Australian Government

Department of the Environment and Water Resources

Assessment of the

Northern Territory Offshore Net and Line Fishery

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Disclaimer

This document is an assessment carried out by the Department of the Environment and Water Resources 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 Water Resources on the fishery in relation to decisions under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999*. The views expressed do not necessarily reflect those of the Minister for the Environment and Water Resources or the Australian Government.

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Table 1: Summary of the Northern Territory (NT) Offshore Net and Line Fishery (formerly the NT Shark Fishery)

Publicly available information relevant to the fishery	• NT *Fisheries Regulations* • NT *Fisheries Act 1988* • NT Annual Fishery Status Reports • The submission — *NT Offshore Net and Line Fishery Draft Re-assessment Report, August 2007* and *Review of the NT Offshore Net and Line Fishery, August 2007* • NT Strategic Plan — *fisheries research and development update for 2007–2011* • The *National Plan of Action for the Conservation and Management of Sharks* (Shark-plan) • Department of the Environment and Water Resources' (DEW, formerly the Department of the Environment and Heritage) Assessment Report of the *NT Shark Fishery, 2005*.
Area	Commercial operators are permitted to fish in NT waters from high water to the Australian Fishing Zone boundary. The majority of fishing occurs within the coastal zone (within 12 nautical miles of the coast or baseline) and immediately offshore in the Gulf Of Carpentaria (GoC). Minimal fishing was undertaken in the offshore component of the fishery during 2006. While not specifically targeted by the recreational sector, the significant areas for recreational shark catches are in the Darwin Harbour, McArthur River and the Cobourg Peninsula areas.
Fishery status	Target species are considered to be fully fished.
Target Species	Target species include blacktip sharks (*Carcharhinus tilstoni* and *C. sorrah*) and grey mackerel (*Scomberomorus semifasciatus*). Information on the biology of these species can be found in DEW's initial assessment of the fishery at: http://www.environment.gov.au/coasts/fisheries/nt/offshore-net-line/index.html
Byproduct Species	Other sharks, primarily whalers (*Carcharhinus spp.* and *Rhizoprionodon spp.*) and hammerhead sharks (winghead shark (*Eusphyra blochii)* and *Sphyrna spp.*), as well as tiger sharks (*Galeocerdo cuvier*), pigeye sharks (*C. amboinensis*), lemon sharks (*Negaprion acutidens)*, Spanish mackerel (*Scomberomorus commerson*) and other pelagic finfish including longtail tuna (mainly *Thunnus tonggol*), blue salmon, queenfish and trevally. Catch restrictions apply to the harvest of Spanish mackerel in the fishery.
Gear	Commercial operators may use either longlines or pelagic nets, but the use of bottom set gillnets is prohibited. Most fishing is undertaken by pelagic gillnets, which are generally 1000

	to a maximum of 2000 m in length with a mesh size of 160 mm (minimum) to a maximum of 185 mm and a drop of 50 to a maximum of 100 meshes. The nets are weighted and have a buoyed headline. In the recreational sector, most sharks are taken during reef fishing and general fishing, primarily using baited lines.
Season	No closed season.
Commercial harvest (2004-2006)	2004: The total catch of all species, as determined from logbook records, was approximately 1,559 t — 1,089 t shark species (440 t blacktip sharks) and 481 t grey mackerel. 2005: The total catch of all species, as determined from logbook records, was approximately 1,398 t — 831 t shark species (379 t blacktip sharks) and 526 t grey mackerel. 2006: The total catch of all species, as determined from logbook records, was approximately 1,292 t — 780 t shark species (457 t blacktip sharks) and 404 t grey mackerel. The catch composition of the commercial NT Offshore Net and Line Fishery for 2006 was blacktip sharks (37%), grey mackerel (33%), other shark species (26%) and other fish species (4%). The catches of sharks (other than blacktips) decreased from 452 t of the fishery catch in 2005 to 323 t in 2006, while there were 26.4 t of mackerels (other than grey mackerel) landed in 2006 — all declared to be narrow-barred Spanish mackerel (*Scomberomorus commerson*). Other fish species landed included tunas, trevallies, queenfish and pomfret.
Commercial Gross Value of product 2006	Approximately AU$4.34 million ($6.2 million in 2005). • Blacktip sharks — $0.70 million • Other shark species — $1.6 million • Grey mackerel — $1.87 million.
Take by other sectors	In 2000/01, approximately 76,000 sharks were caught by the recreational sector with 8,000 sharks harvested and the remainder released (however the mortality rate of released sharks is not known). Approximately 12,000 sharks were also taken by indigenous fishers in 2000/01. In 2006, 8,039 sharks were caught by fishing tour operators with approximately 95% being released. It is not yet possible to determine the potential impact that illegal, unregulated and unreported (IUU) fishing is having on the fishery. Since 2003, a prohibition exists on the possession of sharks and shark products for the NT Timor Reef, Demersal, Finfish Trawl and Spanish Mackerel Fisheries. A 500 kg converted whole weight limit of shark per trip applies for the Barramundi, Coastal Line and Coastal Net Fisheries.
Commercial licences issued 2006	The NT Offshore Net and Line Fishery is a limited entry fishery with 17 licence entitlements. Most vessels employ a skipper and have two or three crew members.

	A 'three for one' licence reduction program commenced in 1995 for the fishery which required new entrants to acquire and transfer three restricted (meaning a licence which can be permanently transferred but not temporally transferred) Offshore Net and Line Fishery licences to the Territory for the issuance of an unrestricted (fully transferable) Offshore Net and Line Fishery licence. Overall capacity has been reduced from 39 licences to 17 licences in 2005.
Management arrangements	The NT Offshore Net and Line Fishery is managed under the NT *Fisheries Regulations* and the NT *Fisheries Act 1988*. <u>Input and output management controls include:</u> • Limited entry — 17 commercial licences, including a licence reduction program. • Ban on the disposal of finned shark carcasses at sea. Fin to meat ratios imposed (current ratios are 6.5% fresh or frozen fin as a proportion of trunk weight, 13% fresh or frozen fin as a proportion of fillet weight and 3% fresh or frozen fin as a proportion of whole weight). The fin ratios are reviewed periodically and have resulted in a general ratio reduction of 17%. • Gear restrictions (ban on use of bottom set gillnets and mesh size restrictions). • A cap of 1,599 pelagic net fishing days/annum, shared between all licensees. • A cap of 234 longline fishing days/annum, shared between all licensees. • A 20% reduction in total allowable gillnet length (from 2,500 m to 2,000 m), with a maximum of 100 meshes drop. • A mesh size reduction (from 150 – 250 mm to between 160 and 185 mm). • A 25% reduction in the total allowable longline length (20 nm of longline reduced to 15 nm) with a maximum of 1,000 hooks per licence. • A prohibition on the use of automatic baiting devices. • Catch restrictions (including fin to meat ratios) for the incidental catch of sharks in the Barramundi, Coastal Net and Coastal Line Fisheries. • A prohibition on the possession of sharks and shark products for other NT commercial fisheries. In addition, an Industry voluntary Code of Practice exists which includes a 'no take' policy on all sawfish in the fishery.
Export	Shark is marketed domestically and internationally. Most shark products are sent interstate with over 20% of the total shark catch set for direct export overseas. Shark fin is a valuable product but must be landed with a prescribed proportion of shark meat.

	Grey mackerel is marketed domestically as fillets, trunks and whole fish.
Bycatch	The amount of bycatch depends strongly on location and season. Most shark species are now retained apart from the tawny shark, *Nebrius ferrigineus*, and all sawfish species subject to the Industry initiated 'no take' policy. Rays are an uncommon bycatch in the surface set nets, which are usually released alive. Some finfish with poor market acceptability (for example some trevally and queenfish) are retained only when there are suitable markets. The recreational and charter sectors have a much higher level of bycatch because of the increased popularity of 'catch-and-release' practices. However, the mortality rate of released sharks is unknown.
Interaction with Protected Species	In 2006, operators reported interactions with one speartooth shark (*Glyphis spp.*) and 17 marine turtles, which were recorded as caught and released. The turtles were released alive where possible and the speartooth shark was released alive. In 2005, operators reported interactions with one dolphin (not identified to species) and several turtles (9 unidentified, 5 green turtles and one hawksbill). No speartooth or northern river sharks were recorded during 2005, however during 2004 one speartooth or northern river shark was recorded by fishery observers. Improved logbooks have been developed for the fishery to facilitate easier reporting of protected species interactions on a species-specific basis. Industry has also initiated a Code of Practice and an Environmental Management System (EMS) which improves the survivability of returned protected species by promoting the use of best practice methods for handling and release.
Ecosystem Impacts	DPIFM states that the relatively low number of operators together with the relatively passive and selective fishing methods used, gillnetting and longlining, means that the NT Offshore Net and Line Fishery is likely to have little effect on the ecosystem and environment generally. However, there is no data collection on the ecological impacts of fishing operations in the fishery, including the key role that sharks, as upper order predators, play in the ecosystem. Industry has also initiated a Code of Practice and an EMS which requires operators to make all efforts to retrieve lost fishing gear and dispose of waste appropriately.
Impact on CITES species	The assessment also considered the possible impacts on species harvested in the NT Offshore Net and Line Fishery which are listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). As a party to the Convention, Australia must apply all CITES provisions of the EPBC Act to all species of Pristidae imports and exports as appropriate. All species of Pristidae are listed as Appendix I on CITES, with the exception of freshwater sawfish to Appendix II for the exclusive purpose of allowing international trade in live animals for primarily conservation purposes. Export of species listed under Appendix I of CITES for commercial purposes is prohibited.

Impacts on World Heritage property	The Kakadu National Park is listed as a World Heritage Area however fishing activity (both commercial and recreational) is not permitted in the waterways of Kakadu National Park.

Table 2: Progress in implementation of recommendations and conditions made in initial assessment of the NT Offshore Net and Line Fishery

Condition	Progress	Recommended Action
Operation of the NT Offshore Net and Line Fishery will be carried out in accordance with the Management Regime for the NT Offshore Net and Line Fishery.	Completed and ongoing. The fishery has operated in accordance with the legislated management regime over the course of the current export approval.	This condition has been met and will continue to apply under the new Wildlife Trade Operation (WTO) declaration for this fishery for the next three years (see **WTO Condition 1**, Table 4).
DPIFM (formerly the NT Department of Business, Industry and Resource Development) to advise DEW of any material change to the NT Offshore Net and Line Fishery management arrangements that could affect the criteria on which EPBC decisions are based, within 3 months of that change being made.	While DPIFM have introduced new management measures for the NT Offshore Net and Line Fishery, there have been no changes to the management arrangements that may affect sustainability of the target species or negatively impact on bycatch, protected species or the ecosystem. Since 2004, DPIFM have implemented a number of new management measures for the fishery including: • Development and implementation of the Operational Plan for the Sustainable Use of Northern Australian Shark Resources in 2005. • Industry Code of Practice with a voluntary 'no take' policy on all sawfish for the fishery. • Improved logbooks to record the species caught on a species-specific, latitude-longitude, shot-by-shot basis. Tagged animals captured are recorded in the same manner prior to release. Improved logbooks also facilitate easier reporting of protected species interactions. • Distribution of educational information, including a species identification guide.	As part of the new WTO declaration for this fishery, this condition remains in force for a further three years (see **WTO Condition 2**, Table 4).

	• Development by industry of an EMS. • Strict controls for the harvest of shark species for the Barramundi, Coastal Line and Coastal Net Fisheries. • Shark fin to meat ratios reviewed annually and ratios tightened by ~20% in 2005. • Reduction in effort allowed in the fishery (see Table 1). • Release techniques education program. • Active industry participation in shark tagging projects.	
Reports to be produced and presented to DEW annually, and to include: • Information sufficient to allow assessment of the progress of DPIFM in implementing the recommendations made in the assessment of the NT Offshore Net and Line Fishery. • A description of the status of the fishery and catch and effort information. • A statement of the performance of the fishery against the objectives, performance indicators and measures once developed. • Research completed relevant to the fishery.	Fishery Status Reports for NT fisheries are prepared annually. The 2004 and 2005 reports are publicly available from the DPIFM website at: http://www.nt.gov.au/dpifm/Fisheries/. The 2006 Fishery Status Report should be publicly available by the end of 2007. The reports contain information on catch and effort trends and research undertaken or completed relevant to the fishery. DPIFM also report on the performance of the NT Offshore Net and Line Fishery against the performance indicators and trigger reference points in the annual fishery status reports.	DEW considers that this condition has been met and notes that, as part of the new WTO declaration for this fishery, this condition remains in force for a further three years (see **WTO Condition 3**, Table 4).

Recommendation	Progress	Recommended Action
DPIFM to review the adequacy of management objectives, performance indicators, trigger points and management actions and develop species-specific measures based on a risk analysis by 30 August 2007.	DPIFM conducted a review of the NT Offshore Net and Line Fishery's management objectives, performance indicators and trigger reference points in 2005 and 2007. The reviews and subsequent risk analysis resulted in DPIFM developing species-specific measures for those shark species identified as least sustainable in the Fisheries Research and Development Corporation (FRDC) project, *Northern Australian Sharks and Rays: the Sustainability of Target and Bycatch species, Phase 2* (the FRDC project — 2002/064). The review also determined that the current management objectives and performance indicators for the fishery are being met while trigger points are yet to be reached. A copy of the NT Offshore Net and Line Fishery's current management objectives, performance indicators, trigger reference points and management responses are published in the 2004 and 2005 (and 2006, once available) Fishery Status Reports.	While DEW commends DPIFM for conducting a review of the NT Offshore Net and Line Fishery's management objectives, performance indicators and trigger reference points, an objective of the National Plan of Action for the Conservation and Management of Sharks (Shark-plan) is to ensure that shark catches from target and non-target fisheries are sustainable. DEW notes that the species-specific measures developed for the fishery occurred prior to the completion of the FRDC project. Management options for species that were classified as being least likely to be sustainable now need to be considered. DEW has made a recommendation for DPIFM to investigate management options, and develop and implement management responses to the 12 chondrichthyan species identified from the FRDC Project as least likely to be sustainable (see **Recommendation 2**, Table 4).
By the end of 2006, DPIFM to review its catch logbook data validation program and incorporate fishery independent information as appropriate.	A recently completed review of the NT Offshore Net and Line Fishery's management arrangements by DPIFM (see above) has indicated that current collection and validation of catch logbook data satisfactorily meets data requirements to ensure sound management of the fishery. All operators in the fishery are required by legislation to complete and return daily logbook data. The collection,	No further action is required at this stage. DEW notes: • the recently completed DPIFM review of the fishery's management arrangements, which determined that current collection and validation of

	entry and verification of catch logbook data is conducted by DPIFM officers and researchers with reviews undertaken annually. Compliance checks are regularly conducted by the NT Police Marine, Fisheries and Enforcement Section (PMFES) and include verification of catch returns against processor returns. Based on previous targeted operations and continuous in-port and at-sea checks, PMFES has advised that the risk of non compliance in the fishery is considered low. In conjunction with the logbook program, a coordinated Observer Program is being conducted which regularly compares and validates the information submitted by the operators. While onboard, observers validate catch returns and assist commercial fishers in completing accurate logbook returns. DPIFM indicate that analysis of observer reports and logbook information has verified correct correlation between the observed catch compositions and quantity, and the corresponding logbook information regarding catch trends. Target observer coverage is currently set at 7% based on the expert opinion of the members of the Northern Stock Assessment Group (NSAG). Additional to the observer monitoring program is a collaborative shark tagging program. This tagging study aims to develop the protocols for estimation of the fishing-related and natural mortality for the two most commercially important species, *C. tilstoni* and *C. sorrah*, as well as providing information on other shark species.	logbooks are satisfactory • compliance checks conducted by the PMFES • the verification of catch returns against processor returns (noting that it is a requirement of all operators to specify where they are selling their product) • no reported irregularity in the comparison of logbooks with on-board observers records or breaches of the NT Fisheries Act 1988 • the coordinated observer program being conducted in the fishery • the collaborative intensive shark tagging program. At present, over 1,500 sharks have been tagged, the majority of which are the two target blacktip shark species. DPIFM anticipates that the tagging program will support new and additional monitoring protocols and management arrangements leading to better spatial and temporal management of shark fisheries in northern Australia. DEW expects DPIFM to continue to ensure that catch logbooks are accurate and validated on an ongoing basis and incorporate fishery independent information as appropriate. DEW will also

		monitor outcomes from compliance reviews annually through the Fishery Status Reports.
DPIFM to continue to improve the system to identify and record shark catch (target, byproduct and bycatch chondrichthyans) on a species-specific basis by June 2006. A component of this system should be an education program to ensure that industry has the capacity to make these reports at an appropriate level of accuracy.	Since the last assessment in 2004, DPIFM has worked closely with both industry and relevant scientific experts to improve the compulsory logbook reporting system. This work has been complemented by the development and enhancement of an identification/education program for fishers. Specifically, shark identification guides and a copy of the National Heritage Trust's *Protected Marine Species Identification Guide* have been produced and distributed to all active operators. In addition, industry has developed an Environmental Management System for the fishery which includes identification guides of marine turtles and sawfish. Logbooks have been amended to expand the existing capacity to record the twelve major target and byproduct specific species and now include a front cover that outlines operators reporting requirements for protected species under the EPBC Act. For research purposes, detailed tagged shark interaction can also now be recorded in the logbook returns. Furthermore, logbooks have been amended for the 2006/2007 logbook year onwards, to include capacity to record bycatch by weight on a shot by shot basis. DPIFM advise that an outcome expected from a collaborative research project, *Estimating fishing-related mortality and designing sustainable management protocols for shark fisheries in North Australia*, will be the prescription of new and additional monitoring	DEW commends DPIFM for expanding the existing capacity of logbooks to record the twelve major target and byproduct specific species and for circulating shark and protected species guides to commercial fishers for more accurate reporting. During the recent final phase of the FRDC project (2002/064), collaborators became aware that, due to the similarities between *C. limbatus* and *C. tilstoni*, observers and commercial fishers have encountered difficulty in ascertaining the true catch composition. It is understood that it is possible that records of *C. tilstoni* could actually be a mix of *C. tilstoni* and *C. limbatus*. While DPIFM is scoping research into developing an easier identification method for *C. limbatus* that will enable observers and commercial fishers to identify and record actual catches, no research has been conducted to date. Currently the only reliable ways to identify the difference between the two species are by genetic sampling, or dissection to provide vertebral counts. While there have been anecdotal reports

	protocols and management arrangements leading to better spatial and temporal management of shark fisheries in northern Australia. In addition, DPIFM is participating in Australian Fisheries Management Authority-funded research, *Developing Catch Statistics for the Illegal Shark Indonesian Fishery of Northern Australia*. The outcomes of this research should provide valuable tools for distinguishing shark species taken in northern Australian waters by fin, thus creating a biological research and compliance tool.	that *C. limbatus* and *C. tilstoni* may actually be the same species, DEW has made a recommendation for DPIFM to investigate the extent of materially misidentifying the two shark species and, where appropriate, investigate a mechanism to accurately identify *C. tilstoni* and *C. limbatus* (see **Recommendations 3** and **4**, Table 4).
DPIFM to develop a program for stock assessments of target species on a triennial basis from 2006. Findings are to be used to review the adequacy of management objectives, performance measures, triggers and management responses within 6 months of the stock assessment.	The NSAG has agreed to undertake a triennial assessment of the black tip sharks *C. tilstoni*, and *C. sorrah*. The first assessment occurred in 2005, with a further assessment to be completed during 2008. At the 2005 NSAG meeting, the stock assessment model for blacktip sharks was updated with the inclusion of revised and updated catch and effort series from the NT, Queensland and Western Australia. When the assessment model for blacktip sharks was updated it indicated no substantial observed changes and that the combined long term sustainable yield should remain at around 2000 t annually. DPIFM indicate that the NT Offshore Net and Line Fishery is a small scale fishery. Effective management of the fishery is based on research conducted over time. In the case of grey mackerel, development of understanding of spatial dynamics of the species' populations has been given priority, including a FRDC project *Determination of management units for grey mackerel fisheries in Queensland and the Northern Territory*. In the interim, the fishery has been very	A recommendation has been made for DPIFM to continue stock assessments of target shark species on a triennial basis and incorporate current catch and effort data into stock assessment models (see **Recommendation 5**, Table 4). DPIFM will also review the adequacy of the current stock assessment model for the target shark species to ensure the ecologically sustainable management of the fishery.

	deliberately constrained in size. In addition, the results of the shark tagging program will allow the development of a mark-recapture based monitoring approach and support a series of mathematical models incorporating mortality estimates. These will be used to evaluate fishing mortality rates and the susceptibility of populations of these sharks under current and alternative future management arrangements.	
From January 2006, DPIFM to implement a scientifically robust observer program sufficient to meet sustainability objectives for the NT Offshore Net and Line Fishery.	In 2006, NT Fisheries observers initiated four observer trips on shark fishery vessels in the NT Offshore Net and Line Fishery, which equates to approximately 7% coverage of the current level of effort in the fishery. An assessment of observer coverage needs, sufficient to meet sustainability objectives for the fishery, was undertaken at the NSAG meeting held in April 2005. It was agreed by the NSAG that the current observer coverage of 7% for the fishery is currently considered appropriate. Recognising the small size of the fishery, DPIFM indicate that this level of coverage represents a compromise between resources available for monitoring of the fishery and the ability to detect changes in species and size composition. A scientifically robust observer program is proceeding based on ongoing examination of the species composition and biological characteristics for non target species. The observer additionally participates in fishery independent research such as tagging and sample collection. DPIFM's Research and Development Strategic Plan identified the further enhancement of the observer program with additional resources to increase the	No further action is required at this stage. DEW notes that it was agreed by the NSAG that the current observer coverage of 7% for the NT Offshore Net and Line Fishery is currently considered appropriate. Additional to the observer monitoring program is a collaborative intensive shark tagging program. This tagging study aims to develop the protocols for estimation of the fishing-related and natural mortality for *C. tilstoni* and *C. sorrah*, as well as providing information on other shark species. It is anticipated that these activities will support new and additional monitoring protocols and management arrangements leading to better spatial and temporal management of shark fisheries in northern Australia. DPIFM recognises the importance of an observer program and will continue the program in 2008. DEW expects DPIFM to evaluate and incorporate the outcomes

	program's coverage for the NT Offshore Net and Line Fishery. This is under review and will consider outcomes of the ARC funded Charles Darwin University research project, *Estimating fishing-related mortality and designing sustainable management protocols for shark fisheries in North Australia.* The project will be evaluated and aspects incorporated, where appropriate, once available.	of the ARC-funded Charles Darwin University research project, as appropriate.
From 2005, DPIFM to establish an annual review of bycatch trends and the adequacy of mitigation measures and to include the outcomes of the review in the annual report on the fishery.	A review of catch trends, management objectives, performance indicators, trigger reference points and management actions by DPIFM and industry representatives was conducted in 2006, with results to be published in the 2006 Fishery Status Report. Management objectives, performance indicators, trigger reference points and management action are developed for bycatch species in the fishery. The recently completed FRDC project (2002/064) provided comprehensive data on species composition and biological characteristics of sharks and rays taken in northern Australia fisheries, including bycatch species. The major output of the project was a risk analysis which provides for prioritisation of research and management direction.	DEW notes that the level of bycatch depends strongly on location and season. Most shark species are now retained apart from the tawny shark (*N. ferrigineus*), and species subject to the voluntary 'no take' policy. The annual Fishery Status Reports also indicate that rays are an uncommon bycatch in the surface set nets, which are usually released alive. DEW expects DPIFM to continue to review catch trends, management objectives, performance indicators, trigger reference points and management actions for bycatch species and include outcomes of reviews in annual Fishery Status Reports. To compliment the shark and rays risk analysis based on the FRDC Report and the Industry-driven Environmental Management System (EMS) for the fishery, a recommendation has been made for DPIFM to conduct an Ecological Risk Assessment (ERA) on the current impact of the fishery on target, byproduct,

		bycatch (other than shark species) and protected species (see **Recommendation 8**, Table 4). Additionally, DEW recommends DPIFM to actively encourage industry to review the NT Code of Conduct and Code of Practice for the fishery to ensure that it continues to assist with the ecologically sustainable management of the fishery.

Table 3: The DEW assessment of the NT Offshore Net and Line Fishery against the requirements of the EPBC Act related to decisions made under Parts 13 and 13A

Part 13	
Division 1 Listed threatened species **Section 208A Minister may accredit plans or regimes**	**DEW assessment of the NT Offshore Net and Line Fishery**
Minister may, by instrument in writing, accredit for the purposes of this Division: (c) a plan of management, or a policy, regime or any other arrangement, for a fishery that is: i. made by a State or self-governing Territory; and ii. in force under a law of the State or self-governing Territory; if **satisfied** that: (f) the plan or regime requires persons engaged in fishing under the plan, regime or policy to take all reasonable steps to ensure that members of listed threatened species (other than conservation dependent species) are not killed or injured as a result of the fishing; and (g) the fishery to which the plan, regime or policy relates does not, or is not likely to, adversely affect the survival or recovery in nature of the species.	The management regime for the NT Offshore Net and Line Fishery will be managed under the NT *Fisheries Regulations* and the NT *Fisheries Act 1988.* The management regime for the then NT Shark Fishery was accredited in November 2004. The management arrangements for the NT Shark Fishery have not significantly changed since this accreditation was granted, however the fishery is now called the NT Offshore Net and Line Fishery. DEW has become aware that the management arrangements for the NT Offshore Net and Line Fishery essentially allow the retention of EPBC Act listed species, including speartooth shark (*Glyphis sp.* A), Northern river shark (*Glyphis sp.* C) and freshwater sawfish (*P. microdon*). While a voluntary 'no take' policy of sawfishes and *Glyphis spp.* has been implemented by fishery operators, it is not mandatory and the post-release survival of sawfish captured by the fishery is currently unknown. In order to satisfy 208A, DEW considers a new Part 13 declaration with an associated **condition** is required. DEW considers DPIFM prohibit the retention of all EPBC Act listed chondrichthyan species in the NT Offshore Net and Line

	Fishery by no later than 28 November 2010. Currently, logbook and observer data suggests that the NT Offshore Net and Line Fishery has minimal interactions with listed threatened species. Reported interactions in 2006 were with marine turtles and a single speartooth shark, which were recorded as caught and released. Therefore, DEW considers the current operation of the NT Offshore Net and Line Fishery is not likely to adversely affect the survival or recovery in nature of any threatened species.

Division 2 Migratory species **Section 222A Minister may accredit plans or regimes**	**DEW assessment of the NT Offshore Net and Line Fishery**
Minister may, by instrument in writing, accredit for the purposes of this Division:	
(c) a plan of management, or a policy, regime or any other arrangement, for a fishery that is: i. made by a State or self-governing Territory; and ii. in force under a law of the State or self-governing Territory;	The management regime for the NT Offshore Net and Line Fishery will be managed under the NT *Fisheries Regulations* and the NT *Fisheries Act 1988.*
if **satisfied** that:	
(f) the plan, regime or policy requires persons engaged in fishing under the plan, regime or policy to take all reasonable steps to ensure that members of listed migratory species are not killed or injured as a result of the fishing; and	The management regime for the then NT Shark Fishery was accredited in November 2004. The management arrangements for the NT Shark Fishery have not significantly changed since this accreditation was granted, however the fishery is now called the NT Offshore Net and Line Fishery.
(g) the fishery to which the plan, regime or policy relates does not, or is not likely to, adversely affect the survival or recovery in nature of a listed migratory species.	The submission provided by DPIFM indicates that there have been no interactions with migratory species in the NT Offshore Net and Line Fishery. Therefore, DEW considers the current operation of the NT Offshore Net and Line Fishery is not likely to adversely affect the survival or recovery in nature of any listed migratory species.

Division 3 Whales and other cetaceans **Section 245 Minister may accredit plans or regimes**	**DEW assessment of the NT Offshore Net and Line Fishery**
Minister may, by instrument in writing, accredit for the purposes of this Division: (c) a plan of management, or a policy, regime or any other arrangement, for a fishery that is: i. made by a State or self-governing Territory; and ii. in force under a law of the State or self-governing Territory; if **satisfied** that: (f) the plan, regime or policy requires persons engaged in fishing under the plan to take all reasonable steps to ensure that cetaceans are not killed or injured as a result of the fishing; and (g) the fishery to which the plan, regime or policy relates does not, or is not likely to, adversely affect the conservation status of a species of cetacean or a population of that species.	The management regime for the NT Offshore Net and Line Fishery will be managed under the NT *Fisheries Regulations* and the NT *Fisheries Act 1988.* The management regime for the then NT Shark Fishery was accredited in November 2004. The management arrangements for the NT Shark Fishery have not significantly changed since this accreditation was granted, however the fishery is now called the NT Offshore Net and Line Fishery. The submission provided by DPIFM indicates that there has been one dolphin (not identified to species) interaction in the fishery, occurring in 2005. This dolphin interaction was also recorded by fishery observers. Given the low frequency of interactions with these species, DEW considers the current operation of the NT Offshore Net and Line Fishery is not likely to adversely affect the conservation status of a species of cetacean or a population of that species.

Division 4 Listed marine species **Section 265 Minister may accredit plans or regimes**	**DEW assessment of the NT Offshore Net and Line Fishery**
Minister may, by instrument in writing, accredit for the purposes of this Division: (c) a plan of management, or a policy, regime or any other arrangement, for a fishery that is:	The management regime for the NT Offshore Net and Line Fishery will be managed under the NT *Fisheries Regulations* and the

i. made by a State or self-governing Territory; and ii. in force under a law of the State or self-governing Territory; if **satisfied** that:	NT *Fisheries Act 1988*.
(f) the plan requires persons engaged in fishing under the plan, regime or policy to take all reasonable steps to ensure that members of listed marine species are not killed or injured as a result of the fishing; and	The management regime for the then NT Shark Fishery was accredited in November 2004. The management arrangements for the NT Shark Fishery have not significantly changed since this accreditation was granted, however the fishery is now called the NT Offshore Net and Line Fishery.
(g) the fishery to which the plan, regime or policy relates does not, or is not likely to, adversely affect the conservation status of a listed marine species or a population of that species.	Currently, evidence suggests that the NT Offshore Net and Line Fishery only has minimal interactions with listed marine species (including marine turtles). Therefore, DEW considers the current operation of the NT Offshore Net and Line Fishery is not likely to adversely affect the conservation status of a listed marine species or a population of that species.

Section 303AA Conditions relating to accreditation of plans, regimes and policies	**DEW assessment of the NT Offshore Net and Line Fishery**
This section applies to an accreditation of a plan, regime or policy under section 208A, 222A, 245 or 265.	DEW recommends that the NT Offshore Net and Line Fishery be accredited under sections 208A, 222A, 245 and 265.
The Minister may accredit a plan, regime or policy under that section even though he or she considers that the plan, regime or policy should be accredited only: (a) during a particular period; or (b) while certain circumstances exist; or (c) while a certain condition is complied with In such a case, the instrument of accreditation is to specify the period, circumstances or condition.	To satisfy the requirements of section 208A, we recommend that the NT Offshore Net and Line Fishery be accredited under Part 13 subject to a condition that requires DPIFM to prohibit the retention of all EPBC Act listed chondrichthyan species in the NT Offshore Net and Line Fishery. The Part 13 instrument for the NT Offshore Net and Line Fishery specifies this condition.
The Minister must, in writing, revoke an accreditation if he or she is satisfied that a condition of the accreditation has been contravened.	

Part 13A	
Section 303DC Minister may amend list	**DEW assessment of the NT Offshore Net and Line Fishery**
(1) Minister may, by instrument in published in the Gazette, amend the list referred to in section 303DB (list of exempt native specimens) by: (a) including items in the list; (b) deleting items from the list; or (c) imposing a condition or restriction to which the inclusion of a specimen in the list is subject; or (d) varying of revoking a condition or restriction to which the inclusion of a specimen in the list is subject; or (e) correcting an inaccuracy or updating the name of a species.	Given that the fishery has formally changed its name from the NT Shark Fishery to the NT Offshore Net and Line Fishery, a new List of Exempt Native Specimens (LENS) amending instrument to reflect the name change is required. In addition, it is necessary to amend the LENS by deleting from the list reference to the NT Shark Fishery.
(3) Before amending the list referred to in section 303DB (list of exempt native specimens), the Minister: (a) must consult such other Minister or Ministers as the Minister considers appropriate; and (b) must consult such other Minister or Ministers of each State and self-governing Territory as the Minster considers appropriate; and (c) may consult such other persons and organisations as the Minister considers appropriate.	DEW considers that the consultation requirements have been met. On 10 August 2004, the Minister wrote to Fisheries Ministers seeking their views on inclusion of WTOs on the Exempt List (see sub 04/1543). Responses in support of the proposal were received from all State, Territory and Commonwealth Fisheries Ministers. The public comment period on the DPIFM submission sought comment on the submission for the NT Offshore Net and Line Fishery and provided sufficient opportunity for consultation with other persons and organisations. A letter to the Hon Chris Natt MLA, Minister for Primary Industry, Fisheries and Mines advises him of the intention to declare the fishery an approved WTO under the EPBC Act.
(5) A copy of an instrument made under section 303DC is to be made available for inspection on the Internet.	The instrument for the NT Offshore Net and Line Fishery made under section 303DC will be gazetted and made available on the DEW website.

Section 303FN Approved wildlife trade operation	DEW assessment of the NT Offshore Net and Line Fishery
The Minister may, by instrument published in the *Gazette*, declare that a specified wildlife trade operation is an ***approved wildlife trade operation*** for the purposes of this section.	
The Minister must not declare an operation as an approved wildlife trade operation unless the Minister is **satisfied** that: (a) the operation is consistent with the objects of Part 13A of the Act; and	The NT Offshore Net and Line Fishery is consistent with objects of Part 13A (listed after this table) as: • the harvest of species listed under CITES is minimal and DEW have recommended that DPIFM specifically consider the management of CITES listed species in the fishery (Recommendation 1, Table 4) • there are management arrangements in place to ensure that the resource is being managed in an ecologically sustainable way (see Table 1) • the operation of the NT Offshore Net and Line Fishery is unlikely to be unsustainable and threaten biodiversity within the next three years • the EPBC Regulations 2000 do not specify fish as a class of animal in relation to the welfare of live specimens.
(b) the operation will not be detrimental to: i. the survival of a taxon to which the operation relates; or ii. the conservation status of a taxon to which the operation relates; and	DEW considers that the NT Offshore Net and Line Fishery will not be detrimental to the survival or conservation status of a taxon to which it relates within the next **three years**, given the management measures currently in place, which include limited entry, gear restrictions, fin ratio conditions and effort limits.
(ba) the operation will not be likely to threaten any relevant ecosystem including (but not limited to) any habitat or biodiversity; and	DEW considers that the NT Offshore Net and Line Fishery will not threaten any relevant ecosystem within the next **three years**, given the management measures currently in place, which include limited entry,

	gear restrictions and effort limits.
(c) if the operation relates to the taking of live specimens that belong to a taxon specified in the regulations – the conditions that, under the regulations, are applicable to the welfare of the specimens are likely to be complied with; and	The EPBC Regulations 2000 do not specify fish as a class of animal in relation to the welfare of live specimens.
(d) such other conditions (if any) as are specified in the regulations have been, or are likely to be, satisfied.	No other conditions are specified in relation to commercial fisheries in the EPBC Regulations 2000.
In deciding whether to declare an operation as an approved wildlife trade operation the Minister must have **regard** to: (a) the significance of the impact of the operation on an ecosystem (for example, an impact on habitat or biodiversity); and	DEW considers that the NT Offshore Net and Line Fishery will not have a significant impact on any relevant ecosystem within the next **three years**, given the management measures currently in place, which include limited entry, gear restrictions and effort limits.
(b) the effectiveness of the management arrangements for the operation (including monitoring procedures).	The management arrangements that will be employed for the NT Offshore Net and Line Fishery are likely to be effective. Management arrangements for the fishery are included in the management regime, in force under the NT *Fisheries Regulations* and the NT *Fisheries Act 1988*. Management arrangements include limited entry, gear restrictions, fin ratio conditions and effort limits. The performance of the NT Offshore Net and Line Fishery is reviewed annually, against a series of management objectives, performance indicators and trigger reference points for target, byproduct, bycatch and protected species.
In deciding whether to declare an operation as an approved wildlife trade operation the Minister must have **regard** to: (a) whether legislation relating to the protection, conservation or management of the specimens to which the operation relates is in force in the State or Territory concerned; and	The NT Offshore Net and Line Fishery will be managed under the NT *Fisheries Regulations* and the NT *Fisheries Act 1988*.
(b) whether the legislation applies throughout the State or	The NT *Fisheries Regulations* and the NT *Fisheries Act 1988* apply

Territory concerned; and (c) whether, in the opinion of the Minister, the legislation is effective.	throughout NT waters. The management arrangements that will be employed for the NT Offshore Net and Line Fishery are likely to be effective. Management arrangements for the fishery are included in the NT *Fisheries Regulations* and the NT *Fisheries Act 1988*. Management arrangements include limited entry, gear restrictions, fin ratio conditions and effort limits. The performance of the NT Offshore Net and Line Fishery is reviewed annually, against a series of management objectives, performance indicators and trigger reference points for target, byproduct, bycatch and protected species.
For the purposes of section 303FN, an operation is a wildlife trade operation if, an only if, the operation is an operation for the taking of specimens and: (d) the operation is a commercial fishery.	The NT Offshore Net and Line Fishery is a commercial fishery.
In deciding whether to declare that a commercial fishery is an approved wildlife trade operation for the purposes of this section, the Minister must rely primarily on the outcomes of any assessment in relation to the fishery carried out for the purposes of Division 1 or 2 of Part 10.	No assessment of the NT Offshore Net and Line Fishery has been carried out under Part 10 of the EPBC Act.
The above does not limit the matters that may be taken into account in deciding whether to declare that a fishery is an approved wildlife trade operation for the purposes of this section.	

Section 303FR Public consultation	**DEW assessment of the NT Offshore Net and Line Fishery**
Before making a declaration under section 303FN, the Minister must cause to be published on the Internet a notice: (a) setting out the proposal to make the declaration; and (b) setting out sufficient information to enable persons and organisations to consider adequately the merits of the proposal; and	DEW considers that consultation requirements of the EPBC Act for declaring a WTO have been met. A public notice, which set out the proposal to declare the NT Offshore Net and Line Fishery a WTO and included the submission, was released for public comment which closed on 17 September 2007 with two submissions received.

(c) inviting persons and organisations to give the Minister, within the period specified in the notice, written comments about the proposal.	
A period specified in the notice must not be shorter than 20 business days after the date on which the notice was published on the Internet.	A public notice, which set out the proposal to declare the NT Offshore Net and Line Fishery a WTO and included the submission, was released for public comment on 21 August 2007 and closed on 17 September 2007, a total of 20 business days.
In making a decision about whether to make a declaration under section 303FN, the Minister must consider any comments about the proposal to make the declaration that were given in response to the invitation in the notice.	Two public comments about the proposal were received (included in the brief to the Delegate of the Minister for the Environment and Water Resources).

Section 303FT Additional provisions relating to declarations	**DEW assessment of the NT Offshore Net and Line Fishery**
This section applies to a declaration made under section 303FN, 303FO or 303FP.	A declaration for the NT Offshore Net and Line Fishery will be made under section 303FN.
The Minister may make a declaration about a plan or operation even though he or she considers that the plan or operation should be the subject of the declaration only: (a) during a particular period; or (b) while certain circumstances exist; or (c) while a certain condition is complied with. In such a case, the instrument of declaration is to specify the period, circumstances or condition.	The standard conditions applied to commercial fishery WTOs include: • operation in accordance with the management regime • notifying DEW of changes to the management regime • annual reporting. It is recommended the standard conditions are applied to the NT Offshore Net and Line Fishery WTO declaration. The WTO instrument for the NT Offshore Net and Line Fishery specifies the conditions applied.
A condition may relate to reporting or monitoring.	One of the standard conditions relates to reporting.
The Minister must, by instrument published in the *Gazette*, revoke a declaration if he or she is satisfied that a condition of the declaration has been contravened.	
A copy of an instrument under section 303FN, 303FO or 303FP or this section is to be made available for inspection on the Internet.	The instrument for the NT Offshore Net and Line Fishery made under sections 303FN and 303FT will be gazetted and made available on the

	DEW website.

Part 16	
Section 391 Minister must consider precautionary principle in making decisions	**DEW assessment of the NT Offshore Net and Line Fishery**
The Minister must take account of the precautionary principle in making a decision under section 303DC and/or section 303FN, to the extent he or she can do so consistently with the other provisions of this Act.	You must consider the precautionary principle when making a decision to include specimens on the LENS.
The precautionary principle is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.	

Objects of Part 13A

(a) to ensure that Australia complies with its obligations under CITES and the Biodiversity Convention;
(b) to protect wildlife that may be adversely affected by trade;
(c) to promote the conservation of biodiversity in Australia and other countries;
(d) to ensure that any commercial utilisation of Australian native wildlife for the purposes of export is managed in an ecologically sustainable way;
(e) to promote the humane treatment of wildlife;
(f) to ensure ethical conduct during any research associated with the utilisation of wildlife; and
(h) to ensure the precautionary principle is taken into account in making decisions relating to the utilisation of wildlife.

Final recommendations to DPIFM for the NT Offshore Net and Line Fishery

The material submitted by DPIFM demonstrates that the management arrangements for the NT Offshore Net and Line Fishery meet most of the requirements of the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries – 2nd Edition*. Management arrangements include limited entry, gear restrictions, fin ratio conditions and effort limits. As such, DEW considers that overall the management regime aims to ensure that fishing is conducted in a manner that does not lead to over-fishing and for fishing operations to be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.

While the fishery is relatively well managed, DEW has identified a number of risks and uncertainties that must be managed to ensure that impacts are minimised, including, but not limited to:

- the 12 shark species identified from an FRDC Report to be least likely to be sustainable in the NT Offshore Net and Line Fishery
- the material misidentification of *Carcharhinus limbatus* from *C. tilstoni*
- the need to update and review the stock assessment model for the two target shark species
- the need to continue to refine sustainable catch levels, performance indicators and trigger reference points for grey mackerel
- the need to undertake an ecological risk assessment on target, byproduct, bycatch (other than shark species) and protected species
- the lack of recreational and Indigenous catch data for the target species harvested in the fishery and the need to incorporate illegal fishing data into stock assessments, once available
- the need to continue to actively pursue the development of collaborative research with other jurisdictions and take account of relevant research projects conducted when reviewing management arrangements for the fishery.

DEW is satisfied that the fishery will not be detrimental to the survival or conservation status of the taxon to which it relates in the short term. Similarly, it is not likely to threaten any relevant ecosystem in the short term. To contain and minimise the risks in the longer term the recommendations listed below have been made. The key challenge for this fishery will be improving the management of EPBC Act listed species and reviewing the management of species listed under CITES. DEW considers that, until it can be demonstrated that these issues have been adequately dealt with, a three year WTO declaration is appropriate.

Given the low level of protected species interactions under current fishing operations, DEW considers that the operation of the fishery does not, or is not likely to, adversely affect the survival in nature of a listed threatened species or population of that species, or the conservation status of a listed migratory species, cetacean or listed marine species or a population of any of those species. Given the change in the fishery's name (from the NT Shark Fishery to the NT Offshore Net and Line Fishery) and DPIFM's commitment to prohibiting the retention of EPBC Act listed species, DEW considers a new Part 13 accreditation should be granted, with a condition requiring DPIFM to prohibit the retention of all EPBC Act listed chondrichthyan species in the fishery.

Unless a specific time frame is provided in the recommendation each recommendation must be addressed within the life of the declaration (3 years). Note that a standard condition of a WTO is an annual reporting requirement, the details of which are provided in Table 4.

Table 4: NT Offshore Net and Line Fishery Assessment - Issues, Conditions and Recommendations

	Issue	DEW WTO Condition
1	General Management Export decisions relate to the arrangements in force at the time of the decision. In order to ensure that these decisions remain valid and export approval continues uninterrupted, DEW needs to be advised of any changes that are made to the management regime and make an assessment that the new arrangements are equivalent or better, in terms of ecological sustainability, than those in place at the time of the original decision. DEW notes that future assessment needs for the NT Offshore Net and Line Fishery are made available through the annual NT Fishery Status Reports, which outlines potential intended changes to the fishery's management arrangements. DEW supports the continued reporting of future assessment needs for the fishery, but reinforces the need for DPIFM to advise DEW of any intended change to the NT Offshore Net and Line Fishery management arrangements, including legislated amendments that may affect sustainability of the target species or negatively impact on byproduct, bycatch, protected species or the ecosystem.	**Condition 1:** Operation of the NT Offshore Net and Line Fishery will be carried out in accordance with the management regime in force under the NT *Fisheries Regulations* and the NT *Fisheries Act 1988*. **Condition 2:** DPIFM to advise DEW of any intended change to the NT Offshore Net and Line Fishery management arrangements that could affect the criteria on which EPBC Act decisions are based.
2	Annual Reporting It is important that reports be produced and presented to DEW annually in order for the performance of the fishery and progress in implementing the recommendations in this report and other managerial commitments to be monitored and assessed throughout the life of the declaration. Annual reports should follow Appendix B to the *Guidelines for the Ecologically Sustainable Management of Fisheries — 2nd Edition* (the Guidelines) and include a description of the fishery, management arrangements in place, research and monitoring outcomes, recent catch data for all sectors of the fishery, status of target stock, interactions with protected species, impacts of the fishery on the ecosystem in which it operates and progress in implementing DEW recommendations. Electronic copies of the Guidelines are available from the DEW website at: http://www.environment.gov.au/coasts/fisheries/publications/guidelines.html	**Condition 3:** DPIFM to produce and present reports to DEW annually as per Appendix B to the *Guidelines for the Ecologically Sustainable Management of Fisheries — 2nd Edition*.

	Issue	DEW Part 13 Condition
3	EPBC Act listed species A number of byproduct species that could potentially be captured by the NT Offshore Net and Line Fishery are listed under the EPBC Act. Speartooth shark (*Glyphis sp.* A) is critically endangered, Northern river shark (*Glyphis sp.* C) is endangered and freshwater sawfish (*Pristis microdon*), which is considered to be one of the least sustainable species in the fishery, is listed as vulnerable. In addition, green sawfish (*P. zijsron*) is currently under consideration for listing. A requirement of section 208A of the EPBC Act is that all reasonable steps need to be taken to avoid killing or injuring listed species. While a voluntary code of conduct has been introduced in the fishery for the release of all sawfish species, it is not mandatory and the post-release survival of sawfish captured by the fishery is currently unknown. To satisfy the requirement of section 208A of the EPBC Act, DEW has recommended that DPIFM prohibit the retention of EPBC Act listed species, current to the date of the 2007 WTO declaration. DEW considers that the implementation of this condition is necessary to meet the requirements of section 208A of the EPBC Act and therefore recommends that this be included as a condition to this accreditation.	**Condition 1:** Within three years, DPIFM to prohibit the retention of all EPBC Act listed chondrichthyan species in the NT Offshore Net and Line Fishery.
	Issue	**DEW Recommendation**
4	CITES species The FRDC project, *Northern Australian Sharks and Rays: the Sustainability of Target and Bycatch species, Phase 2* (the FRDC project) identified 12 shark species as least likely to be sustainable in the NT Offshore Net and Line Fishery. A number of species harvested by the fishery are also listed under the EPBC Act. Speartooth shark (*Glyphis sp.* A) is critically endangered, Northern river shark (*Glyphis sp.* C) is endangered and freshwater sawfish (*P. microdon*), which is considered to be one of the least sustainable species in the fishery, is listed as vulnerable. In addition, green sawfish (*P. zijsron*) is currently under consideration for listing. In addition, the recent Convention of Parties for CITES added all species of Pristidae to Appendix I. One exception was made with the addition of freshwater sawfish to Appendix II for the exclusive purpose of allowing international trade in live animals for primarily conservation purposes. As a party to the Convention, Australia must apply all CITES	**Recommendation 1:** DPIFM to specifically consider the management of CITES listed species, in particular members of the Pristidae family, in the NT Offshore Net and Line Fishery.

	provisions of the EPBC Act to Pristidae imports and exports as appropriate. DEW acknowledges the voluntary code of conduct for the release of all sawfish species and work being conducted by the Northern Australian Fisheries Management (NAFM) workshops with regard to the harvest and sustainability of northern shark species. However, given Australia's CITES obligations, DEW recommends that DPI&F specifically consider the management of CITES species, in particular species of the Pristidae family, in the NT Offshore Net and Line Fishery. It should also be noted that products derived from EPBC Act listed species are not permitted to be exported under the current approvals for the NT Offshore Net and Line Fishery and export of species listed under Appendix I of CITES for commercial purposes is prohibited.	
5	<u>Management for 'least sustainable' chondrichthyan species (FRDC Report)</u> The FRDC project, *Northern Australian Sharks and Rays: the Sustainability of Target and Bycatch species, Phase 2* (the FRDC project) was recently competed (Salini *et al.*, 2007). One of the major outputs of the project was a risk analysis on shark species which provides for prioritisation of research and management direction. The FRDC project identified 12 shark species as least likely to be sustainable in the NT Offshore Net and Line Fishery. Of these, five species had susceptibility and recovery ranks above 2.33 and were the least sustainable species in the fishery. These species include: *C. limbatus, S. mokarran, P. clavata, P. microdon* (listed as vulnerable under the EPBC Act) and *P. zijsron*. An objective of the National Plan of Action for the Conservation and Management of Sharks (Shark-plan) is to ensure that shark catches from target and non-target fisheries are sustainable. In addition, a key issue identified in the Shark-plan is the need for assessment of the adequacy of management for all shark species and more innovative approaches for dealing with identified shark management issues. DPIFM indicate that current management measures are aimed at ensuring sustainable harvests, however there is no information currently available to determine what might be	**Recommendation 2:** DPIFM to investigate management options, and where appropriate, develop and implement management responses to the 12 chondrichthyan species identified from the FRDC Project (2002/064) as least likely to be sustainable to ensure that overall catch levels for these species are sustainable.

	considered a sustainable take of these species, since no stock assessments have been conducted. While DPIFM indicate that the FRDC report utilised old data from the NT Offshore Net and Line Fishery and that it did not take account of the new management arrangements when analysing raw data, the intent of the project still remains — to provide direction for future management to ensure the ecologically sustainable management of northern shark fisheries. Management options for species that were classified as being least likely to be sustainable now need to be considered. This may involve management action suggested by the FRDC Report, including directing research towards obtaining data for stock assessment for high risk species based on life history parameters, rather than undertaking a level 3 risk assessment where there is insufficient data for a quantitative assessment. Demographic models that rely on life history parameters can provide guidelines for management and have been used extensively to aid management of elasmobranchs due to lack of data (Salini *et al.*, 2007).	
6	<u>Identification of chondrichthyan species</u> During the recent final phase of the FRDC project, it became apparent that commercial fishers and observers have encountered difficulties in distinguishing the closely related common black tip sharks (*C. limbatus*) from Australian black tip sharks (*C. tilstoni*). It is understood that records of *C. tilstoni* could potentially be a mix of *C. tilstoni* and *C. limbatus*, which creates difficulty in ascertaining the true catch composition for these two species. This is concerning since *C. tilstoni* is a target species in the fishery, while the FRDC report identified *C. limbatus* as being 'least sustainable' as a result of fishing activity in the fishery. A public comment also expressed concern regarding the misidentification of these two species and the potential implications for the stock assessment for *C. tilstoni* and the sustainability of *C. limbatus*. Since becoming aware of this identification problem, DPIFM have investigated research into developing an easy, cost-effective identification method of *C. limbatus* to enable observers and fishers to distinguish and record actual shark catches. However, it appears that funding is yet to be granted for current research proposals to determine an identification method for separating *C. limbatus* from *C. tilstoni*.	**Recommendation 3:** Within two years, DPIFM to commence investigating the extent of material misidentifying *C. limbatus* from *C. tilstoni* and review current performance indicators and trigger reference points to ensure they are appropriately precautionary. **Recommendation 4:** Should the investigation indicate that material misidentification of the two shark species is occurring, DPIFM to investigate a mechanism to accurately identify *C. tilstoni* and *C. limbatus* in order to determine the true catch composition of these two shark species in the fishery.

	It appears that there is a need to first learn how to correctly identify the species through cost-effective mechanisms that can be used in the field or at port. This may include determining the areas of the fishery where the two shark species are being harvested from. DEW recommends DPIFM investigate a mechanism to separate *C. limbatus* from *C. tilstoni* in order to determine the true catch composition for these two shark species. However, in the absence of current means to distinguish the two species and considering that performance indicators relating to byproduct species are dependent on logbook data and observers, DEW recommends that, in the interim, DPIFM investigate the extent of materially misidentifying these two shark species and review current performance indicators and trigger reference points to ensure they are appropriately precautionary to ensure the ecologically sustainable management of the two species.	
7	<u>Stock Assessment Model for Target Shark species</u> One of the key issues identified in the Shark-plan is the need for continued effort to maintain and improve the standard of stock assessments for target species in dedicated shark fisheries. An age-structured model is currently used to determine potential yield estimates for the two target blacktip shark species, however there is a need for this model to be continually updated. The current age-structured model is based on unreliable data originating from foreign fishing vessels operating in the fishery until 1986. While an update of the model by the Northern Stock Assessment Group (NSAG) was conducted in 2005, the unreliability of the assessment was emphasised. In particular, it was recognised that the Catch per unit effort (CPUE) statistics, on which the assessment relied, were a poor index of abundance. The basic problem with CPUE as an index of abundance is that it may reflect other factors, such as marketability, much more than it does stock abundance. The Shark-plan highlights that increased effort needs to be devoted to the collection of an appropriate balance of fishery dependent and fishery-independent data that will allow the development of more appropriate abundance indices. DEW recommends that current catch and effort data is continuously incorporated into modelling arrangements in order to build upon the model and make it more responsive to changes detected in the fishery. DEW also recommends DPIFM, in consultation with relevant	**Recommendation 5:** DPIFM to continue stock assessments of target shark species on a triennial basis and incorporate current catch and effort data into stock assessment models. DPIFM to review the adequacy of the current stock assessment model for the target shark species to ensure the ecologically sustainable management of the fishery.

	stakeholders and considering the potential implications of misidentifying *C. limbatus* from *C. tilstoni*, review the adequacy of the current stock assessment model for the target shark species to ensure the ecologically sustainable management of the fishery.	
8	<u>Sustainable catch levels for grey mackerel</u> A recommendation was made in the initial assessment of the fishery for DPIFM to develop a program for stock assessments of target species on a triennial basis from 2006. While the NSAG has agreed to undertake a triennial assessment of the two target blacktip sharks (beginning in 2005), there is no indication whether this will occur for the other target species, grey mackerel. In 2006, an initial assessment for grey mackerel was conducted. While the main outcome of this assessment was that the fishery is not currently overfished (rather fully-fished), the 2006 Annual Status Report for the fishery indicated that the assessment was limited as it relied on catch and effort data, and the inability to determine whether sharks or grey mackerel were the principal target species. While performance indicators and trigger reference points have been established for grey mackerel, no sustainable yield estimates have been developed. Therefore, performance indicators are based on increasing or decreasing catch rates. However no sustainable harvest rates have been established for grey mackerel and therefore, it is uncertain whether the performance indicator relating to grey mackerel is appropriate. In recognition of increasing effort being directed towards grey mackerel in the fishery, DEW recommends DPIFM, in conjunction with commencing stock assessments for grey mackerel in 2006, develop precautionary harvest rates for grey mackerel in order to ensure catch levels, performance indicators and trigger reference points are ecologically sustainable. Spatial dynamics of the species as described by the project *Determination of Management Units for Grey Mackerel Fisheries in Queensland and the Northern Territory* (FRDC 2005/010) will need to be addressed in developing harvest rate estimates for grey mackerel in the fishery.	**Recommendation 6:** DPIFM to continue stock assessments of grey mackerel on a triennial basis and continue to refine sustainable catch levels, performance indicators and trigger reference points to ensure the take of grey mackerel is ecologically sustainable.
9	<u>Cross-jurisdictional Management</u> DEW notes that DPIFM have collaborated with the Australian Government, Queensland and Western Australia in pursuit of complementary management and research of shared shark and	**Recommendation 7:** DPIFM to continue to actively pursue identified research priorities and the

	grey mackerel stocks. Additionally, a *Strategic Plan for NT Fisheries Research and Development, 2007–2011*, has been developed which identifies priority research needs for NT fisheries including the Offshore Net and Line Fishery. DEW commends DPIFM for pursuing this collaborative work and recommends DPIFM ensure that relevant research priorities identified, including those identified in the Research and Development Strategic Plan, are undertaken to improve the ecologically sustainable management of the fishery. In addition, the outcomes of the FRDC Report need to be incorporated in management and used to prioritise further research needs.	development of collaborative research with other jurisdictions and agencies and ensure that management arrangements for the NT Offshore Net and Line Fishery continues to take account of the results of research conducted.
10	<u>Ecological Risk Assessment</u> The risk analysis based on the FRDC Report relates only to species of shark and rays. However, grey mackerel is a target species in the fishery, while species harvested in the fishery other than sharks include: Spanish mackerel, salmon, longtail tuna, snapper, queenfish and trevally. In addition, operators reported interactions with one speartooth shark (*Glyphis spp*.) and 17 marine turtles during 2006. An Environmental Management System (EMS) for the fishery has been established which encompasses environmental, economic and social aspects of fishing operations to ensure that the ecologically sustainable development of the fishery is maintained. The EMS was based on a risk analysis conducted for the fishery, resulting in the development of guidelines, including a Code of Conduct, Code of Practice and advice on interactions with turtles and sawfish. The success of actions against EMS objectives will be reviewed annually, with an annual summary report to be produced and distributed to all relevant commercial fishers and made available to other stakeholders (DEW would also like to receive these EMS summary reports). To support and build upon the EMS, DEW recommends DPIFM conduct an Ecological Risk Assessment (ERA) on the current impact of the fishery on target, byproduct, bycatch (other than shark species) and protected species. Consideration should be given to recent catch data, reported protected species interactions, compliance with the Code of Practice, recent changes to management arrangements and the potential misidentification of certain sharks species. While all protected species should be assessed under the ERA, special consideration should be given to the impact of the fishery on the critically endangered Speartooth shark	**Recommendation 8:** Within 12 months, DPIFM to conduct an ERA on the impacts of the fishery on target, byproduct, bycatch (other than shark species) and protected species, particularly *Glyphis sp. A* and *Pristis microdon*. DPIFM to investigate measures to ensure that issues identified at risk are minimised.

	(*Glyphis sp. A*) and the vulnerable freshwater sawfish *(P. microdon)*. In conjunction with the ERA, DPIFM should actively encourage industry to review the aging NT Code of Conduct and Code of Practice for the fishery and ensure that it is still adhered to by commercial fishers and continues to assist with the ecologically sustainable management of the fishery.	
11	<u>Accounting for all removals in stock assessments</u> DPIFM recognise that illegal, unregulated and unreported (IUU) fishing in northern Australian waters represents a serious threat to the sustainability of northern Australian shark and finfish stocks and that a greater understanding of such activities is needed to ensure the future sustainability of northern Australian fisheries. While Coastwatch report a 40% decrease in IUU fishing in 2006 from 2005 (Status Report, 2006), it is not yet possible to determine the potential impact IUU fishing is having on the fishery. DEW recommends that precautionary management of the fishery should take into account estimates of the level of take from this source. DPIFM has been collaborating with the Commonwealth, Queensland and Western Australian governments on this issue and DEW commends DPIFM for being proactive. Once estimates of the level of take from IUU fishing are available, these should be taken into account in stock assessments and management of the fishery. No surveys to estimate the recreational and Indigenous take of grey mackerel or shark species have been conducted since 2000/01 as part of the National Recreational Fishing Survey. The survey suggested that recreational fishers in the NT retain up to 8,000 sharks annually while indigenous fishers retain up to 12,000 sharks per year. Data from this recreational and indigenous survey did not identify mackerel or shark catch by species. Recognising the lack of data collection over the past seven years on recreational and Indigenous catches, there is a need for DPIFM to factor current estimates of all removals of grey mackerel and shark species into management arrangements to ensure overall catch levels are sustainable. While it is uncertain what the current level of non-commercial take of these species are, it is important to ensure that reliable estimates are taken into account to make sure management arrangements are appropriately precautionary.	**Recommendation 9:** DPIFM to improve estimates of recreational and Indigenous harvest of target species in the NT Offshore Net and Line Fishery. Once available, DPIFM to take estimates of IUU fishing, recreational and Indigenous harvests into account in stock assessments and to introduce management arrangements to mitigate any risks identified.

References

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Acronyms

ARC	Australian Research Council
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CPUE	Catch per unit effort
DEW	Australian Government Department of the Environment and Water Resources
DPIFM	Northern Territory Department of Primary Industry, Fisheries and Mines
EMS	Environmental Management System
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FRDC	Fisheries Research and Development Corporation
GoC	Gulf of Carpentaria
IUU	Illegal, Unregulated and Unreported
LENS	List of Exempt Native Specimens
NAFM	Northern Australian Fisheries Management
NSAG	Northern Stock Assessment Group
NT	Northern Territory
PMFES	Northern Territory Police Marine, Fisheries and Enforcement Section
WTO	Wildlife Trade Operation