



Australian Government

Department of the Environment and Heritage

Assessment of the Western Australian Shark Bay Snapper Fishery

Approvals and Wildlife Division

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This document is an assessment carried out by the Department of the Environment and Heritage of a commercial fishery against the Australian Government Guidelines for the Ecologically Sustainable Management of Fisheries. It forms part of the advice provided to the Minister for the Environment and Heritage on the fishery in relation to decisions under Parts 13 and 13A of the EPBC Act. The views expressed do not necessarily reflect those of the Minister for the Environment and Heritage or the Australian Government.

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Assessment of the ecological sustainability of management arrangements for the Western Australian Shark Bay Snapper Fishery

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EXECUTIVE SUMMARY

Background

The Department of Fisheries Western Australian (DFWA) submitted the document *Application to Environment Australia on the Shark Bay Snapper Managed Fishery* (the submission) to the Australian Government Minister for the Environment and Heritage on 20 December 2002. The submission contains an assessment of the Western Australian Shark Bay Snapper Fishery (SBSF) against the Australian Government *Guidelines for Assessing the Ecologically Sustainable Management of Fisheries* (the 'Guidelines'). The purpose of the DFWA document is to provide for an assessment of the impacts of actions taken under the *Shark Bay Snapper Management Plan 1994* (FMP) under parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The submission was released for public comment on Friday 17 January 2003. The public comment period ended on 17 February 2003 with 2 submissions received. No changes were made to the submission as a result of public comment.

The submission reports on the SBSF against the *Guidelines*. The DEH assessment considers the submission, associated documents, public comments and DFWA response to the comments.

Table 1 Summary of Western Australian Shark Bay Snapper Fishery

Target Species	Spawning aggregations of Pink Snapper (<i>Pagrus auratus</i>). Spawning age: 4 years plus (41 cm plus).			
Area	Waters of the Indian Ocean between latitudes 23°34'S and 26°30'S out to 200 nm.			
Management controls	A range of input and output controls including TAC and closed areas (see Table 2 for details).			
Licences	49 licences (27 held by prawn/scallop trawlers).			
Gear	Mechanised handlines with an average of 15 hooks.			
Exploitation Status	Over exploited.			
Breeding Stock assessment	Inadequate.			
	2002	2001	2000	1999
Value to fishers (millions \$)	\$2.25 M	\$2.15 M	\$2.24 M	\$2.06 M
Pink Snapper catch (tonnes)	487	467	488	450
Effort (June–July boat days)	1320	894	851	712
CPUE (kg per line boat day)	555	418	578	632
Export	Primarily as whole fish to Japan, Taiwan, Italy and the USA.			
Peak Fishing Season	May to August.			
Bycatch	Undersized snapper, North-west Blowfish, Bludger Trevally.			
Protected species interaction	Anecdotal capture of 2 Grey Nurse Sharks in 15 yrs, Potato Cod.			
Recreational	Bag limit: Reef fish - mixed bag 8 per fisher; Size limit: 41 cm Total catch (recreational and charter catch) approximately 7.5% of the commercial catch at 38 tonnes. Normal bag limit applies except when taken from or brought onto land in the western Gulf of Shark Bay. There is a ban in place on the taking or bringing Pink Snapper onto land in the eastern Gulf of Shark Bay. ¹			

¹ See DFWA website for inner gulf recreational fishing rules.

The SBSF occurs in waters of the Indian Ocean between latitudes 23°34'S and 26°30'S out to 200 nautical miles and includes waters in the Shark Bay World Heritage Area. The Offshore Constitutional Settlement (OCS) arrangements between Western Australia (WA) and the Commonwealth Government of 1988 established that it is the sole responsibility of the State of WA to manage the SBSF out to 200 nautical miles.

The SBSF has been in operation since the late 1980s. The value of the fishery, in excess of \$2 million to the fishers, contributes significantly to the Gascoyne regional economy and the economy of WA in general. During the 1950s, a fleet of mainly rock lobster boats traveled to Shark Bay each winter to join a small local fleet fishing Pink Snapper (*Pagrus auratus*). In 1959 traps were used for the first time, altering traditional fishing patterns and causing conflict between line and trap fishers. Because fish traps cause loss of scales and skin (reducing the value of the fish for export), they are no longer used in the fishery. After peaking at around 600 tonnes during 1959 and 1960, catches declined for a decade until interest picked up in the late 1970s and early 1980s. In 1985, the catch reached an all-time high of 1300 t and concern about over-exploitation resulted in additional management measures that included the establishment of limited-entry status for the fishery. A summary of the SBSF is provided in Table 1.

As well as being taken by the SBSF, Pink Snapper are taken by hand line and drop line by the wetline fleet outside the SBSF area. Snapper are also caught by fishers in the Southern Demersal Gillnet, Demersal Longline, West Coast Demersal Gillnet and Demersal Longline fisheries (who use power operated demersal gill nets and longlines south of the SBSF area), and the charter boat and recreational fishing sectors. Commonwealth deep-water trawlers are permitted to fish in to the 200 metre isobath and are known to catch some snapper between 200 and 260 metres. It is illegal to take snapper by trawl or purse-seine under a WA licence. Shark Bay prawn and scallop trawlers also take some snapper by line when anchored during the day. The prawn and scallop trawl grounds do not have adult snapper and the snapper grounds are very rocky and untrawlable by prawn and scallop trawl gear.

Pink Snapper are found from Barrow Island south around the coast of WA to New Zealand and along the east coast of Australia, as far north as Queensland. Pink Snapper are demersal and can occur to depths of up to 200 m. Pink Snapper are relatively long-lived species with a moderate rate of growth. Individuals may reach 35 years of age but generally begin to recruit to the SBSF (when they reach the minimum size of 41 cm total length) at around four years though most do not recruit until 5 years. Spawning aggregations over the winter months, from late May through until August, form the basis of the peak fishing season and make Pink Snapper particularly vulnerable to localised depletion due to overfishing and recruitment overfishing. The off-peak season fishing is more dispersed than that conducted during the peak season.

Female snapper are serial spawners with larger and/or older females in the population producing more eggs than their younger counterparts, proportional to their weight. Good post-larval recruitment may result in good recruitment into the fishery four or more years later. Pink Snapper are opportunistic carnivores, consuming a wide range of mainly benthic organisms depending on availability.

A large proportion of WA, including areas of coastline that are part of the SBSF, is the subject of Native Title claims.

Overall assessment

The material submitted by DFWA indicates that the fishery operates in accordance with the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. DEH considers that the Shark Bay Snapper Fishery is a well-managed fishery that is unlikely to have an unacceptable or unsustainable impact on the environment in the short to mid term. Recommendations have been developed to ensure that the risk of impact is minimised in the longer term. Overall, the sophisticated management regime of a responsive and regularly reviewed TAC, spatial closures, operational objectives and performance measures, suggests that the fishery is being managed in an ecologically sustainable way.

DEH considers that while the Pink Snapper stocks are currently overfished the information collection system, risk assessments, management arrangements, objectives and recovery strategy are sufficient to ensure that there is a high degree of probability the Pink Snapper stocks will recover. Considering the research programs and management arrangements in place, DEH considers that fishing operations are managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem. Management of this fishery has a history of reacting appropriately to threats to sustainability and DEH is confident that DFWA will continue to provide this adaptive management.

The assessment finds that the fishery is managed in an ecologically sustainable way and its operation is consistent with the objects of Part 13A of the EPBC Act. DEH recommends that the export of species taken in the fishery should be exempt from the export requirements of Part 13A of the EPBC Act, with that exemption to be reviewed in five years. DEH considers that the fishery, as managed in accordance with the management plan, is not likely to cause serious or irreversible ecological damage over this period.

As the official fishery area encompasses Commonwealth as well as State waters, consideration under Part 13 of the EPBC Act is required regarding the impact of the fishery on listed threatened species, listed migratory species, cetaceans and listed marine species.

A number of protected species occur in the fishery area including Grey Nurse Sharks, Loggerhead, Green and Leathery turtles. The actual and potential impact on Part 13 species under the management arrangements is considered low and adequate protection is provided. There are no listed threatened ecological communities in the fishery area.

DEH recommends that the management plan for the SBSF be declared an accredited management plan under Sections 208A, 222A, 245 and 265 of the EPBC Act. In making this judgement, DEH considers that the fishery to which the plan relates does not, or is not likely to, adversely affect the survival in nature of listed threatened species or population of that species, or the conservation status of a listed migratory species, cetacean species or listed marine species or a population of any of those species. DEH also considers that the plan requires that all reasonable steps are taken to avoid the killing or injuring of protected species, and the level of interaction under current fishing operations is low. On this basis, DEH considers that an action taken by an individual fisher, acting in accordance with the plan, would not be expected to have a significant impact on a listed threatened species or listed migratory species protected by the EPBC Act.

The assessment also considered the possible impacts on the World Heritage values of the Shark Bay World Heritage Area. Shark Bay's listed World Heritage values are located primarily in areas that are closed to fishing under the SBSF. For this reason, and the outcomes of the assessment as listed throughout Part Two of this assessment report, DEH considers that fishing activities as currently practiced in this fishery are unlikely to have a significant impact on the world heritage values of

Shark Bay in the short to medium term. On this basis DEH considers that an action taken by an individual fisher, acting in accordance with the management plan would not be expected to have a significant impact on a matter protected by the EPBC Act.

To further strengthen the effectiveness of the management arrangements for the SBSF, and to contain the environmental risks in the medium to long term, a series of recommendations have been developed. The implementation of these recommendations and other commitments made by DFWA in the submission will be monitored and reviewed as part of the next Commonwealth review of the fishery in five years time.

Recommendations

Recommendation 1: *DFWA to inform DEH, within 3 months, of changes to the legislated management plan that may affect the sustainability of the target species or negatively impact on by-product, by-catch, protected species or the ecosystem.*

Recommendation 2: *DFWA to incorporate into the management regime, an objective to minimise protected/listed species interactions, to minimise or maintain at sustainable levels the take of other non-retained species and to minimise impacts on the marine environment.*

Recommendation 3: *DFWA, in its Annual State of the Fisheries Report, to report on the performance of the fishery against performance measures that relate to the sustainability of the fishery.*

Recommendation 4: *If there is a breach in a performance measure, this will be reported in the State of the Fisheries Report. If a breach materially affects the sustainability of the target species or negatively impacts on by-product, by-catch, protected species or the habitat, the breach will be reported to the Minister for Fisheries within 3 months for subsequent management review and action with timeframes for implementation.*

Recommendation 5: *The ESD report, including all performance measures, responses and information requirements, to be formally incorporated into the management regime and decision making process.*

Recommendation 6: *DFWA to ensure, where appropriate, that any relevant indigenous, conservation, recreational and world heritage interests in the fishery are considered through consultative mechanisms.*

Recommendation 7: *DFWA to complete the formal compliance risk assessment and develop the compliance performance measures for the ESD report.*

Recommendation 8: *DFWA to establish a program to monitor the length frequency distribution for recreationally (derived mainly from charter boat catch) and commercially caught snapper to consider the impacts of fish mortality on snapper populations and develop appropriate management measures, if needed, to deal with this issue.*

Recommendation 9: *The impacts (take and incidental mortality) of recreational and other commercial fishing activities (trawling by both Commonwealth and State vessels and state wetline fishers) to be taken into account by DFWA when setting the TAC.*

Recommendation 10: *Within 12 months DFWA to incorporate a precautionary spawning biomass performance measure into the ESD report to ensure the sustainability of the fishery.*

Recommendation 11: *DFWA to implement a monitoring program sufficient to identify long-term trends in bycatch to ensure that information used in the risk assessment for the fishery remains based on accurate and current data.*

Recommendation 12: *DFWA to provide a mechanism which allows fishers to record interactions with protected/listed species. DFWA to implement an education program to ensure that industry has the capacity to make these reports at an appropriate level of accuracy.*

PART I - MANAGEMENT ARRANGEMENTS

The Department of Fisheries Western Australian (DFWA) manages the Shark Bay Snapper Fishery (SBSF). The management regime is described in the following documents, all of which are, or will be, publicly available:

- The *Shark Bay Snapper Management Plan 1994*
- Shark Bay Snapper Managed Fishery Licence
- The *Application to Environment Australia for the Shark Bay Snapper Fishery* (part of the ESD Report Series)
- The *WA Fisheries Resources Management Act 1994* (FRMA)
- The *WA Fisheries Resources Management Regulations 1995* (FRMR)
- Relevant Gazetted notices and licence conditions
- Ministerial Policy Guidelines : Shark Bay Pink Snapper Managed Fishery In Western Australia

A number of other documents, including research reports, scientific literature and discussion papers, are integral to the management of the fishery. Any discussion papers and proposals for modification to the above management arrangements are distributed widely to stakeholder groups and, where appropriate, are available on the DFWA website.²

DEH considers it important that management arrangements remain flexible to ensure timely and appropriate managerial decisions. Due to the importance of the Ecologically Sustainable Development (ESD) report and Management Plan to DEH's assessment of the fishery, an amendment to either could change the outcomes of our assessment. Hence DEH requests that DFWA advises of any changes to the management regime that may impact on the sustainability of the SBSF.

Recommendation 1: *DFWA to inform DEH, within 3 months, of changes to the legislated management plan that may affect the sustainability of the target species or negatively impact on by-product, by-catch, protected species or the ecosystem.*

The SBSF accesses an oceanic stock of Pink Snapper (*Pagrus auratus*). Although there are no interactions with adjacent jurisdictions due to the location of the fishery on the central coast of WA, there are intra-state cross fishery management issues. These are discussed under Principle 1 Objective 1 in Part II of this assessment.

The SBSF operates within the area of the current Shark Bay World Heritage Area. Pink Snapper have been fished commercially in the Shark Bay region since the beginning of the twentieth century. All waters of the Shark Bay World Heritage Area lie within the bounds of the licence area for the SBSF. However, closures in the inner gulfs result in less than 10% of the Shark Bay World Heritage Property actually being in the SBSF. One of the World Heritage values of Shark Bay for which the property was inscribed on the World Heritage list in 1991 was "the great genetic variability in marine species (eg. Pink Snapper, venerid clams)" as a result of the salinoclines which create two inner bay stocks and an outer bay stock of pink snapper.

Under the EPBC Act, a person may not take an action that has, will have or is likely to have a significant impact on the world heritage values of a declared World Heritage property. People that are taking actions that are a lawful continuation of a use of land, sea or seabed, that was occurring immediately before the commencement of the EPBC Act, may continue to take those actions. An enlargement, expansion or intensification of a use is not a continuation of a use. Shark Bay's listed

² DFWA website www.fish.wa.gov.au.

World Heritage values are located primarily in areas that are closed to fishing under the SBSF. For this reason, and the outcomes of the assessment as listed throughout Part Two of this assessment report, DEH considers that fishing activities as currently practiced in this fishery are unlikely to have a significant impact on the world heritage values of Shark Bay in the short to medium term. Any significant change to existing practices, which is likely to significantly impact on Shark Bay's World Heritage values, is likely to require approval by the Australian Government Minister for the Environment and Heritage.

DFWA has advised that given the small size of the fishery and the number of licences, there is no formal or ongoing Management Advisory Committee for the SBSF. The Shark Bay Snapper Managed Fishing Working Group (the Working Group), established in 1995 with Ministerial approval, was comprised of an independent chair, representatives from two fishermen's associations and one representative from the Department of Fisheries. Its purpose was to revise the management plan for the SBSF. The group adopted three guiding principles to develop the revised management arrangement for this fishery, which also apply to the DFWA management approach. These included the maintenance of Pink Snapper stocks at sustainable levels for the present and future benefit of industry and the community. The current working group, which began in 2001, is made up of industry members and department staff. Its primary focus is to work out issues that develop within the fishery.

Ministerial Policy Guidelines (MPG) finalised in March 2002 for the SBSF provide guidance to the Executive Director of DFWA in regard to day-to-day management issues.³ Under the provisions of the FRMA the development or amendment of the MPGs also involves public consultation.

DFWA has developed an ESD report for the SBSF, based on the National ESD Reporting Framework.⁴ Development of the report involved four steps:

- **Issue identification:** a stakeholder workshop to identify issues that need to be addressed for the fishery (August 2001).
- **Risk assessment/prioritisation:** a risk assessment/prioritisation process which identified issues of sufficient significance (moderate, high or extreme risks) to warrant specific management actions and hence a report on performance. Justifications for assigning negligible to low risk were also recorded but a full report is not required.
- **Component reports:** Assessment of issues of sufficient risk (moderate, high or extreme risks) to require specific management actions with operational objectives, indicators and performance measures, management responses etc specified.
- An overview assessment of the fishery was completed and an action plan for activities that will need to be undertaken to enable acceptable levels of performance to continue or, where necessary, improve the performance of the fishery, were completed.

Operational objectives, indicators, performance measures and management actions to address issues that have been rated as moderate, high or extreme risks are specified in the ESD report. No operational objectives exist in the current ESD Report concerning minimising impacts of the fishery on bycatch and protected species and the broader marine environment because the risk assessment found that this fishery was of negligible or low risk to these issues thus not requiring the full report. DFWA advises that when this fishery is reassessed in five years time, if the fishery is of higher risk (Moderate, High or Extreme) to any of these issues then a full report, including operational objectives, indicators and performance measures, will be developed. DEH suggests that DFWA incorporate into the management regime, an objective to minimise protected/listed species interactions, to minimise or maintain at sustainable levels the take of other non-retained species and to minimise impacts on the marine environment.

³ <http://www.fish.wa.gov.au/comm/broc/mpg/mpgsbs/index.html>.

⁴ Website <http://www.fisheries-esd.com/>.

Recommendation 2: *DFWA to incorporate into the management regime, an objective to minimise protected/listed species interactions, to minimise or maintain at sustainable levels the take of other non-retained species and to minimise impacts on the marine environment.*

DEH considers that a transparent management regime involves not only making public the operational objectives, indicators and performance measures that the fishery will be assessed against, but also public reporting on how management is meeting those performance measures.

Recommendation 3: *DFWA, in its Annual State of the Fisheries Report, to report on the performance of the fishery against performance measures that relate to the sustainability of the fishery.*

DFWA has advised that if a performance limit is reached the first action required is to determine why this has occurred and develop specific strategies to rectify the situation. The ESD report provides only a few of the possible strategies that may be used if such a situation arose. An assessment of the effectiveness of these performance measures is included in Part Two of this report. However, the ESD report provides no timeframes for implementation of the management actions once a performance measure is breached.

Recommendation 4: *If there is a breach in a performance measure, this will be reported in the State of the Fisheries Report. If a breach materially affects the sustainability of the target species or negatively impacts on by-product, by-catch, protected species or the habitat, the breach will be reported to the Minister for Fisheries within 3 months for subsequent management review and action with timeframes for implementation.*

The ESD report will be reviewed every five years. This review will include an external review and full assessment including examination of the validity of the objectives and performance measures. The full ESD report, once finalised, will be available via publication and on the DFWA website. A sufficiently representative set of stakeholders were involved in the development of the report. Although the ESD report has not yet been finalised and is not currently a formal component of the legislative arrangements for the fishery, the DFWA submission indicates that these rules and requirements will be implemented in the fishery to ensure that the fishery management regime remains strategic and capable of detecting and addressing unacceptable impacts of fishing activity.

Although DEH considers that this lack of a legislative base will not cause issues in the fishery in the short term, given the importance of the ESD report to the management of the fishery, greater certainty and transparency would be provided by formally incorporating the report into the management regime.

Recommendation 5: *The ESD report, including all performance measures, responses and information requirements, to be formally incorporated into the management regime and decision making process.*

DFWA produces an annual State of the Fisheries Report, which forms part of the Annual Report.⁵ Individual fishery status reports provide an annual ‘report card’ on ESD performance for all of the State’s major commercial fisheries and some recreational fisheries. The annual reports include assessments of target and byproduct stocks, non-retained species, ecosystem effects and a research summary. The reports are discussed more fully in Part Two of this report.

⁵ Required under s263 of the FRMA.

At an annual meeting for SBSF fishers, DFWA presents the status of the resource, effectiveness of current management arrangements, predictions for future years' catches and any proposals for alterations to arrangements.

DEH considers that a five-year review of the entire fishery is suitable while critical aspects are reviewed annually. DEH considers that DFWA provides for a periodic review of the performance of the fishery management arrangements and the management strategies, objectives and criteria. DEH considers that through the Annual State of the Fisheries report, ESD report and annual reports to industry, DFWA has a comprehensive, transparent and highly accessible reporting framework for reporting on the SBSF.

The FRMA outlines specific procedures for amending a management plan,⁶ which includes specification of who is to be consulted before the plan is amended and consultation with that group on any proposed amendments. The group designated for consultation on the SBSF plan is 'all licensees.' There is no formal management advisory committee, however in addition to the licensees, DFWA also consults with the Shark Bay Snapper Fishermen's Association and the Shark Bay Snapper Working Group as a courtesy. If an urgent amendment is made to the management plan the Minister must consult with the Association and Working Group as soon as practical after the plan has been amended.⁷ DEH considers that DFWA should ensure that relevant Indigenous, conservation, recreational and world heritage interests in the fishery are considered through appropriate consultative mechanisms.

Recommendation 6: *DFWA to ensure, where appropriate, that any relevant indigenous, conservation, recreational and world heritage interests in the fishery are considered through consultative mechanisms.*

The FRMA and the SBSF management plan provide the legislative ability to control the level of harvest within the fishery. This is achieved through a combination of input and output controls as outlined in Table 2. DFWA has varied these arrangements during the past 40 years to ensure that management remains appropriate to achieve the sustainability objectives for the fishery. These controls are coupled with a range of operational objectives, performance measures and management actions described in the ESD report and summarised in part in Table 3.

Table 2 Input and Output controls used in the management of the Shark Bay Snapper Fishery

<p><i>Input Controls</i></p> <ul style="list-style-type: none"> • Gear Restrictions (only permitted to use line and hook). • Controls on the number of licences. • Spatial Closures - commercial fishing is not permitted within the eastern and western inner gulfs of Shark Bay and also in an area adjacent to the eastern side of Bernier and Dorre Islands.
<p><i>Output Controls</i></p> <ul style="list-style-type: none"> • Quota management for the Pink Snapper Total Allowable Catch (TAC): currently 338,250 kg in 2004, reduced from 563,750 kg; 5125 Units (Unit = 66 kg, reduced from 110 kg and minimum unit holding is 100 units). • Minimum legal size of 41 cm for Pink Snapper (commercial and recreational) (allows approx 90% Pink Snapper to spawn at least once before being available to be retained). • Recreational bag limits on Pink Snapper.

⁶ s 65 FRMA.

⁷ s65 (3) and (4) FRMA.

The operational objective for compliance in the fishery is to have sufficiently high levels of compliance with the FRMA, FRMR and the Plan to ensure the sustainability of the target stock. DFWA acknowledges that effective compliance is vital to achieving the management objectives of the fishery. Performance measures for achieving this objective are being developed by the Working Group, which is also undertaking a formal compliance risk assessment. Compliance in the fishery includes a mix of sea patrols and surveillance, land patrols, quota database inspections, processing factory inspections, covert surveillance operations and education programs.⁸ DFWA comments that fishers, given the high value of licences, are also a source of information on illegal activities. Accurate completion of the catch and disposal record forms in a timely manner is vital for maintaining the integrity of the quota management system. Accordingly, offences in relation to this will continue to be treated as major offences. The State of the Fisheries Report also provides detailed statistics on Departmental activities in relation to ensuring fishers' compliance with the management arrangements for each fishery. DEH considers that DFWA provides an effective enforcement and compliance system. Given that a TAC managed fishery relies on an effective compliance regime DEH welcomes the commitment to a risk assessment and recommends completion of the formal compliance risk assessment and development of the compliance performance measures in a timely manner.

Recommendation 7: *DFWA to complete the formal compliance risk assessment and develop the compliance performance measures for the ESD report.*

An analysis of the fishery's capacity for assessing, monitoring and avoiding, remedying or mitigating any adverse impacts on the wider marine ecosystem in which the target species lives and the fishery operates is contained under Principle Two of this report.

DEH considers that the current management arrangements comply with all relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies developed under that policy. DFWA has demonstrated in the past their capacity and willingness to amend arrangements in order to respond to new information or future Government plans and policies.

No regional or international management regimes, to which Australia is a party, are of direct relevance to the fishery. The prime international regime affecting the fishery is the United Nations Convention on the Law of the Sea (UNCLOS). The management regime essentially complies with this. Other international regimes are applicable to fisheries management but do not explicitly involve this fishery, for example the 1992 Convention on Biological Diversity and in particular the 1995 Jakarta Mandate requiring that, in relation to the sustainable use of marine and coastal biological diversity, the precautionary principle should apply in efforts to address threats to biodiversity. While these agreements are not specifically addressed in the Submission, the fishery's compliance with their requirements can be assessed by examination of Part Two of this report. The application of the International Convention for the Prevention of Pollution from Ships (MARPOL) to vessels operating in the fishery is explicitly discussed under Principle 2, Objective 3.

DEH considers it is incumbent on all authorities to develop a thorough understanding of the framework of national, regional and international agreements and their applicability to export-based fisheries for which they are responsible.

⁸ See section 5.4.1.3 of DFWA submission.

Table 3 Summary of operational objectives, performance measures and management actions relating to ecologically sustainable management for the Shark Bay Snapper Fishery contained in the ESD report.

	Operational Objective	Performance measure	Possible management actions if performance limit is exceeded due to fishing
Pink Snapper	To maintain the spawning stock of Pink Snapper at or above an identified level that minimises the risk of recruitment overfishing.	500 kg/standard June-July boat day.	<ul style="list-style-type: none"> • Reduce quota allocations for the following seasons. • Additional temporal closures. • Increase minimum size limit.
Management effectiveness	Licensees in the SBSF are able to take the TAC exerting acceptable levels of effort and without adversely impacting on overall snapper stock levels.	<ul style="list-style-type: none"> • the number of days effort required to take the TAC remains in the acceptable range of 820-950 standard 'June-July' (reported as May-August in 2002 State of the Fisheries Report 2002/2003) line boat days. • % of the TAC caught is above 80%. 	<ul style="list-style-type: none"> • TAC reduction. • Possible further restrictions to recreational fishers.
Compliance	To have sufficiently high levels of compliance with the FRMA, FRMR and the Plan while ensuring the sustainability of the target stock.	Currently under development. (see Recommendation 7)	
Consultation	To administer a consultation process that is in accordance with the requirements of the FRMA and allows for the best possible advice from all relevant stakeholders to be provided to the decision maker (Minister/ED) in a timely manner	<ul style="list-style-type: none"> • Provision of advice from the Working Group to the executive director (Despite not being a formal group with specified reporting requirements). • Provision of SBSWG minutes to all licensees for their information. • Proper consultation procedures have been followed in any amendment of the management plan • An annual skipper/licensees briefing. 	
Assessments and reviews	To continue to report annually to the Parliament and community on the status of all fisheries including the Snapper fishery and to prepare a framework for reporting on ESD for all Western Australian fisheries.	General acceptance of the management arrangements by the community.	

Conclusion

DEH considers that the SBSF management regime is documented, publicly available and transparent, and is developed through a consultative process. The management arrangements are adaptable and underpinned by appropriate objectives and performance criteria by which the effectiveness of the management arrangements can be measured, enforced and reviewed.

The management arrangements are capable of controlling the harvest through a combination of input and output controls appropriate, to the size of the fishery. Periodic review of the fishery is provided for, as are the means of enforcing critical aspects of the management arrangements.

The management regime takes into account arrangements in other jurisdictions, and adheres to arrangements established under Australian laws and international agreements.

DEH considers that there is scope to further refine the management arrangements and has provided a number of recommendations for improvements in the longer term.

PART II – GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES

Stock Status and Recovery

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”*

Maintain ecologically viable 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”*

Information requirements

Commercial operators are required to lodge daily catch and disposal records and monthly returns that detail catch and effort information by one-degree blocks. Strict controls exist regarding the notification of landing snapper, weighing of the catch and transporting of catch. Masters of the snapper vessels must notify DFWA immediately before or upon landing of any snapper. Any snapper landed must be accurately weighed within 240 minutes of being landed. Prior to the fish being moved, once on shore, the weight must be recorded and entered into a Catch and Disposal Record (CDR) book, and a copy of that information must be provided to DFWA within 24 hours of the landing. There are only two areas where catch can be landed and fishers are not allowed in these areas until the CDRs are filled out. Furthermore, external factors, such as a very low beach price, do not encourage individuals to cheat on their CDRs. An offence carries substantial fines (1 year imprisonment- \$25,000 fine). In addition, the vast majority of the snapper taken goes through one processor so the incentive to cheat is reduced because the offence is likely to be detected.

Recreational catch information is collected via creel surveys every five years. There is no Indigenous take from this fishery. Illegal take is estimated from compliance data. DEH considers that there is a reliable fishery dependent data collection system in place.

Research on the oceanic stock targeted by the SBSF was undertaken in the 1980s and provides the scientific knowledge base for the current management regime. A FRDC funded project⁹ that commenced in July 2000 and finished in 2004, utilised data collected since the 1980s to assess and model the snapper stock. The FRDC project was aimed at developing an age-structured model from which the 2001-2003 TAC of 563.75 tonnes can be reassessed. The objectives of the study were to:

1. Estimate annual recruitments and fishing mortalities in the snapper fishery throughout the 1980s and 1990s.
2. Assess the risks to the snapper stock of a range of annual commercial and recreational catches, taking into account the mortality of discarded fish and variability in recruitment.
3. Devise a minimal cost method for future monitoring of the snapper fishery.

Results from this project indicate that the stock assessment completed in the mid 1980s, which estimated the maximum sustainable yield to be around 600 t, was probably an overestimate of the sustainable yield. Thus the stock appears to have been declining slowly since the early 1990s, despite commercial landings of only 500 t annually. The TAC has been reduced as an interim measure for 2004 to 338.25 t (around a 40% reduction). DFWA advises that the TAC will be revised downwards (based on the final results of this project) in the setting of new quotas in September 2004. The project also concluded that as for other snapper stocks in Australia and New Zealand, the levels of annual recruitment can be highly variable. DFWA advises that additional data from 2001, 2002 and 2003 will be used to update the stock assessment and provide advice for ongoing management prior to the peak fishing season in 2004. The advice is that a TAC of 220 t for 2005 to 2009 has a probability of 0.5 of rebuilding stocks to the target level of 40% of virgin biomass and a probability of 0.95 of being above 30% of virgin biomass by 2009. A TAC of 480 t thereafter is recommended to maintain stocks at this level. These estimates will be reviewed annually in the short term. These figures take into account mortality of undersized snapper.

Preliminary results of the post-capture mortality rates of snapper caught and returned to the water by commercial and recreational fishers indicate that when snapper have been caught from depths of greater than 40 meters, as in most of the fishery, mortality is greater than 70%. Final results of this study may have ramifications for size limits across all sectors. Pink Snapper have a tendency to school according to size, so fishers try to pick areas with larger fish. Except for the mid 1980s, the peak of the length-frequency distribution for the commercial snapper catch is well above the minimum size with the proportion of undersized catch being quite small. It should be noted that DFWA advises that length-frequency information collection has up until now generally been of retained fish. In the early 1990s discarded fish were also measured through on-board monitoring. While the catch of undersized snapper is thought to be a very small proportion of the total commercial catch, DFWA has advised that this will be checked through on-board monitoring planned for the coming year. DFWA will develop a program to monitor the length frequency distribution of snapper caught which will identify the periodicity of sampling needed in the fishery. The periodicity of this sampling will remain under review to ensure its adequacy for input to the stock assessment model.

Recommendation 8: *DFWA to establish a program to monitor the length frequency distribution for recreationally (derived mainly from charter boat catch) and commercially caught snapper to consider the impacts of fish mortality on snapper populations and develop appropriate management measures, if needed, to deal with this issue.*

⁹ FRDC 2000/138.

DEH strongly supports the investigation of the use of specifically designed hooks, such as circle hooks, to reduce gut hooking of undersized fish or fish not marketed. DFWA advises that a project to evaluate specially modified hooks will begin in the 2004 peak season.

A summary of research conducted for the SBSF since 1982 is provided at appendix 5 of the DFWA submission.

Prior to 1996, observer data was collected by researchers in the Department and unpublished data was used in the risk assessment for this fishery. DEH notes that there is currently no fishery independent information collected in the fishery and suggests that this may be the focus of future research.

Assessment

Snapper targeted in the SBSF are classified as being over exploited. A review of the SBSF is conducted yearly which includes an assessment of the total catch by the fishery, effort levels required to take the catch, distribution of effort both spatially and temporally across the season and calculated catch rates. This review is reported in the State of the Fisheries Report. DEH considers that this process provides a satisfactory regular assessment of the ecological sustainability of the fishery and periodic review of data collected on the dynamics and status of the fishery.

Research has shown that three distinct stocks of Pink Snapper occur within the Shark Bay region,¹⁰ two populations within the inner gulfs of Shark Bay and one that inhabits the mouth and outer ocean. These three populations are a result of the hydrological structure in Shark Bay, which is characterised by salinoclines and three major water types. This salinity pattern influences the distribution of marine flora and fauna, including Pink Snapper, within the bay. New evidence also indicates that the snapper population inhabiting the Denham Sound part of the outer bay has only limited mixing with the ocean stock.¹¹ The inner bay stock has been severely depleted by recreational fishing and is subject to separate management arrangements.

There is some conjecture that the Abrolhos Islands stocks of Pink Snapper may act as a nursery area for the oceanic stocks from Shark Bay.¹² Tagging studies have shown that Pink Snapper living in the mouth and outer ocean may travel up to 300 kilometres. The known extent of spawning aggregations is from close to the shore to 11 nautical miles west of the islands or 25 nautical miles off the mainland north of the bay. The smaller fish tend to aggregate farther offshore than the large ones. Spawning occurs in winter when the Leeuwin current is flowing and it is likely that eggs and larvae from the more offshore part of the spawning distribution are carried to the south and may possibly be important to the maintenance of snapper stocks off the mid-west coast. The extent of the snapper 'oceanic' stock and the significance of the Shark Bay Snapper population in seeding other areas is one of the information/research gaps identified in the Risk Assessment Workshop papers. DFWA contend that if management of the fishery is such that adequate spawning stocks are maintained for the managed fishery in Shark Bay, then they would consequently be maintained for the downstream areas, particularly as it is likely to be the younger offshore fish, which are the least depleted by fishing, that contribute most to the downstream recruitment. DEH encourages DFWA to continue to work towards developing a greater understanding of the importance of the Shark Bay snapper oceanic stock in seeding other areas.

Within the fishery area, only a relatively small portion of the licence area forms the functional fishery (around 1%) due to fishers targeting the higher yield fishing grounds.

¹⁰ Edmonds and Moran 1994, Johnson *et al* 1986.

¹¹ M. Moran, DFWA Research Division pers. Com. Cited in DFWA submission.

¹² M. Moran, pers. comm. 1998 cited in Crowe, Lehre and Lenanton (1999).

In terms of overall ecosystem management, DEH considers that it would be best for the Shark Bay fishery to be managed as a single unit (area based and inclusive of all catch). This is also reflected in the outcomes of a review of management directions for WA's coastal commercial fisheries which concluded that current management boundaries for commercial coastal finfish fishing should be modified to complement management for recreational and charter fishing, and establish a consistent basis for integrated management and resource allocation.¹³

Currently a number of fisheries, other than the SBSF, contribute to Pink Snapper mortalities:

- The open access Western Australian Fishing Boat Licence (FBL) or "wetline" licence has access within the waters of the SBSF to target species other than Pink Snapper. The extent of this fishing activity and the associated mortality of Pink Snapper on return to the water from vessels is the subject of ongoing discussions with industry and consideration by DFWA.
- The level of interaction between the Shark Bay prawn and scallop fleets and the snapper stocks is also under examination. Issues relate mainly to the separate inner Pink Snapper stocks, which are not targeted in the SBSF.
- It is not clear from submission whether other commercial fisheries along the coast also access the oceanic stock that the SBSF accesses (apart from the other fisheries that operate in the SBSF area such as the wetline fishers and Commonwealth trawlers etc).
- The SBSWG has also raised concerns regarding the unquantified impacts of the recreational sector and other commercial fishing activities (trawling by both Commonwealth and State vessels and State wetline fishers) on oceanic stocks. Significant release mortality of undersized snapper (from charter, recreational (70% of rec fish discarded – results of NRIFS) and wet line fishers (have to throw all snapper back) is currently not taken into account in TAC setting. DFWA advise that 'catch and release' by other commercial line fishers and trawlers operating in the area is currently being investigated. Industry has raised concerns over Commonwealth deep-water trawlers fishing within the bounds of the SBSF. Commonwealth deep-water trawlers are permitted to fish up to the 200 metre isobath.

DEH recommends that the take from these fisheries need to be incorporated into the TAC setting process. This is particularly important given the recent assessment that the fishery is overfished.

Recommendation 9: *The impacts (take and incidental mortality) of recreational and other commercial fishing activities (trawling by both Commonwealth and State vessels and state wetline fishers) to be taken into account by DFWA when setting the TAC.*

Recreational catches from the oceanic stock, which occur along the Shark Bay outer islands and extends to the northern part of Denham Sound, were assessed in 1998-99 and estimated at 14 tonnes (approximately 2.5 % of the commercial catch). Preliminary results from charter boat returns indicate that the take by charter boats for 1998/99 was about 6 tonnes. The collection of returns from charter boats in 1998/99 was a trial year. Collection of annual charter boat returns are only a recent requirement, but DFWA will now collect this information on an annual basis. For 2002, charter catch was 24 t (5 % of the commercial catch). Total recreational snapper catch (recreational and charter) is approximately 7.5 % of the commercial catch. DFWA advises that in the past, the commercial fishery TAC was set 40 or more tonnes below the estimated Maximum Sustainable Yield to allow for the recreational catch, which was thought to be around 30 tonnes. Charter boats are now providing monthly catch and effort information and there is an estimate of the non-charter recreational catch from a survey in 1998. Recreational catches are now included in the age-structured stock assessment with the aim of managing them alongside the commercial catch.

¹³ Management Directions for WA's Coastal Commercial Finfish Fisheries. Fisheries Management Paper 134 March 2000.

DFWA has not determined the precise nature of the stock/recruitment relationship for the Pink Snapper stocks in this fishery. Some assumptions are made based on the general body of knowledge derived from other similar finfish fisheries in Australia and the world. The level of recruitment for finfish species, similar in biology and dynamics to snapper, is generally considered to be unaffected while the spawning stock is greater than 30% of the virgin biomass.¹⁴ Previously, based on a yield per recruit analysis, with a small proportion of the catch being undersized, and a fishing mortality on the recruited snapper of less than 0.3, it was estimated that the spawning biomass was at least 30% of the virgin level. Estimates from a stock-production model indicate that the total biomass (mature + immature) may have been as high as 60% of unfished levels. The combination of these two sets of information suggested that spawning biomass was above the assumed point (30%) where recruitment may become affected by stock size. However, the recent FRDC project has determined that the breeding stock level for the oceanic stock is currently below 30% of the unfished level. For the coming years, DFWA has advised that they are looking towards setting the performance measure for the snapper component of this fishery at 40% spawning biomass. DFWA advises that appropriate management action (re-setting of TAC) to initiate restoration of the stock to the 40% level will be taken in 2004 based on the final results of the FRDC project.

A production model, developed in the 1980s based on the catch and catch rate of the SBSF during the previous 20 years suggested that the maximum sustainable yield (MSY) for this stock was 600 tonnes per annum. The FRDC project has now concluded that this was an overestimate of the sustainable yield, which is now estimated to be around 500 tonnes. DFWA advises that the total allowable catch has been revised downwards (by around 40%) in 2004 based on the final results of this project.

DEH considers that DFWA are responding in a timely manner to the results of the age structure modelling to ensure that the harvest level is set at an ecologically sustainable level.

Management response

The objective in the ESD report is to maintain the spawning stock of Pink Snapper at or above an identified level that minimises the risk of recruitment overfishing. The performance measure is 500 kg/standard June-July boat day (limit reference point). Catch rates peak in June –July so this period is considered the most appropriate estimator of local abundance. Over the past 10 years catch rates have been relatively stable averaging 593 kg/boat day which is above the current limit reference point. DFWA has advised that they are aware that technology creep would affect the CPUE. DEH note that CPUE is generally not a useful indicator for a fishery that targets spawning aggregations and strongly supports the development of a performance measure linked to maintaining an agreed percentage of virgin spawning biomass as discussed below. DFWA has committed to changing the stock indicator from catch rate to spawning biomass.

Recommendation 10: *Within 12 months DFWA to incorporate a precautionary spawning biomass performance measure into the ESD report to ensure the sustainability of the fishery.*

Since the beginning of 2001, the SBSF has been quota-managed on a year-round basis (prior to this only the peak season was quota managed). The annualised quota system was set at 563.7 tonnes of Pink Snapper (reduced to 338 t for the 2004 season). Strict controls exist regarding the notification of landing snapper and weighing and transportation of the catch. A minimum unit holding principle, which is currently 100 units, aims to encourage a lower number of participants in the fishery, with a significant level of commitment to the fishery, which in turn improves compliance effectiveness. Although units are transferable, a number of governing policies and principles exist.

¹⁴ based on assumptions in Mace 1994 and Gabriel and Mace 1999.

Following the amendments in 2001, each of the 27 licences attached to Shark Bay prawn and scallop trawlers was allocated transferable quota units that had an initial value of one tonne. It is expected that the new quota arrangements will facilitate utilisation of latent effort from the Shark Bay prawn and scallop trawler fleet. Results from two studies currently underway (age structure stock assessment model and mortality of released snapper) will allow DFWA to examine various management issues such as the implementation of a managed Wetline fishery and changes to the Total Allowable Catch (TAC).

The catch of Pink Snapper has been kept below the previously estimated maximum sustainable yield of around 600 tonnes for the past 12 years with an average of approximately 500 tonnes. The submission states that the quotas in the fishery are set with the purpose of maintaining biomass at above half of the unfished level although this is not an explicit performance measure. DFWA has committed to changing the stock indicator from catch rate to spawning biomass (see **Recommendation 10**).

DFWA will continue to collect data on the age-structure of the snapper population for the fishery model and set the quota accordingly. Under the MPG, in setting the TAC the Executive Director is to take advice from the Director of Research with respect to the state of the Pink Snapper stock in Shark Bay and any other factors considered to be relevant (for example, the level of recreational fishing) to the long-term sustainability of the stock. Furthermore, fishermen actively participating in the Fishery may have relevant anecdotal information related to pink snapper stock levels. Therefore the Executive Director is to take into account any relevant advice from the Director of Research, industry members, recreational fishing bodies and the like before making any decision on the TAC.¹⁵

DFWA argues that if the TAC is realistic then it could be assumed that the TAC is set at a level which effectively 'buffers' external factors (such as recreational catch, impact by other commercial fishermen) and as such, one would expect commercial fishers to be able to catch the TAC in a timely manner. Hence performance measures include:

- the number of days effort required to take the TAC remains in the acceptable range of 820-950 standard June-July line boat days; and
- 80% of the TAC is taken.

The 2002 level of CPUE was outside the acceptable range and was a trigger for the review of the fishery that is currently in progress. DEH considers that these performance measures coupled with the introduction of the proposed spawning biomass indicator (see **Recommendation 10**) and a clear process to dealing with a breach of a performance measures (see **Recommendation 4**) should be sufficient to monitor the performance of the fishery.

Concern was raised during public comment regarding latent effort levels in the fishery. DFWA has advised that while latent effort can be an issue for other fisheries (i.e. trawl fisheries and effort based fisheries), it is not relevant for the SBSF as it is a quota-managed fishery and effort does not affect the TAC. DFWA also advised that effort creep is also not considered currently relevant in determining catch rates for this fishery since the latest technology increase in efficiency, Global Positioning System (GPS), was introduced into the fishery over ten years ago. The DFWA is aware that effort creep would affect the CPUE. DEH notes that efficiencies arise due to skippers learning, new boats replacing old, new radars, new engines in boats etc and this needs to be built in to how DFWA uses its CPUE for management purposes.

Yield-per-recruit models indicated that, over a wide range of values of fishing mortality and for assumed natural mortality rates of 0.2 and 0.3, yield-per-recruit of Pink Snapper would either be

¹⁵ section 4.3 of Ministerial Policy Guidelines.

increased or not affected by increases in minimum legal length from 38 to 41, 45 or 50 cm. Egg-per-recruit models indicated that the reproductive potential of the population was substantially improved by increases in minimum length, especially when fishing mortality was high. Based on these results, an increase in minimum legal length from 38 to 45 cm was recommended. Consultation with recreational and commercial fishermen revealed that while most supported the change, it would adversely affect the developing export market for snapper. A compromise decision was made to increase the minimum length to 41 cm.¹⁶

Concern was raised during public comment about the minimum size being different from the size at first spawning. The current minimum size of 41 cm is above the mean size at maturity of 38 cm. DFWA has commented that the minimum size is only one of the management measures used to maintain the biomass of the oceanic Snapper stock. Length and age frequencies show that fishing mortality does not reach its maximum level until several years after minimum size is reached, hence most fish actually spawn several times before capture. DEH concurs with the DFWA arguments and decision to set the current size limit.

Maintenance of the catch rate, combined with the size limit allowing 90% of the snapper stock to reach maturity prior to exploitation, should guarantee that the breeding stock will be maintained at levels where subsequent recruitment is not likely to be adversely affected. DEH considers that the current management strategies in place are capable of controlling the level of take in the fishery in the short term and that the timely implementation of the FRDC project outcomes should increase this certainty. DFWA advise that the commercial success of the SBSF appears to have encouraged many fishers to be somewhat risk averse and inclined to a very conservative approach to management, particularly given their level of investment. This coupled with the adaptive management approach taken by DFWA, should ensure that stocks of Pink Snapper remain at ecologically viable levels.

There is no byproduct in the SBSF. A number of species are taken by SBS fishers, including mullet, various species of cods (Serranidae), trevallies (Carangidae) and spangled emperors (Lethrinidae) under other endorsements (105 tonnes (excluding mackerels) taken in 2001). Snapper fishers also catch some tunas and mackerels by trolling, but not as part of their demersal snapper fishing operations. These species are the target species of the WA wetline fishery (FBL licence). Of the species targeted under the wetline license, mackerel will be the only species to come under formal management in the near future. The remaining species will continue to be available to holders of FBLs until all scale fish species are formally managed. The FBL is currently under consideration through the Wetline Review. DFWA has advised that the assessment and management of these species will be dealt with under the environmental assessment of the Wetline and Spanish Mackerel fisheries. The assessment report for the Spanish Mackerel Fishery is expected to be submitted in 2004. Catches taken by the SBS fishers under their wetline endorsements will be included in these analyses, along with other sectors, including recreational take.

Conclusion

DEH considers that the management regime in the SBSF is appropriately precautionary and while Pink Snapper stocks are currently overfished the fishery is being conducted in a manner that there is a high degree of probability the stocks will recover. DEH considers that the information collection system and stock assessment and management arrangements generally are sufficient to ensure that the fishery is conducted at catch levels that will ensure ecologically viable stock levels with acceptable levels of probability.

¹⁶ Moran, M J; Hancock, D A (1992).

DEH considers that there is scope to further refine some of the existing information collection, assessment and management responses and has provided a number of recommendations for improvements in the longer term.

Promote recovery to ecologically viable stock levels

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”*

A stock assessment completed in 2004 estimated the mature biomass in 2002 and 2003 to be at 20% of the virgin level. DFWA’s response to preliminary results of this assessment was to reduce the TAC for the 2003-2004 season from 564 to 338 tonnes. The final assessment evaluates a number of options for rebuilding the stock by 2009 to the reference point of 40% of virgin biomass. DFWA advises that a management option will be selected in consultation with fishers and implemented for the 2004-2005 season. DEH considers that the timely implementation of a management option to recover the stock is vital for management of the Pink Snapper stock.

Conclusion

DEH recognises that DFWA is taking appropriate action to restore the stock to the reference point in a reasonable timeframe and to maintain it above that reference point thereafter.

Ecosystem impacts

Principle 2: *“Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem”*

Bycatch protection

Objective 1: *“The fishery is conducted in a manner that does not threaten bycatch species”*

Information requirements

Information on the levels of interaction with non-retained species has been obtained from interviews and discussions with fishers. Observer information was collected by DFWA staff aboard vessels operating in the fishery in the 1980s and 1990s. Bycatch information provided in the submission is supported by the unpublished results from these observer surveys. DFWA has advised that an ongoing observer program is not being implemented within this fishery because there is no basis for any concern with the bycatch for the fishery. DEH considers that DFWA needs to develop a monitoring program to identify long-term trends in bycatch to ensure that information used in the ESD risk assessment for the fishery remains based on accurate and current data.

Recommendation 11: *DFWA to implement a monitoring program sufficient to identify long-term trends in bycatch to ensure that information used in the risk assessment for the fishery remains based on accurate and current data.*

Assessment

Bludger Trevally (*Carangoides gymnostethus*) and North-west Blowfish (*Lagocephalus sceleratus*) were identified as bycatch species in the SBSF. A formal risk assessment for these species was completed as part of the ESD assessment. This assessment concluded that the SBSF was of negligible risk to bludger trevally and North-west Blowfish.

Distribution of bludger trevally is highly variable therefore the species is either caught in relatively large numbers or not at all. It is generally returned to the sea alive but there is no data on survival after discarding. DFWA concludes that the level of catch compared to their overall distribution suggests that the fishery has little impact on the stocks.

North-west Blowfish commonly occur at high densities within Shark Bay. DFWA conclude that while mortality of some individuals may occur due to the activities of the SBSF, it does not appear to have impacted on their sustainability.

DFWA has advised that no studies are proposed on the survivorship of bludger trevally or northwest blowfish. However, the impact of the fishery on both species is believed to be minimal. Both can sustain similar levels of fishing mortality to snapper. However, neither is targeted by any fishery in WA, both have a wider distribution than snapper and are taken in far smaller numbers than snapper in the SBSF.

Snapper fishers are considered to generally have a low bycatch of undersized snapper because they have the technology to be able to pinpoint adult breeding aggregations.¹⁷ There is evidence that juvenile and adult snapper are spatially separated in respect of their preferred habitat. As mentioned previously, DEH strongly supports the continued monitoring of length frequency of catches to ensure that the percentage of undersized fish caught is minimised (see **Recommendation 8**) and encourages the investigation of methods to reduce mortality of undersized catch such as circle hooks.

DEH concurs that there are minimal bycatch issues associated with the SBSF. The negligible risks involved, as identified in the risk assessment process, demonstrate that the fishery is being conducted in a manner that does not threaten bycatch species. While the fishery appears to have few bycatch issues that are likely to be of environmental significance, collection of non-fishery dependant data on interaction with bycatch species would provide confidence in reliability of estimates of non-retained species.

Management response

The take of Bludger Trevally and North-west Blowfish in the SBSF were identified as negligible risks and therefore it was considered that they did not require specific management actions.

No operational objectives were identified in the current ESD Report concerning minimising impacts of the fishery on bycatch. DEH suggests that DFWA incorporate into the management regime, an objective to minimise or maintain at sustainable levels the take of non-retained or bycatch species (see **Recommendation 2**).

The WA submission indicates that if future studies indicate that further management is required for bycatch species, then appropriate actions will be developed.

The *Guidelines* suggest that an indicator group of bycatch species could be monitored with associated decision rules that trigger additional management measures when there are significant

¹⁷ SBSF Risk Assessment Workshop papers p 22.

perturbations in the indicator species numbers. Monitoring an indicator species will also facilitate the best possible use of monitoring resources. An indicator group of bycatch species has not been identified in this fishery. DFWA considers that as bycatch levels are low in the fishery an indicator group of bycatch species is not appropriate to the scale of the fishery given the levels of bycatch. DEH concurs with this response.

Conclusion

DEH considers that there is a high likelihood the fishery is conducted in a manner that does not threaten bycatch species. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that DFWA would undertake appropriate actions to ensure that bycatch species are not threatened by this fishery.

A recommendation has been developed to ensure that the risk of unacceptable impact on bycatch species is detected and minimised in the longer term.

Protected species and threatened ecological community protection

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”*

Information requirements

Information on the interaction with endangered, threatened or protected species has been obtained from interviews and discussion with fishers. DFWA observers have also collected information. DEH notes that bycatch of many non-fish species is often a rare statistical event requiring a properly structured observer program to understand the level and nature of interactions.

The EPBC Act requires that all protected species interactions in Commonwealth waters be reported to DEH. In addition, DEH believes that monitoring and managing the impact of fishing on protected species is made more reliable when all interactions of the fishery are required to be reported to the relevant State Department.

Recommendation 12: *DFWA to provide a mechanism which allows fishers to record interactions with protected/listed species. DFWA to implement an education program to ensure that industry has the capacity to make these reports at an appropriate level of accuracy.*

Assessment

As snapper are a demersal species and the bottom of the line is weighted, bycatch of birds and other pelagic non-fish wildlife is likely to be minimal or non-existent.

Capture of Potato cod (*Epinephelus tukula*) has been reported from the SBSF. This species is protected under the *Fisheries Resources Management Regulations 1995* (Schedule 2 part 10). It is estimated that only 4 to 5 are caught per year. Captures occur in shallow water and are returned to the water and most are expected to survive. DFWA concluded that there should be virtually no impact on the stocks of these species.

Grey nurse sharks (*Carcharias Taurus*) occur in Shark Bay and there is anecdotal evidence that 2 grey nurse sharks have been caught over the period of the fishery (around 15 years). The west coast

population is listed as vulnerable under the EPBC Act. Grey nurse sharks are also protected under WA legislation (Wildlife Conservation Special Notice, WA Government Gazette 9 April 2002.). There is a Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) in Australia.¹⁸

The EPBC Act requires that all reasonable efforts are taken as part of the management arrangements to avoid killing or injuring protected species and that the result of any take will not adversely affect the survival or recovery of species in the wild. Under the EPBC Act, commercial fishers that capture a Grey Nurse Shark in Commonwealth waters must report it to the Secretary for the Australian Government Department of the Environment and Heritage. There have been no reports to date and this could possibly be due to lack of knowledge of this requirement, identification problems and/or the catch of Grey Nurse Sharks in Commonwealth waters has not occurred.

A formal risk assessment undertaken on the impact of the fishery on Potato Cod and shark species concluded that the SBSF was of negligible risk to these species.

There are no threatened ecological communities associated with the SBSF.

Management response

Current management arrangements prohibit the landing of Potato Cod and Grey Nurse Sharks. Given that there are few encounters with these species and these encounters are not expected to result in mortality, DFWA considers that no extra management response is required. DEH concurs with this response however suggests that reporting coupled with an education program will enhance the robustness of the management response.

There are currently no threatened ecological communities identified in the fishery area, consequently no information collection system or assessment is required. As mentioned previously DEH suggests that DFWA formalises the commitment to implement appropriate changes to the licence conditions or the management plan to minimise any possible impact of the fishery should a threatened marine ecological community be declared and a recovery plan developed.

No operational objectives have been identified in the current ESD Report regarding minimising impacts of the fishery on protected/listed species interactions. DEH suggests that DFWA incorporate into the management regime, an objective to minimise protected/listed species interactions (see **Recommendation 2**).

Conclusion

DEH notes that there are minimal interactions with protected species in this fishery and considers that 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. However should this situation change, or the risk assessment process indicate otherwise, DEH suggests that appropriate actions be undertaken to ensure the fishery avoids mortality or injury to these species and avoids or minimises impacts on threatened ecological communities.

A recommendation with respect to reporting aimed at improving reliability of information on protected species interactions has been developed to ensure that the risk of unacceptable impact on protected species is minimised in the longer term.

¹⁸ <http://www.ea.gov.au/coasts/species/sharks/greynurse/plan/index.html> .

Minimising ecological impacts of fishing operations

Objective 3: *“The fishery is conducted in a manner that minimises the impact of fishing operations on the ecosystem generally”*

Information requirements

DFWA concludes that appropriate levels of information have been obtained to allow a sensible assessment of the level of risk for most of the risks identified in the ESD Workshop. This information includes catch and effort data from the fishery, a number of publications that provide valuable information on trophic interactions, and past and ongoing research by DFWA.

Pink Snapper are opportunistic carnivores, consuming a wide variety of mainly benthic organisms depending on availability. The range of foods includes: fish, crustaceans, molluscs and other invertebrates. Though snapper are near the top of the food chain, they may be prey for large estuary cod, dolphins and sharks.

DEH is concerned at the lack of information collection and research covering the fisheries impact on the ecosystem and environment generally. However, DEH understands that this lack of information is the case across a range of Australian and International fisheries and until appropriate research techniques and programs are developed and implemented this will continue to be the case. DEH strongly supports research in this area.

Assessment

The ESD workshop analysed the risks to general ecosystem components. This assessment will be reviewed every five years. The ESD risk assessment process identified six issues in relation to possible ecosystem impacts. Three of the issues were rated as ‘low risk’; namely removal of all species, translocation of bait and discarding debris from bait packaging. Three issues were rated as ‘negligible’; namely translocation of organisms on vessel hulls, discarding of lines and hooks and anchoring.

DFWA contends that impact on the ecosystem food chain from removal of snapper are negligible in the SBSF because the quota system restricts catches to a small percentage of the total biomass of snapper. It is estimated that the proportion of snapper taken by the fishery, compared to the virgin stock levels, allows for a large biomass of snapper to remain. Moving towards ensuring maintenance of a scientifically determined percentage of virgin spawning biomass will also contribute to this outcome. Given the recent results of the FRDC project suggesting that the Pink Snapper biomass may only be at 20% of the virgin level, DEH considers that the immediate implementation of the recovery plan by DFWA, as outlined in Principle 1 Objective 2, is vital to minimise broader ecosystem impacts of removal of snapper from the ecosystem.

DFWA comments that Pink Snapper are generalist carnivores and do not have a close association with any particular prey species, thus the impact of a lower abundance of snapper would be distributed across many species.

Pilchards are the preferred bait in the fishery. Since Shark Bay is at the extreme northern limitation of the pilchard’s distribution on the west coast, the risk was considered low for pilchard-specific disease.

Discarding debris and bait packing was considered a low risk as disposal facilities are provided to fishers at port.

Underwater video work has shown that sponges, soft corals and gorgonians dominate the habitat. The DFWA submission details that fishing does not occur over the seagrass or hard coral areas as part of the managed snapper fishery. Anchor damage from vessel usage in the SBSF is unknown, but thought to be minimal. The area over which the fishery is actually fishing represents around 1% of the total area available to the fishery. Thus there is likely to be minimal impacts on the physical environment given the nature of the fishing operation.

Management response

Coral areas in the fishery are located adjacent to the coast in areas where snapper do not school. The main coral areas are on the eastern side of Dorre, Bernier and Dirk Hartog Islands. The Shark Bay Snapper Management Plan 1994 describes a large area, closed to fishing for snapper, along the eastern sides of Dorre and Bernier Islands taking in a large amount of coral reef habitat.

The WA submission states that if future studies indicate that further management is required for one or more of the various habitat types then appropriate actions will be developed.

DEH considers that the risk assessment workshop was robust enough to ensure short to mid-term risks were identified and addressed. DEH are confident the DFWA will continue to consider such impacts in their management of the fishery.

DEH considers that fishing activities as currently practiced in this fishery are unlikely to have a significant impact on the world heritage values of Shark Bay in the next five years. Any significant change to existing practices, which is likely to significantly impact on Shark Bay's World Heritage values, may require approval by the Australian Government Minister for the Environment and Heritage.

No operational objectives exist in the current ESD Report concerning impacts on the marine environment. DEH suggests that DFWA incorporate into the management regime, an objective to minimise impacts on the marine environment (see **Recommendation 2**).

Conclusion

DEH considers that the fishery is conducted in a sufficiently precautionary manner to minimise the impact of fishing operations on the ecosystem generally. Recommendations have been developed to ensure that the risk of significant impact by the fishery on the marine environment generally is minimised in the longer term. DEH notes that should circumstances alter significantly in the fishery, appropriate assessments and additional actions will be developed by DFWA.

Table 4 Acronyms

CAES	Catch and effort statistics
CDR	Catch Disposal Record
CPUE	Catch Per Unit Effort
DEH	Department of the Environment and Heritage
DFWA	Department of Fisheries Western Australian
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESD	Ecologically Sustainable Development
FBL	Fishing Boat Licence
FMP	Fishery Management Plan
FRDC	Fisheries Research and Development Corporation
FRMA	<i>Fisheries Resources Management Act 1994</i>
FRMR	<i>Fisheries Resources Management Regulations 1995</i>
GPS	Global Positioning System
MAC	Management Advisory Committee
MPG	Ministerial Policy Guidelines
OCS	Offshore Constitutional Settlement
SBSF	Shark Bay Snapper Fishery
SBSWG	Shark Bay Snapper Working Group
TAC	Total Allowable Catch
WA	Western Australia

References

- Johnson, M.S., Creagh, S. and Moran, M.J. (1986). Genetic subdivision of stocks of snapper, *Chrysophrys unicolour*, in Shark Bay, Western Australia. *Australian Journal of Marine and Freshwater Research*, 37, 337-345.
- Crowe, Lehre and Lenanton (1999). A study into Western Australia's open access and wetline fisheries. Fisheries Research Report no. 118. Western Australian Marine Research Laboratories Fisheries Western Australia.
- Gabriel, W.L. and Mace, P.M. (1999). A review of biological reference points in the context of the precautionary approach. Proc. 5th National Stock Assessment Workshop. *NMFS, NOAA Tech. Memo. F/SPO -40*. pp 34-45.
- Mace, P. M. (1994). Relationships between common biological reference points used as thresholds and targets of fisheries management strategies. *Canadian Journal of Fisheries and Aquatic Science*. 52:110-122.
- Moran, M J; Hancock, D A (ed). (1992). Yield and egg-per-recruit models of Shark Bay snapper: A case study in justification and implementation of an increase in minimum legal length. Australian Society For Fish Biology Workshop. Legal Sizes And Their Use In Fisheries Management, Lorne, Victoria, 24 August 1990.
- Western Australian Department of Fisheries. State of the Fisheries Report 2002/2003. Department of Fisheries. Perth, WA.