inshore waters is 'in attendance'); bit hard to see how this stops marine mammals and turtles from drowning (laugh or cry),
- *reducing the recreational daily bag limit from 10 to 5* (most Douglas region recreational grey mackerel fishers had not even caught 5 greys per year over the previous 5 years, so this will have no impact whilst giving the impression that the regulators 'are doing something').

Management responses

- 1.2.1** *A precautionary recovery strategy is in place specifying management actions, or staged management responses, which are linked to reference points. The recovery strategy should apply until the stock recovers, and should aim for recovery within a specific time period appropriate to the biology of the stock.*

Observation July 2010: From the above it is evident that nothing approaching this level of ability has been achieved for this fishery. It would be misleading to claim otherwise.

- 1.2.2** *If the stock is estimated as being at or below the biological and / or effort bottom line, management responses such as a zero targeted catch, temporary fishery closure or a 'whole of fishery' effort or quota reduction are implemented.*

Observation July 2010:

The grey mackerel were heavily targeted by the Cairn-based offshore gillnetters on their traditional spawning grounds in the Douglas Region, 2006 – 2007 and where the local commercial fishers maintained a gentlemen's agreement not to net the grey mackerel stocks. This agreement was made by the community in the early 1970's following being told of the demise of the Reyard's Reef Grey mackerel fishery, near Bowen in 1971 by a Bowen fisherman, Lenny Kite. The collapse of this (Bowen) fishery and its subsequent failure to return in anything like its former abundance is recorded by De Lacy (2005). It is unknown whether the much lesser numbers of grey mackerel now caught near Bowen are of the same stock as that pre-1971,

There is a perception in the Douglas Community that the depletion of inshore fish resources has now deteriorated to such an extent that there is the danger that the Minister's fisheries advisers apparently feel forced to remain in denial for fear of reprisal. This should be the subject of an enquiry by highly experienced and appropriately qualified independent fishery advisors with no affiliation to FQ.

A number of JCU Fisheries staff has undertaken to carry out a study of the oral history of fishing in the Douglas Region commencing July 2010. This is seriously overdue and the community expects the results should reveal a baseline perception for the 1990's that is far different from stock levels in 2010.

The authorities have insufficient knowledge of the various stocks involved to have anything like the required level of ability to make the necessary estimates to satisfy this guideline and it would be misleading to suggest otherwise.

PRINCIPLE 2.

Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.

Observation July 2010: This is clearly not the case as discussed above and illustrated by the photograph below.



Plate 40: Recently dead dugong found near Snapper Island, showing faint impressions on the skin corresponding to the marks that could be left by a large mesh gillnet, photo by Dr Tony Ayling 3 April 2009. Dr Ayling commented that he would be extremely surprised if the death of the dugong was not caused by the net boat that he had seen fishing in the vicinity for the previous three days.

Objective 1. The fishery is conducted in a manner that does not threaten bycatch species.

Observation July 2010: Nets are regularly set in inshore waters including turbid waters adjacent to estuaries, over seagrass beds, and near headlands and inshore reefs where endangered turtle, migratory dugong and two of the most threatened species of dolphin in the world may occur. It is widely accepted on the international scene that such gillnets cause significant harm to populations of inshore dolphin and dugong. Being “in attendance” on board offshore gillnets does not significantly reduce the likelihood of bycatch of turtle, dolphin or dugong as nets are usually bottom set, are up to 1.2 km in length, set in turbid waters, and set throughout the night. Dugongs drown within 12 minutes of becoming entangled if they cannot reach the surface to breathe.

Information requirements

2.1.1 *Reliable information, appropriate to the scale of the fishery, is collected on the composition and abundance of bycatch.*

Observation July 2010: The offshore net fishers have in a public meeting (November 2009) made comments suggesting there is a culture in the industry of manipulating the data presented in their log books to suit their requirements. There is no incentive for fishers to report such bycatch and every reason why they should not, as numerous incidents would eventually have to lead to the closure or severe restriction of their fishery. To suggest that

all fishers operating in any such culture would voluntarily report drowning of dugong, turtle and dolphin is extremely naive.

From the above it is evident that nothing approaching the level of sophistication required by this guideline has been achieved. It would be misleading to claim otherwise. Only recently has an observer programme been introduced and this applies to less than 10% of the fishery. With an occasional observer onboard, it would only be human nature for skippers to do all they can to operate in areas where the risk of bycatch of unwanted and protected species is minimised. When no observers are on board it is human nature that operators would eventually try in areas where risks are greater.

Members of the NSF have tried to obtain information about bycatch recorded by the observer programme from FQ but this has been refused, stating commercial in confidence. Apparently GBRMPA also do not receive up to date information on bycatch recordings from the observer program through FQ.

Assessments

2.1.2 There is a risk analysis of the bycatch with respect to its vulnerability to fishing.

Observation July 2010: *The contributors to this review have not seen the required risk analysis; any risk analysis which glosses over the risk to dugong, our two species of inshore dolphin (rated near-threatened in QLD but both considered by WWF to be amongst the 10 most endangered species of dolphin in the world) and turtle from bottom-set monofilament gillnets in areas frequented by these animals needs to be carried out in more detail by better-informed independent specialists. As recorded earlier, the Ellis Beach population of Snubfin dolphin, endemic to Australian northern inshore coastal waters was eliminated by shark netting. These animals are all highly vulnerable to 6.5 inch mesh monofilament netting in inshore and offshore waters (>2m depth at low water, according to FQ's definition); it would be misleading to claim otherwise.*

Management responses

2.1.3 Measures are in place to avoid capture and mortality of bycatch species unless it is determined that the level of catch is sustainable (except in relation to endangered, threatened or protected species). Steps must be taken to develop suitable technology if none is available.

Observation July 2010: *The recent introduction of the "In attendance rule" for those offshore gillnetters operating from small, open boats should reduce the incidence of drowning of turtles, dugong and dolphin, provided netters maintain a constant watch over their nets, and these nets are set in shallow waters such that all net floats are on the surface. Dugongs, being warm blooded mammals, are believed to drown after being submerged for longer than about 12 minutes.*

The "In-attendance rule" will have no effect when the nets are set on the seabed, as for grey mackerel and all floats are not visible from the surface, or when the nets are set at night (as they can hardly be patrolled at intervals of less than 12 minutes and dugong move into shallower waters at night time) or when operated by the large live-aboard boats where operators may be watching a DVD or asleep in their bunks at night. From the above it is evident that nothing approaching the required level of risk reduction has been achieved for this fishery. It would be misleading to claim otherwise.

2.1.4 An indicator group of bycatch species is monitored.

Observation July 2010: *The contributors to this review are not aware of what level of monitoring of bycatch species is undertaken. Any such monitoring of just one indicator group in just one area risks overlooking the impact that philopatry has on affected populations. A number of different populations of the one indicator group would need to be monitored before the results were meaningful. From our observations so far it appears unlikely that anything approaching this level of ability has been achieved for this fishery.*

2.1.5 There are decision rules that trigger additional management measures when there are significant perturbations in the indicator species numbers.

Observation July 2010: *From the above it appears likely that nothing approaching the required level of ability has been achieved for this fishery on the local scale required for philopatric species.*

2.1.6 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

Observation July 2010: *From the above it is evident that nothing approaching this level of ability has been achieved for this fishery. It would be misleading to claim otherwise.*

Objective 2. The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities.

Observation July 2010: *From the above it is evident that nothing approaching this level of ability has been achieved for this fishery. It would be misleading to claim otherwise.*

Information requirements

2.2.1 Reliable information is collected on the interaction with endangered, threatened or protected species and threatened ecological communities.

Observation July 2010: *From the above it is evident that, given the extensive risk identified to inshore dolphin species, information collection is grossly inadequate. It would be misleading to claim otherwise.*

Assessments

2.2.2 There is an assessment of the impact of the fishery on endangered, threatened or protected species.

Observation July 2010: *Outline assessment provided here, the risk is unacceptably high. It would be misleading to claim otherwise.*

2.2.3 There is an assessment of the impact of the fishery on threatened ecological communities.

Observation July 2010: *Not aware of any such assessment.*

Management responses

2.2.4 There are measures in place to avoid capture and/or mortality of endangered, threatened or protected species.

Observation July 2010: *From the above it is evident that nothing approaching this level of ability has been achieved for this fishery. It would be misleading to claim otherwise.*

2.2.5 There are measures in place to avoid impact on threatened ecological communities.

Observation July 2010: *Where iconic large mammals and turtles are clearly at threat from offshore gill netting carried out by live-aboard net boats there will clearly be an impact on threatened ecological communities. It would be misleading to claim otherwise.*

2.2.6 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

Observation July 2010: *From the above it is evident that nothing approaching this level of ability has been achieved for this fishery. It would be misleading to claim otherwise.*

Table 2: Summary of the assessment by NSF of the performance of offshore gillnetting against the Principles, Objectives and Guidelines presented in the 'Guidelines for the Sustainable Management of Fisheries, 2007'.

PRINCIPLES, Objectives and Guidelines (G1.1.1 etc) as presented in the Guidelines for the Sustainable Management of Fisheries, 2007.	Pass, Fail borderline
PRINCIPLE 1: A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover.	Fail
Objective 1: The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability.	Fail
G1.1.1: There is a reliable information collection system in place appropriate to the scale of the fishery. The level of data collection should be based upon an appropriate mix of fishery independent and dependent research and monitoring.	Fail
G1.1.2: There is a robust assessment of the dynamics and status of the species/ fishery and periodic review of the process and the data collected. Assessment should include a process to identify any reduction in biological diversity and /or reproductive capacity. Review should take place at regular intervals but at least every three years.	Fail
G1.1.3: The distribution and spatial structure of the stock(s) has been established and factored into management responses	Fail
G1.1.4: There are reliable estimates of all removals, including commercial (landings and discards), recreational and indigenous, from the fished stock. These estimates have been factored into stock assessments and target species catch levels.	Fail
G1.1.5: There is a sound estimate of the potential productivity of the fished stock/s and the proportion that could be harvested.	Fail
G1.1.6: There are reference points (target and/or limit), that trigger management actions including a biological bottom line and/or a catch or effort upper limit beyond which the stock should not be taken.	Fail
G1.1.7 There are management strategies in place capable of controlling the level of take.	Fail
G1.1.8: Fishing is conducted in a manner that does not threaten stocks of by-product species. (Guidelines 1.1.1 to 1.1.7 should be applied to by-product species to an appropriate level)	Fail
G1.1.9: The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.	Fail
Objective 2. Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes.	Fail
G1.2.1: A precautionary recovery strategy is in place specifying management actions, or staged management responses, which are linked to reference points. The recovery strategy should apply until the stock recovers, and should aim for recovery within a specific time period appropriate to the biology of the stock.	Fail
G1.2.2: If the stock is estimated as being at or below the biological and / or effort bottom line, management responses such as a zero targeted catch, temporary fishery closure or a 'whole of fishery' effort or quota reduction are implemented.	Fail
PRINCIPLE 2. Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.	Fail
Objective 1. The fishery is conducted in a manner that does not threaten bycatch species.	Fail
G2.1.1: Reliable information, appropriate to the scale of the fishery, is collected on the	Fail

composition and abundance of bycatch.

G2.1.2: There is a risk analysis of the bycatch with respect to its vulnerability to fishing.	Fail
G2.1.3: Measures are in place to avoid capture and mortality of bycatch species unless it is determined that the level of catch is sustainable (except in relation to endangered, threatened or protected species).	Fail
G2.1.4: An indicator group of bycatch species is (adequately – <i>my insert, ed.</i>) monitored.	Fail
G2.1.5: There are decision rules that trigger additional management measures when there are significant perturbations in the indicator species numbers.	Fail
G2.1.6: The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.	Fail

9. DISCUSSION

The contributors to this review are concerned to find that offshore gillnetting carried out by live-aboard gillnetters in inshore waters of the GBRMP fails to satisfy any of the 17 guidelines, three objectives and the two principles laid down in the Guidelines (introduced in Section 2 of this report). Furthermore there do not appear to be any realistic measures which may be introduced to the operations of these large, 'over-efficient' netters that would enable them to satisfy the majority of the Guidelines whilst operating near estuaries and other breeding and aggregating grounds during the breeding seasons of any of the larger inshore species of fish.

Part of our concern stems from the likelihood that our analysis will be interpreted by those who do not share the same level of knowledge of the inshore fish stocks found along the shores of the GBRMP, fish biology and fisheries management issues, as bias influenced by the recreational sector. However we stand by our assessment. We are fully aware that concerted efforts will be made by some quarters to discredit our findings. If so then we would request that they be made public so we may engage in further discussion.

What we have attempted to illustrate in this review is the importance of future reviews of major fisheries such as the ECIFF not being confined simply to desk top studies of material provided by the managers themselves, who in effect, are the ones being examined. A real effort must be made to contact an adequate cross section of stakeholders, especially those with long term, intimate and current experience and knowledge of our inshore species. To rely only on 'the best scientific evidence' and the "dodgy data" supplied by some netters, rather than the 'best available information' is failing to conform to the requirements of ESD.

Grafton *et al* (2005) use examples from more than a dozen fisheries to highlight the failures of 'command control' fisheries management and show that approaches that empower fishers with the incentives and the mandate to be co-custodians of the marine environment better adapted to promoting sustainability. They provide evidence that "*where harvesters share well-defined management responsibilities over fish, and experience both the pain of overexploitation and the gains from conservation, they are much more likely to protect fish stocks and habitat. The key insight is that to maintain marine ecosystems for present and future generations, fishing incentives must be compatible with long-term goals of sustainability.*"

10. CONCLUSIONS

It is apparent from this review and assessment that the operations of the larger, misleadingly termed 'offshore' live-aboard gillnetters cannot be approved under WTO requirements or passed as a fishery complying with the principles of ESD. Some of their operations have come about in recent years as a result of effort creep, as operators moved from smaller to far larger, more efficient live-aboard boats under the same licence. The implications of this move for use of CPUE data as an indicator of the state of the fishery are significant (we have already seen that CPUE

should not be used alone to assess the condition of any fishery based on aggregating stocks because of hyperstability considerations).

In a modern world, where fishing must be run along ESD lines, the operations of the very efficient, live-aboard gill netters in the inshore waters of any area of North Queensland, whether World Heritage declared or not, is anachronistic. If the fishery was to be assessed on the basis of sustainability of target species alone, good leadership and firm action would be required to phase out the live-aboard offshore gillnetters from inshore waters at least during the spawning/aggregation seasons for all larger inshore fish species.

The operations of the live-aboard netters must however also be assessed based on the risk to bycatch in inshore waters, which as we have seen, are shared even by Migaloo and other Humpback whales, in addition to two species of endemic inshore dolphin (one still to be formally confirmed as endemic), six turtle species and dugongs which, by one estimate, are thought to be at 3% of their numbers in 1960. All are at risk of entrapment in gillnets. As we have seen, the Ellis Beach population of Snubfin dolphin was recently wiped out by shark nets.

The risk the live-aboard netters present to these iconic animals, especially as the nets are often bottom set and used over the 24 hour cycle, such that entrapped animals may not be visible to operators until the nets are hauled, means the operations of these netters should not be allowed in areas where these animals occur.

11. RECOMMENDATIONS

- 11.1. All four larger mackerel species in Queensland's inshore waters are simply too vulnerable to being overfished by netters when aggregating. This was largely the deciding factor Spanish and spotted mackerel have already been made 'line only' species. Grey and school mackerel should also be made line only species for the same reason. They are also readily caught on lures in commercial quantities and unlikely to be depleted by line fishing. In addition line fishers have minimal impact on whales, dolphin, dugongs and turtle.
- 11.2. Port Douglas Smooth and Partially Smooth Waters should be recognized as the breeding grounds they are and be declared a fishery management zone and made a line-only fishing area, open to both commercial and recreational line fishers.
- 11.3. All recreational and commercial fishing of grey mackerel in Port Douglas smooth and partially smooth waters be banned for two years or until stocks recover, allowance being made for possession of not more than one grey mackerel (as bycatch when trolling for Spanish and spotted mackerel).
- 11.4. Formal recognition should be given to the potential value to communities through job creation and tourism by the rebuilding of inshore fish stocks in populated areas for the benefit of recreational and charter fishers. A Recreational Fishing Branch should be created within FQ to ensure this is given the attention communities deserve.
- 11.5. The next assessment done by any agency to determine whether the ECIFF can be certified under the EPBC Act and WTO should address and respond to all issues raised in this report.
- 11.6. FQ should be given the extra resources required to commence formulating plans to ensure the conclusions of Grafton *et al* (*loc cit*) can be applied to the ECIFF, namely the zoning of the coastline at an appropriately fine scale and all fishers being restricted to operating within the single zone for which they are licensed. This would encourage fishers to maintain healthy resources. The extra resources provided to FQ for this purpose should include funding to develop collaborative arrangements with national and international world leaders in fish stock assessment and fisheries management practices.

12. REFERENCES

Bensley, N., J. Woodhams, H. Patterson, M Rodgers, K McLoughlin, I Stobutzki, and G A Begg. 2009. Shark Assessment Report for the Australian National Plan of Action for the Conservation and Management of Sharks, final report to the Department of Agriculture, Fisheries and Forestry, Bureau of Rural Sciences, Canberra.

Campbell, A. B., M. F. O'Neill, R. Officer. 2008. Assessment of the barramundi fishery in Queensland, 1989–2007. Department of Primary Industries and Fisheries, State of Queensland, Brisbane. PR08–3730

Cole, D. 2005 The precautionary principle - its origins and role in environmental law. <http://www.edo.org.au/edosa/research/david%20cole%20on%20precautionary%20principle.doc>;

Cook, D. C. 2008. The possible collapse of a grey mackerel population and the decline of an inshore fishery within the World Heritage Great Barrier Reef Marine Park: the need to implement the precautionary principle to immediately close local inshore waters to all offshore and itinerant gillnetting: a case study. Available online from Fishers for Conservation: www.ffc.org.au/Grey_Mackerel.html#latest.

Cook, D. C. 2010. Fisheries Co-management, rose to the bait but not hooked. Lineburner June 2010. p14-15. <http://www.fishingportdouglas.com.au/lineburner0610.pdf>;

Cox, T. M., A. J. Read, D. Swanner, K. Urian and D. Waples, 2004. Behavioural responses of bottlenose dolphins, *Tursiops truncatus*, to gillnets and acoustic alarms. Biological Conservation Volume 115, Issue 2, 203-212.

The CRC Fact Sheet, 'Dugongs in the Great Barrier Reef, Current state of knowledge'. April 2002.

Davis, T.L.O. 1982. Maturity and sexuality in Barramundi *Lates calcarifer* (Bloch) in the Northern Territory and south-eastern Gulf of Carpentaria. Australian Journal of Marine and Freshwater Research 33, 529-545.

De Lacy, R. 2005. The North Queensland Fishing Eldorado, Memoirs of a Gulf Fisherman. Sid Harta Publishers, Hartwell, Victoria. pp372

Diggles PhD, B. 2010. On the Science of the Coral Sea and the Great Barrier Reef: Ministers' briefing note presented at Shangri-La Hotel, Cairns, 12 July 2010 DigsFish Services Pty Ltd, www.digsfish.com;

Ernst and Young (2004). Economic impact of the striped marlin fishery. Report prepared for NSW Fisheries by EYECon, July 2004. 124 pp. http://www.dpi.nsw.gov.au/data/assets/pdf_file/0006/151944/stripped-marlin-report.pdf

Elliston, L. and Cao, L. 2004, Managing Effort Creep in Australian Fisheries: An Economic Perspective, eReport 04.5 Prepared for the Fisheries Resources Research Fund, Australian Bureau of Agricultural and Resource Economics (ABARE), Canberra.

Forrest, R. and T. J. Pitcher. 2006 Misguided Claims of Overfishing in New South Wales: Comment on "Empty Oceans Empty Nets. An evaluation of NSW fisheries catch statistics from 1940 to 2000" Fisheries Centre Working Paper #2006-16, The University of British Columbia, Vancouver, B.C., Canada

Frère, C. H., P. T. Hale, L. Porter, V. G. Cockcroft and M. L. Dalebout, 2008. Phylogenetic analysis of mtDNA sequences suggests revision of humpback dolphin (*Sousa* spp.) taxonomy is needed. Marine and Freshwater Research, 59, 259–268.

www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=81322; Orcaella heinsohni — Australian Snubfin Dolphin

Grafton, R. Q., R. Arnason, T. Bjørndal, D. Campbell, H. F. Campbell, C. W. Clark, R. Connor, D. P. Dupont, R. Hannesson, Ray Hilborn, J. E. Kirkley, T. Kompas, D. E. Lane, G. R. Munro, S. Pascoe, D. Squires, S. I. Steinshamn, B. R. Turriss, Q. Weninger. 2005. ***Incentive-Based Approaches to Sustainable Fisheries***. Australian National University, Economics and Environment Network Working Paper, EEN0501

Hauser, L., G. R. Carvalho. 2008. ***Paradigm shifts in marine fisheries genetics: ugly hypotheses slain by beautiful facts***. Fish and Fisheries, Volume 9 Issue 4. p 333-362. Blackwell Publishing Ltd. Published online: Nov 24 2008.

Hilborn, R and C.J. Walters.1992. ***Quantitative Fish Stock Assessment. Choice, Dynamics and Uncertainty***. Chapman and Hall, 570pp.

Jefferson Ph.D., Thomas, 2010 (co-author of the FAO Species Identification Guide, 'Marine Mammals of the World') '***The Most-Endangered Cetacean Species***' located online at: www.savethewhales.org/mostendangered.html.

Ley, J.A., Halliday, I.A. and Tobin, A.J. (2002). ***Ecosystem effects of fishing closures in mangrove estuaries of tropical Australia***. Marine Ecology Progress Series 245, 223-238.

Ley, J.A., Halliday, I.A., Tobin, A.J. , Garrett, R.N. and Gribble, N.A. (2002). How do Fishing Closures Influence Fish Biodiversity? - a Case Study. 2002 World Congress on Aquatic Protected Areas.

McCook et al. Management, ***Zoning and Monitoring on the Great Barrier Reef*** online at the Proceedings of the National Academy of Sciences: www.pnas.org/cgi/content/short/0909335107;

Marsh, H., H. Penrose, C. Eros and J. Hugues, (2002) Dugong Status Reports and Action Plans for Countries and Territories. UNEP, Kenya. Available at: <http://data.iucn.org/dbtw-wpd/edocs/2002-001.pdf>;

Parra, G. J., R. Schick and P. J. Corkeron, 2006. Spatial distribution and environmental correlates of Australian snubfin and Indo-Pacific humpback dolphins. *Ecography* 29: 396-406.

Parra, G. J. 2006. Resource partitioning in sympatric delphinids: space use and habitat preferences of Australian snubfin and Indo-Pacific humpback dolphins. *Journal of Animal Ecology*, 75, 862-874.

Parra, G. J., P. J. Corkeron and H. Marsh, 2006. The Indo-Pacific Humpback Dolphin, *Sousa chinensis* (Osbeck, 1765), in Australian Waters: A Summary of Current Knowledge. *Journal of Animal Ecology*, 75: 862-874.

Parra, G.J., Corkeron, P.J. and Marsh, H., 2006b. Population sizes, site fidelity and residence patterns of Australian snubfin and Indo-pacific humpback dolphins: Implication for Conservation. *Biological Conservation* 129: 167-180.

Pauly, D. 1994. Theory and practice of overfishing. In 'On the sex of fish and the gender of scientists'. Essay eleven, 89 – 103. Chapman and Hall. London. 250 pp.

Pauly, D., V. Christensen, S. Guénette, T. Pitcher, U. Sumaila, C. Walters, R. Watson & D. Zeller 2002. Towards sustainability in world fisheries. *Nature* 418: 689-695

Reeves, R.R., Smith, B.D., Crespo, E.A. and Notarbartolo di Sciara, N. (Compilers). 2003. Dolphins, whales and porpoises: 2002-2010 conservation action plan for the world's cetaceans. International Union for the Conservation of Nature and Natural Resources, Gland, Switzerland.

Ross, G.J.G. 2006. Review of the conservation status of Australia's smaller whales and dolphins. www.environment.gov.au/coasts/publications/pubs/conservation-smaller-whales-dolphins.pdf;

Wade, Paul R. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds, Marine Mammal Science Volume 14 Issue 1.

Zischke, M. T., T. H. Cribb, D. J. Welch, W. Sawynok and R. J. G. Lester, 2009. Stock structure of blue threadfin (*Eleutheronema tetradactylum*) on the Queensland east coast, as determined by parasites and conventional tagging. *Journal of Fish Biology* 75,156–171.

APPENDIX: Conclusions & Quotes from the Review of the ECIFF

Quotes taken from the Independent Review: “Proposed Management Arrangements for Queensland’s East Coast Inshore Fin Fish Fishery” by John Gunn, Frank Meere and John Stevens. Commissioned by the Hon Peter Garrett MP, Minister for the Environment, Heritage and the Arts; 31/10/2008. The entire text of the independent review of the East Coast Inshore Fin Fishery is available online at:

<http://www.environment.gov.au/coasts/fisheries/qld/east-coast-finish/index.html>.

The purpose of presenting these selected quotes is to facilitate the opportunity to look at some of the salient points, not just in the Summary but also deep in the main text that have bearing on our push to have offshore netting of inshore waters Port Douglas to Daintree banned. The majority of the points below, taken from the text of the Garrett Review have been raised by the NSF over the last two years and especially during our response to the ECIFF consultation exercise.

p ii from **Executive Summary**

“...the Panel believes that even greater weighting should be given to ecological/sustainability considerations since the fishery operates (at least in part) in the GBRWHA. Such a shift in emphasis would be more in line with contemporary application of the ESD principles.

The Panel noted that in a best practice fisheries management framework, the scale of a fishery (geographic, landed volume, value and number of operators) should not dictate the levels of risk accepted by managers, nor the fisheries management arrangements applied to minimizing the ecological risk. In the case of the ECIFF the Panel is of the view that its location within a World Heritage Area, the ecological risk profiles of target and by-product species, and the known (and potential) interactions with protected species should be the primary determinants of the management framework and resources applied to the fishery.

However the Panel is of the view that these need to be further improved given the geographical location of the fishery, the majority of which is in a WHA encompassing the GBRMP. In addition, the species taken, which includes a range of shark species, and the scope for interactions with a wide range of protected species are of concern. There is also scope for a substantial increase in effective effort, which is of concern.

Given the lack of data available to gauge sustainability and manage the fishery, ... the Panel considers that the proposed management arrangements pose a high risk to the sustainability of target and byproduct species, to protected species and potentially to the broader ecosystem. In the Panel’s judgment the proposed measures do not adequately reflect a precautionary approach to managing the fishery in the face of the considerable unknowns and the high risks associated with these. The clear message, in the face of this uncertainty, is the need to lower catches and effort and hence reduce the risk.

The Panel has therefore suggested an integrated suite of conditions and recommendations, which if implemented as a package, will help move the management of the fishery towards “best practice” over a period of time (see summary ...).

p iv (of Executive Summary) **Effort Management**

Condition 8: By 1 February 2009 DPI&F to review and lower proposed trigger for effort from 34,000 net days to more closely reflect the average level of effort in the fishery over the last two years.

Localised depletion/Spatial Management

DPI&F to conduct a review seeking broad public and scientific input on the use of spatial management in the ECIFF to reduce the potential for localised depletion of key species (ie grey mackerel but also garfish) and interactions with protected species such as dugong, inshore dolphins and humpback whales. The findings are to be implemented by the 31 December 2010.

p v **Condition 14:** From 1 July 2009, DPI&F is to implement a catch receiver system, with enforcement checking to provide confidence in these data, to verify sales against landings and to cross check logbook catch data with catch landing data.

p4 the Panel believes that even greater weighting should be given to ecological/sustainability considerations since the fishery operates (at least in part) in the GBRWHA. Such a shift in emphasis would be more in line with contemporary application of the ESD principles.

p5 Written submissions were also received from:....

-
- Network for Sustainable Fishing in Far North Queensland/Mossman Boating and Fishing Club; and ...

p6 submissions included:

- Particular concern over the localised depletion and potential collapse of grey mackerel and garfish stocks caused in some cases by the migration of large mesh net boats into the area.

p6 The Panel did not seek, nor did the TOR require, that it undertake a full assessment of the fishery under the EPBC Act, but rather sought to focus and provide advice to the Minister on the key elements of the TOR, that is:

p8 See 2.2. **Guidelines for the Ecologically Sustainable Management of Fisheries 2nd edition:**

p9 See 2.3. **Precautionary Principle (both worth a look - my comment)**

p12 10 DPI to ensure that:

- based on the risk analysis, develop and conduct scientifically robust stock assessments, commencing with those species considered at most risk (noting that where data on which to base stock assessments are of poor quality or does not exist, qualitative assessment methods will be employed); and

p15 under 3.3. Management Approach

... the Panel believes that there continue to be some significant gaps in a number of important areas which make managing the ECIFF difficult.

“It appears that many relatively routine fisheries management adjustments need Queensland Cabinet and sometimes parliamentary approval before they can be implemented. DPI&F explained that in some circumstances, depending on the issue, it could take up to 12 months to implement a relatively simple change, such as a response to a trigger, if this were not built in to the original management regime. Such a delay in providing a management response can be extremely costly to a resource or the broader ecosystem.

.... and: The Panel believes there may be considerable scope to improve the management framework in Queensland and would encourage further discussion and review of policy and legislative settings.”

- compulsory Vessel Monitoring System for netters (*that automatically transmits vessels location - my note*)

p 35. **6.3 Data**

“ ... The level of detail in the effort data, particularly for gillnet fishing, is insufficient for monitoring, catch rate interpretation and management.”

“A well designed observer scheme to validate and supplement logbook data is essential for best practice fishery management.”

“There is also much scope for improvement of data collection and data sharing for monitoring of ecosystem effects.”

p. There should be no netting in DPAs

p50 **Effort & Retained Catch**

“The reason why ‘current’ levels of catch are considered precautionary by DPI&F is not adequately articulated. It appears that this assumption is based on considerations of “stable” catches, “stable” unstandardised catch rates and/or no evidence of “a problem”. These “quantities” are, however, risky as indicators of stock abundance or of sustainability...

... In many cases it would be risky to interpret the proposed indicators as indicators of stock abundance (e.g. catches which are subject to external influences, effort measured in coarse units such as days, and unstandardised catch rates). ...

... but it does not constitute good fisheries management practice, because it potentially perpetuates delaying action to limit fishing - often until it is too late.”

p53 “In submissions to the Panel, we were made aware that some stakeholders have serious concerns about localised depletion of fin fish, including grey mackerel, garfish and fingermark”

(from p66, **Summary of Issues**) The Queensland East Coast Inshore Fin Fish Fishery (ECIFF) is a multispecies, multi gear (gillnet and line) fishery with more than 400 commercial fishers and 750,000 recreational and charter fishers. Recreational fishers are believed to take at least half of the catch. ...

... A serious lack of validated and species-specific data on the fishery catch means there is very limited knowledge of the sustainable levels of catch for most target, byproduct and bycatch species. In addition, there is inadequate fishery-independent data on the interactions with vulnerable and protected species that are susceptible to gillnets – the primary gear used in the ECIFF.

Against this background, the (Review) Panel has concerns over the level of precaution being adopted by Department of Primary Industry & Fisheries (DPI&F) in the development of management arrangements and the setting of catch limits for target species.

Guided by the Environment Protection and Biodiversity Conservation Act and the (Commonwealth) Dept. Environment, Water, Heritage and Arts’ Guidelines for the Ecologically Sustainable Management of Fisheries 2nd Edition, the Panel’s assessment is that under the management measures proposed by DPI&F and in the absence of more information the immediate risks for key target species and protected species are high, as is the risk to the broader ecosystem. The suggested conditions and recommendations reflect these risks, and a view that until more is known, catches should be reduced.

p72 from: 'Issues and Suggested Conditions and Recommendations':

Issue: "Localised depletion/spatial management

"Submissions to the Panel documented (albeit based largely on anecdotal information) localised depletion for some species. These depletions are not always obvious when fishery "assessments" are based on aggregate data, as they have been in the ECIFF. Yet in schooling species with local residency and/or those that form seasonal spawning aggregations, the risk of localised depletion is high e.g. grey mackerel. The DPI&F have indicated that they intend to explore greater spatial management once the proposed management changes have been implemented. The Panel considers that given the geographical size of the fishery and the potential for interactions with protected species this should be a priority.

Condition 11: DPI&F to conduct a review seeking broad public and scientific input on the use of spatial management in the ECIFF to reduce the potential for localised depletion of key species (ie grey mackerel but also garfish) and interactions with protected species such as dugong, inshore dolphins and humpback whales. The findings are to be implemented by the 31 December 2010."

p74: Issue: Management Arrangements

More generally, the proposed management arrangements for the ECIFF are complex and inter-dependent. DPI&F indicated to the Panel that the arrangements were akin to a house of cards - if one were removed, the house would collapse. Such an approach does not allow the flexibility necessary to deal with a fishery operating in a complex, dynamic, world heritage listed ecosystem. Similarly, the past approach in the ECIFF of developing stronger management measures (e.g. quota controls) only when information (anecdotal and research data) suggested there was a problem (e.g. spotted mackerel, tailor and most recently grey mackerel) is a concern.

DPI&F informed the Panel of the significant financial constraints under which ECIFF managers operate when it comes to compliance, monitoring and observing programs. The mixture of complexity and lack of resources lead the Panel to have significant concerns about how well the proposed management measures could be implemented, enforced and ultimately made to work. It is clearly not enough to draw up measures without having the capability of enforcing them and measuring performance against management objectives.

p. 75:

The Panel also has concerns over the potential impact of the fishery on highly vulnerable species, notably inshore dolphins and dugongs (particularly in the extensive non-DPA components of the fishery). Increasing numbers of humpback whales along the Queensland coast are also likely to see increased interactions with ECIFF gill nets.

Finally while recognizing that management of the ECIFF has been significantly improved over recent years, and that DPI&F are committed to further advances towards best practice management in a WHA, the Panel suggests there needs to be a fundamental rethink of the management approach for the ECIFF over the next 3 years, to reduce complexity, ensure sustainability of all species, and to take into account significant spatial heterogeneity in the risks.

Recommendation 8: DPI&F to review management arrangements for the ECIFF and develop a (*new, outline details provided - my comment*) management regime whichetc

Conclusions and quotes compiled by:

David Cook,

27.11.2008