

NPF TIGER PRAWN WORKSHOP

7 February 1994

Summary of Conclusions and Recommendations

A. Issue: The tiger prawn life cycle is more complex than originally thought

In 1986 when the tiger prawn fishery in the NPF was in decline CSIRO explained that the cause was unknown. However, one possible explanation was that there was a stock recruitment problem due to excessive fishing effort.

Subsequent research by CSIRO has shown that the life cycle of tiger prawns is more complex than originally thought and that new management strategies and research programs may be needed to increase average annual catches per trawler.

Questions

Possible management strategies

1. Should the present restraints on fishing pre-spawning tiger prawns be strengthened?

6 out of the 10 working groups did not believe that the current constraints on effort should be strengthened at this time, although two groups suggested that changes to the timing of closures and the introduction and review of area closures could be considered. Two of these groups also considered that it was too soon to assess the effects of the restructure and that this should be done before any further constraints are introduced.

3 groups proposed that additional measures should be introduced. One proposal was to ban tiger prawn fishing for the first month of the first half and another to increase the length of the mid-year closure by reducing the first half to 9 weeks. (One group did not address the question)

CONCLUSION:

That the majority of the working groups are opposed to introducing additional constraints on effort at this time.

2. If the answer is yes what new measures should be introduced (minimum limits on cod end mesh size, extending the mid-season closure etc)?

This question was only answered by four working groups. Two of these addressed the issue of mesh size and both concluded that mesh size restrictions are not effective. Proposals put forward for further constraining effort were restricting the first half to 69 days, protecting small prawns, allowing catching of banana prawns only for the first month of the first half, extending the mid year closure, discrete area closures and a night fishing ban in the first half.

CONCLUSION:

The majority of the working groups do not support additional constraints on effort.

3. If the answer is no, what alternatives should be adopted?

Two of the 6 working groups which addressed this question considered that the status quo of management measures should be retained; one group proposed that an evaluation of the effort/boat day relationship should be undertaken and the length of the banana prawn season constrained accordingly and another group suggested the 6000 boat day formula be retained. One of the six groups suggested that an industry/govt standard tiger prawn monitoring survey be carried out each July to monitor tiger prawn stocks on an annual basis.

CONCLUSION:

There was no consensus between the working groups on alternative management measures for the fishery

Research needs

4. What research is required to monitor the effectiveness of seasonal closures on recruitment (improved modelling, what proportion of small prawns that go through trawl mesh survive and how this is affected by mesh size)?

The research proposals put forward by each working group are recorded below:

Group 1

- a) implementation and monitoring of discrete area closures for 'hot spots' on a rotating basis
- b) Some concern at making trade offs of endeavour prawn catches to ensure better tiger prawn catches. It was felt there was a need to study more closely the biological and economic impact of decisions such as no fishing in December/January - what impact would this have on tigers if fishing was permitted (biologically) and what is the economic trade off (eg endeavours may represent \$7 - \$15 million "lost") and is this made up for by improved tiger catches (ie 1 000 tonnes endeavours now, if 2000 tonnes in 1980's)?
- c) We felt that it may be possible with the use of INMARSAT to manage on a species basis in the future (ie banana/tiger). This should be looked at to see if there are any areas that could be left open for banana catches only after the tiger season closes and before it opens again on 1 August.

Group 2

We could not identify specific research alternatives but felt that effectiveness of the current mid-year closure should be carefully evaluated - by modelling and other methods. Should evaluate discrete area closures for the spawning population.

Group 3

Modelling and survival of small prawns should be addressed. Experiments should be linked to experiments on mortality rates.

Group 5

Cost effective on-board sampling

Group 6

Improved size composition modelling, size sampling, assessment of mortality in closed areas, better monitoring of closures

Group 9

Yearly tagging in current known areas (closed/shallow) to monitor the movement of prawns into the fishery and provide information on growth. No tagging has been conducted in the Gulf for many years. Some industry members felt that tagging was the most effective way of monitoring prawn stocks. The industry members also suggested the idea of industry funding an "old" (pushed out of the NPF by the restructure) vessel to do the tagging

Group 10

Establish a Govt/industry standard tiger prawn monitoring survey in July- fixed areas on each ground- repeated each year- results reported- long term fishery independent survey

RECOMMENDED ACTION:

Refer to the NORMAC Research and Environmental Sub-committee for consideration

B. Issue : The number of prawn predators has increased

It has been suggested that the dumping of large quantities of by-catch (trash) has increased the number of predators such as sharks. During closures this trash is not available to predators which turn to alternate food sources, one of which is prawns. It has also been suggested that this has led to marked changes in the numbers of other fish (such as pigfish) in different areas.

Questions

Possible management strategies

1. Should modifications be made to prawn trawling gear to reduce the quantity of by-catch?

The majority of the working groups (6/10) did not support modification of trawl gear to reduce by-catch at this time. One of these groups expressed specific concern about the practical problems of towing TED's and four of these groups considered that current research projects in this area should be assessed before any changes are made. One group suggested that by-catch should be utilised instead of wasted or better handled to allow live by-catch to be returned to the sea.

Two groups indicated some support for modifications to trawl gear but one group which supported modifications did so on the basis of saving fuel and reducing the crew workload (One group did not address this question)

CONCLUSION:

That modifications to trawl gear to reduce by-catch should not be introduced at this time.

2. Should the establishment of a fishery within the NPF that targets predators be encouraged?

The majority of the groups (8/10) supported the establishment of a fishery that targets predators. However five of these groups emphasised the fact that any fishery which is established to target predators must not be to the detriment of NPF fishermen and of these four groups believed that existing NPF licensed vessels should be used to target predators.

One group did not support the establishment of a fishery on predators as it did not believe that predators had increased. (One group did not answer the question)

CONCLUSION:

The majority of the working groups supported the establishment of fishery to target predators and that consideration should be given to the effects of this on the NPF operators and the potential to use NPF licensed vessels to reduce predators

RECOMMENDED ACTION:

Refer to NORMAC for consideration.

Research needs

3. Should research into trawl gear that takes less by-catch be accelerated ?

The majority of the working groups (6/10) were opposed to additional research projects being implemented on trawl gear to reduce by-catch although one group suggested that studies on the relationship between prawns and by-catch may be worthwhile. Three of these groups believed that existing data and projects currently under way should be assessed before additional research is carried out.

One group held the view that by-catch reducing equipment tested to date was dangerous and unnecessary. Another of the groups opposed additional research as they considered that by-catch could not be reduced without loss of prawns. Four groups supported further research activities, one on the basis that reducing by-catch would reduce fuel and sorting.

CONCLUSION:

The majority of the working groups were opposed to additional research being carried out on trawl gear to reduce by-catch at this time.

4. Should a program for monitoring predators be introduced?

The majority of the working groups (8/10) were opposed to introducing a specific research program to monitor predators. However it was suggested that existing Russian data should be reviewed and that predators could be monitored by assessing current research on by-catch reducing gear (stomach contents of by-catch etc). It was also suggested that the industry could provide information on the level of predators in their log books.(One group did not address this issue).

CONCLUSION:

The majority of the working groups were opposed to introducing a specific predator monitoring program but agreed that monitoring should occur through reviewing existing data and other research projects and through log book information

RECOMMENDED ACTION:

That NORMAC consider the feasibility and benefits of collecting information on predators through the NPF logbook system.

C. Issue: Estimate of mortality used in CSIRO model is incorrect

If the rate at which prawns are dying naturally is higher (around 10%) than has been assumed by CSIRO (4 to 5%), then prawns are dying off more rapidly during closure periods than previously estimated. However, this is unlikely given the known life cycle of tiger prawns (up to two years).

Questions

Possible management strategy

1. Should tiger prawns be fished more intensively (eg no closures) to catch prawns before they die ?

The majority of the working groups(8/10) agreed that prawns should not be fished more intensively. Of these one group expressed the view that tiger prawns needed more protection. (Two groups did not answer the question).

CONCLUSION:

The majority of the working groups agreed that tiger prawns should not be fished more intensively at this time.

Research needs

2. Should an area within the NPF be closed off and the prawn population be monitored so another estimate of natural mortality can be obtained ? (Note: Mortality rates may vary from year to year and research would need to extend over more than one season and could be costly).

5 of the working groups were supportive of prawn monitoring to assess mortality rates. However one group suggested that the costs/benefits of the project needed to be taken into account and four of these groups were opposed to additional closures being introduced for this purpose. These groups were firm in the view that mortality monitoring should be carried out in existing closures. 3 groups did not consider monitoring to assess mortality necessary. (Two groups did not answer the question).

CONCLUSION:

The majority of the working groups recognised the importance of assessing mortality rates more precisely but were opposed to implementing additional closures for this purpose.

RECOMMENDED ACTION:

The NORMAC Research and Environmental Sub-committee to consider the costs/benefits of implementing a prawn monitoring program in existing closures to determine mortality rates and report to NORMAC.

3. Should a tagging experiment that takes into account recruitment and fishing mortality be conducted to obtain a new estimate of mortality ?

Two groups considered that a tagging program to determine mortality was a priority but that the program should be carried out in existing closures. Two groups agreed that a tagging program should not be implemented unless results could be guaranteed. One group was opposed to implementing a tagging program and two groups considered that tagging to assess mortality could be done in conjunction with other programs carried out in discreet area closures. One group considered that the program should only be implemented if it were practical and cost effective.

CONCLUSION:

That there was general recognition by the working groups of the need to determine mortality levels of tiger prawns more precisely but limited support for a specific project to do this. The majority agreed that the costs/benefits of this research need to be taken into account and that this program should be carried out as part of other tagging programs and in existing closures.

RECOMMENDED ACTION:

That the NORMAC Research and Environmental Sub-committee consider the feasibility and costs/benefits of incorporating a tagging program that takes into account recruitment and fishing mortality to obtain a new estimate of mortality in other projects and in existing closures and report to NORMAC.

D. Issue: An unknown environmental factor is influencing stocks

CSIRO has been unable to identify any unknown factor that may be influence tiger prawn stocks. It has compared catch records for the two species of tiger prawns with rainfall, air temperature, wind speed and direction. No correlation comparable with the influence rainfall has on banana prawn catches has been found. A link has been found between the destruction of seagrass beds in south-western Gulf of Carpentaria and decreases in tiger prawn populations, but there is no information on seagrass beds for 600 km of the coast west of Cape Arnhem. It is possible that a drop in tiger prawn stocks could have followed a reduction in seagrass beds in the NPF through natural causes or by trawling.

Questions

Possible management strategy

1. **Should critical tiger prawn habitats in the NPF be identified and protected ?**

CONCLUSION:

All the working groups recognised the importance of protecting prawn nursery grounds. Six of the working groups considered that the important areas had already been identified and steps had been taken to protect these grounds. It was proposed that further identification and protection of nursery areas out of the GOC (including Cape Arnhem) was necessary. It was also proposed that nursery areas needed better protection from development/mining etc.

RECOMMENDED ACTION:

That the NORMAC Research and Environmental sub-committee take steps to identify and protect tiger prawn nursery habitats not yet identified within the NPF.

Research needs

2. **Should a concentrated search be made for environmental factors that may be influencing the abundance of tiger prawn stocks in the NPF ? (Note: Information would need to be collected over several years to establish which environmental factors affected prawn stocks).**

Three of the working groups agreed that the effects of the environment on tiger prawn stocks should be monitored. Two groups were opposed to doing research in this area. Two groups were of the view that as environmental effects were uncontrollable, this was a low research priority and funds should be spent on more important issues such as sampling programs and mortality monitoring. One group proposed that additional log-book data on environmental influences such as wind/tides should be collected and monitored. (2 groups did not answer the question).

CONCLUSION:

The majority of the working groups did not support a concentrated study on the environmental factors affecting prawn stocks.

3. **Should reliable recruitment indices be established from logbook data and a search for relationships between recruitment indices and meteorological events ?**

The majority of the working groups (6/10) agreed that log book data should include weather factors however one of these groups considered that this was a low research priority. Two groups were opposed to this suggestion. One of these groups considered that including this data in log books would complicate the log book system and therefore the information may not be reliable. (Two groups did not answer the question).

CONCLUSION:

The majority of the working groups agreed that a reliable indices should be established from log book data and a search for relationships between recruitment indices and meteorological events.

RECOMMENDED ACTION:

Refer to the NORMAC Research and Environmental Sub-committee and NORMAC for consideration as a specific NPF Research proposal.

4. Should critical nursery habitats be monitored over five to 10 year cycles ?

Four of the working groups agreed that nursery habitats should be monitored. One group could not reach agreement on the issue. (Five groups did not address the question).

CONCLUSION:

A majority decision by the working groups was not reached on this issue.

E. Issue: Trawling has altered the bottom making it less suitable for prawns.

Trawling can remove sponges and other marine organism and disturb the sea bed. CSIRO does not know what the impact disturbance to the sea bed has on prawn populations.. There are claims by some sections of industry that the productivity of certain grounds has been declining for years. It is known that there are certain areas in the NPF that are important to prawn egg production. If these habitats are damaged or modified there could be an adverse effect on recruitment.

Questions*Possible management strategy***1. Should the tiger prawn fishery be closed down for a number of years to allow the trawling grounds to recover ?**

The groups which addressed this issue (7/10) unanimously opposed closing down the fishery to monitor the effects of trawling. Four of these groups proposed that current research projects in other areas should be monitored and assessed. One group proposed that any additional research carried out must be done in existing closed areas. One group proposed that if it was ever necessary to close the fishery, it should be done on a rotating area basis.

CONCLUSION:

The majority of the working groups were opposed to closing down the fishery to monitor the effects of trawling and agreed current research projects should be monitored and assessed.

RECOMMENDED ACTION:

That the NORMAC Research and Environmental Sub-committee monitor current research projects on the effects of trawling.

Research needs

2. Should there be an investigation on the effect of long-term closures on sea bed fauna, including prawn populations ?

Five working groups believed that closures should be monitored and that no additional closures should be introduced for this project. Two groups were opposed to implementing this research - of these one believed that current projects in other fisheries should be monitored and assessed (3 groups did not address the question).

CONCLUSION:

50% of the working groups believe that the effects of long term closures on sea bed fauna and prawn populations should be investigated by monitoring existing closures.

RECOMMENDED ACTION:

That the NORMAC Research and Environmental Sub-Committee consider the appropriateness of carrying out an investigation of the long-term effects of closures in existing closures and report to NORMAC.

3. Should more environmentally friendly trawl gear be developed ?

Six working groups believed that development of environmentally friendly trawl gear should continue. One group agreed that new projects should not be implemented until the outcome of existing and current research could be assessed. One group did not believe this type of research was necessary. (Two groups did not answer the question).

CONCLUSION:

The majority of the working groups supported the continuation and monitoring of research projects to develop environmentally friendly trawl gear.

RECOMMENDED ACTION:

That NORMAC and the NORMAC Research and Environmental Sub-committee continue to support and monitor current research projects on environmentally trawl gear.

4. Should there be an investigation of the relationship between trawling on key prawn spawning grounds and subsequent recruitment?

Five groups indicated that this research would be useful, however one of these groups suggested this should only be done if key spawning areas could be identified. Three of these groups said costs/benefits should be considered and one of the groups considered this research to be low priority. One group indicated other research projects on this issue should be assessed and one group proposed that if catches were low a similar approach to managing the Exmouth Gulf fishery should be considered. (Three groups did not answer the question).

CONCLUSION:

Five of the working groups considered this type of research would be useful but that costs/benefits need to be assessed.

RECOMMENDED ACTION:

That the NORMAC Research and Environmental Sub-Committee consider the appropriateness and costs/benefits of implementing an investigation of the relationship between trawling on key prawn spawning grounds and subsequent recruitment and report to NORMAC.

F. Other Issues affecting prawn catches

The 1993 catch statistics show the total tiger prawn catch in the NPF as the lowest on record since the mid-1970's. Whilst many fishermen have stated their 1993 catch per vessel is up on previous years, there may be other reasons than those addressed above for the total catch being so low.

1. Are total catches down as a result of reductions in effort ie less trawlers?

The majority of the groups (9/10) believed the low total catch in 1993 was due primarily to the reduced number of boats in the fishery. One group wasn't sure what the reason was; and most groups (6/10) considered that other factors such as the environment and predators also contributed to the low total catch of tiger prawns in 1993.

CONCLUSION:

The majority of the working groups consider the low total catch in 1993 was due primarily to the reduced number of vessels in the fishery.

2. If the answer is yes should we increase effort in the fishery to increase the annual total catch? If so, how should effort be increased?

The working groups unanimously agreed that there should be no increase in effort allowed at this time.

Reasons given for this were that the current levels of effort need to be better determined, that catches and current effort levels should be monitored to assess the effects of the restructure, that effort will increase through efficiency and that the fishery still needed time to properly recover.

CONCLUSION:

The working groups unanimously agreed there should be no increase in effort in the tiger prawn fishery at this time.

3. If the answer is no, are total catches down because there is too much effort in the fishery?

The majority of the working groups (6/10) were of the view that total catches were not down due to excess effort, one of these groups suggested the increase in catch per vessel supported this view. One group considered it was too soon after the restructure to ascertain if there was

too much effort in the fishery. One group was unsure and one group could not reach agreement on the issue (1 group did not answer the question).

CONCLUSION:

The majority of the working groups concluded that total tiger prawn catches were not down due to excess effort (also see F 1).

4. What impact has GPS had on the tiger prawn fishery?

The working groups unanimously agreed that GPS has substantially increased the efficiency of fishing effort. One group estimated the efficiency increase through GPS at 5%, four of the 10 groups estimated increased efficiency of approximately 20%, two groups estimated up to 30%. Three groups did not volunteer a percentage but agreed that the increase in efficiency of effort had been high.

CONCLUSION:

The working groups unanimously agreed that there has been a substantial increase in effort due to GPS.

5. Taking into account the effects of closures, gear restrictions, and restructuring compared with the increased efficiency of vessels as a result of technological advances such as GPS etc do you believe that fishing effort has increased or decreased since 1986? If so, by how much?

The majority of the groups (7/10) believed that, although effort per vessel has increased, effective effort has remained the same or only slightly increased since 1986. One group was unsure if there had been an increase in total effort and two groups proposed that effort has decreased since 1986.

CONCLUSION:

The majority of working groups believed that effective effort in the fishery has either remained the same or increased slightly since 1986.

Research Needs

1. Should a review of the current level of effort in the fishery be undertaken?

The majority of the working groups (8/10) agreed that a review of effort in the fishery should take place.

Comments made by the individual working groups on the proposal to review the current levels of effort included the need to review the boat day/effort relationship, that monitoring of the impacts of fishing should be on-going, and that the review should not require extensive time and money as this could be a 'desk-top' study. (Two groups did not answer the question).

CONCLUSION:

The majority of the working groups agreed that a review of effort should take place.

RECOMMENDED ACTION:

That the NORMAC Research and Environmental Sub-committee and NORMAC endorse the industry views that a review of current levels of effort taking account of the above criteria take place as a priority project.

2. Should the desirable maximum level of fishing effort on pre-spawning tigers (ie 6000 boat days) as specified by CSIRO be reviewed taking into consideration increases or decreases in effort/efficiency since 1986?

Seven out of the 10 groups believed that the 6000 boat day formula for maximum effort on pre-spawning tigers should be reviewed - these groups all agreed this review should take account of increases in effort and efficiency since 1986. One group did not believe a review was necessary as the effort on the pre-spawning tigers is well below 6000 boat days and one group believed the status quo should be retained . (One group did not answer the question).

CONCLUSION:

The majority of the working groups agreed that the desirable maximum level of fishing effort on pre-spawning tigers (ie 6000 boat days) as specified by CSIRO be reviewed taking into consideration increases or decreases in effort/efficiency since 1986.

RECOMMENDED ACTION:

That the NORMAC Research and Environmental Sub-committee and NORMAC endorse the industry views that the desirable maximum level of fishing effort on pre-spawning tigers (ie 6000 boat days) as specified by CSIRO be reviewed taking into consideration increases or decreases in effort/efficiency since 1986 as a priority project.

3. What information should the scientists collect to examine the effects of GPS?

Three groups which answered this specific question agreed that existing data should be used to review the effectiveness of GPS, including log book data comparing the catch levels from when receivers only used, the initial reception of transmitters to reception today and the use of receivers and plotters. One group considered this review to be a low priority and another did not believe it was necessary at all. (Five groups did not answer the question).

CONCLUSION:

The majority of working groups did not consider an examination of the effects of GPS to be a high priority. Any review on the effectiveness of GPS should be confined to examining existing data.

RECOMMENDED ACTION:

Refer to NORMAC Research and Environmental Sub-committee for information.

Possible Management strategy

What management measures should be taken if there is a stock recruitment problem in the tiger prawn fishery?

Proposals from individual working groups are recorded as follows:

Group 1

Discrete area closures for "hot spots" on a rotating basis. For example, 3 month closure of a particular grid where prawns are spawning. The idea behind this proposal is to protect these stocks and let them build up - a similar approach to a farmer leaving paddocks fallow.

It was recognised that one of the problems with this approach would be surveillance, and electronic data transmission (INMARSAT) was felt to be one means of surveilling the closure. This could save other surveillance costs which could be redirected into research.

Group 2

We should consider discrete area closures to investigate how stocks can respond to pull back in effort. Weipa might be an appropriate area for this and could be done by extending mid-year closure here (to early or mid October).

Group 3

longer closures/ the no of boats, no hours/day, amount of gear could be reduced.

Group 4

Recruitment was not considered a problem at present. It was considered there were a range of factors that might be responsible for the present level of recruitment not being as high as expected. Given the present catch monitoring system we think there is sufficient time to take corrective steps if there was a major downturn in recruitment.

Group 5

Close selective areas, night time ban in the first season, extend mid-year closure and end of year closure.

Group 6

We did not answer this question as we do not consider there is a stock recruitment problem at this time

Group 7

There should be no increases in vessel numbers.

Group 10

If there is a demonstrated SRR problem in the tiger prawn fishery then consider fallow grounds approach. We realised this would be very hard on industry and we could not reach

unanimous agreement but one to think about. Reduce effort again/maybe less trawling time per night (take 1 hour off means 8-10% reduction each night) /reduce season - 2 weeks off at the start of tiger season (mid-August opening or mid-November closure).

Additional Questions

During his presentation at the Workshop, Dr. Hill requested the industry to consider some additional questions of relevance which were not included in the Issues Paper. These questions are recorded below but were not addressed by all the working groups. To avoid misinterpretation, the views of individual working groups are recorded for information.

Are closures the most appropriate way to protect spawning stocks?

Group 2.

Closures have been an effective method. We didn't know whether it is the most effective way and felt that the current closure regime should be evaluated regarding the length of closure and when it starts.

Group 3.

Closures appear to be the only way to ensure an adequate spawning stock. It was suggested that some closures should be extended- close the fishing earlier in November, perhaps some changes in closures around Bountiful.

Group 4.

Closures may not be the ultimate means of ensuring an adequate spawning stock but they do have important social and economic benefits as well as protecting spawning stocks.

Group 5.

A combination of closures as part of the total closures package made up specific closed areas not just blanket closures. Electronic surveillance is an effective deterrent for people who breach closures. More info supplied by vessel on size composition of daily catch with regard to provide info towards research. Electronic surveillance gear can also help provide this data on a real time basis.

Group 6.

We agreed closures are the most adequate way to protect prawn stocks. The effects of closures should be reviewed and evaluated on a regular basis.

Group 8.

Supported closures as being the most appropriate. The timing and length of closures should be closely monitored and continue to be monitored.

Group 9.

Industry members of the group believed that area closures should be considered in the future (as alternatives to seasonal closures) when technological advances allowed them to be effectively enforced. For example position transponders on all vessels. this could allow the catching of larger prawns that are available in some areas during December to March.

Group 10.

Closures are important - but don't increase any new ones without real reasons.

CONCLUSION:

The majority of the working groups believed closures were an appropriate means of protecting the resource and that the NPF closures regime should be reviewed and evaluated on a regular basis.

RECOMMENDED ACTION:

That NORMAC in conjunction with CSIRO continue to review and evaluate the NPF closures regime.

2. In the views of industry by what percentage has GPS increased effective effort?

Group 1.

GPS has had a huge impact - our group thought this was around 20% at least (increase).

Group 2.

GPS - increased efficiency by +20%, changed pattern of fishing.

Group 3.

Up to 60% increase in catches in same areas but not generally measurable. One estimate was 60% in fishing power, there were disagreements with this figure with the feeling that it should have been substantially lower. Increase is through better location of grounds and more precise tracking of try shots.

Group 4.

It was estimated that the introduction of GPS had increased trawler efficiency by at least 5 %. It has allowed trawlers to fish rougher sea bottom and less inaccessible ground.

Group 5.

GPS has a marked impact on NPF fishermen and the tiger prawn fishery.

Group 6.

We believe GPS has increased effort by between 10 and 30%.

Group 7.

25 - 30% increase in efficiency of a boat/day. High improvement in catch efficiency by catching prawns quicker and the coverage of grounds is broader and the general level of skill has increased.

Group 8.

High improvement in catch efficiency by catching prawns quicker and the coverage of grounds is broader and the general level of skill has increased.

Group 9.

10-20% increase efficiency in a boat day. (GPS)Allows them to fish hot shots.

Group 10.

20% increase efficiency in a boat day - it (GPS) makes good skippers out of average ones.

CONCLUSION:

The working groups unanimously agree that there has been a substantial increase in effort due to GPS (Also see F4/ F5).

RECOMMENDED ACTION:

Refer to NORMAC Research and Environmental Sub-committee for information.

Should the quantity of discards in the catch be reduced?

Group 2.

We should reduce the amount of discards if at all possible but not at the expense of prawn catches.

Group 3.

There was general agreement (but not unanimous) that discards should be reduced. There was industry opinion that the pressure on predators could be increased but not identified by the group as a major issue.

Group 4.

Yes- research should be directed towards excluding by-catch that had no commercial value Industry should be involved in any research work undertaken in this area.

Have changes taken place to the seabed which is affecting prawn populations?

Group 2.

A feeling that changes had taken place in the seabed. Some anecdotal evidence from Pearl Divers around Groote Eylandt that there have been major changes in the bottom.

Group 3.

The sea bed has changed but there has been little change in the last decade, and little discernible impact on prawn catches.

Group 4.

Yes there had been changes. Research is needed to develop more environmentally friendly trawl gear.

What environmental factors do industry believe affect prawn catch variations:

Group 2.

Did not know what environmental factors would explain variation in catch. A number were mentioned: - temperature, rainfall, turbidity.

Group 3.

Rainfall, temperature and nutrients are possible environmental factors but they do not have clear impact on prawn abundance.

Group 4.

Climactic changes, particularly those resulting from the El Nino phenomenon such as changes in currents and water temperatures were believed to have an impact on tiger prawn catches and behaviour.

Additional Comments/Suggestions by Individual Working Groups**Group 2.**

If tiger prawns are declining management should consider:
seeding removing the predators by encouraging fishing for the predators
review the current closure and effort data.

A strong view that management should monitor, evaluate and review the current closures before making changes. it is too early to determine whether the stocks have changed due to the changes that were introduced at the start of 1993.

The group raised the following concerns:

- . 6000 day figure of effort on pre-spawning tigers should be carefully evaluated, particularly on whether it is robust.
- . Are the fishing patterns and catch rates being influenced by fishermen targeting larger prawns due to the price structure and what influence does this have on catch and CPUE figures.
- . Species mix of prawns used to determine stocks of individual species should be carefully re-evaluated - possibly a species identity kit and data from logbooks.
- . Important to know the effect of trawling on the substrate.

Group 3

Are mortality rates age/size dependent? Is there within and between year variation from environmental influences?

Group 4

It was believed that should effort in the tiger prawn fishery be shown to be affecting the level of catches seasonal closures should be modified to the meet the situation.

Group 5

A combination of closures as part of the total closures package made up specific closed areas not just blanket closures. Electronic surveillance is an effective deterrent for people who breach closures. More info supplied by vessel on size composition of daily catch with regard to provide info towards research. Electronic surveillance gear came also help provide this data on a real time basis.

Group 6

We believe we should maintain the status quo re closures, gear restrictions etc until the results of the restructure are known

Group 10

Points raised which are worth considering:

- . Is rain really not a factor in tiger production - look more closely.

- . Give the fishery time to adjust to the effort reduction measures before you change the rules yet again.
- . What has happened to the Melville tigers?
- . Despite the boat reduction strategy effort is still going to increase - the headrope increases in 93 resulted in the equivalent of 5 more boats in the fishery than the anticipated 125. Next year it will probably go up to another 10-20 boats as skippers gear up.
- . Don't increase the length of the banana prawn season.
- . Fishermen say that they should be allowed quad gear but restricted headropes is more effective. safer and easier - if this results in effort increases then match that with reduced days. The management strategy for the NPF should be to allow the most efficient gear with the effort balance. Forcing fishers to use effective boat days is what managers should be aiming for.
- . Give thought now to stopping or counteracting the effect of effort creep.
- . Introduce an SA fishery approach of monitoring with CSIRO /States and Industry on purpose chartered vessel on fixed stations and times throughout fishery on annual basis.
- . Predators are not seen as significant problem.

Future of Pre-Season Conferences and Workshops

The working groups were asked to indicate if they considered that the pre-season conference and workshops should be continued and if so when was the appropriate time to hold these.

Of the 8 groups which addressed these issues all agreed that future workshops should be held in the mid-year closure. Two groups proposed that the location of the workshops should be rotated and one preferred workshops to be held in Darwin.

Five groups supported the continuation of the pre-season conference forum - two of these considered it should be held in conjunction with workshops in the mid-year closure and three believed it should be held in prior to the opening of the banana prawn season.

Three groups had reservations about the value to the fishermen of the pre-season conference but of these one agreed if that it should be held in February and should include more information on management and product processing if it continued.

CONCLUSION:

The majority of the working groups supported future workshops being held during the mid-year closure.

50% of the working groups supported the continuation of the pre-season conference but views on the timing and venue of the conference were varied

RECOMMENDED ACTION:

Refer to NORMAC 34 for consideration

ACTION SHEET - NPF TIGER PRAWN WORKSHOP

RECOMMENDED ACTION.

ISSUE A:

Point 4 - Refer to NORMAC Research and Environmental Sub-committee for information.

ISSUE B:

Point 2 - Refer to NORMAC for consideration.

Point 4 - That NORMAC consider the feasibility and benefits of collecting information on predators through the NPF logbook system.

ISSUE C:

Point 2 - That the NORMAC Research and Environmental Sub-committee consider the costs/benefits of implementing a prawn monitoring program in existing closures to determine mortality rates and report to NORMAC.

Point 3 - That the NORMAC Research and Environmental Sub-committee consider the feasibility and costs/benefits of incorporating a tagging program that takes into account recruitment and fishing mortality levels to obtain a new estimate of mortality in other projects and in existing closures, and report to NORMAC.

ISSUE D:

Point 1 - That the NORMAC Research and Environmental Sub-committee take steps to identify and protect prawn nursery habitats not yet identified within the NPF (ie outside of the GOC).

Point 3 - Refer to the NORMAC Research and Environmental Sub-committee and NORMAC for consideration as a specific NPF research proposal.

ISSUE E:

Point 1 - That the NORMAC Research and Environmental Sub-committee monitor current research projects on the effects of trawling.

Point 2 - That the NORMAC Research and Environmental Sub-committee consider the appropriateness of carrying out an investigation of the long term effects of closures in existing closures and report to NORMAC.

Point 3 - That NORMAC and the NORMAC Research and Environmental Sub-committee continue to support and monitor current research projects on environmentally friendly trawl gear.

Point 4 - That the NORMAC Research and Environmental Sub-committee consider the appropriateness of costs/benefits of implementing an investigation of the relationship between trawling on key spawning grounds and subsequent recruitment and report to NORMAC.

ISSUE F:

Research Needs Point 1 - That the NORMAC Research and Environmental Sub-Committee endorse the industry view that a review of current levels of effort taking account of the above criteria take place as a priority project.

Research Needs Point 2- That the NORMAC Research and Environmental Sub-committee and NORMAC endorse the industry view that the desirable maximum level of fishing effort on pre-spawning tigers (ie 6000 boat days as specified by CSIRO be reviewed taking into consideration increases or decreases in effort/efficiency since 1986 as a priority project.

Research Needs Point 3- Refer to the NORMAC Research and Environmental Sub-committee for information.

Additional Questions:

Point 1 - That NORMAC in conjunction with CSIRO continue to review and evaluate the NPF closures regime.

Point 2 - Refer to the NORMAC Research and Environmental Sub-committee for information

Future of Pre-Season Conference and Workshops: Refer to NORMAC 34 for consideration