

**Report of the Freshwater Sawfish *Pristis microdon***

**Scientific Workshop of 24 March 2009**

**Brisbane**

**Prepared for DEWHA by the Freshwater Sawfish Expert Review Committee**

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## INTRODUCTION

The Department of the Environment, Water, Heritage and the Arts (DEWHA) established the Freshwater Sawfish Expert Review Committee (the Committee) in order to:

“undertake a review of current research and prepare independent scientific advice relating to the removal of freshwater sawfish (*Pristis microdon*) from localised river systems in northern Australia”

In providing that advice the Committee was asked to answer the following questions:

- a. Having reviewed the current research, what is the considered opinion of the group as to the degree to which populations of *P. microdon* are able to sustainably support the removal of specimens from localised river systems?

Consideration should be given to the implications of removal from one river system only, removal from across a number of river systems, and removal from tidal waters only, as opposed to removal from further upstream.

In formulating this advice, the precautionary approach should be applied, while taking into account what is known about population structure, distribution and genetic diversity, and the various threats to the species (including external sources of mortality such as incidental catch in fishing nets).

- b. What are the potential risks arising from removing animals from river systems?
- c. Giving consideration to the best available information on population size, the degree of genetic transfer and genetic diversity, are there any particular river systems that individuals should not be harvested from?
- d. Giving consideration to the best available information on population size, population structure, life-history characteristics, the degree of genetic transfer and genetic diversity, are there any particular age classes or population sub-sections that should not be harvested?
- e. If the group feels that removal of some individuals would not be detrimental to the survival of the species, management advice should be provided to minimise impacts on population genetic diversity and structure, particularly considering the isolated and fragmented distribution of the species.

The full Terms of Reference of the Committee, including its composition, are provided at Annex 1.

## **APPROACH**

The Committee discussed the five specific questions posed in the Terms of Reference. The Committee agreed that the questions were not mutually exclusive. In particular, it was considered that question (a) was the primary question and that questions (b) to (d) were integral to providing an answer to that primary question. The Committee agreed to approach its task as follows:

1. Review the latest available research results on *P. microdon*.
2. Determine, based on the information available, the appropriate management scale against which advice would be provided. Essentially, this involved deciding whether advice should or could be provided on the basis of individual river systems or groups of river systems and, if the latter, the appropriate groupings.
3. Consider, for each of the Management Units identified in Step 2, the information available on sustainability (including life history characteristics, population size and structure, threats to the population of *P. microdon* and measures in place to mitigate those threats) and genetics.
4. Based on that consideration, determine the degree to which populations of *P. microdon* in each of those Management Units could support removal of specimens.
5. If removal of some specimens of *P. microdon* from one or more Management Units was considered possible, identify any constraints that should be placed on the characteristics of the specimens removed (e.g. size, sex, source).

The Committee considered that its task related to advice as to the extent to which the populations of *P. microdon* could sustain removals over and above that currently removed through commercial, recreational and indigenous fishing activity taking into account current and proposed measures to mitigate those removals.

In relation to the reference in question (a) to “tidal waters” the Committee agreed, that for the purposes of its task, it would interpret this as referring to “tidal waters within the body of the river” in order to differentiate it from tidal waters outside the river mouth.

## **STRUCTURE OF THE REPORT**

This report summarises the Committee's consideration of the latest available information on key aspects of the populations of *P. microdon* that it considered relevant to addressing the Terms of Reference. The basis upon which the Committee delineated Management Units for the purpose of providing advice on the extent of possible additional removals is then described. This is followed by a summary of the Committee's understanding of the population in each Management Unit, the current and potential threats affecting that population and the current and potential measures to mitigate those threats. On the basis of that assessment, the Committee's advice as to possible levels of additional extraction is then provided and suggestions made for how such extraction might be managed.

## **REVIEW OF RESEARCH**

A list of the documents reviewed by the Committee is provided at Annex 2. The Committee noted that only one of the documents had been subject to peer review.

The Committee considered that Document 1 represented the previously available baseline set of information on *P. microdon*. Documents 2 -11 were reviewed to identify whether they changed or enhanced that understanding of *P. microdon* populations and, specifically, how the new information might inform the questions posed in the Terms of Reference. Specific issues addressed by the Committee are summarised below. Additional aspects of the new research available were considered throughout the Committee's deliberations.

### ***Size at maturity***

It was noted that the best estimate of size at maturity was 3 m for both sexes, but that this was less certain for females<sup>1</sup>.

### ***Litter size***

The Committee noted that there was confirmation of one female *P. microdon* carrying 12 pups. It also noted that while one female had been found with 34 oocytes present (Peverell, in press cited in Doc.3) this did not necessarily indicate a litter size of 34. It was agreed that the litter size may be higher than 12, and that there may be a relationship between the size of the female

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<sup>1</sup> Thorburn, D.C., Morgan, D.L., Rowland, A.J. & Gill, H.S. (2007). Freshwater Sawfish *Pristis microdon* Latham, 1794 (Chondrichthyes: Pristidae) in the Kimberley region of Western Australia. *Zootaxa* 1471: 27–41.

and the number of pups. However, the Committee agreed that, on the basis of the available evidence, it would be precautionary and scientifically defensible, to assume an average litter size of 12. It was also noted that this litter size was consistent with that for the Smalltooth Sawfish (*P. pectinata*)<sup>2</sup>.

### ***Breeding frequency***

The Committee agreed that there was no information available to suggest that the assumption of annual breeding was inappropriate.

### ***Sex ratio***

The Committee considered the estimates of female to male sex ratios available and agreed that the evidence suggested that a ratio of 1:1 should be adopted, noting that the sex ratio of 0+ individuals recorded in the Fitzroy River, Western Australia was equal (Doc. 6) but that the ratio may be skewed towards females in older fish (Thorburn *et al.*, 2007)<sup>1</sup>.

### ***Sex-based dispersal***

The Committee noted that conclusions about population structure are based on the patterns of variation in mtDNA which reflects female mediated gene flow. Thus it is important to recognise that *P. microdon* might exhibit sex-based dispersal with female philopatry and male dispersal.

### ***Environmental fluctuations***

The Committee noted that in the Fitzroy River and King Sound area of Western Australia there was a strong correlation between recruitment and the length of the wet season. Whitty *et al.* (Doc. 6) report a significant correlation between the stage height (river level) for the Fitzroy River and the proportion of new recruits in samples between 2003 and 2007 (see Figures 13-15, Doc. 6). This could suggest a need to vary any level of extraction of juvenile (0+ age class) *P. microdon* according to the length of the previous wet season. The Committee noted that this relationship may not necessarily occur in Freshwater Sawfish populations in the Gulf of Carpentaria. It was agreed that the further analysis of microsatellite data that is underway, and likely to be available by June 2009, will provide further guidance on this relationship.

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<sup>2</sup> See, for example, Simpfendorfer, CA. 2005. Threatened fishes of the world: *Pristis pectinata* Latham, 1794 (Pristidae). *Environmental Biology of Fishes*, 73:20.

### ***Other considerations***

The Committee discussed the role of *P. microdon* in the ecosystem. It was agreed that it was a top-order predator and, as such, removal of adults from the ecosystem will have flow-on effects. However, it was noted that there were other top order predators in the same ecosystem, such as bull sharks (*Carcharhinus leucas*).

The resilience of *P. microdon* to interactions with fishing gear was also discussed. It was noted that while susceptible to capture in nets, they generally survived capture and could be released alive with a high chance of survival if appropriate release methods were used. It was noted that recapture of many tagged specimens confirmed that the species had a high rate of post-release survival. Further, it was noted that education programs aimed at fostering the adoption of release procedures to maximise the chances of survival had been introduced and were considered to have been successful in the Queensland Gulf of Carpentaria.

### **MANAGEMENT UNITS**

After consideration of the available genetic data (principally from Doc. 6) the Committee noted that insufficient sampling had been conducted to allow analysis of whether individual river systems should or should not be fished due to their genetic characteristics. The Committee considered that it would be appropriate, taking a precautionary approach, to identify five broad Management Units for *P. microdon*, each comprising a group of river systems:

1. West Coast of Western Australia (centred on the Fitzroy River and King Sound)
2. Northern Territory and East Kimberley (from the Cambridge Gulf and its river systems in Western Australia, north and east to, and including, the Glyde River in the Northern Territory)
3. Southern and Western Gulf of Carpentaria (east of the Glyde River in the Northern Territory to the Mitchell River in Queensland)
4. North Eastern Gulf of Carpentaria (north of the Mitchell River in Queensland to Torres Strait)
5. East Australian Coast (south of Torres Strait)

The river systems comprising these Management Units are identified in the maps in Annex 3.

In arriving at these Management Units the Committee took into account:

- That the sample sizes underlying the available genetic information remained low and that DNA was not available from all the samples of dried rostra
- The available results of genetic testing suggest that:
  - *P. microdon* is genetically sub-divided between the West Coast of Western Australia and the Gulf of Carpentaria
  - There is a possibility that the East Australian Coast assemblages are relatively distinct, based on the finding that the two samples from the Normanby River had a haplotype that was not found at any other site.
    - It was also noted that the Torres Strait acts as a point of stock delineation for a number of other marine species and that this supported the proposition that the East Coast population of *P. microdon* was separate from those in the Gulf of Carpentaria and further west.
  - There are some subtle differences between the assemblages in the eastern and western assemblages of the Gulf of Carpentaria, although it remains possible that there may be a single population in the Gulf of Carpentaria
  - There is greater genetic diversity in *P. microdon* in the Gulf of Carpentaria than in the Fitzroy River
- The genetic data available was not sufficient to indicate that female *P. microdon* home to a particular river to give birth, but this possibility cannot be ruled out.
- There was very limited information on the structure of *P. microdon* in the Northern Territory and East Kimberley. More sampling is required from this Management Unit in order to better understand the extent to which populations in this area are separate from other populations.
- There was insufficient data available to assess rivers in the Gulf of Carpentaria separately and it would be necessary to consider Management Units comprising clusters of rivers systems. In the Gulf of Carpentaria, and particularly in the southern part of the Gulf, normal weather patterns result in the merging of rivers to form a single floodplain during the wet season. This provides opportunities for movement of *P. microdon* across river systems, although there is currently no evidence to substantiate this. Movement

into adjacent river systems via the coast has, however, been documented in the southern Gulf.

- That, in respect of the Southern and Western Gulf of Carpentaria, there is considerably more information available on *P. microdon* assemblages in the Queensland rivers than for rivers of the Northern Territory section of this Management Unit.

## **FRESHWATER SAWFISH POPULATIONS BY MANAGEMENT UNIT**

### ***West Coast of Western Australia***

The Committee considered that the current major threats to the population of *P. microdon* in this Management Unit included:

- Commercial fishing
- Indigenous take
- Recreational fishing
- Barrages in the river system

The Committee regarded long-term climate change (while it may get wetter rainfall may also be more variable), proposals for ground water extraction and additional dams and weirs, the impact of cane toads and the prospect for coal mining in the Fitzroy Basin as potential threats to the population of *P. microdon*.

It was noted that many areas of the *P. microdon* habitat were inaccessible and this provided some natural level of protection from both commercial and recreational fishers. Education programmes had also been successful in raising awareness of the relative rarity of the species and this has had a positive impact on attitudes towards its conservation. In particular, it was considered that this had probably resulted in a reduction in the level of mortality incurred by recreational fishing.

However, the Committee noted that, despite the no retention policy, there was an ongoing and substantial level of Indigenous take of *P. microdon* that requires quantification. Given the presence of juveniles in upstream river systems it was considered that this subsection of the population was most at risk from Indigenous take. However, if the current level of Indigenous extraction reflects the historical level of take by the Indigenous community, it is unlikely that this will have a significant impact on the population. In addition, it was noted that natural mortality of juveniles is high, with only 1 in 4 juveniles (0 - 2+) surviving to maturity, therefore the impact of

Indigenous take on the sustainability of the population as a whole would be reduced as a result of its focus on juveniles.

It was acknowledged that there was a relatively low potential for impact on *P. microdon* from the Kimberley Gillnet and Barramundi Fishery in which only two of the seven licenses are operated in the vicinity of the Fitzroy River population. Further, the impact of commercial fishing had been reduced through the revocation, in 2008, of exemptions to fish for Threadfin Salmon on 80 Mile Beach<sup>3</sup>, the adoption of live release practices and the full protection (i.e. no retention) of all sawfish species in Western Australian waters. It was noted that there was likely to be some level of illegal net fishing by both commercial and recreational fishers, and that there remained the potential for mortality of *P. microdon* to occur in legal, commercial fishing operations, such as the Pilbara Fish Trawl (Interim) Managed Fishery. This impact was likely to be higher on adults of the species. However, the Committee noted that *P. microdon* is very hardy in comparison to some other species, such as the Narrow Sawfish (*Anoxypristis cuspidata*), and if removed from gillnets appropriately, had a high chance of survival (although survival after release from trawl nets was likely to be significantly lower).

In considering the degree to which populations of *P. microdon* could support removal of some animals the Committee considered that:

- the threat to populations was higher if older juveniles and adults were removed than if juveniles (i.e.  $\leq 1.5$  m) were removed;
- the threat to populations was higher if females were removed; and
- ideally, any additional take should be associated with a reduction in mortality from other sources, noting that some such reductions are already occurring as a result of management initiatives.

In relation to the population on the West Coast of Western Australia, the Committee considered that it was not possible to quantify the current level of removals of *P. microdon*. It was, therefore, not possible to quantify the impact of additional removals. Further, the apparent relationship between the length of the wet season and recruitment added complexity to analysis

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<sup>3</sup> This information was confirmed by Dr Rory McAuley at the request of the Committee, noting Dr McAuley's advice that the previous impact of fishing concessions for Threadfin Salmon were largely removed from the Fitzroy population of *P. microdon* but, fishing under these concessions may have affected any population of *P. microdon* that may occur in the De Grey River.

of the extent to which the population could sustain removal of animals, as this may vary annually. The Committee noted:

- that it was likely that Indigenous take remained the single largest source of current removals of *P. microdon* in this Management Unit;
- that it was unlikely that the level of removals by the Indigenous community could be reduced significantly, but that it would be relatively simple to quantify the extent of this take to inform future decisions about the capacity of the population to sustain further extraction;
- the impact of commercial fishing had been significantly reduced, although not entirely removed, through the prohibition on retention of sawfish and reduction in fishing effort in the habitat of *P. microdon*;
- if commercial catch of sawfish was now only incidental bycatch, then there remained little scope to further reduce this impact other than through ongoing vigilance in relation to the use of appropriate release procedures and other mitigation measures;
- the mortality incurred by recreational fishing was, as discussed above, thought to be declining;
- the recreational sector may be the only sector where further reductions in the impact on *P. microdon* could be achieved through ongoing education programmes; and
- the level of any additional take may need to be reduced in years of low river flows.

The Committee considered that the population appeared to be surviving at the current level of extraction and there was evidence to suggest that recent levels of extraction from commercial and recreational fishing were declining. Under these circumstances the Committee was of the view that an additional small level of removals was unlikely to have a significant impact on the population.

### ***Northern Territory and East Kimberley***

The Committee had little information on which to assess the freshwater sawfish population in this Management Unit. Threats to the population were identified as commercial fishing and recreational fishing.

It was noted that commercial fishers were allowed to fish in only two rivers in the Northern Territory but that fishers were permitted to fish on river flats where they would potentially encounter adult specimens of *P. microdon*. Further, it was noted that the Northern Territory Government has proposed to prohibit the take of all sawfish species by recreational fishers but would allow Indigenous people to continue to take sawfish species when undertaking customary fishing.

Given the lack of information about the population status and population genetics in this area and the current level of extraction, and acknowledging the need for a precautionary approach, the Committee agreed that there should be no additional removals of *P. microdon* from this Management Unit. It was considered that this region warranted further sampling effort in order to improve the scientific understanding of the population.

### ***Southern and Western Gulf of Carpentaria***

The Committee noted that its assessment of this Management Unit was based largely on information on the population of *P. microdon* in the rivers of the southern Gulf of Carpentaria. There is little information available about the population in the rivers in the western Gulf while the understanding of the species in the southern Gulf is steadily increasing.

The Committee identified the current major threats to *P. microdon* in this Management Unit as including:

- The Queensland Inshore Net Fishery (N3)
- Fish and prawn trawl fisheries
- Recreational fishing
- IUU fishing by foreign vessels
- Illegal net fishing, particularly in freshwater areas
- Extraction for aquarium purposes
- Impacts on habitat from modification of flow (dams, weirs and barrages) and mining operations

It was noted that while there were no recent reports of catches of *P. microdon* in the Northern Prawn Fishery (NPF) the species had historically been caught in the fishery. It was thought that this may reflect a reduction in abundance of adults, although it was noted that fishing effort in

the NPF had declined significantly, through reductions in both the season and the size of the fleet, and that operators in the NPF are not permitted to retain any species of elasmobranch. The Committee considered whether under-reporting could explain the absence of recent records in this fishery, but noted that a crew-based observer program is operating successfully in the NPF. In addition, CSIRO conducts pre-season surveys for the NPF in the Gulf of Carpentaria and also has observers on NPF vessels. No *P. microdon* have been recorded by scientific or crew-member observers since 1998.

The Committee was advised that juvenile *P. microdon* had been recorded in the Queensland N3 Fishery, but *P. microdon* were not recorded as being taken in the N9 (Offshore Net Fishery). Possibly this was because adults are likely to be on the bottom, out of reach of the gillnets in the N9 fishery, which do not reach the bottom. As of 1 March 2009, the Queensland Government has prohibited the retention of all sawfish species in fisheries in Queensland waters of the Gulf of Carpentaria.

It was considered that IUU fishing remained a threat, but the level of IUU fishing in the region appeared to have declined but needs to be monitored.

The Committee agreed that fisheries management measures had probably reduced the impact of commercial fishing on *P. microdon* in this Management Unit, particularly on juveniles affected by the N3 fishery. Further, education programmes regarding the need for conservation of sawfish and on methods for releasing sawfish alive were considered to have reduced the level of mortality from fishing operations. It was also suggested that anecdotal advice indicated a decline in shark fin prices, linked to the global financial downturn, and this may provide some reduction, at least in the short term, in the incentive for fishers to retain *P. microdon*. However, there was scepticism from some members of the Committee on the issue of declining fin prices. The likely formation of marine protected areas in the Gulf of Carpentaria under the Commonwealth regional marine planning exercise was also seen as providing an additional level of protection to *P. microdon* in the future.

The Committee concluded that it was not possible to quantify the current level of removals of *P. microdon* from this Management Unit and, that while there had been a decline in the population, there was insufficient evidence to indicate the magnitude of that decline. Overall, the Committee considered that the population in this Management Unit was likely to be at slightly higher risk than that on the West Coast of Western Australia.

The Committee noted the findings of the demographic modeling (Doc. 7) that the removal of a small number of young animals from the population in the Gulf of Carpentaria was unlikely to have any significant impact on the population over and above the current impacts.

The Committee found that the removal of a small number of individual specimens was likely to have only a limited impact on the population if these removals comprised juvenile males ( $\leq 1.5$  m). It was agreed that there was a need to ensure that any extraction of *P. microdon* was spread across the rivers in the Management Unit rather than concentrated in one or more river systems. The Committee noted that this spread should be both spatial and temporal, i.e. across both rivers and years, to minimise the possibility of affecting potentially rare genotypes.

### ***North Eastern Gulf of Carpentaria***

The Committee identified the major threats to *P. microdon* in this Management Unit as including:

- Inshore Net Fishery (N3)
- Fish and prawn trawl fisheries
- Recreational fishing
- IUU fishing by foreign vessels
- Illegal net fishing, particularly in freshwater areas
- Some Indigenous take
- Extraction for aquarium purposes
- Impacts on habitat from proposed mining developments
- Tidal barriers and barrages, particularly in dry periods

The Committee noted that the management measures applying to the NPF and to the N3 and N9 fisheries were as discussed above for the Southern and Western Gulf Management Unit and that it was likely that commercial fishing mortality in this Management Unit may have declined. Similarly, while IUU fishing remained a threat, it too appeared to have declined.

Again, taking into account the findings of the demographic model (Doc. 7), the Committee considered that the removal of a small number of male juveniles ( $\leq 1.5$  m) spread across the rivers of the North East Gulf of Carpentaria would be unlikely to have a significant impact on the population of *P. microdon*. The Committee noted the relatively smaller number and size of the

rivers in this Management Unit compared to those in the southern part of the Gulf. Any level of sustainable removals from the North East Gulf of Carpentaria Management Unit might, theoretically, need to be lower than that from the Southern and Western Gulf of Carpentaria Management Unit.

### ***East Australian Coast***

The Committee noted that the *P. microdon* population on the East Australian Coast has probably been affected by commercial fishing in the East Coast Inshore Fin Fish Fishery (ECIFF), recreational fishing and the Queensland Shark Control Programme.

The Committee accepted that the beach meshing data on catch of *Pristis* spp. (including *P. microdon*) (Doc. 11) together with the absence of any observer records of the species, indicated that there had been a significant reduction in the abundance of *P. microdon* and a significant contraction in its range in this region.

Interactions with *P. microdon* in the rivers of Eastern Queensland and waters off the East Queensland coast were now extremely rare. The Committee considered it likely that numbers were so low that they did not justify resources being devoted to tagging of the species in this region.

The Committee noted that the risk from commercial fishing had been reduced due to the introduction, on 1 March 2009, of a 'no retention' policy for all sawfish species in the ECIFF. This would remove the incentive to target sawfish and, together with education programmes to encourage live release of sawfish taken incidentally, would reduce, although not eliminate, the fishing induced mortality of any *P. microdon* that might be taken by the ECIFF. The Committee also noted that the Queensland Department of Primary Industries and Fisheries was proposing to close the Normanby, Bizant and Kennedy Rivers, in which *P. microdon* were known to occur, to all gillnetting.

The Committee came to the view, taking into account the need to apply the precautionary approach, that this population could not sustain any degree of additional removal of specimens since:

- there had been an apparent marked reduction in the population;
- there was a strong likelihood that this population is genetically distinct from other populations of *P. microdon* in Australia;

- commercial and recreational fishing may continue to place some level of ongoing, albeit reduced, pressure on the population; and
- the proximity to the Great Barrier Reef World Heritage Area.

### **SCOPE FOR REMOVAL OF FRESHWATER SAWFISH**

The Committee found that, consistent with the precautionary approach, it was not currently possible to recommend removal of specimens from the populations of *P. microdon* in either the East Australian Coast or the Northern Territory and East Kimberley Management Units. The Committee was of the view that further surveys should be conducted in the Northern Territory and East Kimberley Management Unit to improve the understanding of the sawfish populations and that the Committee's advice in relation to this population should be reviewed as new information becomes available.

In relation to the West Coast of Western Australia, the Southern and Western Gulf of Carpentaria and the North East Gulf of Carpentaria Management Units the Committee found that the removal of a small number of individuals would not have a significant impact on the populations subject to the following conditions:

1. removals are comprised only of males
  - the only exception to this condition should be to allow for the capture of females for the purposes of captive breeding programs, where the credibility of the captive breeding program has been established and the number of females captured for such purposes is capped
2. removals should be comprised only of neonate and juvenile sawfish  $\leq 1.5$  m total length. This equates to animals between 0 - 2+ years of age (Peverell cited in Doc. 7 and Thorburn *et al.*, 2007<sup>1</sup>)
  - on the basis that only one in four juveniles reach maturity (Doc. 7) and that removal of juvenile specimens will, therefore, have less impact on the sustainability of the population
3. removals should be spread across river systems within Management Units
  - in order to minimise the likelihood that rare genotypes are overexploited
4. removals should be sourced from below the lowest barrier in any river system

- where natural mortality was likely to be lower and thus the impact of removals on the sustainability of the population also likely to be lower (Thorburn *et al.*, 2007<sup>1</sup>)

In relation to the request in the Terms of Reference for advice on the differential impact of removals from tidal and upstream waters, the Committee considered that its recommendation that only juveniles be removed addressed this since juveniles are found within river systems rather than marine habitat.

The Committee considered that, subject to the conditions outlined above, a maximum number of four individuals could be removed annually from each of the (1) West Coast of Western Australia, (2) Southern and Western Gulf of Carpentaria and (3) North Eastern Gulf of Carpentaria Management Units without compromising the sustainability of these populations. In doing so the Committee emphasised that its advice is made in the context of having no estimates of current total removals from any Management Unit and that the sample sizes underlying the structure of the populations remain small. In the face of this uncertainty, the Committee believes that its advice is consistent with a precautionary approach.

The upper limit of four removals of juvenile males per Management Unit is based on the demographic modelling that suggests that, assuming an age of maturity of *P. microdon* of eight years, one in four juveniles will reach maturity, i.e. three will die before reaching maturity. This suggests that removal of four younger juveniles/year from each of the three identified Management Units was equivalent to losing one adult/year/Management Unit. The Committee considered that the removal of four juveniles per year from the three identified management units was consistent with a precautionary approach, noting that such removals would be in parallel to ongoing attempts to reduce mortality from other sources, particularly from commercial and recreational fishing.

While the Committee acknowledged that, theoretically, it would be appropriate for a smaller number of individuals to be removed from the North Eastern Gulf than from the Southern and Western Gulf Management Unit, it was considered that a number lower than four would equate to less than one adult lost. As a result, and given the level of uncertainty involved in the understanding of the *P. microdon* populations generally, it was considered that it was inappropriate to attempt to discriminate between the number of removals from these two Management Units.

## MANAGEMENT ADVICE

Given the current CITES Appendix II listing of the species, the Committee considered specifically the provision of management advice in relation to the removal of *P. microdon* for the purposes as described in the annotation to the listing “for the exclusive purpose of allowing international trade in live animals to appropriate and acceptable aquaria for primarily conservation purposes”.

The Committee agreed that, while it had not been quantified, there was likely to be some level of conservation benefit in the display of *P. microdon* in public aquaria. It noted that DEWHA has the capacity, through the ambassador agreement with any exporter, to impose conditions on the data to be provided in relation to specimens exported and to approve the nature and content of the information regarding the species which is to accompany its public display in overseas aquaria. The Committee expressed some concern as to whether sufficient attention was being given to ensuring the adequacy of the information accompanying displays of exported Freshwater Sawfish. The Committee was also concerned that *P. microdon* displayed in Australian aquaria were not subject to any restrictions regarding the nature of the information to be displayed.

The Committee considered that the conservation benefit derived from removal of *P. microdon* for aquaria purposes would be enhanced by adoption of measures including:

- the provision of a genetic sample from each specimen;
- the tagging of each specimen with a Passive Integrated Transponder (PIT) at the base of the first dorsal fin giving it a unique identifier;
- the development, by DEWHA, of a database of tagging information to facilitate tracing of exported specimens, monitoring of mortality and breeding programs; and
- ongoing monitoring of the fate of the specimen (for example, to determine what happens when an animal outgrows the facilities available at an aquarium).

In addition, the Committee was of the view that those permitted to remove the species for aquarium purposes should be subject to a research levy. Since permission to remove *P. microdon* from the wild, as opposed to permission to export it, came from State agencies it was considered that the levy should be imposed at that level. Further, given that the level of removal is determined by the States, while the Commonwealth has control only over exports, the

Committee recommends that there be a formal, coordinated approach between DEWHA and the relevant agencies in Western Australia, the Northern Territory and Queensland to ensure that levels of removal are sustainable. The Committee noted that the recovery plan for Freshwater Sawfish and *Glyphis* spp., currently under development, may provide a platform for establishing such a coordinated approach.

### **CONCLUDING COMMENTS**

The Committee noted the research environment in relation to *P. microdon* is dynamic and emphasised that its advice is based on the evidence currently available. The amount of information available on populations of *P. microdon* is increasing and there is considerable genetic analysis currently underway that will further inform the questions considered by the Committee in this report. For example, based on the relatively small sample sizes currently available across river systems, it appears that *P. microdon* populations in some rivers have unique haplotypes. If this trend persists as sample sizes increase, this would provide a basis for a more structured approach to advice on extraction of *P. microdon* and may enable more specific recommendations to be made about the impact of removal from individual river systems in the future.

The Committee recommends that its findings be reviewed within a two year time frame taking into account the latest available research information and to allow reassessment of the threats facing the species and the impact of initiatives to mitigate those risks.

# FRESHWATER SAWFISH EXPERT REVIEW COMMITTEE

## TERMS OF REFERENCE

### Introduction

The Freshwater Sawfish Expert Review committee (Sawfish Committee) has been established by the Department of the Environment, Water, Heritage and the Art (DEWHA).

The Sawfish Committee has a responsibility to undertake a review of current research and prepare independent scientific advice relating to the removal of freshwater sawfish (*Pristis microdon*) from localised river systems in northern Australia.

This advice is being sought by DEWHA to: inform decisions on whether the current CITES Appendix II listing and annotation provides sufficient protection for the species; assist in making robust non-detriment assessments for the purpose of export approval decisions; and to inform the development of a sawfish and freshwater shark multi-species recovery plan.

On behalf of the Sawfish Committee, the Chair with assistance from Dr John Stevens, will prepare a report that details the findings and any recommendations of the Sawfish Committee in response to the five questions detailed below. The final report will be provided to DEWHA within a month of the workshop being undertaken.

### Objectives and Questions

The objective of the Sawfish Committee is to undertake a review of current research and prepare independent scientific relating to the removal of freshwater sawfish (*Pristis microdon*) from localised river systems in northern Australia to provide responses to the following five questions:

*In answering the following questions, consideration should be given to the requirements/criteria for making a CITES 'non-detriment finding' – in effect an assurance that the harvest of the CITES-listed species will not be detrimental to the survival of the species in the wild.*

- a. Having reviewed the current research, what is the considered opinion of the group as to the degree to which populations of *P. microdon* are able to sustainably support the removal of specimens from localised river systems?

Consideration should be given to the implications of removal from one river system only, removal from across a number of river systems, and removal from tidal waters only, as opposed to removal from further upstream.

In formulating this advice, the precautionary approach should be applied, whilst taking into account what is known about population structure, distribution and genetic diversity, and the various threats to the species (including external sources of mortality such as incidental catch in fishing nets).

- b. What are the potential risks arising from removing animals from river systems?
- c. Giving consideration to the best available information on population size, the degree of genetic transfer and genetic diversity, are there any particular river systems that individuals should not be harvested from?
- d. Giving consideration to the best available information on population size, population structure, life history characteristics, the degree of genetic transfer and genetic diversity, are there any particular age classes or population sub-sections that should not be harvested?
- e. If the group feels that removal of some individuals would not be detrimental to the survival of the species, management advice should be provided to minimise impacts on population genetic diversity and structure, particularly considering the isolated and fragmented distribution of the species.

### **Freshwater Sawfish Expert Review Committee Composition**

The Sawfish Committee will comprise:

- An Independent Chair, appointed by DEWHA, Ms Mary Lack
- Dr John Stevens, CSIRO
- Dr Neil Gribble, Queensland Department of Primary Industries
- Dr Rory McAuley, Western Australia Fisheries<sup>4</sup>
- Dr David Morgan, Murdoch University
- Dr Richard Pillans, CSIRO
- Dr Colin Simpfendorfer, James Cook University

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<sup>4</sup> Dr McAuley was, ultimately, unable to attend the meeting of the Sawfish Committee.

Members of the Sawfish Committee have been identified based on their scientific expertise relating to *Pristis microdon* including a strong understanding of current research findings and history of relevant published research.

Other attendees at the meeting will be:

- Ms Lorraine Hitch (DEWHA) who will attend the meeting as a minute-taker only.

### **Use of information**

The Sawfish Committee may request information relevant to its objectives from the Department. The Department may provide information to the Sawfish Committee subject to such conditions as it determines.

The Sawfish Committee may, with the agreement of the Department seek information relevant to its objectives from other sources.

The Sawfish Committee will not make public any information on its work (including any finding or recommendation) without the prior written approval of the Department.

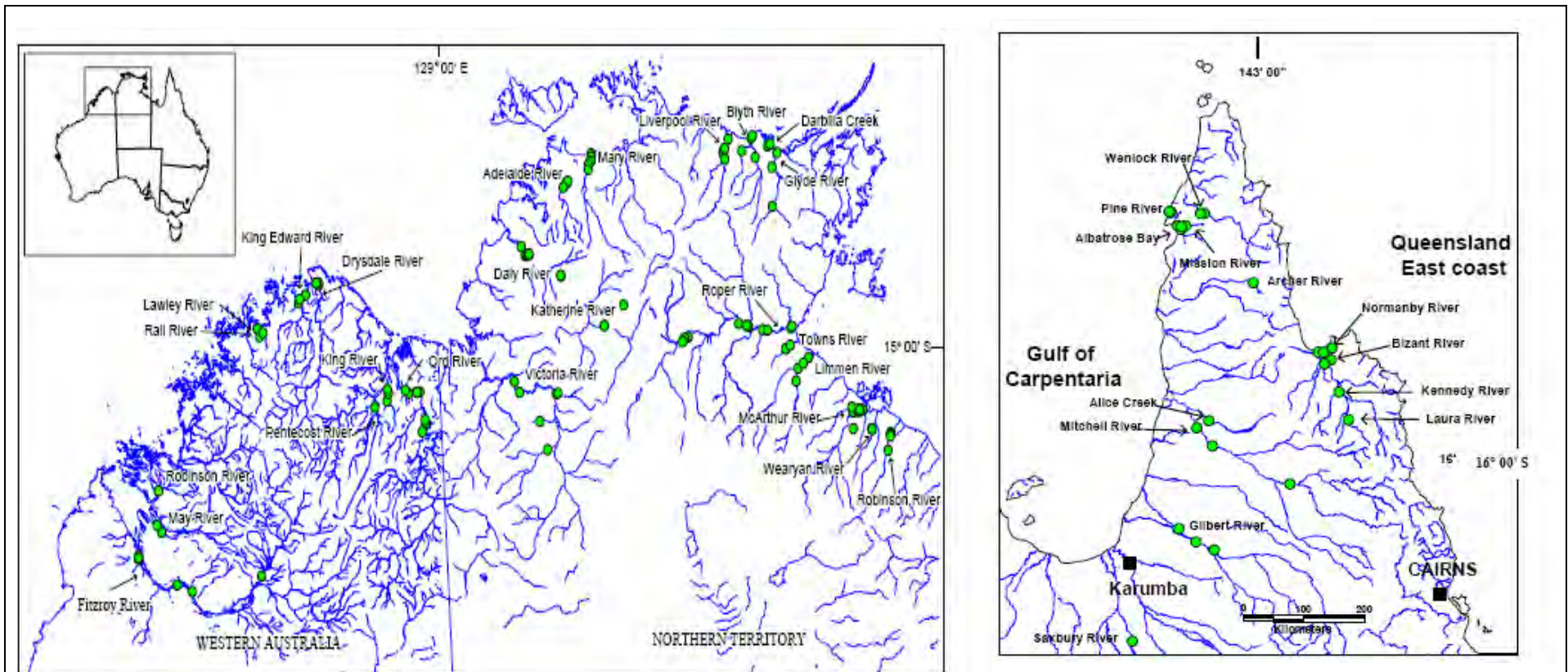
### **Meetings**

The Sawfish Committee shall meet on one occasion for the purpose of the review detailed above, on March 24m, 2009 in Brisbane. Additional meeting details to be provided separately.

**Research reports provided to the Sawfish Committee for consideration at the meeting**

1. Freshwater Sawfish *Pristis microdon* (Extract from draft Issues Paper prepared as part of the development of a Multi-species Recovery Plan for Sawfish and *Glyphis*. The document represents the outcomes of a previous Sawfish and *Glyphis* workshop conducted by DEWHA in June 2008)
2. Extracts from Gunn, J., Meere, F. and Stevens, J. (2008) "Independent Review: Proposed Management Arrangements for Queensland's East Coast Inshore Fin Fish Fishery". A review commissioned by the Hon. Peter Garrett MP, Minister for the Environment, Heritage and the Arts.
3. Cairns Marine Aquarium Fish (2007) "Non Detriment finding for the purpose of Proposed Export of Freshwater Sawfish: *Pristis microdon*." Submitted to Australia's CITES Scientific Authority at the Commonwealth Department of the Environment and Water Resources.
4. Field, I.C., Charters, R., Buckworth, R.C., Meekan, M.G. and Bradshaw, C.J.A. (2008) "Distribution and abundance of *Glyphis* and sawfishes in northern Australia and their potential interactions with commercial fisheries". Final Report to DEWHA.
5. Stevens, J.D., McAuley, R.B., Simpfendorfer, C.A and Pillans, R.D. (2008) "Spatial distribution and habitat utilisation of sawfish (*Pristis* spp) in relation to fishing in northern Australia." Final Report to DEWHA.
6. Whitty, J.M., Phillips, N.M., Morgan, D.L., Chaplin, J.A., Thorburn, D.C. and Peverell, S.C. (2008). "Habitat associations of Freshwater Sawfish (*Pristis microdon*) and Northern River Sharks (*Glyphis* sp. C): including genetic analysis of *P. microdon* across northern Australia." Final Report to DEWHA.
7. Simpfendorfer, C. (2008) Freshwater sawfish (*Pristis microdon*) demography: analysis of fishing patterns in the Gulf of Carpentaria. Unpublished manuscript.
8. Peverell, S.C (2005). Distribution of sawfishes (Pristidae) in the Queensland Gulf of Carpentaria, Australia, with notes on sawfish ecology. *Environmental Biology of Fishes*, 73: 391-402.
9. Gribble, N.A and Peverell, S.C. Relative Sustainability Index for *Pristis microdon* in the Queensland Gulf of Carpentaria N9 and N3 fisheries. Unpublished work in progress.
10. Gribble, N.A. Queensland Shark Control (swimmer protection) Program: Sawfish catch and effort data. Tabled at the Sawfish Committee meeting.
11. Peverell, S.C and Gribble, N.A. Tag recapture and population estimates for *Pristis microdon* on the Queensland coast of the Gulf of Carpentaria. Unpublished, provided in confidence.

River systems in the Kimberley region of Western Australia, the Northern Territory and Queensland



Source: D.C. Holdam, S. Fyfe, J.D. Stevens, F.R. Last and A.J. Rowland (2003). *Status of Freshwater and Estuarine Elasmobranchs in Northern Australia*, Natural Heritage Trust Report.  
 The green dots were sites sampled for elasmobranchs in that report.