INTER-RELATIONSHIP OF Panulirus ornatus STOCKS IN NORTH QUEENSLAND AND PNG

TORRES STRAIT AND GULF OF PAPUA

* Tagging studies have shown that lobsters migrate from both the PNG and Aust areas of the protected zone (PZ) into the Gulf of Papua(GOP) and Yule Island area. Throughout the major fisheries areas of the protected zone there are no spawning grounds for P.ornatus and tagged lobsters from all these areas have been recovered in the GOP . Therefore the stocks of lobsters throughout both the PNG and Aust reef fisheries of the protected zone migrate into the GOP to spawn.
* The lobster migration takes place in several waves, usually about 2 weeks apart.
* The route of the migratory lobsters varies even within the same season, at the same longitude different waves of lobsters can be at different depths and a single wave of lobsters may vary its depth as it progresses across the GOP. Depth of migratory lobsters was found to vary from 14 to 70 metres . Some lobsters would migrate across normal trawling grounds (eg Orokolo and Kerema Bay) and incidental catches taken, In other areas the migration occurs on unfavourable prawning grounds(eg Cape Blackwood ) and these lobsters would only be detected by targeted searching.
* Research in the 1970’s demonstrated that even a small number of trawlers ( 4-6) that actively targeted lobsters had the ability to locate and catch virtually the entire migration. With todays improved electronics this would be a much easier task.
* Tagged lobsters from the PZ were taken from all areas where trawl catches were made.
* Timing of the GOP migration is quite consistent (October to November).No P.ornatus are taken by trawlers outside of this migratory period. Small numbers of other species( P.homarus up to 10/day and the odd specimen of P.polyphagus) are taken throughout the year especially in the Orokolo/Kerema Bay area.
* There are no lobster habitats in the Western GOP. Koilahu reef East of Orokolo Bay is the most westerly, with some small patches in Kerema Bay and then more extensive submerged reefs further to the East. Diving on all these areas demonstrated that they did in some years have spawning lobsters that were part of the GOP migration but there were no resident population in these areas.
* Yule Island and the coastal fringing reefs often have a large influx of lobsters during the spawning migration and tag recoveries confirmed that these included lobsters from the PZ. In the non-spawning season there are some P.ornatus in the Yule Island area, including juveniles, indicating a resident population. However these stocks are quite small.
* Diving in the deeper waters off Yule Island (up to 30m) located some spawning lobsters during the migratory period but stocks were negligible in the non -spawning season.
* Limited surveys by manned submarine in the deeper waters of the GOP failed to locate any P.ornatus.
* All available evidence indicates that the vast majority of migratory lobsters die after spawning.
* **From the above it is concluded that there are no other areas in the Gulf of Papua or Yule Island area that hold stocks of lobsters that could form part of the annual spawning migration across the GOP and that this migration consists entirely of lobsters from the Torres Strait Protected Zone.**

QUEENSLAND EAST COAST

* On the qld East coast lobsters settle in the inshore area , move offshore to the middle reefs as 1+ and then move into the deeper water to spawn. The spawning period is very similar to that in the GOP but lobsters have to move only a short distance to spawn and available information indicates that they do not die after spawning but return to the fishery .
* For this reason the East Coast has many more year classes and much larger lobsters than the PZ or GOP.
* In the easterly areas of the Torres Strait,( Murray, Darnley Islands) the lobster population structure is similar to the East Coast and spawning also occurs in these areas. These lobsters would not migrate into the GOP and these outer barrier areas of the Torres Strait are regarded as an extension of the East Coast. Lobster catches in this region forms only a minor part of the Australian Torres Strait catch.
* With the possible exception of lobsters in the far northern section of the East Coast, there is no movement of lobsters from the East Coast into the Torres Strait.

LARVAL INTER-RELATIONSHIP

* Genetic studies have shown that the PZ, GOP, Yule Island and East Coast lobster populations are one stock
* P.ornatus occurs south to the NSW border . North of about Cooktown there is a circular current(gyra) in the Coral Sea that means that larvae released in the GOP, Yule Island and East Coast north of Cooktown would be carried around this Gyra and depending on climatic conditions could settle in any of these areas. Larvae escaping the Gyra or released South of Cooktown would be carried further South in the East Australian current**. Stocks of lobsters on the East Coast of Queensland North of Cooktown, the Torres Strait, GOP and Yule Island areas are therefore Inter-related and regarded as one stock.**
* It is not known to what extent spawning in one area contributes to recruitment in another area. Certainly this would vary from year to year depending on climatic conditions. Management needs to take a very precautionary approach to protect spawning in both the Gulf of Papua and the NE coast of Queensland.

TRAWLING OF MIGRATORY LOBSTERS

* First reports of trawled lobster in the GOP were from the 1960’s . First catches were incidental but as operators became more aware of the seasonal lobster migration this was targeted. Targeted fishing commenced in 1973 when 24 vessels operating in the GOP prawn fishery took 525 tonnes of whole lobsters. This is equivalent to the present total catch of the PNG and Australian dive fisheries in the PZ
* Although the trawl fleet reduced in the mid 1970’s(4-12 vessels) operators became more efficient and it was concluded that even a small number of trawlers ( 4-6) had the ability to locate and catch the bulk of the GOP migration.
* To protect the reef fisheries of Torres Strait and Yule Island area the PNG government introduced restrictions on the take of lobsters by trawlers in the GOP, starting with quota restrictions in 1978/1978 And a total ban in 1979. Trawling was allowed again in 1980 to collect more data and then closed again
* Australian trawlers in the Torres Strait did not start to catch lobsters until about 1980 (20tonnes) . This is probably because prawn catches were poor during the period of the lobster migration and trawlers moved to other grounds on the East Coast and Gulf of Carpentaria
* With knowledge of the migration some trawlers remained in Torres Strait to target lobsters moving through the Great North East Channel, and catches increased (123, 188, and 113 tonnes in 1981 to 1983).
* Tagging of these trawled lobsters demonstrated that they were part of the migration into the GOP and Yule Island areas.
* A seasonal ban on taking trawled lobsters in Torres Strait ( 6th Aug to 15 Oct) was introduced in 1984. Although there was considerable resistance from the Australian trawl operators the trawling of lobsters in the Torres Strait fishery was subsequently totally banned to protect the important reef fisheries, in line with the PNG’s management. All incidental catches of lobsters have to be returned to the water alive.
* On the East Coast of Queensland there have been incidental catches of lobsters in the inshore areas at least as early as the 1970’s. These were not spawning lobsters but the movement of juvenile lobsters moving offshore from the settlement grounds. Some targeting of these movements occurred in the 1980’s
* The spawning movements of lobsters on the East Coast are generally short and in coralline areas not suitable for trawling.
* Knowing the inter-relationship of the Australian and PNG lobster stocks and to protect the dive fisheries, Queensland also introduced a ban on the trawling of lobsters.

EFFECT OF TRAWLING ON CAUGHT LOBSTERS

* Even with prolonged trawling (3 hour shots) lobsters are in good condition. Tagged lobsters released from trawlers continued on their migration and there was a good recovery rate both on the trawl grounds and the reef fishery in the Yule Island area.
* When the migration was targeted and very large catches made(~3 tonnes/shot)some lobsters cold be damaged by crushing when the nets were lifted on board. This only occurred when excessive catches were made.
* Experiments suggest that predation on lobsters released from trawlers was also minimal. Large quantities of trash fish are discarded from the trawlers and these are preferred by the sharks and other predators that follow the trawlers.
* **It is concluded that there is a very good survival of lobsters that are released from trawlers.**

RELEVENT LITERATURE

* Moore and MacFarlane 1978 Interim report on the 1977 lobster season in the Gulf of Papua, with particular reference to management of the trawl fishery.PNG Dept of Primary Industry
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* Moore and MacFarlane 1984 Migration of the Ornate Rock Lobster, Panulirus ornatus in Papua New Guinea. Australian Journals of Scientific Research
* MacFarlane and Moore 1986, Reproduction of the Ornate Rock Lobster Panulirus ornatus in Papua New Guinea. Australian Journals of Scientific Research
* Bell et al 1987, Movement and Breeding of the Ornate Rock Lobster, Panulirus ornatus, in Torres Strait and on the North-East Coast of Queensland.
* CSIRO 2001, Possible impacts of Prawn Trawling on the Ornate Rock Lobster (Panulirus ornatus) population in Torres Strait. CSIRO Marine Research.