

**INTEGRATED FISHERIES MANAGEMENT
RESOURCE REPORT
PEARL OYSTER (*Pinctada maxima*) RESOURCE**

FISHERIES MANAGEMENT PAPER NO. 281

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Integrated fisheries management resource report
Pearl oyster (*Pinctada maxima*) resource

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INTEGRATED FISHERIES MANAGEMENT

Integrated Fisheries Management (IFM) is a policy aimed at ensuring that Western Australia's aquatic biological resources remain sustainable (Appendix 1). In essence, this involves reserving a proportion of a specified aquatic biological resource¹ for conservation and reproductive purposes, then setting a sustainable allowable harvest level for use by the fishing sectors.

The proportion "reserved" also includes an allowance for Customary fishing and public benefit purposes such as scientific research.

The sustainable allowable harvest is then divided into shares amongst commercial and recreational (including fishing tour operators) fishing sectors by means of an allocation process that considers social and economic factors associated with various resource uses. Each sector is then managed within the allocated share.

As part of this process, the Director General of the Department of Fisheries is required to approve a sustainability report for each fishery, which includes a clear statement on the recommended sustainable allowable harvest level.

This report has been prepared to provide the Integrated Fisheries Allocation Advisory Committee (Allocation Committee) with a summarised, factual account of the nature and status of the *Pinctada maxima* (*P. maxima*) pearl oyster resource and current and historical trends in its use and conservation.

The report provides information on:

- The biology of the resource and its sub-components;
- The sectors and fisheries involved in harvesting the resource;
- Non-harvest interests;
- Current management arrangements affecting the resource;
- The history of fishing;
- Data on catch and fishing effort by sector;
- Information on methods used to assess the sustainability status of the resource;
- The sustainability status of the resource;
- Recommended total sustainable allowable harvest levels for of the resource; and
- Other social and economic information, such as regional employment, economic and social/lifestyle issues.

This information will form part of the deliberative process of the Allocation Committee which will provide advice to the Minister for Fisheries (Minister) on the proportion of

¹ In this context "aquatic biological resource" may refer to a single species of fish, or a number of species or species groups. The resource may also be defined by area. Several "fisheries" and sectors may operate on a resource.

the sustainable allowable harvest that should be assigned to each sector or fishery/s within a sector.

The Allocation Committee is required to consider all the information on a resource and its users, and to consult widely in order to make recommendations on how the shares in the resource should be allocated. This process will be documented by the Allocation Committee after its deliberations and submitted in a separate report to the Minister to assist him in determining the initial share allocations. The Minister may choose to publicly release the Allocation Committee's final report to him to the public.

It is not the purpose of this paper to set out which sector will be allocated what share of the resource.

INTRODUCTION

This report on the wild-capture *P. maxima* pearl oyster fishery is the fifth in a series of Integrated Fisheries Management (IFM) resource reports required under the Government policy on IFM.

There have been several published management and research reports on the *P.maxima* pearl oyster resource, which are listed in the Reference section at the back of this report.

The report takes its information on the state of the fishery from these papers and should be read in conjunction with these papers and the annual *State of the Fisheries and Aquatic Resources* report (Fisheries, 2014).

THE PEARL OYSTER RESOURCE

The resource under consideration in this report is the silver-lipped pearl oyster (*Pinctada maxima*) as it occurs in waters adjacent to Western Australia.

Distribution

The silver-lipped pearl oyster is a tropical species of bivalve mollusc which belongs to the family *Pteriidae*. Silver-lipped oysters are the largest of any species of pearl oyster, and are widely distributed throughout the tropical waters of the Indo-West Pacific region, from the Bay of Bengal in the west to the Solomon Islands in the east.

In Western Australia, silver-lipped oysters are found in waters between 8 and 40 metres deep, northward from Dirk Hartog Island in Shark Bay. However the bulk of the population occurs north of 114° 10' E (North-West Cape), and more specifically adjacent to Eighty Mile Beach.

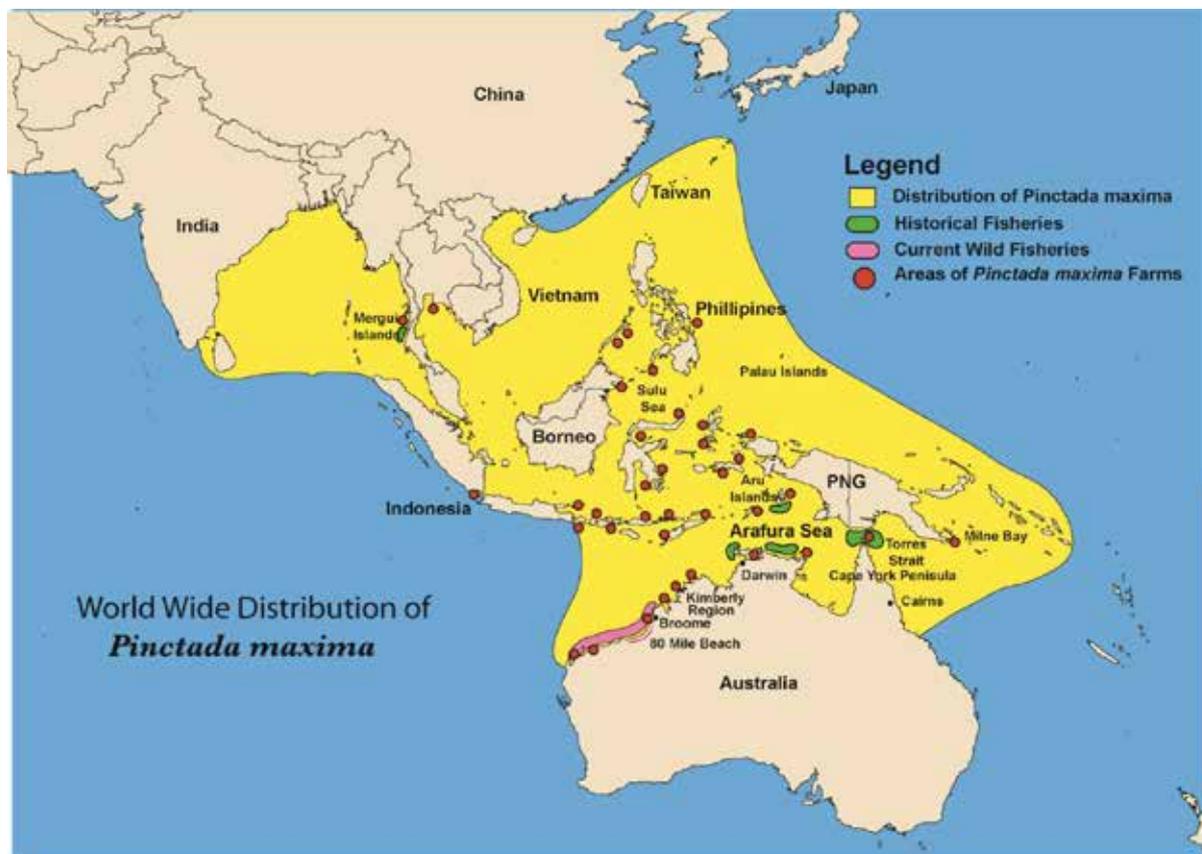


Figure 1: Distribution of *P.maxima*

Habitat

Silver-lipped pearl oysters commonly inhabit areas of sea bed where there is a hard rock substratum on which individual oysters attach themselves. The substrate is relatively flat with small crevices, covered by a fine layer of sediment. Other marine assemblages may also inhabit these areas. Sea bed areas occupied by ascidians and sponges are referred to by pearl divers as "potato bottom", while assemblages

of hydroids, sponges, ascidians, soft corals, sea pens and crinoids are termed “garden bottom”².

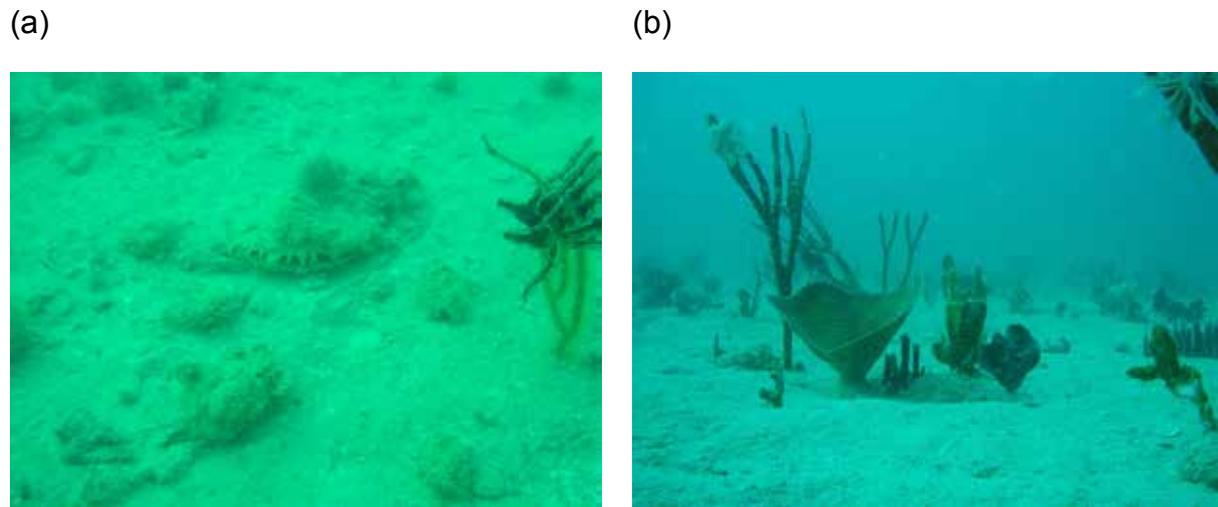


Figure 2 Examples of the two main habitat types found in the Pearl Oyster Fishery (a) “potato” (ascidian) habitat with pearl oyster, and (b) “garden” habitat.

Life history

Silver-lipped oysters are protandrous, rhythmic hermaphrodites, changing sex from male to female after initial maturation. They may have more than one sex reversal in a lifetime.

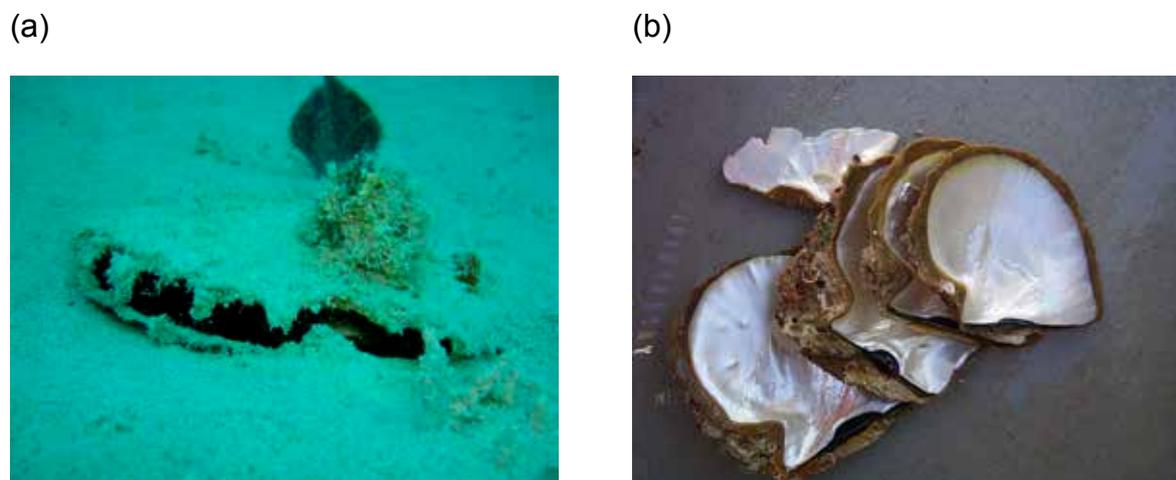


Figure 3 *Pinctada maxima* in its (a) natural habitat, and (b) processed for sale.

Young oysters grow quickly, with males maturing at 3-4 years old and at a length of 100mm to 120mm. By the time the individuals in an age cohort have reached about 170mm, about half have changed from male to female. Most oysters larger than

² Pearl Oyster Fishery ESD Report Series Number 5 2006

190mm are female. Pearl oysters can reach a size of 270mm and at 200mm are between 15 and 20 years old³.

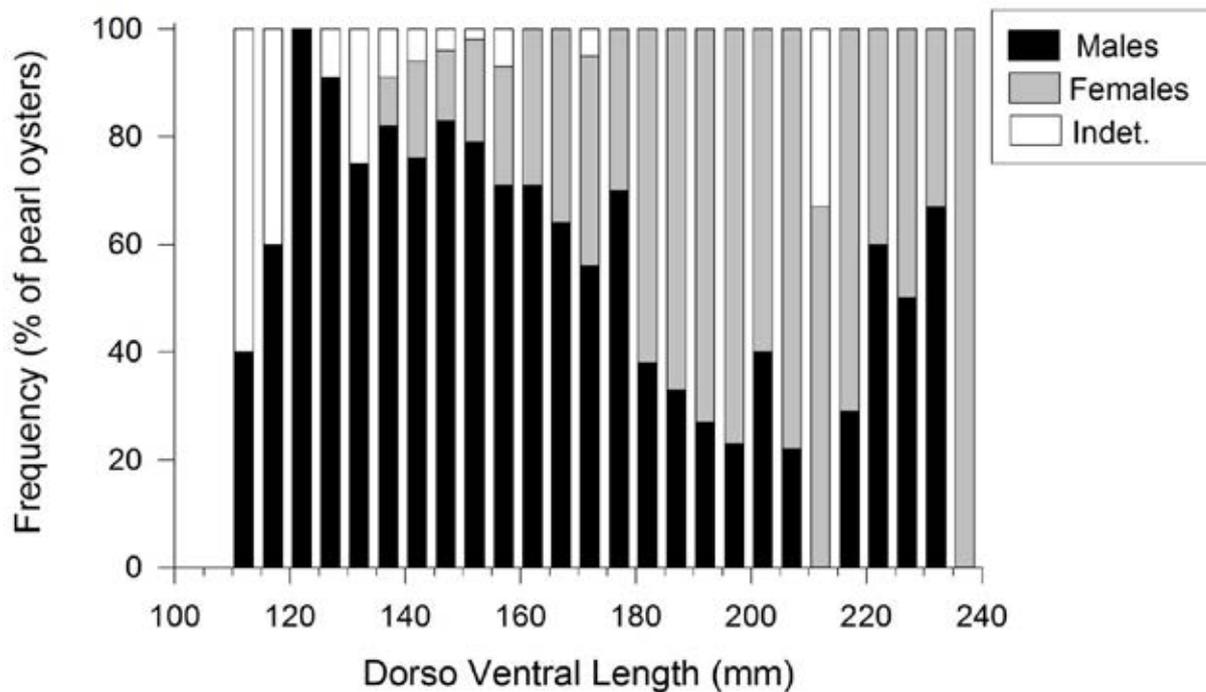


Figure 4: Typical sex distribution ratios in *P. maxima* populations

Synchronous spawning generally occurs between September and May each year, with the primary spawning period between October and December. Females are highly fecund, producing millions of eggs, however less than one percent of those fertilized survive the free-living larval stages. The planktonic oyster larvae are distributed by wind and currents and metamorphose through a number of stages over about 28 days before they settle to the sea floor, at which time they change into juvenile oysters or “spat”. The spat require a hard substrate on which to anchor and do not move again. If the larvae settle on unsuitable habitat they metamorphose then die.

Pearl oysters are filter feeders, which use their gills to filter small food particles of plant and animal matter from the water. The abundance of suspended food particles in a particular location has a major influence on growth rates and population density.

Population dynamics

Like most marine species, pearl oyster populations experience highly variable recruitment, with survival of larvae and successful spat settlement dependent on prevailing oceanic and environmental conditions including water and wind movement, temperature and the abundance of nutrients.

³ Joll 1996

The periodic and largely unpredictable highs and lows in spat survival have a major influence on the abundance of specific cohorts within the population. This in turn affects the annual availability of “culture-sized” shell, with the industry generally relying on the abundance of 3-4 consecutive cohorts of younger, generally male, oysters for seeding.

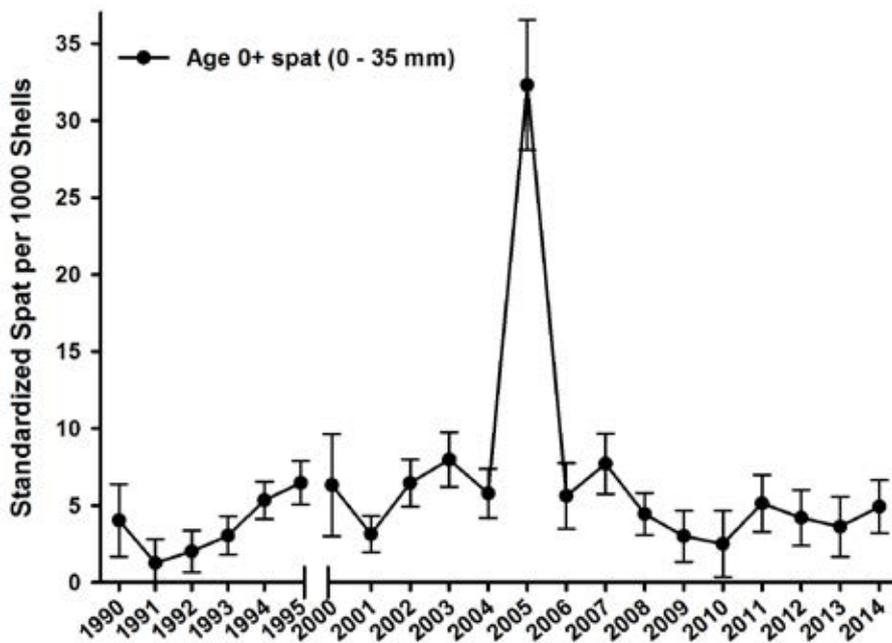


Figure 5: Recruitment varies from year to year in response to environmental conditions.

Larval distribution

The genetic structure of *P. maxima* suggests that the Western Australian populations are functionally separate from those located in the Northern Territory and Queensland, and therefore most likely dependent on localized reproduction for their sustainability⁴.

Like recruitment, larval distribution and areas of spat settlement are heavily influenced by prevailing wind, current and tidal movement, as well as bottom strata, with the highest density settlement occurring in the vicinity of existing oyster beds.

⁴ Benzie and Smith 2002

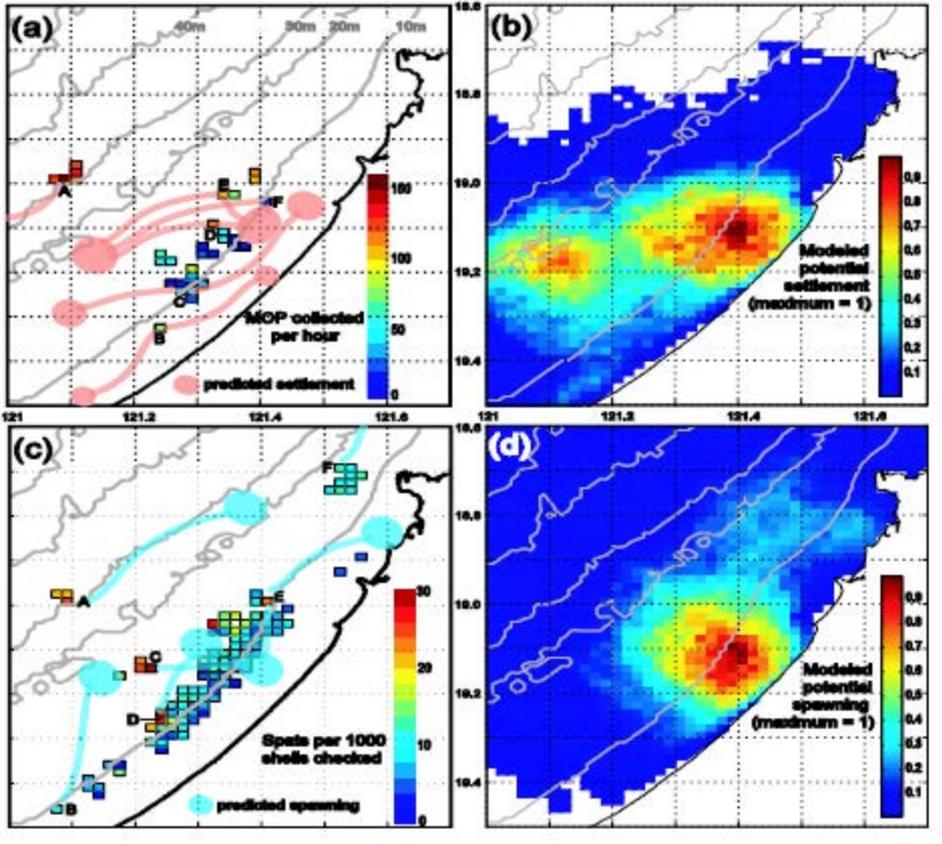


Figure 6: Settlement (a, b) and Source (c,d) Regions

THE PEARLING INDUSTRY

The pearling industry is managed under the provisions of the *Pearling Act 1990* (Pearling Act) and the *Pearling (General) Regulations 1991* (Pearling Regulations). The definition of *P. maxima* in the Act includes any hybrids of *P. maxima* that may be produced through laboratory technology.

Industry structure

The pearling industry is vertically integrated, from the wild oyster fishery, which harvests oysters for both culture and mother-of-pearl (MOP) shell, (generally considered pearl oysters over 175 mm in length) through seeding to pearl production, and marketing (Figure 7). In recent decades the production of oyster spat from hatcheries has become an important component of the oyster supply for pearl seeding. The end product from the industry is primarily high quality pearls, with pearl oyster meat and MOP shell as additional products. Technology available to the Australian industry allow multiple seeding of individual pearl oysters during it's productive life.

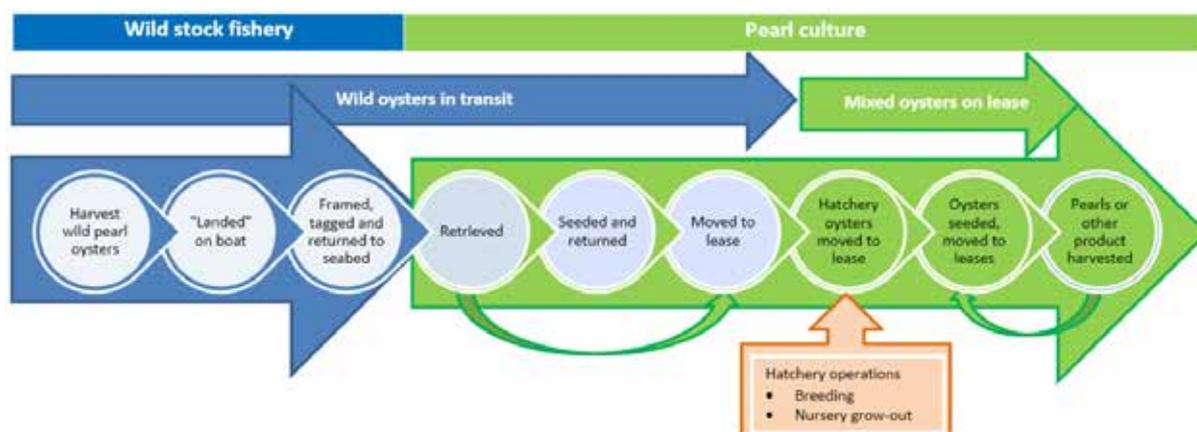


Figure 7: The Pearling industry is vertically integrated from wild oyster harvest to pearl production to marketing

The Western Australian pearl oyster fishery is the only remaining significant wild-stock fishery for pearl oysters in the world.

Subject to the proposed *Aquatic Resources Management Act* (ARMA) being enacted, the *Pearling Act 1990* will be repealed.

Management objectives

Ministerial Policy Guideline No. 17, "Pearl Oyster Fishery", issued pursuant to Section 24 of the Pearling Act, sets out the management objectives for the pearling industry as:

- a) a control on the collection of pearl oysters from the wild stocks;
- b) the orderly development of pearl farms;
- c) the vertical integration of the industry;

- d) *an approach to the growth in production of pearl oysters determined by industry, and based on sensitivity to markets;*
- e) *market stability; and*
- f) *the retention of the pearling industry in Australian hands.*

History of the pearling industry

The pearling industry originated in the Shark Bay region in the 1850s and was initially based on the smaller *Pinctada albina* oyster. In the 1860s *P. maxima* was discovered near Nickol Bay, and the industry started to expand northwards, initially using Aboriginal labour, and later South-Sea Islanders and Malays (Bach, 1955) wading for oysters in nearshore waters. By the 1880s the larger pearl oysters became the focus of the fishery due to their use as mother of pearl (MOP) for buttons in the clothing industry and inlay for furniture. In the early 1890s, surface air supply or “hard-hat” diving became the dominant fishing method, enabling the industry to effectively fish oyster beds in deeper waters.

By 1910 there were nearly 400 luggers and 3,500 people in the industry harvesting up to approximately two million pearl oysters per year – or up to 75 per cent of the world production (Southgate et al. 2008; Malone et al. 1988).

The emergence of plastics around the time of World War I and the acceptance of plastic buttons and buckles by consumers created direct competition for the MOP material. The 1920s and ‘30s saw a decline in fishing and MOP production due to competition from plastics, and the wider effects of the Great Depression.

At the same time the adoption of new technology by the industry, including engine-powered and mechanical air pumps, enabled two divers to operate from each vessel, increasing the average annual harvest per boat from 3.5 tons in 1912 to 12 tons in 1936 (Taylor, 1985).

During World War II pearling operations in WA almost ceased entirely. When pearling recommenced after the War the 1910 industry comprising 400 pearl luggers and 3,500 people had shrunk to around 15 luggers and 200 people.

In 1949 the *Pearling Act Amendment Act 1922*, which prohibited the culture of pearls, was repealed and the pearl culture phase of the industry began to develop. *P. maxima* pearl culture activities began in Kuri Bay in the Kimberley during the 1950s, and by the end of the 1970s most of the pearling industry had started to move into cultured pearl production.

Pearl culture requires pearl oysters to be at their prime nacre producing stage of life which is when the oyster is young and smaller (around 3 years old). Nacre is the material the oyster secretes in layers on the nucleus implanted during the seeding process to create the pearl. As a consequence the annual catch of the smaller culture-sized pearl oysters (between 120-175mm) increased to around 400,000

(Malone et al. 1988), while the catch of larger sized pearl oysters for MOP production (above 175mm) declined from 1,700 tonnes in 1957 to less than 300 tonnes a year.

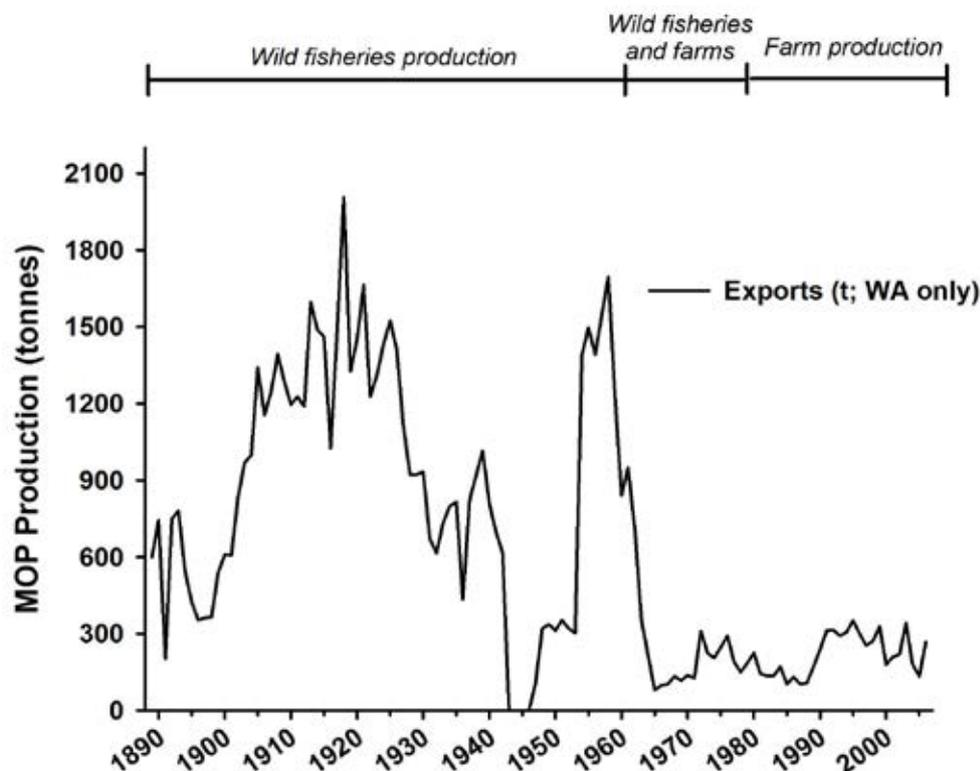


Figure 8: The take of oysters for mother of pearl (MOP) declined rapidly as pearl culture emerged as the dominant element of the industry.

The harvest method is drift diving, in which six to eight divers are attached to large outrigger booms on a vessel and towed slowly over the pearl oyster beds, harvesting legal-sized oysters by hand as they are seen.

The move into the harvest of smaller pearl oysters for culture purposes also meant that fishing operations shifted from the deeper offshore oyster stocks into shallower regions with a higher proportion of the culture-sized oysters.

In 1980 it was agreed that the prime use of pearl oysters would be for pearl culture and MOP a secondary objective. In 1981 each operator utilizing pearl oysters between Kuri Bay and Port Hedland was set an annual quota for the three years 1982-84. Minimum sizes were set for culture pearl oysters and a voluntary minimum size set for MOP pearl oysters. In 1983 it was decided that any take of pearl oysters for MOP would form part of a licensee's annual quota and the area to which the quota applied was extended south to NW Cape. During 1985 and 1986 individual companies strictly adhered to the total allowable catch (TAC), and lobbied for protection of the larger female oysters as the breeding stock (previously taken for MOP) to ensure continuity of high levels of recruitment considered necessary for adequate culture-sized pearl oyster abundance.

The subsequent increase in fishing pressure on nearshore oyster beds such as Eighty Mile Beach led, in 1987, to the establishment of a Pearling Industry Review Committee (PIRC). The Committee's task was to make recommendations about the future development and management of the industry.

A moratorium on the issue of new pearling licences was put in place until the end of 1987, effectively limiting the number of operators to those active in the fishery. At that time there were 11 pearling licensees, with nine licensed to operate in the northern sector of the fishery (Zones 2 and 3) and two licensed to operate in the southern sector (Zone 1) (see Figure 6).

Catch limits for each licensee were also introduced for culture-sized oysters. At the time the production and grow-out of oysters from hatcheries was not considered a viable alternative to the take of wild oysters.

The PIRC made a series of recommendations about the management of the resource, including recommendations for quotas to be set by annual stock assessments using catches and catch rate data as reference points, the complete phasing out of fishing for large MOP-sized oysters to support breeding stocks and the zoning of the fishery to provide more control over localised fishing pressure and rates of depletion (Malone et al., 1988). The majority of these recommendations have formed the basis for management of the industry since 1988.

The current *Pearling Act 1990* was proclaimed in December 1990, establishing a regulatory framework which encompassed the cultivation of pearl oysters, hatchery production of pearl oysters, a form of individual transferrable fishing rights, and other provisions relating to issues such as diver safety.

Until 1995 the pearling industry was administered in two parts. The catching segment, which operates across the boundaries of State Waters (3nm) was administered by a State-Commonwealth Joint Authority established under both the WA Pearling Act (1990) and the *Commonwealth Fisheries Management Act* (1991), while the culture segment was administered by the State.

The revision of the *Offshore Constitutional Settlement* between the Commonwealth and the State in 1995 enabled a full transfer of jurisdiction for all aspects of the *P.maxima* pearling industry to the State.

The Pearling Act contained a sunset clause that required the Minister for Fisheries to instigate a review of the operation of the Act (including subsidiary legislation) within a year of the fifth anniversary of proclamation of the Act. This review was undertaken in 1996 and the pearl oyster fishery is now managed under the *Pearling Act 1990* and *Pearling (General) Regulations 1991*.

Ministerial Policy Guidelines 8 and 17 were issued in 1998 and 2001 (Department of Fisheries, 1998 and 2001) respectively, pursuant to the Pearling Act. These

guidelines establish the policies that direct consultation with and management of the industry.

Current catching segment management

The commercial wildstock fishery off WA is the only remaining significant commercial pearl oyster fishery in the world. There has not historically been a recreational fishery for pearl oysters.

The wildstock fishery is divided by regulation into 4 zones (Table 1). There is a total of 572 wild-stock units that were initially allocated in 1991 based on historical catch data. The catch value of each unit is derived from the annual TAC.

Licensing arrangements take the form of conditions on a licence that limit the annual quantity of oysters each licensee may take, and regulatory arrangements to ensure proper accounting and audit of catches.

The quantities are derived from the allocation amongst pearling licence holders of an annual total allowable catch (TAC) and given form as licence conditions that establish a number of quota units (shares) on each licence. Historically an overall total catch of around 500,000 pearl oysters has been distributed between the number of quota units.

These units may be permanently or temporally transferred through an administrative process by obtaining the approval of the CEO of Fisheries for amendments to the licences of both the “seller” and the “buyer”.

Table 1: Zones, licences and quota units for the harvest of *P.maxima* in WA.

Zone	Boundaries	Licences	Units	Notes
1	North West Cape (including Exmouth Gulf) to 119°30' east longitude.	5	115	
2	East of Cape Thouin (118°20' east longitude) and south of 18°14' south latitude	9	425	Also have full access to Zone 3.
3	West of 125°20' east longitude and north of 18°14' south latitude	2	32	Also have partial access to Zone 2.
4	East of 125°20' east longitude to the Northern Territory border	NA	All licensees have access to this zone	Exploratory fishing has shown that stocks in this area are not economically viable. However, pearl farming does occur.

There is also a 'buffer zone' between zones 1 and 2, which may be accessed by licensees from both zones, although in practice, it is generally only utilised by zone 1 licensees.

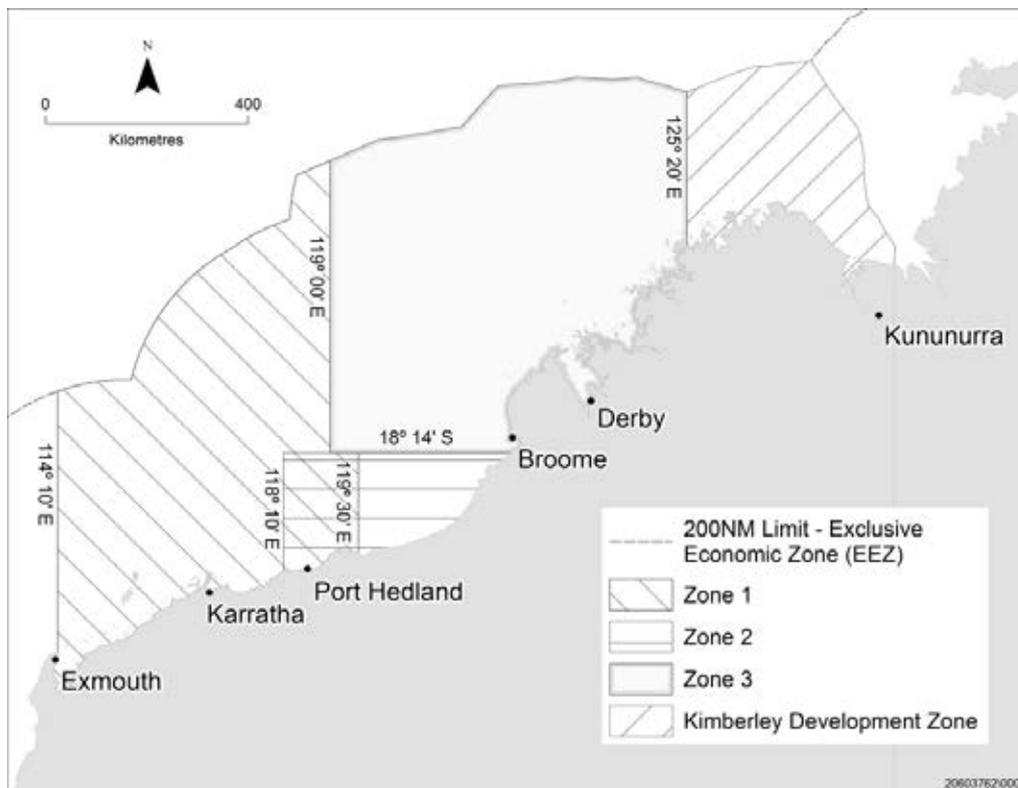


Figure 9: Catching zones for *P. maxima*

Whilst provided for in each year's fishing arrangements, for economic reasons, no fishing has occurred in Zone 1 and Zone 3 since 2008, consequently the breeding stocks in these areas is likely to be increasing. Fishing recommenced in Zone 1 in 2014

Zone 2 of the fishery was subject to a phase of abnormally high abundance between 2008-2012 due to exceptional recruitment in 2005 and higher than average settlement in 2006 and 2007. This phenomenon coincided with the global financial crisis and a fall in sales of luxury goods resulting in the economic decision of industry to reduce production. It is estimated that only around 50 per cent of these higher year cohorts were harvested for pearl culture production (small fast growing males in the size range 120 – 160 mm), and the remaining oysters have moved through to the breeding stock (≥ 175 mm).

Juvenile recruitment to the fishery has now returned to around the historical average since 2009.

Managing for sustainability

The annual recruitment monitoring program is a measure of the abundance of new juveniles (Age 0+; Age 1+) or "piggyback spat", that settle onto adult oysters. This

model now has 20 years of data. It has resulted in a highly informative relationship between catch rates and previous years recruitment, enabling accurate predictions of future abundance and pre-emptive management to sustain breeding stocks.

The pearl oyster fishery uses a 'gauntlet' fishing strategy in which the young, fast-growing oysters (principally males) of 120 – 165 mm shell length are targeted for their high quality nacre producing qualities. The fishery is currently trialling pearl quality outcomes of catching at a minimum size of 100 mm for a further three years (completed in 2016).

Given average growth rates and low natural mortality, this strategy ensures recruitment into the pearl oyster breeding stock exceeds catch and natural mortality, and breeding stocks are likely to increase in most years. This results in a large residual broodstock being built up over time as the surviving animals may live for another 15 to 20 years.

For dive safety and commercial reasons, the Pearl Oyster Fishery can only operate within a narrow depth corridor (max 35 metres) along the Western Australian coastline. As such, significant patches of pearl oysters occur in the deeper water outside of the normal fishing areas

Customary Fishing

Harvesting for pearl oysters began long before European settlement. Yu and Brisbout (2011) have noted that indigenous groups of the west Kimberley coast have harvested *P. maxima* for at least 20,000 years. Northern Australian coastal dwelling Aborigines harvested the plentiful pearl oysters from the shallow waters of the north west coast and had well established traditional trading networks for pearl oysters that extended throughout Australia (Akerman and Stanton, 1994). Aboriginal communities ate the pearl meat, used the oysters for decoration and other cultural purposes and the pearl oyster has important cultural significance. The oysters were collected, cleaned, shaped and often decorated with designs that were worn for ceremonial occasions.

Pearl oysters travelled further perhaps than any other item. In Western Australia an explorer saw an Aboriginal wearing a pearl oyster which had travelled at least 500 miles from its point of origin. (Blainey, G. 1975).

Akerman (1994) noted that in the 1970s there were over a dozen artists carving pearl oyster for traditional exchange and commercial sale. Currently only a few pearl oyster carvers (such as Aubrey Tigan⁵ and Bruce Wiggan) are left in the Kimberley region, although pearl oyster continues to be significant in the cultural traditions of the Kimberley coastal and inland groups.

⁵ Examples of Mr Tigan's work can be seen at: <http://shortstgallery.com.au/artists/778914/aubrey-tigan> accessed on 2 September 2013.

Bruce Wiggan, from One Arm Point, says that apart from being used for trade, pearl oysters were symbols of status, worn on belts of human hair. Aboriginals used them for dancing, cutting their hair off and making a hair belt. The oysters were also used for rainmaking, and as magical charms⁶.

The Federal Court of Australia has recognised non-exclusive native title rights in relation to waters, including areas of sea, in a number of native title determinations. These rights have included the right to fish and use the resources of the waters for personal, domestic and communal needs (including, but not limited to, cultural or spiritual needs) but not for commercial purposes and in accordance with traditional laws and customs. Such native title rights and interests have been determined in respect of the following matters:

- Ngarla- Alexander Brown and Ors- (WAD 6185/98) decided by consent
- Karajarri – Nangkiriny v State of Western Australia (WAD 6100/98)
- Bardi Jawi - Sampi on behalf of the Bardi and Jawi People v State of Western Australia (WAD49/1998)
- Dambimangari – VB (deceased) v State of Western Australia [2011] FCA 518 (WAD 6061/98) decided by consent
- Uunguu – Goonack v State of Western Australia [2011] FCA 516 (WAD 6033/98) – decided by consent
- Balangarra Combined – Cheinmora v State of Western Australia (No 2) [2013] FCA 768 (6027/98) decided by consent

Further, specific rights in relation to *P. maxima* have been agreed in a number of matters including:

- Nyangumarta – Hunter v State of Western Australia (WAD 6281/98 and WAD 234/2007);;Nyangumarta-Karajarri Overlap Proceeding (Yawinya) WAD 280/2008
- Rubibi - Rubibi Community v State of Western Australia (No 7) [2006] FCA 459 (WAD 6006/98)

These rights in relation to *P. maxima* include:

- “ (a) *The right to take live adult P. maxima for the purpose of:*
- (i) *Sustenance; and*
 - (ii) *Using its shell for the ceremonial activities of the Nyangumarta people, including the ceremonial exchange of goods (including items made from P. maxima shell), to the extent that such exchange is effected in accordance with a traditional ceremony.*
- (b) *The right to take shell of dead P. maxima for the purpose of using its shell for the ceremonial activities of the Nyangumarta people including shell of live or*

⁶ ABC local radio at: <http://www.abc.net.au/local/audio/2013/05/27/3767849.htm?site=kimberley>
Accessed on 2 September 2013.

dead *P. maxima* shell), to the extent that such exchange is effected in accordance with a traditional ceremony.

Provided that the native title rights and interests to take adult *P. maxima* (including shell of live or dead *P. maxima*:

- (a) Does not include the taking of it while using artificial breathing apparatus, such as but not limited to scuba or hookah apparatus (surface supplied compressed air) but not including apparatus such as snorkels;
- (b) For the avoidance of doubt, do not include any right to use *P. maxima* (including shell of live or dead *P. maxima*) for sale, barter or exchange, other than exchanges made in accordance with traditional ceremonies confirming with (a) or (b) above.”

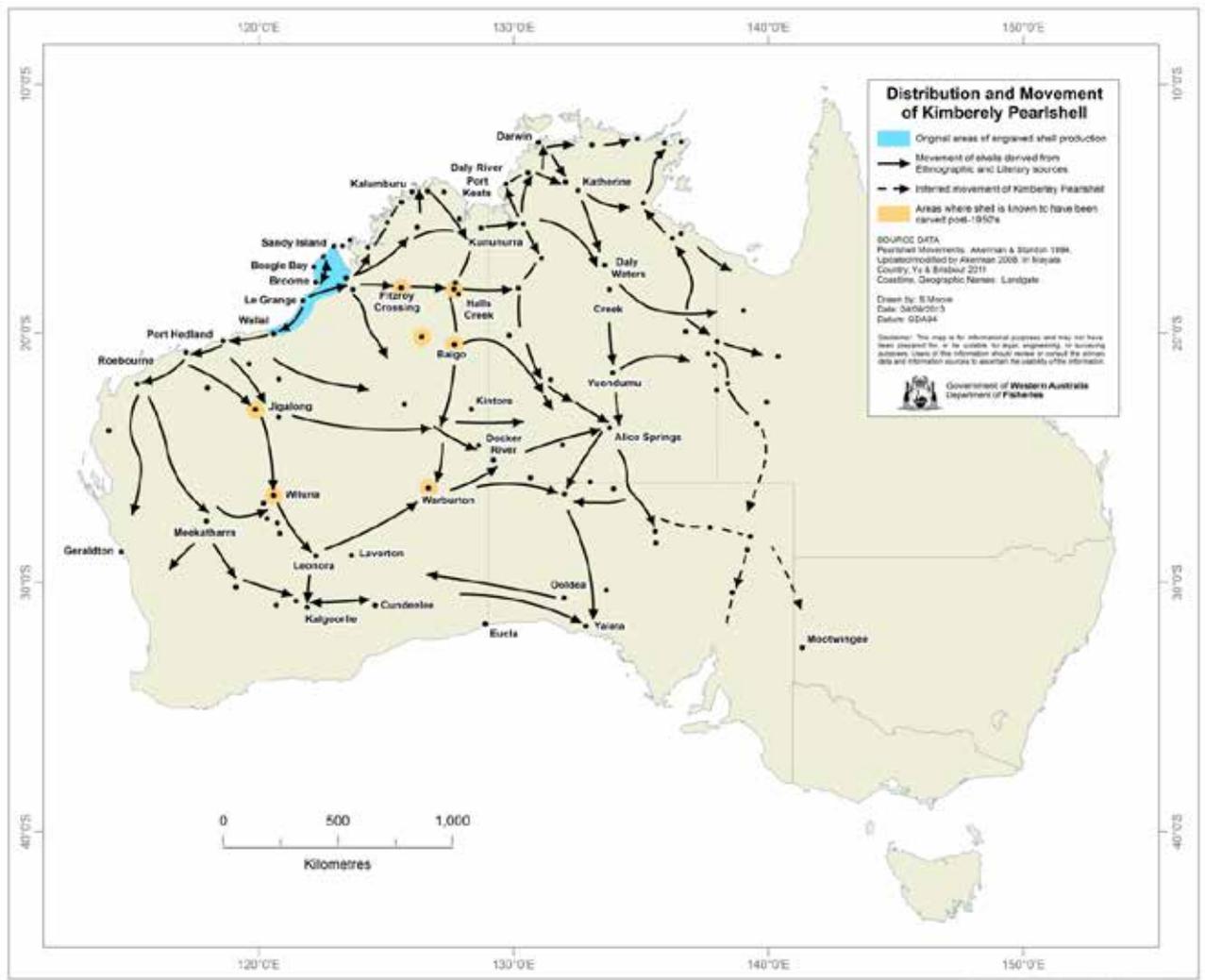


Figure 10⁷: Distribution and movement of pearl shell by indigenous communities

⁷ Taken from Yu, S and Brisbout, J. with Tigan, A. (2011) In Mayala country with Aubrey Tigan. Report to Department of Sustainability Energy Water Populations and Communities.

Evidence for such native title rights and interests the subject of litigated claims may be found on court transcript. If a matter has been decided by consent (a consent determination), that information may have been included in connection information provided by the claimants to the State of Western Australia (it is noted that certain connection information may have been provided with confidentiality restrictions).

The Department of Fisheries has no records of Customary catches of *P. maxima*.

Recreational Sector

Whilst the *Pearling Act 1990* regulates all forms of pearling activity, there has not historically been a recreational fishery and during the Second Reading Speech of the Act in 1990 the then Minister made no mention of the recreational sector (Appendix 2). Under S7 of the *Pearling Act* a person must hold a pearling licence or pearling permit in order to collect *P. maxima* in Western Australian waters. However, no pearling licences have been issued to collect *P. maxima* for a recreational purpose.

Despite this, anecdotal evidence suggests a low level of incidental take of pearl oysters by recreational fishers picking up *P. maxima* washed up on a beach, or in shallow waters. Charter boat operators have made enquiries⁸ about access to the resource for their diving clients, but no formal licence applications have been received.

The illegal take or possession of *P. maxima* without a valid reason or appropriate receipts can attract significant penalties.

⁸ Pers. Comment (2014) Dr Anthony Hart, Department of Fisheries

Conservation Areas

There are a number of conservation areas in the pearling zones. These are summarised below (Table 2):

Table 2: Conservation areas in pearling zones

Area	Restriction
Barrow Island Marine Management Area	Commercial fishing (including pearling) is permitted in all areas of the marine management area.
Barrow Island Marine Park	Commercial fishing is prohibited in all areas of the marine park.
Montebello Islands Marine Park	Recreational special purpose zones allow recreational, but not commercial fishing. Pearl farming occurs in the special purpose zones. Commercial fishing may occur in the general use zone.
Camden Sound Marine Park	Zoning scheme is not yet in place.
Eighty Mile Beach Marine Park	Zoning scheme is not yet in place.
Rowley Shoals Marine Park	Commercial fishing is prohibited and recreational fishing on key demersal species has been banned.

There are also proposals for marine parks to be developed around the Horizontal Falls region, across the North Kimberley and in Roebuck Bay.

FACTORS THAT INFLUENCE NET BENEFIT FROM USE OF THE RESOURCE

Economic factors

Over the past twenty years hatchery produced *P. maxima* pearl oysters have become an increasing component of culturing high quality pearls, however, the pearling industry still considers wild caught *P. maxima* pearl oysters to be the key component of pearl culturing activities, given their pearl producing qualities.

The pearling industry has faced its toughest period in recent years since culturing pearls began. Anecdotally, the global financial crisis (GFC), together with the high Australian dollar has driven the export price of pearls to half of that achieved in the late 1990's. This has caused licensees to scale back their operations, which included a significant reduction in the catch of wildstock *P. maxima* pearl oysters to around 25% of the annual total allowable catch set in 2009 and 2010.

There are signs that the pearling industry is recovering as world economies slowly recover, discretionary spending increases on luxury goods and currencies move in favour of Australian exporters. Industry has responded with an increased take of wildstock pearl oysters recorded in 2011 (almost 50% of the annual total allowable catch). In addition, the recruitment of *P. maxima* pearl oysters is beginning to return to more historic levels from the highs experienced in 2005.

A precise estimate of the total industry value is difficult to achieve, owing to the variable time lags that occur between harvesting of pearls and eventual sale to offshore buyers, and the costs incurred in marketing before sales take place. Based on information provided by the industry, the value of cultured pearls and by-products in 2014 was considered to be approximately \$67 million, which is slightly higher than 2013, in which it was around \$61 million.

Customary factors

The recognition of Customary fishing in Native Title Agreements means that native title holders will have rights to ensure environmental and sacred sites rules are upheld. These Agreements flow from the High Court's decision in the Croker Island Case of 2001 (*Commonwealth v Yarmirr*) which upheld the existence of non-exclusive native title rights over the sea and seabed.

Social factors

Commercial fishing

Pearl oyster fishing vessels operate from the Lacepede Islands north of Broome to Exmouth Gulf in the south. The number of vessels in the fishing fleet has been slowly reducing from 16 in 1997 (overall), mostly due to increased economies of

scale through companies sharing vessels capacity. In 2009, with the negative impact of the GFC on the industry, only two vessels fished. Six vessels fished in 2014.

When fishing for pearl oysters (between March and June) most vessels operate with 10 to 12 crew (6 to 8 divers). These vessels also support pearl culture seeding operations, transport of oysters to pearl farms and a number of other pearl farm functions throughout the year.

Prior to the GFC, the pearling industry provided employment for approximately 500 people in the northern coastal regions of WA, including in the operation of the pearl farms. However the impact of the GFC resulted in a substantial rationalisation of pearling activities and resultant reduction in personnel employed in the pearling industry. Maintaining technical capacity within companies has been a major focus.

Customary fishing

Engraving of pearl oysters and use in ceremonies is still being carried out in the Kimberley (Yu *et al*, 2011), but the participation rate and amount of pearl oysters harvested for these ceremonies is unknown.

EXTERNAL INFLUENCES ON FISHING

There are a number of external influences that affect why, how and where commercial fishers can operate and hence have relevance to any decision on allocation of access to pearl oyster resources.

Marine Planning

A number of agencies, both State and Federal, have legislative responsibility for aspects of marine planning and resource use. Many of these can affect fishing activities or impact on fish habitats.

Marine Protected Areas can be partially or totally closed to fishing activity and therefore have the potential to impact on the commercial pearl oyster fishery activity, in particular 'no-take' sanctuary zones. Marine planning initiatives should therefore be considered as part of any resource allocation decision-making.

National marine planning

Marine Bioregional Planning initiatives are undertaken by the Australian Government, via the Department of the Environment in accordance with the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to identify areas within Commonwealth waters (from State waters to the 200-nautical mile Economic Exclusion Zone) worthy of inclusion within the 'National Representative System of Marine Protected Areas' (NRSMPA).

The primary goal of the NRSMPA is "to establish and manage a comprehensive, adequate and representative system of marine protected areas to contribute to the long-term ecological viability of marine and estuarine systems, to maintain ecological processes and systems, and to protect Australia's biological diversity at all levels" (DEH, 2004).

The planning framework for NRSMPA is based on the 'Interim Marine and Coastal Regionalisation for Australia' (IMCRA) ecosystem classification. In line with this objective, 60 IMCRA regions have been identified to cover Australia's waters, 16 of which are within Western Australia's coastal waters.

A bioregion is defined by a combination of biological, social and geographic criteria, rather than by geopolitical considerations, and is generally a system of related interconnected ecosystems. Two bioregions have been identified within Commonwealth waters off the Western Australian Coast – the South-west Bioregion (to include waters between Kangaroo Island, South Australia and Shark Bay, Western Australia), and the North-west Bioregion (to include waters between Shark Bay and the Northern Territory border). Other bioregions in Australia include the North, Coral Sea, Temperate East and the now completed South-East.

Marine bioregional plans (MBPs) have been developed for four of Australia's bioregions - South-west, North-west, North and Temperate East. The MBPs describe

the marine environment and conservation values of each marine region, set out broad biodiversity objectives, identify regional priorities and outline strategies and actions to address these priorities.

In November 2012, the then Federal Minister for Environment proclaimed Marine Reserve Networks for the South-west, North-west, North, Coral Sea and Temperate East bioregions, and in March 2013, approved management plans for the networks. The management plans identify the location of the marine protected areas and permitted activities and describe management strategies.

In December 2013 the Australian Government announced a Marine Reserves Review consisting of two components:

- the appointment of an expert scientific panel to look closely at the science supporting the current marine reserves; and
- the establishment of bioregional advisory panels to improve consultation with stakeholders.

Following this review, new management plans may replace the management plans that were scheduled to come into effect in July 2014, which have now been set aside.

Until that time all fishing activities continue as normal.

State Marine Conservation Reserves

Multiple-use marine protected areas, referred to as marine conservation reserves may be created in State waters (generally to 3 nautical miles) under the provisions of the *Conservation and Land Management Act 1984*. The lead agency for implementing this legislation is the Department of Parks and Wildlife.

A key element of this process is the establishment and management of a State-wide system of marine conservation reserves, which restrict fishing activity to varying degrees in accordance with a zoning scheme outlined within the plan of management for a particular area. Partial or total restrictions (within 'no-take' sanctuary zones) to fishing activity are required to be reflected in an order under the *Fish Resources Management Act 1994* (FRMA). The zones obviously have a direct effect on fish resource allocation.

Existing marine conservation reserves along the Gascoyne and north coast include Shark Bay Marine Park, Hamelin Pool Marine Nature Reserve, Ningaloo Marine Park, Muiron Islands Marine Management Area, Montebello Islands and Barrow Island Marine Reserves, Rowley Shoals Marine Park, Eighty Mile Beach Marine Park and Lalang-garram/Camden Sound Marine Park. Additional marine parks are being planned for the Kimberley (as part of the Kimberley Science and Conservation Strategy) at Roebuck Bay, Horizontal Falls, north Camden Sound and North Kimberley. A proposed marine conservation reserve off Dampier is also under consideration by the State Government, however the planning process is currently on hold.

Fish Habitat Protection Areas

Fish Habitat Protection Areas (FHPAs) are another form of marine protected area and may be created under the provisions of S115 of the FRMA to meet a number of objectives, including fish protection, fish habitat protection, human use and resource sharing, or observation and education.

FHPAs are most commonly community-initiated proposals to protect relatively small areas of the aquatic environment and rely on community stewardship for on-going management. There are no FHPAs along WA's north coast.

FRMA closures

Fishing closures are able to be created under S43 of the FRMA for a variety of purposes and can include a total or partial; spatial and or temporal restriction to fishing. On the north coast, there are currently restrictions to fishing at Point Samson Reef and closures around Kunmunya and Samson II wreck sites.

INSTITUTIONAL ARRANGEMENTS

Governing Legislation

Since 1995, all aspects of the pearling industry have been managed solely by the Western Australian Government through the provisions of the *Pearling Act 1990* and the *Pearling (General) Regulations 1991*. This legislation provides for the management and licensing of pearling activities. The Regulations support the Pearling Act providing a framework for the management of administrative and technical matters.

The CEO of the Department grants leases, licences and permits under Section 23 of the Pearling Act, subject to conditions being satisfied and having regard to Ministerial Policy Guideline 17 (MPG 17). MPG 17 sets out the limited entry management framework of the pearl oyster fishery and deals with pearl oyster fishing, the establishment of zones in the fishery, quota allocation, the take of pearl oysters for research purposes and transfer of pearl oyster, as well as the “farming” of pearl oysters.

The number of permanent units (or if transferred for that season, temporary units) on a licence will determine the annual individual quota, that will be authorised by licence condition. The allocations are in quota units with approval to take the quota in zones, which have been established under the Pearling Act.

Ministerial Policy Guideline 8 (MPG 8) summarises the process of obtaining a lease for an area of coastal water for pearling, outlines the process required for lease applications (including public and interdepartmental consultation), site environmental impact assessment and the appeals process.

The Pearling Act and the Pearling Regulations are silent on Customary fishing. However, Customary fishing is legislated under the FRMA. Its definition in the FRMA is:

“*Customary Fishing* means fishing by an Aboriginal person that —
(a) is in accordance with the Aboriginal Customary law and tradition of the area being fished; and
(b) is for the purpose of satisfying personal, domestic, ceremonial, educational or non-commercial communal needs.”

S258 (1) (ba) of the FRMA allows for Customary fishing to be regulated.

The Department has a Customary fishing policy, which is at Appendix 3. This policy covers fishing under the FRMA and the Pearling Act.

According to the Western Australian Land Approvals and Native Titles Unit⁹, native title is a form of land title that recognises the unique ties some Aboriginal groups have to land. Australian law recognises that native title exists where Aboriginal people have maintained a traditional connection to their land and waters, since sovereignty, and where acts of government have not removed it.

Native title was first recognised by the High Court of Australia in 1992 with the Mabo decision. The Mabo decision overturned the idea of 'terra nullius', that the Australian continent did not belong to anyone at the time of Europeans' arrival. It recognised for the first time that indigenous Australians may continue to hold native title and to be uniquely connected to the land.

Aboriginal and Torres Strait Islander people can apply to the courts to have their native title rights recognised under Australian law. The native title of a particular group will depend on the traditional laws and customs of those people. The way native title is recognised and practised may vary from group to group, depending on what is claimed and what is negotiated between all of the people and organisations with an interest in that country. Native title holders have the right to be compensated if governments acquire their land or waters for future developments.

Native title can co-exist with other forms of land title (such as pastoral leases) but is extinguished by others (such as freehold).

An overview of the proposed new *Aquatic Resources Management Act (ARMA)* and the objectives of sustainable fisheries and aquatic management policy and how they relate to national and international fisheries law and policy are published in *A Sea Change of Aquatic Sustainability – Meeting the Challenge of Fish Resource and Aquatic Sustainability in the 21st Century*. At the time of writing this report, the ARMA had passed through the Legislative Assembly and was to be debated in the Legislative Council of the Western Australian Parliament. It is intended to replace the FRMA and the Pearling Act.

⁹ Department of Premier and Cabinet, accessed on 3 October 2013 at: <http://www.dpc.wa.gov.au/lantu/WhatIsNativeTitle/Pages/FAQs.aspx>

IMPACTS OF FISHING

Divers have the ability to target pearl oysters of choice (species, sizes (within legal size limits) and quality of *P. maxima*). Pearl oysters brought to the vessel after hand collection are young and have relatively little epiphytic growth (fouling organisms). A small number of over-sized or under-sized oysters are returned to the substrate.

There is no interaction between the pearl oyster fishing operation and protected species.

The fishery removes only a small proportion of the biomass of pearl oysters on the fishing grounds and is considered to have negligible impact on the food chain in the fishing area.

Pearl divers have minimal contact with the habitat during fishing operations. The main habitat contact is by pearl oysters held in mesh panels on holding sites following capture. However, these sites cover a very small proportion of the habitat and the activity concerned is unlikely to cause any lasting effect.

Similarly, the pearl farming operation, which uses longline systems in areas of high tidal flow to culture pearls, has limited impact on the environment. Physical effects are limited to static anchoring systems in typically sand/mud habitats. Environmental management research has demonstrated that pearl farming has negligible impacts on habitat and environment.

Research and monitoring

Stock Assessment

Multiple lines of evidence indicate that there is a high degree of certainty that the stock is above the point at which recruitment would be impaired. These include:

- Effort has been tightly controlled for over 20 years and has remained relatively stable, with the exception of 2009 and 2010 when it fell substantially due to economic conditions.
- Catch has successfully been controlled by the TAC for 30 years and the catch has been demonstrated to be very accurately recorded.
- Catch rates in recent years have been exceptionally high and although they are now returning to normal levels, they are still within the target catch rate range.
- Although variable, there has been consistent recruitment of pearl oysters in the 19 years of monitoring. This has included an exceptional year of recruitment in 2005, which was the highest ever recorded. The variation in recruitment has been well explained by environmental factors.
- This fishery has operated for over 100 years and there has never been an obvious stock collapse; current catch levels are much lower than in the 50 year period from 1890 – 1940.
- A relationship between catch rates and previous recruitment has been demonstrated to be highly informative for predicting future abundance, allowing for pre-emptive management.
- Stock status is within the target catch rate reference points and has been for over a decade. The current system of adjusting TACs in response to predicted abundance will continue to be applied and it is expected that stock status will remain within the target SCPUE range for the foreseeable future.
- The fishery uses standardised catch rates to determine whether the pearl oyster stock is at appropriate levels and uses a model that incorporates catch rates and recruitment levels to set an annual TAC.
- Standardised catch rates have been above the lower end of the proposed target reference point (i.e. 25 oysters per hour) since the standardised CPUE index began in 2003, indicating that the stock has been above its target reference point for the past 10 years. Because the management system in place responds to the state of the stock, with TAC adjusted as required, the stock has fluctuated above a level where fishing mortality is having an effect on recruitment. That is, variations in stock size are attributed to natural variations in recruitment.
- There is clear evidence from experience gained in past years that the monitoring in place ensures that actions are taken to maintain stock sustainability. In 2005, the monitoring program detected exceptionally high recruitment of 0+ spat, which indicated it was appropriate to increase future TACs to allow industry to maximise economic use of the available resource. Subsequently, more recently the TAC were adjusted downwards as the information on recruitment indicated this was

necessary to provide increased protection of the stock now that the strong year-class had passed through the fishery and recruitment had returned to more normal levels. There is thus every expectation that the monitoring in place will continue to determine whether the harvest strategy is working effectively.

Research and monitoring

Catches

Catch records have been collected from this fishery since 1890. There has been a statutory obligation for pearl oyster fishers to provide a daily catch and effort record with catch and effort recorded for 10 x 10 miles statistical reporting blocks since 1979. Total catch since 1979 has oscillated between 330 000 and 830 000 oysters, with an overall average of 530 000 ($\pm 120,000$ SD).

Commercial effort (hours of fishing) is recorded simultaneously with the catch monitoring and has the same checks and balances as for the catch information. As a result of the constraints of diving to avoid decompression illness, the estimates of effort derived from the daily logbook are highly accurate as they are dependent on pre-determined depth/time profiles which are consistent between pearl divers and from year to year. These profiles are tightly regulated through health and safety regulations, including a database checked by health and safety officers for compliance with approved dive standards.

Catch rates are derived from the daily catch and effort logbook, which has complete coverage of the entire fishery. Full details are recorded for each dive. The indices derived from these data are standardised to account for the variables that influence the catching efficiency and abundance and used as one of the performance measures in the harvest strategy. The indices are always presented with details of the associated levels of uncertainty. Hart et al. (2011) carried out a detailed analysis of the main environmental variables influencing abundance and fishing efficiency in this fishery, which has been used to inform and improve the standardised catch rate abundance index.

Growth

Research observers on board commercial vessels undertake a length frequency monitoring programme annually. The observers undertake measurements of pearl oysters during a minimum of 30% (~3 trips) of the 5 to 10 discrete fishing trips that occur in the *P. maxima* fishery each year. Data collected are length frequency data, spatial location, and incidence of bioeroding sponge infestation, which is a general measure of the health of the shell.

Abundance

Population surveys to estimate stock abundance have been carried out periodically. The first structured survey of the Zone 2/3 stocks was in 1988 (Penn and Dybdhal 1988), followed by another in 2001 (Hart and Friedman 2004). These surveys provide an independent time series of abundance to compare against fishery catch

rates. Hart and Friedman (2004) also provided total population estimates and sustainable harvest regimes for harvesting of the MOP oysters. In 2007, population surveys were incorporated into the annual monitoring program for the fishery.

Population structure

Population length-frequency data are collected by spatial location (GPS points), and depth. Between 3000 and 5000 pearl oysters are measured from 30 – 150 sites per year. These surveys provide both an index of pre-recruitment abundance (“chicken”) that can be compared with earlier predictions from the recruitment, and an index of breeding stock abundance (MOP) which can be compared over time. Again, there is a high level of confidence that the data collected during these surveys are highly accurate.

Recruitment index

Pinctada maxima primarily spawn in October/November, and the larvae spend 3–4 weeks in the water column (Rose et al. 1990) before settling onto appropriate habitat, including adult shells, primarily during November and December. A unique settlement index (the “piggyback” spat recruitment index) that measures the abundance of each year class was developed by Hart and Joll (2006). The piggyback spat index is derived from examining the occurrence of juvenile spat which settle onto adult oysters as part of the commercial monitoring program. The annual change in recruitment strength measured by this index is one of the primary tools used to forecast future stock abundance and consequently, catch quotas. Between 30 000 and 155 000 adult oysters are inspected each year.

Other research

There are several other significant research projects being carried out by the pearling industry focusing on environmental management, improved health and safety for pearl divers and pearl oyster health. The main aims of the pearl oyster health study are to investigate aspects of oyster oodema disease (OOD) in *Pinctada maxima*, to assist in mitigating the impacts and understand pathways to disease and disease response in pearl oysters.

The Department of Fisheries’ Research Division’s Fish Health Unit also provides a comprehensive disease-testing program to the industry.

Socio-Economic Research

There have been a number of publications on the commercial pearling industry and the importance of the pearl oyster to the industry since the 1850s. The pearling industry has also been one of the largest regional employers in the Kimberley outside the oil and gas industry.

There have been a number of publications on the Customary sector and the importance of pearl oysters to Aboriginal communities. In one of the most recent, Yu and Brisbout (2011) note that *goonwarn* (unengraved pearl oysters) changes to *riji* when it is engraved and highlighted with red ochre.

“They are of great significance, constituting a critical element of cosmology and the economic and ritual life of Kimberley Aboriginal people.”

Every aspect of the process, from collecting, preparing, engraving and applying the ochre to the oyster is an expression of the artist’s connection to country and ancestors.

Riji are prepared for ceremony when performing *ilma* and for boys at *boogarn* (the second last stage of initiation). *Riji* are worn in front of the man and *goowarn* are worn behind¹⁰.

The engraving and ceremonies are still being carried out in the Kimberley, but the participation rate and amount of pearl oyster harvested for these ceremonies is unknown.

Compliance and Education

The penalties for taking *P. maxima* without a licence or permit are substantial \$50 000 and a further mandatory penalty of an amount of twice the wholesale value at the time of the offence of any pearl oysters, or pearl oyster spat, the subject of the offence. A breach of a licence or permit condition by the holder is a penalty of up to \$100 000 plus suspension or loss of quota. Compliance in the commercial pearling industry is extremely high.

Fisheries and Marine Officers use a risk assessment based approach to fisheries compliance to ensure areas and activities of a high risk of non-compliance are targeted.

Compliance inspections are carried out during fishing and seeding operations, during transport and at various pearl oyster farm lease sites. A tagging system is used for quota compliance.

Fisheries and Marine Officers conduct a wide variety of education and extension services, formally and informally, directed at industry, recreational and Customary fishers, fishing organisations, schools and the general community.

¹⁰ Women are able to see *riji* designs, but layers of specific meanings associated with them are secret. Women can view and handle the shell prior, but cannot view shell being used in ceremony.

CATCH AND EFFORT

Commercial

In 2014, catch was taken in Zones 1, 2 and 3 of the Fishery with the number of wild-caught pearl oysters being 627,634, comprising of 486,145 “culture-sized” (100-174 mm) and 141,489 “MOP-sized” (greater than 175mm) pearl oysters (Figure 11). The historic catch average is around 500,000 pearl oysters.

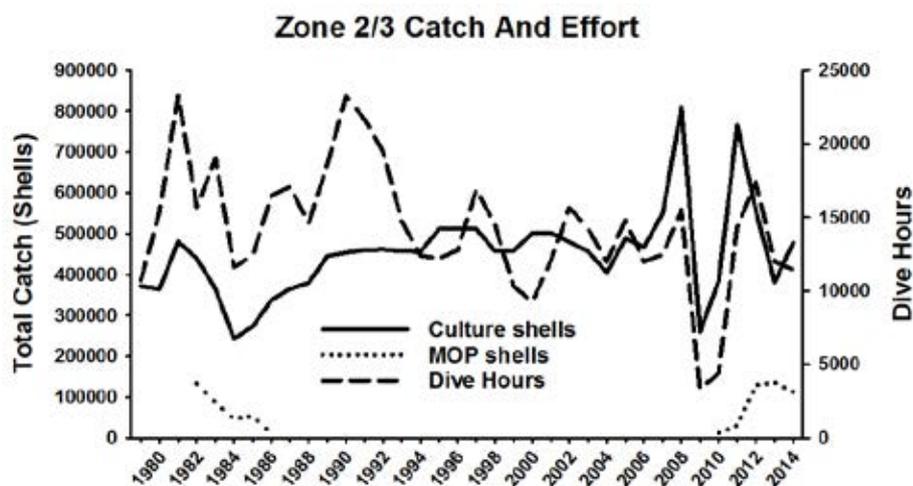


Figure 11: Pearl shell catch and effort - Broome area – zones 2/3

The TAC for the Fishery in 2014 was 707,566, thus 89% of the TAC was caught. In Zone 2/3, 478,101 “culture-sized” pearl oysters were caught (approximately 95% of the that component of the TAC) and 112,917 “MOP-sized” pearl oysters (55% of the MOP TAC of 204,866). In comparison, 517,000 “culture-sized” pearl oysters and 135,721 “MOP-sized” pearl oysters were caught in Zone 2/3 in 2013. The reduced catch in more recent years is due to a lower quota as a result of the abundance returning to more normal levels with some culture shell not fished for economic reasons.

Fishing recommenced in 2014 in Zone 1, after a hiatus since 2008. In 2014, the number of wild-caught pearl oyster was 36,332, comprising of 8,044 culture-sized” pearl oysters and 28,572 MOP-sized” pearl oysters in Zone 1.

Total effort was 14,011 dive hours in 2014, an increase of 17% from the 2013 effort of 11,993 hours. Of this total effort, 12,651 hours was focused on culture shell fishing, and the remaining 1,360 hours was applied to MOP fishing.

The target effort range relates to the time required to achieve the TAC (culture shell only) in all zones of the pearl oyster fishery. Acceptable effort ranges for individual

management zones are 11,456 – 15,819 dive hours for Zone 2/3 and 2,615 – 4,732 dive hours for Zone 1. These ranges are based on the 5-year period (1994 – 1998) following the introduction of global positioning systems (GPS) into the fishery, and reflect the typical variation in abundance of the stock under natural environmental conditions.

Zone 2/3 of the pearl oyster fishery achieved its catch with 12,479 dive hours of effort, which was within acceptable effort range.

Zone 1 of the pearl oyster fishery achieved its catch (both culture and MOP) with 580 dive hours of effort, which was below acceptable effort range due to minimal fishing.

The catch rate achieved by the fishery is an indicator of the abundance of the 3/4 to 6/7-year-old oysters specifically targeted for pearl production. Year-to-year variations reflect changes in recruit abundance, while the long-term trend in catch per unit effort (CPUE) involves an element of effort efficiency change. In 2013, a standardised SCPUE index was developed for “culture-sized” pearl oysters and provides the best estimate of annual abundance accounting for environmental and efficiency effects. Zone 2/3 SCPUE in 2014 was 28 shells per hour, the same as in 2013, which is at the lower end of the target range, but still above the threshold SCPUE. Raw CPUE was 38 shells per dive hour, a similar level to 2013 and 2012. This stabilisation of catch rate indicates that stock levels have returned to normal levels after record high levels in 2008 - 2011 as a result of good spat settlement in 2005. The “MOP-sized” pearl oyster catch rate of 104 per hour in 2014 was similar in 2013 at 112 pearl oysters per hour and much higher than the 72 pearl oysters per hour in 2012.

Recruitment to the Zone 2/3 fishery, as measured by the standardised catch rate (SCPUE), is predicted by the piggyback spat abundance index at 4 to 6 years prior to the current fishing year. The predicted recruitment is then used to set the quota for forthcoming years according to the harvest control rule. A very high 0+ spat abundance detected in the Zone 2 fishery in 2005 was confirmed in the 1+ spat year class in 2006, and again in the 2+ age class from population surveys in 2007. This cohort entered the commercially fished population between 2009 and 2011 resulting in the highest CPUE for over 30 years, but CPUE has now returned to normal levels as a result of spat settlements returning to normal levels.

Using the catch rate prediction system, the culture catch quota for 2014 was reduced to a unit value of 1,100 shells (TAC = 502,700) which is an 8% reduction in the 2013 TAC of 548,400 shell. A small increase in CPUE is predicted for the following two years, 2015 and 2016. Fishers were also given an MOP quota of 328 shell per unit to further explore the potential of the MOP fishery, resulting in a total quota of 1,428 shells per unit.

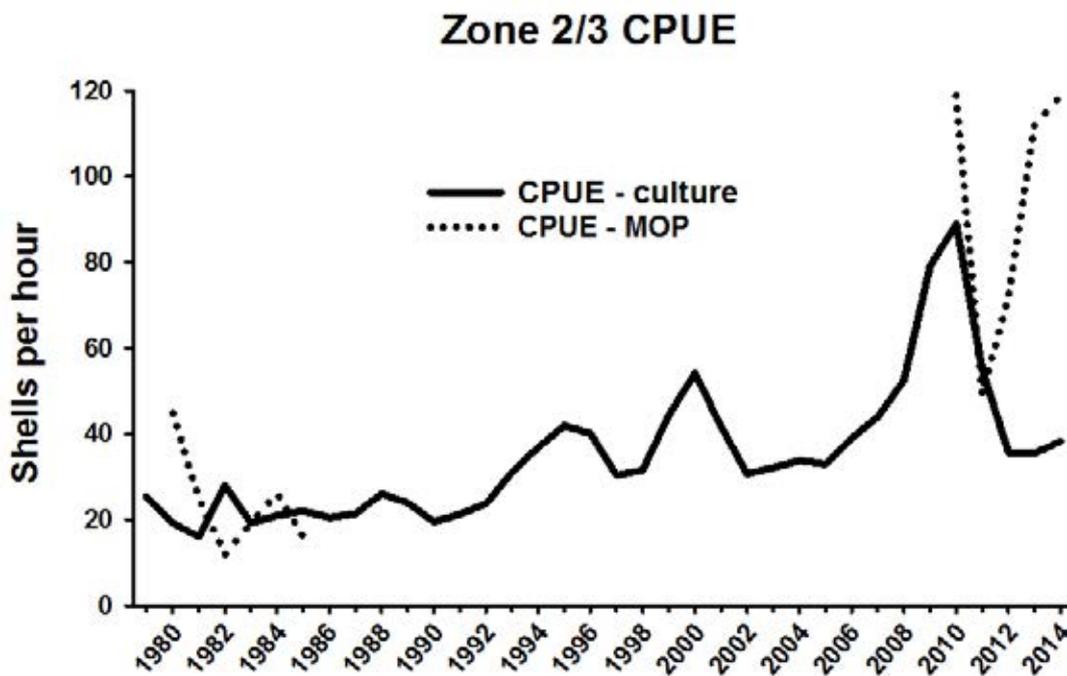


Figure 12: Pearl Shell Catch per Unit Effort (CPUE) in Zone 2/3

Under average growth and mortality and recent levels of TAC, recruitment into the pearl oyster breeding stock exceeds natural mortality, and hence breeding stocks are likely to be increasing in most years. This results from the ‘gauntlet’ fishing strategy employed by the industry, in which the young, fast-growing shell (principally males) of 120 – 165 mm shell length are targeted for their fast pearl-producing qualities. Despite the fishery trialling a minimum size of 100 mm for 3 years, the basis for quota setting remains the abundance within the 120-165 mm size class.

Animals that survived this ‘gauntlet’ were effectively protected from the age of 6 to 7 years onward, and could have lived for another 15 to 20 years. With very low natural mortalities, this results in a large broodstock being built-up over time. The fishery is trialling the capture of a conservative level of MOP shell which should not make a significant impact on the breeding stock. In Zone 1, breeding stock should also be increasing due to the low effort since 2002, including a period of no fishing.

The Department has no record of the size of the Customary catch of pearl oysters, but believes it to be very small.

13. Allowable Harvest Level

The IFM policy requires the Director General to declare an Allowable Harvest Level (additionally referred to as the TAC) for each resource that is under formal IFM arrangements.

Based on stock assessment information the statutory Allowable Harvest Level for each zone of the Pearl Oyster Fishery in 2013 was:

- Zone 1 54,970 (478 pearl oysters per quota unit)
- Zone 2/3 622 891 total shell (1363 pearl oysters per quota unit)
 - *548,400 pearl oyster 'culture' shells (1200 pearl oysters per quota unit)
 - ~*75,000 allocated on a *pro-rata* basis to Zone 2/3 wildstock licence holders (163 MOP-sized only pearl oysters per quota unit)
- Zone 4 Development zone (not allocated).

The Allowable Harvest Level for each zone of the Pearl Oyster Fishery in 2014 was:

- Zone 1 54,970 (478 pearl oysters per quota unit)
- Zone 2/3 652 596 total shell (1428 pearl oysters per quota unit)
 - *502,700 pearl oyster 'culture' shells (1100 pearl oysters per quota unit)
 - *149,896 MOP-sized only shells (328 pearl oysters per quota unit)
- Zone 4 Development zone (not allocated).

The Allowable Harvest Level for each zone of the Pearl Oyster Fishery in 2015 was:

- Zone 1 54,970 (478 pearl oysters per quota unit)
- Zone 2/3 612 380 total shell (1340 pearl oysters per quota unit)
 - *502,700 pearl oyster 'culture' shells (1100 pearl oysters per quota unit)
 - *109, 680 MOP-sized only shells (240 pearl oysters per quota unit)
- Zone 4 Development zone (not allocated).

The Allowable Harvest Level for each zone of the Pearl Oyster Fishery in 2016 is:

- Zone 1 54,970 (478 pearl oysters per quota unit)
- Zone 2/3 557,540 total shell (1340 pearl oysters per quota unit)
 - *502,700 pearl oyster 'culture' shells (1100 pearl oysters per quota unit)
 - *54,840 MOP-sized only shells (240 pearl oysters per quota unit)
- Zone 4 Development zone (not allocated).

*Voluntary industry harvest level

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Integrated Fisheries Management

Government Policy

2009

General

1. The Government is committed to the implementation of an integrated management system for the sustainable management of Western Australia's fisheries.
2. The integrated management system will be open and transparent, accessible, inclusive and flexible.

Information requirements

3. The development and funding of an appropriate research and monitoring program encompassing all sectors is essential to provide the necessary information for sustainability and allocation issues to be addressed under an integrated policy. This policy will continue to be progressively developed and phased-in over a number of years.
4. The Department of Fisheries will, in consultation with sectors, investigate options for standardising catch information between sectors, noting that the scale for data collection and reporting must be appropriate for each particular fishery.

Guiding principles for management

5. The following principles will be adopted (by incorporating them into either legislation, Ministerial Policy Guidelines or Government policy as appropriate) as the basis for integrated fisheries management policy.
 - i) Fish resources are a common property resource managed by the Government for the benefit of present and future generations.
 - ii) Sustainability is paramount and ecological impacts must be considered in the determination of appropriate harvest levels.
 - iii) Decisions must be made on best available information and where this information is uncertain, unreliable, inadequate or not available, a precautionary approach adopted to manage risk to fish stocks, marine communities and the environment. The absence of, or any uncertainty in, information should not be used as a reason for delaying or failing to make a decision.
 - iv) A harvest level, that as far as possible includes the total mortality consequent upon the fishing activity of each sector, should be set for

each fishery¹¹ and the allocation designated for use by the commercial sector, the recreational sector, the customary sector, and the aquaculture sector, should be made explicit.

- v) The total harvest across all sectors should not exceed the allowable harvest level. If this occurs, steps consistent with the impacts of each sector should be taken to reduce the take to a level that does not compromise future sustainability.
- vi) Appropriate management structures and processes should be introduced to manage each sector within their prescribed allocation. These should incorporate pre-determined actions that are invoked if that group's catch increases above its allocation.
- vii) Allocation decisions should aim to achieve the optimal benefit to the Western Australian community from the use of fish stocks and take account of economic, social, cultural and environmental factors. Realistically, this will take time to achieve and the implementation of these objectives is likely to be incremental over time.
- viii) It should remain open to government policy to determine the priority use of fish resources where there is a clear case to do so.
- ix) Management arrangements must provide sectors with the opportunity to access their allocation. There should be a limited capacity for transferring allocations unutilised by a sector for that sector's use in future years, provided the outcome does not affect resource sustainability.

More specific principles to provide further guidance around allocation decisions may also be established for individual fisheries.

Harvest levels

6. A sustainability report will be prepared for each fishery to be considered under the IFM Policy in accordance with the 'Policy for the implementation of ecologically sustainable development for fisheries and aquaculture in Western Australia'.
7. The Chief Executive Officer, Department of Fisheries, will approve a sustainability report for each fishery, which provides advice on appropriate harvest level(s), taking into account sustainability and other objectives, such as stock rebuilding, maximising economic yields and amenity values.

¹¹ Fishery is defined under the *Fish Resources Management Act, 1994* (the Act) as one or more stocks or parts of stocks of fish that can be treated as a unit for the purposes of conservation or management; and a class of fishing activities in respect of those stocks or parts of stocks of fish.

Effective management of each sector

8. The Government is committed to introducing more effective management across all fisheries. The implementation of more effective sectoral management in which the catch of a sector can be contained is an essential first step in the introduction of a new integrated management system within which allocation issues may be addressed. In the interim, each sector will continue to be managed responsibly within current catch ranges and should the catch of a sector alter disproportionately to that of other sectors, the Minister will take appropriate management action to address this.
9. It is important to formalise existing shares not only as a basis for future allocation discussions, but as a basis for insuring the safe harvest level. These will be formalised on the basis of proportional catch shares using the best information available at the time the Integrated Fisheries Allocation Advisory Committee starts its process (see below).

Allocation processes

10. An Integrated Fisheries Allocation Advisory Committee has been established under s42 of the *Fish Resources Management Act 1994* (the Act) to investigate resource allocation issues and make recommendations on optimal resource use to the Minister for Fisheries including:
 - i) allocations between sectors, now and into the future;
 - ii) strategies to overcome allocation and access issues arising from temporal and spatial competition at a local/regional level;
 - iii) allocation issues within a sector as referred by the Minister for Fisheries;
 - iv) more specific principles to provide further guidance around allocation and reallocation decisions for individual fisheries; and
 - v) other matters concerning the integrated management of fisheries as referred by the Minister for Fisheries.
11. The Minister will be responsible for determining the process and timeframes for resolving allocation issues in each fishery based on advice from the CEO of the Department of Fisheries and the Integrated Fisheries Allocation Advisory Committee.
12. The Minister will provide a statement of decision on announcement of his determination in an allocation matter.

The Minister may make public the Committee's report at the same time his statement of decision is released.

Compensation

13. Where a reallocation of resources from one sector to another results in demonstrable financial loss to a licensed commercial fisherman or licensed aquaculture operator, in principle there should be consideration of compensation.
14. Cases for compensation should be assessed on their merits.
15. Priority will be given to investigating the potential development of market based systems to achieve reallocations, along with due consideration of social equity considerations, as soon as practical. Clearly, consideration of any market-based system will be based on its merit.
16. No compensation should be payable where adjustments are made for sustainability reasons.

Funding

17. The Government will consider seeking contributions from all sectors over time corresponding to the cost of managing the resource and providing access for each sector.

PEARLING BILL

Second Reading

MR GORDON HILL (Helena - Minister for Fisheries) [10.20 am]: I move -

That the Bill be now read a second time.

Pearling in Western Australia has been managed under the Western Australian Pearling Act 1912 and the Commonwealth Continental Shelf (Living Natural Resources) Act 1968. However, pearling as an industry goes back far beyond 1912, having started in the Shark Bay area more than 140 years. It is one of the more romantic tales in the history of the State and a certain mystique surrounds the taking of pearls and its associated industries. It is indeed a fascinating industry. However, the reality of the industry throughout its history in many ways belies its romantic image. Conditions in the industry and on pearling luggers were in the past largely primitive and harsh. Divers and crew were faced with appalling environmental problems such as cyclones and the affliction of the bends, and with economic problems such as fluctuating product prices and the introduction of cultured pearls internationally after the second World War. Throughout all of this, pearling has grown to be an industry worth an estimated \$60 million to Western Australia.

This unique industry is covered by laws now regarded by many people, including the

industry itself, as out of touch. This Bill represents the biggest rewrite of the Act since its introduction, and reflects the importance of an industry with a fascinating past and an economic future which is important to all of us.

The introduction of the fisheries segment of the Offshore Constitutional Settlement led to the necessity for a review of all managed fisheries in Western Australia including pearling. Negotiations with the Commonwealth resulted in agreement being reached that the pearling industry be managed under an OCS arrangement using the authority of Western Australian law. To accomplish this effectively meant that the Pearling Act be updated. As well as updating the Act to enable the OCS arrangement to proceed, it had been recognised for some time that the Act was inadequate in that it related more to the taking of pearl shell for use as mother-of-pearl and not the culture of pearls. A detailed examination and review of the Act was therefore undertaken and that review clearly confirmed that the Act was no longer relevant to the pearling industry as it operated today. The present Act regulates the planting, cultivation and propagation of pearl oyster shell and, by way of licence, the right to gather, collect and remove pearl shell and pearls within or from specific areas of the territorial waters of Western Australia. The Act is silent in relation to the cultivation of pearls which is now the major activity of the industry. The taking of shell for mother-of-pearl is only allowed in exceptional circumstances.

Since enactment of the principal Act in 1912 there have been 12 amending Acts. Perhaps the most significant of these was the 1949 amendment Act which removed the prohibition on the dealing in cultured pearls in Western Australia; that prohibition having been included in the Act in 1922.

As already stated, there are many provisions in the Act which are no longer relevant. These include such matters as the requirement for superintendents and inspectors to sign persons engaged in the industry on and off and the prohibition on female pearl fishers. Quite clearly this latter provision offends the Commonwealth Sex Discrimination Act, the Western Australian Equal Opportunity Act, the Government and the community generally. I might add that this provision has not been enforced by the Fisheries Department for some years, but the provision needs to be removed. The matter of what licences are required was also addressed. These covered such occupations connected with pearling as pearl cleaners, shell buyers, pearl dealers and beachcombers. Clearly with the changes that have occurred, these licences are no longer needed. I will deal with the matter of licensing in more detail at a later stage.

In 1987 the Government in conjunction with the Commonwealth established the Pearling Industry Review Committee to review and assess the structure and operations of the pearl culture industry. The review committee was requested "to review, and report upon its recommendation with respect to the future development and management of the pearl culture industry along the coast of Western Australia (other than in the Shark Bay region) in accordance with the following terms of reference -

1. To investigate and advise on the best means of preservation and enhancement of naturally occurring sources of pearl oysters and the management of access thereto by the pearl culture industry, so as to ensure the future stability and satisfactory operation of that industry, and in particular to advise on -
 - (a) the options in both the short term and long term, in respect of the assessment and determination of applications by proposed new entrants to the pearl culture industry, following the expiry of the then current restrictions at the end of 1987;
 - (b) the most appropriate ongoing system of determining and allocating quotas for pearl oyster collection in the pearl culture industry;
 - (c) the use of "holding areas" in the operations of the pearl culture industry and the most appropriate manner of future regulation of the practice.
2. To advise on any improvements which may be appropriate in the provision of pearl farm lease areas and in the nature of those leases.
3. Taking account of 1 above, to comment on the current development and provision within the pearling industry of hatchery-produced pearl oysters, and

advise on the appropriate future role of such production and recommend measures which might be taken in that regard by the industry or Government.

4. To comment on such other matters incidental to or arising out of the foregoing which are considered to warrant special attention in achieving the objectives of this review."

While the terms of reference for the committee as outlined above did not include a review of the Pearling Act, some of the recommendations from the report have formed the basis for provisions in the new Pearling Act, and of course will be useful in formulating the requirements of subsidiary legislation for the future management of the industry.

I turn now to the major features contained in the new Act. It is not my intention to go through every section but rather to deal with it under broad headings.

Pearling and hatchery activities.

Pearling is defined as meaning -

- (a) taking pearl oysters;
- (b) removing pearls from pearl oysters;
- (c) moving, dumping, holding, storing or transporting pearl oysters;
- (d) practising pearl culture techniques; ie any technique or practice used to produce pearls from pearl oysters.

Hatchery activities are defined as meaning -

- (a) taking pearl oyster spat;
- (b) taking pearl oysters for breeding stock;
- (c) producing stocks of pearl oysters by acclimatisation, propagation, hatching, breeding, rearing or raising;
- (d) moving, dumping, holding, storing or transporting pearl oysters or pearl oyster spat for any of the purposes outlined above.

The culture of pearls and the hatchery production of pearl oysters are important aspects of the present day pearling industry. The hatchery production of pearl oysters, although still in the developmental stage, is probably the most significant factor which could impact on the pearling industry in the future. Uncontrolled production of pearl oysters could well lead to overproduction of pearls which would have serious consequences for the marketing of pearls.

Separate licences will be required to carry out pearling and hatchery activities; that is, a licence to carry out pearling does not give the right to carry out hatchery activities and vice versa. Provision has been made for the issue of permits for the purpose of research or investigation or for other purposes which may be prescribed.

The major tool to be used in the management of the industry will be the imposition of quotas to limit the number of wild stock oysters which may be taken, and also to limit the production and sale of oysters from hatchery produced stock.

Other licences required are -

- (a) pearl boat - all boats, other than those used exclusively on a pearl farm, must be licensed;
- (b) pearl boat master - which can only be held by an individual. This type of licence must be held by any person in charge of a licensed pearling boat;
- (c) pearl divers - all divers engaged in the pearling industry will be required to hold a licence. This applies whether taking shell from the wild, diving on dumps, holding areas or the pearl farm. As with the pearl boat master, only an individual may hold a diver's licence.

While on the subject of diving within the pearling industry, I point out that all divers will be required to undertake a medical examination which complies with Australian Standard 2299. The pearling industry itself recognises that it has obligations under occupational health, safety and welfare legislation and to this end has embarked on a project of developing dive profiles specifically for the industry.

Training and education of divers is also another aspect which is receiving attention by industry. The Pearl Producers Association has appointed a diving safety officer. Apart from the requirement to undergo the medical examination mentioned previously, the Pearling Act will not, quite properly, cover matters related to occupational health, safety and welfare. All licences and permits may be subject to conditions and will generally be granted for a 12 month period. As with all licences, fees are payable. The annual fee for pearling and hatchery licences and permit fees will be paid to the fisheries research and development fund to be used for research and in meeting a proportion of the costs of management of the industry. All other fees will be paid to Consolidated Revenue.

Farm leases, that is, the area of waters where the major portion of the pearl growout occurs, will be issued only to the holders of a pearling or hatchery licence. These leases may be issued for a period not exceeding 21 years. The existing Act provides for a maximum period of 14 years. It should be noted that the issue of a farm lease is not as of right and may be cancelled if it is not being used. This is to avoid areas of water being "tied up" unnecessarily. The maximum area of any one lease is four square nautical miles which is the same as the existing Act.

Guidelines and discretionary powers.

Provision has been made for the issue of policy guidelines by the Minister. These guidelines will be issued for the assistance of the executive director and the information of those engaged in the industry. They will cover those matters considered by the Minister to be of significance in the management of the pearling industry. The use of guidelines in the pearling industry follows the same principle as that used for the processing sector of the fishing industry. The Act does not "spell out" the detail to be included but will cover policy matters related to the grant, renewal and transfer of pearling and hatchery licences.

Foreign ownership in the pearling industry is an issue and this subject will be addressed in the guidelines in much the same way as I addressed this issue for the fishing processing sector last year when I released a set of guidelines which I tabled in this Parliament. I hasten to add that it will not affect current licence holders whilst they hold those licences. The issue of guidelines does not detract from the discretionary powers of the executive director or Minister included in the Act. Concerns are sometimes expressed from various quarters about the granting of discretionary powers. However, these powers cannot be used capriciously and I take this opportunity to quote from a 1989 Western Australian Supreme Court decision where the presiding judge stated -

It should be clearly understood that the use of discretionary powers would have to be exercised for the purposes for which they were granted and in conformity with the policy discernible from perusal of the Act and in accordance with the provisions of natural justice.

The general administrative functions of the Act will be the province of the executive director with the right of appeal to the Minister. Matters for which a right of appeal from orders or decisions of the executive director are the -

- (a) issue of a farm lease, pearling or hatchery licence or permit either unconditionally or subject to conditions;
- (b) sale of hatchery produced pearl oysters;
- (c) removal of pearl oysters from holding areas or dumps to the pearl farm by a specified date;
- (d) exclusion of persons from a pearl oyster farm;
- (e) imposition of conditions on licences;
- (f) refusal to issue or renew a farm lease, pearling or hatchery licence or permit;
- (g) cancellation or suspension of a licence or permit;
- (h) cancellation of a farm lease where it is considered the lease is not being used in the better interests of the pearling industry;
- (i) refusal to transfer a farm lease, pearling or hatchery licence;
- (j) transfer of part or all of the quota of pearl oysters;

- (k) transfer of part or all of the quota of pearl oysters produced under a hatchery licence that may be used or sold for breeding stock or pearl culture; and
- (l) forfeiture of seized pearl oysters or spat.

From the foregoing it can be seen that there are extensive rights of appeal. The effect of an appeal will be to put a "stay" on the decision or order of the executive director pending determination of the appeal.

Inspection.

All fisheries inspectors will automatically be inspectors under the Pearling Act. Generally speaking, the powers of inspectors are the same as those under the Fisheries Act modified to relate to the pearling industry. The power of arrest granted to fisheries inspectors has been used very carefully over many years and has not been abused. Therefore, pearling inspectors will have the power of arrest without warrant but only if an inspector has reason to believe that -

- (a) it is necessary to prevent the offence from continuing;
- (b) any other procedure for dealing with the offence would not be effective.

In all other cases a warrant will be required. It is considered that the foregoing is a reasonable power to enable inspectors to carry out their duties.

Pearling Industry Advisory Committee.

A pearling industry advisory committee will be appointed under the Act to advise the Minister or executive director in relation to -

- (a) management, control, production, regulation or development of pearling;
- (b) pearl oysters;
- (c) pearl oyster hatcheries;
- (d) pearl oyster fisheries.

Membership of the committee is not detailed to enable flexibility in making appointments.

Commonwealth-State Management.

As mentioned earlier, the pearling industry is to be managed under Western Australian law and an offshore constitutional settlement arrangement. The provisions contained in the Act will enable the establishment of these arrangements. They are, where necessary, a repeat of the provisions in the Fisheries Act modified to refer to the pearl oyster fishery. Any arrangement entered into will cover the taking of pearl oysters from wild stocks, but will not cover hatcheries and farm leases.

Penalties.

The matter of penalties is generally a contentious issue. The proposed penalties contained in the Bill are acknowledged as being heavy. However, it must be remembered that because of the difficult nature of detecting offences, the penalties must be such that they act as a deterrent. Detection of offences is more difficult in the pearling industry as the major portion of activities occurs under water.

I will now outline the major offences and penalties -

- (1) Unlicensed pearling or hatchery activities \$50 000 plus twice the wholesale value of the pearl oysters or pearl oyster spat, the subject of the offence. This additional penalty is irreducible.
- (2) Contravention of a condition on a pearling or hatchery licence other than conditions relating to quota or the area of waters where pearling or hatchery activities may be carried out - \$10 000.
- (3) Contravention of a condition relating to quota -
 - (a) Where there are less than 100 pearl oysters involved in the offence -
 - (i) First offence \$10 000.
 - (ii) Second offence (in 10 years) \$40 000 plus reduction in quota for two years rounded up to the nearest 1 000.

- (iii) Third offence (in 10 years) \$100 000 plus permanent reduction in quota rounded up to the nearest 1 000.
- (b) Where there are more than 100 pearl oysters involved in the offence -
 - (i) First offence \$40 000 plus reduction in quota for two years if the excess number is less than 1 000 or a period of three years if the excess number exceeds 1 000 and in both cases rounded up to the nearest 1 000.
 - (ii) Second offence (in 10 years) \$100 000 plus permanent reduction in quota rounded up to the nearest 1 000.

Reduction of quota applies where an offence is committed with the knowledge of the holder of the licence. The onus of proving that an offence was committed without such knowledge rests with the licence holder.

- (4) Contravention of a regulation relating to -
 - (a) identification of pearl oysters;
 - (b) identification or use of containers for holding pearl oysters; and
 - (c) taking, transportation, collection, holding, dumping or storing pearl oysters.

Pearl oysters the subject of these offences will be deemed to have been taken in excess of quota, contrary to a condition of licence.

The monetary penalties are the same as those applicable for offences involving contravention of conditions relating to quota which I have already covered.

- (5) Contravention of a condition relating to areas of water where pearling or hatchery activities may be carried out, \$50 000 plus further penalty of twice the wholesale value of the pearl oysters or spat, the subject of the offence. This additional penalty is irreducible.

If a licensee is convicted three times in 10 years of offences contrary to licence conditions, the licence against which all or the majority of those offences was committed is automatically cancelled.

- (6) Sale of hatchery produced pearl oysters without the written approval of the executive director, \$10 000 plus an irreducible additional penalty being twice the wholesale value of those hatchery produced pearl oysters.
- (7) Obstructing, assaulting, etc an inspector, \$20 000.
- (8) Other offences such as not holding a diver's licence range from \$1 000 to \$10 000.

The pearling industry is in general agreement with the penalties except the "rounding up" provisions in relation to quota management and the automatic cancellation of a licence if three offences are committed in 10 years. Quota management is to be on the basis of units of 1 000 pearl oysters, for offences relating to taking excess quota, any reduction is to be rounded up to the nearest 1 000. The pearling industry has submitted that any round up should be to 100. I do not agree with industry for the reason outlined. There is power to seize pearl oysters or pearl oyster spat, boats and equipment. On conviction these items are forfeited to the Crown. Because of the value which can attach to pearl oysters particularly, the executive director, with the approval of the Minister, may sell seized pearl oysters, or they may be bonded and held by the person alleged to have committed the offence, on payment to the executive director of an amount not exceeding the wholesale value of the pearl oysters.

One further point I wish to make in relation to convictions for offences by a body corporate is that any director, manager, secretary, or any other officer of the body corporate, or any person purporting to act in any of the foregoing positions, is also guilty of the offence if it can be proved that the offence occurred with the consent of, or is attributable to any neglect by, such a person. This places responsibility to see that the "rules" relating to management of the industry are properly observed.

Clearly the existing Pearling Act is unsatisfactory and the Bill, apart from my earlier reference to penalties, has the support of the pearling industry. I reiterate that the pearling industry is a very valuable industry to the State and is the second most valuable fishery in Western Australia.

I commend the Bill to the House.

Debate adjourned, on motion by Mr Blaikie.



POLICY STATEMENTS

1. Sustainability and biodiversity objectives are paramount in the operation of this policy.
2. Customary fishing applies, within a sustainable fisheries management framework, to persons:
 - of Aboriginal descent;
 - fishing in accordance with the traditional law and custom of the area being fished; and
 - fishing for the purpose of satisfying personal, domestic, ceremonial, educational or non-commercial communal needs.
3. Customary fishing encompasses the elements of barter or exchange of fish as long as it occurs within or between Aboriginal communities, is for other food or for non-edible items other than money, and if the exchange is of a limited and non-commercial nature, consistent with the traditional practice of those communities.
4. Customary fishing is not limited to “traditional” fishing gear, species or methods, but any fishing gear or methods of fishing that are destructive or threaten sustainability (whether traditional or contemporary) and the take of threatened species must be accountable within a sustainable fisheries management framework.
5. Customary fishing is to be articulated and clearly separated from other forms of fishing in fisheries legislation and policy to allow for the development of appropriate management arrangements that reflect customary fishing access rights, practices and sustainability requirements.
6. Educational information promoting and raising awareness in the broader community about customary fishing access rights, responsibilities, rules and practices must accompany changes to the management of customary fishing.
7. Pearling legislation pertaining to *Pinctada maxima* to include capacity for the Minister for Fisheries to allow for the use of that pearl oyster species for customary fishing purposes.

21 December 2009

