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**Exploiting Green and Hawksbill Turtles in
Western Australia. A Case Study of the Commercial
Marine Turtle Fishery, 1869 – 1973:
A HMAP Asia Project Paper**

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ABSTRACT

Anecdotal evidence of the abundance of marine turtles in Western Australian waters was documented by European explorers from the early 1800s. Many attempts were made to exploit both the green and hawksbill turtle commercially from the mid-1800s. The first commercial export of hawksbill tortoiseshell appeared in the Western Australian trade tables in 1869 and the green turtle fishing industry operated intermittently between 1870 and 1961, prior to the industry becoming successfully established in the 1960s. Archival and oral history evidence reveal that up to 55,125 and 69,000 green turtles (respectively) were potentially harvested from Western Australian waters prior to the industry being closed down in 1973. Upper estimates indicate that between 15,000 and 32,000 hawksbill turtles were harvested from northern Western Australia over the course of 84 years. It is argued that the exploitation of green turtles led to an observable decline in the numbers of these animals and it is likely that the fishing effort for the tortoise shell industry had an adverse impact on hawksbill turtle populations in the State's north. In a global context, the exploitation of the green and hawksbill turtles occurred at a time when there was an extensive international harvest of marine turtles. The relatively small-scale harvest that took place in Western Australia is likely to be a contributing factor to the green and hawksbill populations of Western Australia being some of the largest populations remaining in the world. This research provides a detailed historical account of the commercial exploitation of marine turtles in Western Australia and includes empirical evidence that indicates the total number of animals harvested from turtle populations throughout the State.

INTRODUCTION

Historical accounts of commercial fisheries are becoming widely recognised as a necessary component of modern-day ecosystem analysis (Bolster, 2006; Jackson *et al.*, 2001). Retrospective data, both quantitative and qualitative, can play a vital role in conservation efforts for exploited marine species. Historical information can help estimate historical abundances and geographical ranges of exploited species, clarify the underlying causes and rates of ecological change, improve understanding of long-term ecosystem change, determine achievable goals for restoration and management of ecosystems, and be a powerful trigger for conservation action (Bolster, 2006; Jackson *et al.*, 2001; Marsh *et al.*, 2005; McClenachan *et al.*, 2006). Moreover, it has been suggested that in the absence of historic data, current conservation assessments underestimate the magnitude of population declines and the resultant ecological consequences, and that affected populations have consequently become victims of the shifting baseline syndrome (Bjorndal and Jackson, 2003; McClenachan *et al.*, 2006).

Marine turtles, like many large marine invertebrates, have been commercially exploited for centuries. In many parts of the world, once abundant marine turtle populations have been decimated by the intensity of historical harvests (Bjorndal and Jackson, 2003; Lutcavage *et al.*, 1997).

Six of the seven extant species of marine turtles occur in Western Australia: green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*), flatback (*Natator depressus*), olive ridley (*Lepidochelys olivacea*) and leatherback (*Dermochelys coriacea*) (Limpus, 2002). All marine turtles that occur in Western Australian waters are listed as fauna that is 'rare, or is likely to become extinct' and declared to be specially protected under the Western Australian *Wildlife Conservation Act 1950* (Department of Conservation and Land Management (CALM), 2005; Department of Environment and Conservation (DEC), 2008). They are also subject to the management provisions of the *Conservation and Land Management Act 1984* within the marine conservation reserve system (though there are provisions in the legislation for harvest by people of Aboriginal descent) (DEC, 2008). All species of turtle are also protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (DEC, 2008). Marine turtles that occur in Western Australia are defined by the IUCN as critically endangered (hawksbill and leatherback), endangered (green, loggerhead and olive ridley) or data deficient (flatback) (DEC, 2008).

The purpose of this paper is to recount the historical commercial marine turtle fishery of Western Australia which, at present, has only been partially documented (Limpus, 2002; Halkyard, 2005). Similar to the work conducted by Daley *et al.* (2008) on the Queensland turtle fishery, this paper aims to provide an indication of the ecological impact of historical European practices on marine turtle populations in Western Australia based on documentary and oral history research.

Documentary evidence of the fishery was accessed primarily through the official records of the Western Australian State Records Office, chiefly the corporate files of what is today known as the Department of Fisheries (DoF). Other records were accessed through the DoF library, including annual reports produced by various Chief Inspectors of Fisheries. Export statistics were obtained from the annual editions of the *Colony of Western Australia* (1837 – 1869), the *Blue Book* (1870 – 1898) and the *Statistical Register of Western Australia* (1898 – 1968). Further documentary evidence was obtained from the journals of early explorers and other publications, including oral history transcripts. Other oral history sources included interviews with three fishermen who were engaged in the turtle fishing industry during its peak in the 1960s and early 1970s (interview transcripts in Halkyard, 2005). Interviews were conducted in 2005 using a methodology adapted from Weaver (1998).

As with Daley *et al.* (2008) and their synopsis of the Queensland marine turtle industry, a qualifying statement is needed for the reconstruction of the Western Australian branch of the fishery. An exhaustive search of the records has been conducted in an attempt to obtain as much detail as possible regarding the operation of the industry. However, the documentary evidence is incomplete and many catch returns are missing, possibly because figures for green turtles were treated as confidential (Department of Fisheries and Fauna, 3rd August 1966, 1966/0210 v1, Cons 1552). Furthermore, export and catch figures were often inconsistent and open to interpretation, a point which was noted by the Director of Fisheries in 1973 with respect to the catch returns:

Even these figures are open to some question as the specification of the export has changed from time to time so that one is not sure that the figures are comparable. (Department of Fisheries and Fauna, 17th May 1973, 1950/0248 v1, Cons 1598, fol. 210).

Additionally turtle research and monitoring has only been undertaken in Western Australia since the early 1980s (DEC, 2008), meaning the marine turtle fishery operated with no scientific baseline data on marine turtle populations. As a consequence of these factors, the extent of depletion of marine turtles cannot be estimated with confident precision and

estimates of the former population sizes based on historical evidence has not been attempted in this paper.

COMMERCIAL MARINE TURTLE FISHERY IN WESTERN AUSTRALIA 1869 – 1973

European exploitation of at least two marine turtle species has occurred in Western Australian waters since the earliest European exploration. William Dampier regularly recorded and harvested marine turtles during his visits to Western Australia in 1688 and 1689 (Limpus, 2002) as did Philip Parker King during his surveys of the WA coast from 1818 to 1822 (King, 1827). John Lort Stokes and his crew aboard the *Beagle* caught green and hawksbill turtles for personal consumption and for delivery to the Swan River Settlement during their surveys of the north-west coast from 1837-1843 (Stokes, 1846). In 1864, Captain Jarman and his passengers conducted a turtle hunt on the east coast of Barrow Island where ‘the bays were swarming with them’ (Cox, 1977).

The abundance of green and hawksbill turtles and the potential for a large-scale turtle fishing industry on the north-west coast was recognised by the late 1800’s, and frequently reported on by the State government:

Turtle of the most valuable qualities, including the aldermanic green turtle, *Chelone Mydas*, and the tortoiseshell producing hawksbill, *Chelone imbricata*, abound on the Western Australian coastline on Houtman's Abrolhos, and from Sharks Bay northwards. Excepting for local consumption no attempts have hitherto been made to turn these abundant natural supplies to practical account. There can be no doubt that there are numbers of locations on the Nor'-West coast, such as the Lacepede Islands, whereat extensive and profitable stations might be established for the wholesale export of the living animals, and for the curing of preparation of those commercial products of the turtle which have hitherto been mainly obtained from the West Indies and the Island of Ascension. (Western Australian Year Book for 1896-97).

The first commercial export of hawksbill tortoise shell appeared in the WA trade tables in 1869 (Appendix A) and intent to commercially exploit green (or ‘edible’) turtles appears around the same time. The hawksbill turtle was primarily targeted for its tortoise shell, whereas the trade in green turtle products included turtle meat and extract for turtle soup (calipash and calipee), turtle oil (which was thought to have medicinal properties) and skin for leather. Its shell was considered far inferior to the hawksbill. The preparation of green turtle for the export market was described by Thomas Bellis, the London ‘Turtle King’ in 1908:

The turtle should be killed by cutting off the head; and the belly shell (calipee) then taken off carefully, and cleaned from blood and adhering red meat. The belly shell is then to be

placed in scalding hot water until the calipee peels off. Care must be taken not to over-scald or the white bloom will disappear from the outside, which greatly depreciates the value. The freed calipee (in as large pieces as are convenient) should then be dried in the sun, on wire frames. It will dry quite hard, and must be kept from dust and dirt, and packed in plain wooden boxes or barrels. On the back shell is the dark green or black-meat-calipash – near the edge of the shell – this can be scalded off and dried in the same way. The younger fins can also be boned and dried – but are of inferior quality. The red meat of the turtle is not wanted – and is of no value in London, but a market could probably be found for the meat extract prepared from this red meat. (Department of Aborigines and Fisheries (DAF), 9th Jul 1909, 1911/1008, Cons 652, fol. 33).

Applications to the government for exclusive turtle fishing rights over particular areas began to appear in the 1870s and several attempts were made to commercialise these animals without any marked degree of success. Applications to lease islands for the purposes of turtle fishing appear in the records from 1871 and included islands such as Barrow, Delambre and the Montebello group, though it's not clear to what extent turtle fishing was carried out (Cox, 1977; Crown Lands and Surveys Department, 22nd Aug 1881, A0353, Cons 541). It's possible that these were the first applications received by the Government for lease of an island other than for pastoral purposes (Cox, 1977).

Prior to 1911, exclusive licences to take turtles could not be granted under Section 30 of the *Fisheries Act 1905* (DAF, 12th Oct 1918, 1919/0025 v1, Cons 477). In recognition of the need for security of tenure to encourage investment in the turtle fishing industry, the Chief Inspector of Fisheries attempted to bring about a change in the *Fisheries Act 1905* to allow the granting of exclusive licences for taking of turtles. A bill to amend the Act went before Parliament in 1909 but was unsuccessful (Gale, 1910). In 1911 the Act was amended by Parliament, which permitted the granting of exclusive licences for take of green turtles only (DAF, 12th Oct 1918, 1919/0025v1, Cons 477). The Fisheries Department instigated a further amendment in 1921 (*Fisheries Act Amendment Act 1921*) which allowed the granting of exclusive licences to take hawksbill turtles (Fisheries Department, 8th Apr 1922, 1920/0016, Cons 477, fol. 20)

In 1900 a factory was established at Beagle Bay for processing turtles caught at the Lacepede Islands, otherwise known as 'Home of the Green Turtle'. The factory closed down one year later due to 'bad management' (Fisheries Department, 1901/0888, Cons 477, 19th Oct 1901; Gale, 1901). In 1901, a factory was also established at Cossack (Duckett, 1990) and in 1903 a small soup factory was erected at Point Peron, Rockingham, where the turtles

from Onslow were received (Gale, 1904). There is no further evidence in these records as to how many turtles were processed at these factories, however the *Statistical Register of Western Australia* confirms export of turtle soup and dried turtle to a value of £237 in 1901 and £65 in 1902.

The Chief Inspector of Fisheries was keen to see this branch of the fishery successfully commercialised and in 1909 the Fisheries Department took steps to introduce calipash and calipee to hotels and clubs in Perth and other populated areas. A small consignment was also sent to London to be valued. The calipash was valued at 1/6 per lb and the calipee, if removed from the bone before drying, was valued between 1/- to 1/3 per lb and as high as 1/6 per lb (DAF, 30th Sept 1909, 1911/1008, Cons 652, fol. 46).

There were a few notable instances where the attempts to establish an industry were fruitful, albeit short-lived. At various times between 1910 and 1934, H. Barron Rodway held exclusive licences to take green turtle between North West Cape and Cape Lambert including waters and foreshores of numerous adjacent islands (though excluding Barrow Island and the Montebello Islands) (DAF, 1919/0025 v1, Cons 477, 1913-1921; Fisheries Department, 1919/0025 v2, Cons 477, 1921-1937). The licence operated under the business name of *Chelonia Co. Ltd* and it would appear that William Benstead was employed to manage the operations (Fisheries Department, 12th Jan 1924, 1919/0025 v2, Cons 477, fol. 29). Due to the First World War, the company experienced significant difficulty in securing finance and commencing operations until 1922, when the building of a turtle soup factory commenced at Point Peron (whether this was the same factory as the one established in 1903 is uncertain) (Fisheries Department, 3rd July 1922, 1919/0025 v2, Cons 477, fol. 265). This represented the most committed attempt to develop an export industry for the green turtle up to this point in time.

Turtle fishing vessels operated out of Cossack and the turtles were shipped live to the Rockingham facility. This method of transportation met with extremely limited success. The first shipment of turtles died because they weren't regularly hosed down with seawater and while the second shipment fared better, many turtles were still lost (Durant, 2004). More animals perished in the company's attempts to pen the turtles in water considerably cooler than northern waters (Durant, 2004). In 1923, it is believed that a consignment of green turtles (potentially no larger than 50 lb each) escaped through openings in the factory's holding pens (Taggart, 1984; Durant, 2004). It would appear that around this time the company ceased its operations at Rockingham and did not recommence elsewhere. The company went into liquidation in 1934 after experiencing difficulty in raising fresh capital.

At least 169 turtles were harvested during the company's operations (Fisheries Department, 12th Jan 1924, 1919/0025 v2, Cons 477, fol. 29).

Meanwhile, Benstead relocated to Cossack and in 1924, he secured an exclusive licence for the foreshores and coastal waters of Depuch, Forrestiere and Turtle islands (Fisheries Department, 22nd Oct 1924, 1924/0015, Cons 477, fol. 18). In collaboration with the *Roebourne Produce Company*, a long-term lease of the abandoned Customs house at Cossack was secured for the creation of a turtle soup factory (Fisheries Department, 6th Feb 1925, 1924/0015, Cons 477). Due to the Great Depression, the company experienced problems finding a market for its turtle soup, with unfavorable reports that the soup was diluted and mixed with beef (Durant, 2004). The company went into liquidation in 1931 after harvesting at least 834 turtles from the waters around Cossack and Onslow and exporting 408 cases (19,464 lb) of finished turtle soup. The *Roebourne Produce Company* also produced detailed notes on the preparation of turtle soup, the recipe of which stipulated that 900 lb of turtle (live weight) combined with 20 lb of beef would produce 560 lb of turtle soup (Carse, 1925).

In 1922, the *Broome Turtle Preserving Company* preserved at least 50 turtles in various forms both for the export trade (London markets) and local consumption (Fisheries Department, 15th May 1922, 1922/0058, Cons 477, fol. 1). The company held an exclusive licence for the waters surrounding the Lacepede Islands and adjoining islands up to and including Callience Reef and Adele Island (Fisheries Department, 30th May 1923, 1922/0058, Cons 477, fol. 48). The licence was transferred to *Lacepede Products Limited* in 1924, however the company forfeited its licence in 1928 following difficulties in securing capital for ongoing operations (Fisheries Department, 18th Jan 1928, 1922/0058, Cons 477).

Between August and December 1933, the *Montebello Sea Products Ltd* (licence transferred to *Australian Canning Company* in 1934) processed at least 334 turtles caught at the Montebello Islands to produce 12,840 lb of extract for turtle soup at the Cossack factory (Fisheries Department, 9th Sept 1953, 1921/0170, Cons 477; Fisheries Department, 9th Aug 1934, 1934/0012, Cons. 477, fol. 70). The company attempted to expand its capacity for operations with the installation of new factory equipment, however the £856 received for its first export shipment left the company in financial difficulty (Fisheries Department, 9th Sept 1953, 1921/0170, Cons 477). Production ceased in 1934 while the new equipment was installed. Production then recommenced, but ceased permanently in 1935 when the company went bankrupt (Fisheries Department, 9th Sept 1953, 1921/0170, Cons 477). During its peak operating phase, the factory was capable of treating 40 turtles per week, with an adjacent pen

capable of holding 50-60 turtles (Fisheries Department, 3rd Oct 1933, 1934/0012, Cons 477, fol. 42).

In 1939 *Westella Canning Company* obtained an exclusive licence to take turtles from the coastal waters surrounding the Montebello Islands (Fisheries Department, 22nd Sept 1939, 1939/0094, Cons 477). The company processed its turtles at a factory in Belmont and for a few months, its turtle soup production was a financial success. However, due to a shortage of tin-plate and labour created during World War Two, the company cancelled its licence (Fisheries Department, 9th Sept 1953, 1921/0170, Cons 477). During its turtle soup making operations, the company received several shipments of turtles as a sideline to its other canning operations (Department of Industrial Development, 28th June 1939, 1938/0001, Cons 961, fol. 15). At 30 June 1939, these shipments were valued at £77.5.8 (Department of Industrial Development (DID), 30th June 1939, 1938/0001, Cons 961, fol. 32). Assuming values of 10/- per animal (as per the value received by *Montebello Sea Products Ltd.* in 1934), the *Westella Canning Company* received approximately 155 turtles in the space of six months.

In 1958 James Antonio Mazza and Alfred Robert Eric Russell of *North West Enterprises* conducted extensive market research in relation to green turtle products. They established that there was a market in the UK, USA and probably Europe for frozen turtles and dehydrated meats (Fisheries Department, 12th Feb 1959, 1958/0148, Cons 477, fol. 19). *North West Enterprises* did not propose to enter into soup production but instead sell turtles as frozen bodies, dehydrated meat, turtle steaks, turtle oil, turtle eggs (mature and immature), which were taken from the bodies of female turtles and were 'greatly prized', and to produce pet food, poultry meat, and blood and bone fertilizer (Fisheries Department, 12th Feb 1959, 1958/0148, Cons 477, fol. 18). They proposed to establish their works at Cossack and estimated the market value for 10 tons of dried meat or 100 tons of frozen meat (approximately 1600 turtles) to be £22.400 (Fisheries Department, 12th Feb 1959, 1958/0148, Cons 477, fol. 19). This positive conjecture contrasted with examinations by an Advisory Committee for the Minister for Industrial Development that stipulated no overseas market had been proven and that there was no definite prospect of a continuing market (Department of Industrial Development, 1959, 1959/0015, Cons 961). Industry speculation suggested that the only way to establish an economical industry was to operate from a freezer vessel and return the catch to Fremantle for treatment. After processing a sample of 25 turtles at Robbs Jetty (captured on the beach after laying and flown to the meatworks), the venture appeared

to lapse after a request for financial assistance from the State government was rejected (Fisheries Department, 19th Oct 1959, 1958/0148, Cons 477, fol. 34).

Prior to 1960, turtle fishing had been conducted on a sporadic basis but never in significant commercial quantities. By 1961, *West Coast Enterprises* was using freezer boats to harvest turtles at a level unprecedented in the history of the industry. The company reportedly processed 40 tons of turtle meat in its first six weeks of operation from turtles caught at the islands of the Dampier Archipelago between Onslow and Roebourne (Department of Fisheries and Fauna (DFF), Sept 1961, 1950/0248 v1, Cons 1598, fol. 36). The turtles were caught by 20 men using a fleet of six small catcher boats and processed aboard two large freezer boats (*Will Succeed* and *Collier*) prior to transportation to Robb's Jetty aboard State ships (DFF, Sept 1961, 1950/0248 v1, Cons 1598, fol. 36). Turtles up to 500 lb were caught as they returned to the water following nesting, harpooned at sea or trapped in throw nets (DFF, Sept 1961, 1950/0248 v1, Cons 1598, fol. 36).

During its operation, *West Coast Enterprises* was accused of indiscriminate killing and concerns were expressed by industry personnel about the potential consequences to turtle populations. There were calls to restrict the quantities of turtles taken and ensure that any catch taken was against firm orders only (DFF, 18th Apr 1962, 1950/0248 v1, Cons 1598, fol. 43). As a result of harvesting without an export market, *West Coast Enterprises* requested financial assistance from the State government to pay an advance on its turtle products when the company was unable to find a buyer (DID, 9th March 1961, 1959/0015, Cons 961). In addition, 128,000 turtle eggs (the annual egg production of roughly 240 females) remained in storage for two years before being advertised for tender (Limpus, 2002; DFF, 18th Apr 1962, 1950/0248 v1, Cons 1598, fol. 43). At the conclusion of the tender period, if the eggs hadn't been sold, they were to be destroyed (outcome unknown) (DFF, 24th Apr 1962, 1950/0248 v1, Cons 1598, fol. 46). Warnings were issued to other operators by the Department of Fisheries not to engage in similar fishing practices, otherwise action would be taken to control their activities (DFF, 27th Oct 1961, 1950, 0248 v1, Cons 1598, fol. 40). The company went into receivership in 1963 after harvesting at least 91,483 lb of turtle (live weight) (DID, 24th Feb 1961, 1959/0015, Cons 961; DFF, 1960, 1966/493 v1, Cons 4169).

From 1963 to the conclusion of the commercial turtle trade, all commercial take of green turtles was conducted under two exclusive licences. One of these was held by *Tropical Traders* and the other was held by Strahinja (Stan) Stojanovic and was later transferred to *West Coast Traders*. The operations of *Tropical Traders*, Stan Stojanovic and *West Coast Traders* comprised the bulk of the green turtle fishery in Western Australia. Each licensee

operated a licensed freezer boat in adjoining areas from the North West Cape to the Montebello Islands. The number of exclusive licences was restricted to two due to concerns about the sustainability of the fishery (WA Department of Fish and Fauna, 1969). The processing vessels for *Tropical Traders* and *Stojanovic/West Coast Traders* operated on a quota system, which was based on competitive and limited European export market (DFF, 1969). The fishing season generally commenced mid-winter (June or July) and terminated in September or October, depending on when the quota for the available market was obtained (DFF, 1969).

Tropical Traders was issued an exclusive licence in 1963 to fish green turtles in an area from Point Maud to 75 miles northwards along the North West Cape (23°07'00' to 22°02'00'). In 1969 the area on the exclusive licence was amended to cover 50 miles of coastline (23°10'00' to 22°25'00'). *Tropical Traders* contracted the Plug family until 1969 and Andy Cassidy from 1970 to 1972 (M. Plug, personal communication, 15th Nov, 2005; Weaver, 1998). Their processing vessels were *Ngardee Mar* and *Tringa* respectively (M. Plug, 2005; Weaver, 1998). Contracts stipulated a harvest of 4,000 turtles per season and that all turtles produced had to weigh 120 pounds dressed (gutted), though a few smaller turtles were kept for ornamental purposes for friends and family (M. Plug, 2005; Weaver, 1998). In his interview with Weaver (1998), Cassidy noted that 'a few had eggs, not a terrible lot'.

Turtles were decapitated, gutted and frozen aboard the vessel in preparation for further processing at the Robb's Jetty facility (M. Plug, 2005). Turtle steaks were exported to France and Germany, the breastplate and backbone were rendered down for the gelatinous component used in the making of turtle soup, and the leather was used for watch bands and ladies' shoes and handbags (M. Plug, 2005; Weaver, 1998). *Ngardee Mar's* capacity of 350 turtles was usually filled within three and a half days, at which point the vessel would travel back to Shark Bay to unload its consignment (M. Plug, personal communication, 2005). A weekly delivery of 250 turtles was sent by Cassidy to Robbs Jetty for processing (Weaver, 1998).

Sporadic catch records specific to *Tropical Traders* reveal that at least 8,549 turtles (roughly 756 tons live weight) were harvested from the company's licensed fishing grounds (DFF, 3rd Nov 1970, 1963/0195, Cons 1759; DFF, 29th Oct 1963, 1963/0195, Cons 1759, fol. 14; DFF, 5th Dec 1961, 1950/0248 v1, Cons 1598, fol. 42; Limpus, 2002; DFF, 29th Nov 1968, 169/66, Cons 1598, fol. 29). The total actual harvest would have been considerably higher but an exact quantity cannot be quoted because explicit catch records for the company

are missing for certain years and only statewide catch statistics are available. Commercial fishermen who worked on the fishing vessels reported a harvest of approximately 3,500 to 4,000 turtles for each year of the company's exclusive licence, apart from the first two seasons in which approximately 1,000 turtles were harvested per year (M. Plug, 2005; Weaver, 1998).

Prior to obtaining an exclusive licence, *Tropical Traders* harvested at least 487 turtles (49,303 lb live weight) from the Onslow area during October and November 1961 (DFF, 5th Dec 1961, 1950/0248 v1, Cons 1598, fol. 42). Fishing practices included nightly shore excursions where however many turtles were found on the beach (typically two to three) were turned onto their backs and collected by dinghies the following day (D. Plug, 2005).

In 1964 Stan Stojanovic was issued an exclusive licence to take turtles from an area extending from the top end of Norwegian Bay (22°03'00') north along the North West Cape and continuing in a north-east direction to include North Muiron Island, South Muiron Island, Long Island (also known as Serrurier Island) and Thevenard Island (DFF, 20th July 1964, 1964/0235, Cons 1598). In 1965, this licence was surrendered and a new licence was issued to cover less coastline along the North West Cape, the Muiron Islands and Long Island, but also included the Montebello Islands (DFF, 6th Aug 1965, 1964/0235, Cons 1598). In 1967 the Muiron Islands were excluded from the exclusive licence following claims that turtle fishing would be incompatible with potential tourism ventures proposed for the islands (DFF, 26th Jan 1967, 1950/0248 v1, Cons 1598, fol. 64).

In 1969, following its purchase of Stojanovic's processing vessel *East Winds*, *West Coast Traders* obtained an exclusive licence for the same area allotted to Stojanovic with the exception of the Muiron Islands and the Montebello Islands (approximately 50 miles of coastline) (DFF, 4th Jun 1969, 1969/0239, Cons 1565, fol. 8). Each season typically went from March through to August, with vessels aiming to depart the area before the strong September southerlies (McGowan, 2005). The vessel had a capacity of 30 tons that took approximately three weeks to fill at which point the consignment would be unloaded at Learmonth jetty (McGowan, 2005).

Explicit catch returns for Stojanovic/*West Coast Traders* appear in the State records for six seasons (the remainder appearing as cumulative statewide catch records). This documentary evidence suggests that at least 16,468 green turtles were harvested from the exclusive licence area (roughly 1,342 tons - live weight). Oral history evidence suggests that approximately 3,000 turtles were harvested from the exclusive licence area on an annual basis

(McGowan, 2005). Unlike *Tropical Traders*, *West Coast Traders* processed its turtles into various export components onboard the vessel (processing involved the separation of the shell, separation of the flippers and separation of the red and green meat) (McGowan, 2005). A boiler aboard the vessel was used to boil connecting material between breast plates (McGowan, 2005).

A detailed description of the method used for fishing and processing the turtles was described in the July 1969 edition of the Monthly Staff Bulletin (WA Department of Fish and Fauna):

Each licensed freezer boat has several small 16 foot scooter catcher boats, powered by 40 H.P. outboard motors. These scooter boats operate within a one mile radius of the mother freezer boat, in the relatively shallow water inside the offshore reefs, where the turtles graze on the brown and green algae of the rocky sea bed. When a turtle is located it is harpooned from the scooter boats as it races through water from 3 to 8 feet deep. On attaining a full load of about 10 turtles, the scooter boats unload their catch onboard the freezer boat for processing. Turtles are gutted, beheaded, washed, drained and blast frozen. Each carcass weighs about 120 lbs dressed. When the freezer boat attains a full load, usually about 300 turtles taken in about 3 days fishing, it returns to port to unload its catch. From the port of landing the catch is taken by freezer trucks to Robb's Jetty, near Fremantle, for further processing and storage pending export. Most of the best quality cuts of meat come from the muscles of the fore-flippers. Very little wastage of the landed dressed turtle occurs.

During the mid to late 1960s and early 1970s, a number of additional applications for exclusive licences to take turtle were received by the Fisheries Department. These applications were refused due to Departmental concerns regarding the sustainability of the fishery:

The Department is concerned that the present rate of exploitation might cause a serious decline in turtle population numbers. It has decided not to grant any additional licenses until data is obtained to give an indication of the turtle populations and to assist in determining maximum safety fishing effort in the future. (DFF, 25th Feb 1969, 1969/0209, Cons 1553).

The Department did however note that even though an exclusive licence couldn't be granted, a person holding a current professional fisherman's licence was permitted to engage in the taking of turtle for gain or reward (pursuant to provisions under the *Fisheries Act 1905-1964*). This practice was permitted up until roughly 1970 when turtles became fully protected under both the *Fauna Conservation Act* and the *Fisheries Act* unless taken under the authority of an exclusive licence (DFF, 11th Nov 1970, 1950/0248 v1, Cons 1598, fol. 163).

From July 1968, Western Australia was the only state in the country to still allow commercial turtle fishing after legislation was introduced in Queensland to fully protect all turtle species (DFF, 28th Feb 1969, 1950/0248 v1, Cons 1598, fol. 120). In May 1973, the Minister for Fisheries and Fauna announced that the commercial harvest of turtles in Western

Australia would cease from 30 June 1973 (DFF, 30th May 1973, 1950/0248 v1, Cons 1598, fol. 222). *West Coast Traders* was given dispensation to cease its fishing operations by July 25 1973 to allow it to fulfil outstanding orders (DFF, 28th Jun 1973, 1969/0239, Cons 1565, fol. 35).

From 1871 until the closure of the Western Australian commercial turtle fishing industry, at least 61 applications for exclusive turtle fishing licences were received by the State Government. Exclusive licences were issued for at least 28 of these applications and production got underway in 10 instances. The main fishing grounds applied for were the Lacepede Islands, Montebello Islands, the islands of the Dampier Archipelago, islands of the Exmouth Gulf, North West Cape and Yampi Sound.

SUSTAINABLE MANAGEMENT AND PUBLIC PERCEPTIONS

The Fisheries Department, in its various incarnations throughout the 20th century, was the State government agency responsible for administering the commercial harvest of turtles. Concerns about the sustainability of the turtle fishing industry were acknowledged by industry regulators as early as 1901:

‘This question will no doubt receive the attention of the lessees of the Lacepede Islands, as it would be suicidal policy on their part if they did not seek to attain the continuity of the supply... I think it would be well for us to watch the operations of the lessees for the present and encourage them to protect the young turtle themselves.’ (Fisheries Department, 6th Feb 1901, 1901/0344, Cons 477, fol. 12)

In recognising the need for a sustainable fishery, the Department proposed several management strategies but it is unclear to what extent they might have been implemented and enforced. For example, in 1923, size and weight limits for green and hawksbill turtles were recommended by the Chief Inspector of Fisheries. This was in response to *Chelonia Co. Ltd.*'s consignment of small-size green turtles escaping through gaps in a turtle enclosure at Rockingham. It was estimated that the turtles were potentially less than 50 lb each. It was suggested that green turtle weights should be fixed at 120 lb and the minimum size of hawksbill turtle should be fixed at 24 inches (end to end of carapace) (Fisheries Department, 21st Apr 1924, 1923/0164, Cons 477, fol. 11). Documentary evidence indicates that these size restrictions weren't necessarily enforced when in 1959, turtles as small as 100lb were harvested by *North West Enterprises* (Fisheries Department, 2nd Feb 1959, 1958/0148, Cons 477, fol. 16). Conversely, contracts for licensees such as *Tropical Traders* specified that all turtles produced had to weigh 120 pounds dressed (Weaver, 1998).

In 1934, protection for nesting females was endorsed by the Chief Inspector of Fisheries:

While there is every reason to believe that green turtles appear in abundance in the waters of our North-West coast, it is highly desirable, in the interests of the industry, that the business of turtle fishing be carried out along sound lines. Since the female turtles come ashore during the night... and may be readily captured at this time, there is a tendency to secure supplies in this manner. It should, however, be remembered that the creatures visit the beaches for egg-laying purposes, and if numbers are taken before they have laid their eggs, the rate of destruction is increased... It is, therefore, in the interests of all concerned that laying females remain undisturbed. (Aldrich, 1934)

It was further noted in correspondence from 1973, that the take of turtles on the beaches was already 'strictly against the law', however it was acknowledged by the Director of the DFF that it was a likely occurrence from time to time:

The female turtles are very vulnerable whilst on the beach and it has been suggested that the population is, in fact, exploited at this point. I do not have documented information to support this suggestion, although in remote areas it is quite possible that human nature would prevail and the conditions of the lease broken by taking turtles from the beaches. (DFF, May 1967, 1950/0248 v1, Cons 1598)

The act of taking nesting turtles was occasionally observed by members of the public. The following citation was taken from correspondence between the Commissioner of the Shire of Exmouth and the Fisheries Department:

The caretaker at Yardie Creek homestead has informed me on various occasions of a turtle boat being anchored close to shore and the turtles being taken on the beach while nesting. I understand at the present time very few turtles indeed are sighted on the beaches of the N.W. side of the Cape having been decimated over the last few years. (DFF, 17th May 1973, 1950/0248 v1, Cons 1598, fol. 210).

The take of turtles from the beach by commercial fishermen is confirmed by documentary and oral history evidence (DFF, Sept 1961, 1950/0248v1, Cons 1598, fol. 36; D. Plug, 2005; Weaver, 1998). However due to difficulties associated with handling the dead weight of the animal, landing dinghies on the shore and tainting the product with sand following slaughter on the beach, it wasn't common practice (Weaver, 1998; Halkyard, 2005; McGowan, 2005).

In spite of legislation and management arrangements designed to protect the sustainability of the fishery, contrary behaviour and illegal activities appear frequently in the

oral and documentary history records. Thus it would appear that even though appropriate management frameworks were in place (e.g. catch returns, licensing), the industry operated in the absence of effective surveillance and enforcement.

Criticisms of the commercial turtle harvest appear frequently in the documentary evidence from the early 1960s, along with pressure on the State Government to apply catch limits, implement closures to certain areas or cease the industry entirely. The following correspondence was sent by the Managing Director of *John Lusty Limited*, one of the principal users of turtle meat for the production of turtle soup in London. In it he notes his concern regarding an article in the *The Australian Exporter* relating to the Western Australian commercial turtle fishery (in relation to the activities of *West Coast Enterprises*):

Fishing on such a scale [more than 40 tons of meat processed in the first six weeks of operations] will soon wipe out the turtles in any area or drive them from their natural breeding grounds... It takes 15 to 20 years to 'replace' a large turtle and heavy fishing proves very false economies as the West Indies, East Africans and even Seychelloise have found to their cost. Please advise your Government Department in that area to take immediate steps to restrict or limit the quantities of turtles taken each year. (DFF, 18th Sept 1961, 1950/0248 v1, Cons 1598, fol. 38).

One of the most regular correspondents was the Commissioner of the Shire of Exmouth who reported observable declines in the number of turtles at the North West Cape:

I should like to report the decreasing number of sightings of turtles on the North West Cape over the last three years. In 1964 and 1965 sightings were plentiful and turtles could be seen in fair numbers on the western shores of the Cape. Latterly the number has decreased to the extent that sightings are comparatively few. (DFF, 13th May 1968, 1950/0248 v1, Cons 1598, fol. 84)

Decreasing numbers of nesting turtles were also reported by the Honorary Warden at Carnarvon, which he attributed to the commercial turtle industry (DFF, 3rd Dec 1968, 1950/0248 v1, Cons 1598, fol. 106). Similar reports were also received from the Ashburton area:

'Green turtle: Few common around some offshore islands near Onslow. No longer plentiful at Long Island probably due to overfishing. Consider greater protection is warranted.' (DFF, 31st Dec 1969, 1950/0248 v1, Cons 1598, fol. 142)

While the State government acknowledged concerns about the fishery and that there was 'no doubt that fishing these areas [within the boundaries of the exclusive licences] will reduce the population' (DFF, 11th Nov 1970, 1950/0248 v1, Cons 1598, fol. 163), it presented

conflicting views regarding the sustainability of the industry. On one hand it maintained the belief that the Western Australian fishery was not as vulnerable to collapse as the overseas turtle fisheries:

...it appears that the species is not really threatened as there are many breeding areas which are either inaccessible or for other reasons not fished. (DFF, 8th Aug 1968, 1950/0248 v1, Cons 1598, fol. 94)

It is established that turtle fisheries are vulnerable to over-exploitation, but we have no information to suggest that this is occurring here. (DFF, 20th Aug 1970, 1950/0248 v1, Cons 1598, fol. 153).

Conversely, the Department presented the following opinions in its correspondence:

We have been concerned about aspects of the existing exploitation of turtles for some time. (DFF, 4th Nov 1968, 1950/0248v1, Cons 1598).

Oral histories refute the notion that public sentiment was one of opposition to the turtle harvesting. Commercial fishermen note that they received much positive public interest in their activities, particularly in the early 1960s, and that they never felt compelled to keep their exploits out of the public eye (D. Plug, 2005; McGowan, 2005).

Closures of turtle fishing areas were introduced in the late 1960s. In 1968, the Muiron Islands were removed from the exclusive licence of *West Coast Traders*, most likely in response to concerns raised by members of the community looking to establish tourism facilities at the islands. They argued that turtle fishing and tourism were incompatible activities. In 1969, when *West Coast Traders* sought to obtain Stan Stojanovic's exclusive licence, the Fisheries Department decided not to grant a licence in respect to any length of coastline in excess of 50 miles (DFF, Mar 18th 1969, 1969/0239, Cons 1565, fol. 2). Similarly, in 1969 the exclusive licence area for *Tropical Traders* was also amended to cover 50 miles of coastline.

At the time their licences were renewed in 1971, *Tropical Traders* and *West Coast Traders* were advised that it would be unlikely that their licences would again be renewed in 1973. Additional licence conditions were also imposed at this time to more closely control the fishing activities of the boats engaged in the fishery. (DFF, 12th Oct 1971, 1963/0195, Cons 1759, fol. 74; DFF, 7th Jul 1971, 1969/0239, Cons 1565, fol. 17).

While there was some regulation by the State Government, there was almost no scientific monitoring. Documentary evidence indicates that during the last decade of the

industry – in response to the pressure placed on the Fisheries Department to prohibit turtle fishing - the State Government attempted to ascertain details of the turtle population based on its analysis of commercial catch records (DFF, 21st Jan 1971, 1950/0248v1, Cons 1598, fol. 167). Vessels were required to complete research log books providing information to the DFF with the view to enable the Department to assess whether the fishery was in danger of being overfished (DFF, 1969).

Without information on the history of the turtle fisheries, it is possible that pressure on the Government by some members of the community may influence a decision to ban the taking of turtles, as has been done in most parts of the world. However, if data available does show that the resource is being exploited in a rational manner and that the population is not trending downwards, then requests for turtle bans can be answered. It is for these reasons that I am endeavouring to obtain information about the turtle fishery. (DFF, 26th Sept 1968, 1950/0248v1, Cons 1598, fol. 97)

For a number of years prior to the cessation of the industry it also attempted to engage Dr H.R. Bustard, considered ‘a world authority on turtles’ to undertake a detailed survey of the marine turtle populations in Western Australia and determine the sustainability of the fishery, though the records suggest that this never eventuated (DFF, 21st Jan 1971, 1950/0248v1, Cons 1598, fol. 167).

CATCH RECORDS: HAWKSBILL TURTLE FISHERY

By the mid-nineteenth century, the hawksbill turtle was recognised as a potentially valuable source of tortoise shell or bekko (Daley *et al.*, 2008). Other turtle shells were considered inferior as they did not possess the thickness and colour pattern on the scute (Mack *et al.*, 1995).

The first record of exports in tortoise shell from Western Australia appear in 1869 when 643 pounds of tortoise shell was exported to South Australia (434 lb) and the UK (200 lb). The value of the 1869 export was £482.5.0 at 15/- per lb (Colony of Western Australia, 1869).

Between 1869 and 1953, annual exports of tortoise shell appeared regularly in the Western Australian trade records and these figures are presented at Figure 1 and Appendix A. For certain years, only the value of the exported tortoise shell appears in the trade tables. In these instances, the weight has been inferred from the export value, using an average of the preceding and proceeding known values of shilling per pound weight. All export figures were cross-referenced with national and international imports into WA to ensure that all tortoise

shell exports originated from WA rather than re-exported from other countries or parts of Australia.

Figure 1 illustrates that tortoise shell production occurred on a relatively small scale until the 1920s when there was a peak in the export value of the shell with tortoise shell of a particular mottling and thickness reaching as high as 22/10/- per ton and certain mottlings of yellow belly reaching as high as 120/- per lb (Fisheries Department, 7th Nov 1921, 1921/0157, Cons 477). Immediately following this peak, values dropped to below pre-1920 levels and for the next two decades, prices fluctuated between 7/- and 19/- per lb. For the most part, production of tortoise shell remained above pre-1920 levels with exports occurring on an annual basis up until World War 2.

Export data is deficient during World War 2 when publication of international trade figures in the State's statistical register was suspended. The weight of exported tortoise shell spiked dramatically in 1948 when 281 cwt of tortoise shell was exported to the USA. Given the trends, it would appear that this figure is an error in the trade tables. However, the spike might also be a cumulative total of suspended trade figures. The highest value of tortoise shell was attained between 1950 and 1953.

From 1953 onwards, tortoise shell was no longer listed under a separate category in the export tables. Instead, there appears a line item for 'Shells, unmanufactured (other)' and it is not possible to ascertain how much of this comprises tortoise shell. It is likely that the amount was minimal given that in the 1950s synthetic materials replaced the use of tortoise shell and the market for the natural product collapsed (Daley *et al.*, 2008).

The evidence suggests that by 1953 at least 69,937 lb (31,723 kg) of tortoise shell had been exported from Western Australia. Assuming that an individual hawksbill turtle has a carapace weight between one and two kilograms (Mack, 1983), between 15,862 and 31,723 hawksbill turtles were harvested from northern Western Australia in 84 years. If the figures for 1948 are removed, the trade in tortoise shell came to at least 37,925 lb (17,238kg), equating to a harvest of between 8,619 and 17,238 hawksbill turtles.

This is comparable to the Queensland tortoise shell industry in which at least 86,020 lb of tortoise shell was exported between 1871 and 1938; a harvest which had a significant impact on hawksbill turtle populations in the north of the State (Daley *et al.*, 2008). Anecdotal reports suggest a similar outcome for Western Australian hawksbill turtle populations as a result of this fishing effort:

The hawksbill turtle was once abundant and heavily exploited commercially for its shell. Today, its appearance is a relatively rare occurrence along the coast. (DFF, 1969)

The principal export market for Western Australian tortoise shell was the United Kingdom. Other export markets included Singapore, British Malaya, Japan, Ceylon, the Straits Settlement, India, France, Italy, USA, Germany, Austria, and the other Australian States.

The hawksbill fishery was closely associated with the pearling and beche-de-mer industries, and a large proportion of the hawksbill harvest was carried out by pearlers holding professional fisherman's licences. Good quality shell was reportedly harvested from Bedout and Turtle islands near Port Hedland and Adele Island in King Sound (DAF, 1914, 1915/0589, Cons 477, fol. 14).

It is worth noting that prior to European exploitation, Macassan fishermen travelling out of Indonesia harvested tortoiseshell from the Kimberley coast and possibly as far south as the Pilbara coast (Limpus, 2002). It is thought that this fishery ceased in about 1900 (Limpus, 2002). Attempts to quantify this fishery are outside the scope of this paper.

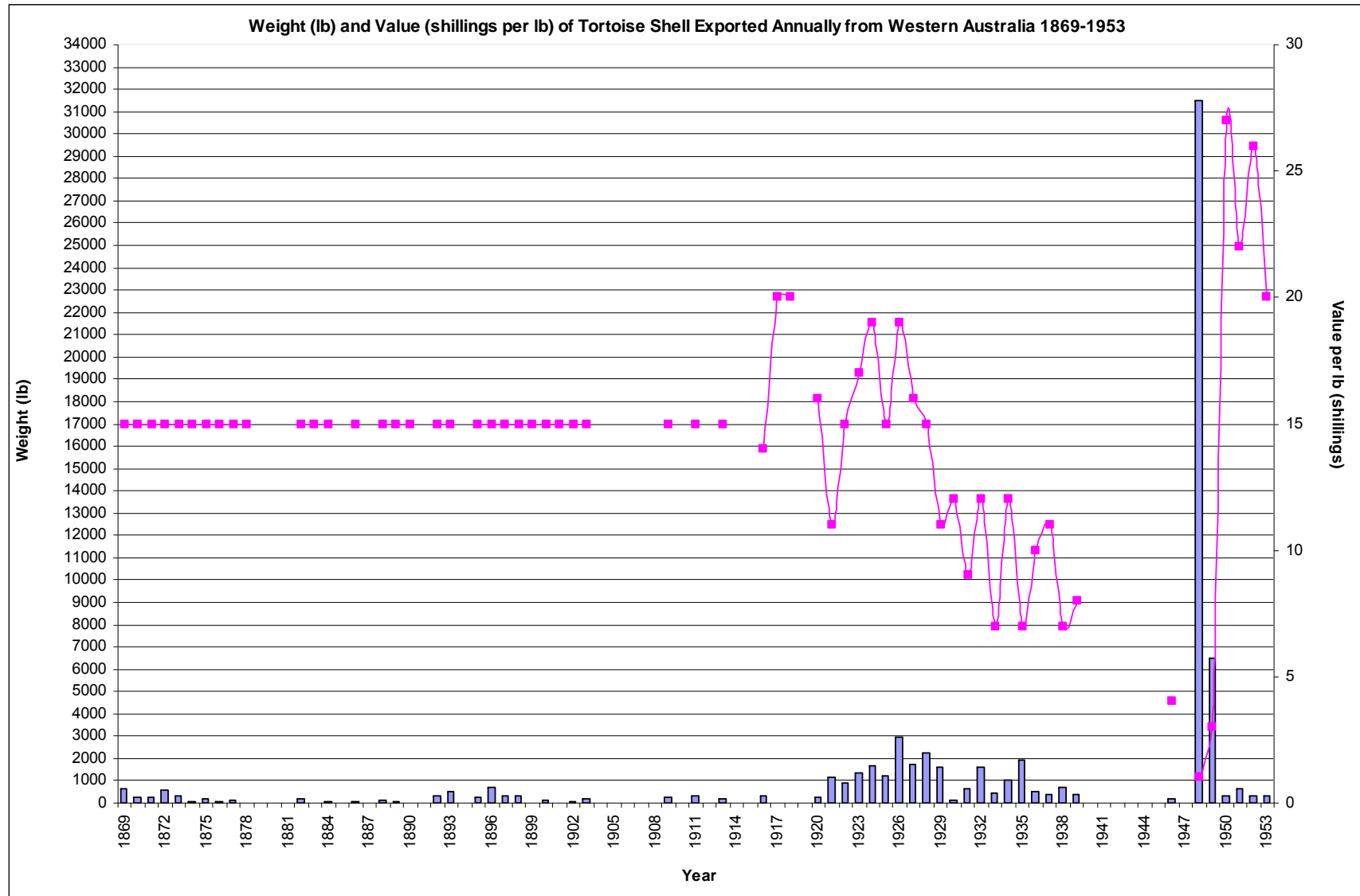


Figure 1. Exports of tortoise shell from Western Australia, 1869 to 1953: weight (bars) and export value (points). Compiled from data published in the annual *Colony of Western Australia* (1837 – 1869), the annual *Blue Book* (1870 – 1898) and the annual *Statistical Register of Western Australia* (1898 – 1968).

CATCH RECORDS: GREEN TURTLE FISHERY

Documentary evidence suggests that between 40,077 and 55,125 green turtles were harvested from Western Australian waters between 1837 and 1973 (Table 1). The bulk of this fishing effort occurred in the decade prior to the industry being closed down and was concentrated in fishing blocks 2313, 2213, 2113 and 2114 (i.e. Coral Bay, Exmouth, Onslow and offshore islands) (Figure 2, Table 1 and Appendix B). Other fishing localities included Derby, Cape Cuvier, Denham, Carnarvon and Mandurah. During the peak of the industry, up to two thirds of the take may have been female turtles (M. Plug, personal communication, Nov 2005).

Table 1 summarises green turtle harvests (weights and numbers) between 1837 and 1973 based on documentary evidence. The harvest during the early to mid-1800s was a combination of European subsistence harvests, and harvests to deliver back to the Swan River colony for export. The harvest for the remaining years was commercial harvest. These data have been summarised from the catch records detailed at Appendix B (please refer to Appendix B for source data, a complete reference list and the assumptions for how these figures were derived. N.B: unless otherwise indicated in the records, a conversion factor of 1.5 is used to convert landed data to equivalent live weight).

Oral history accounts suggest an even greater quantity of green turtles were harvested from these fishing localities. *Tropical Traders* harvested between 3,500 and 4,000 turtles for each year it operated, with the exception of its first two seasons when approximately 1,000 turtles were harvested (M. Plug, 2005; Weaver, 1998). Altogether, *Tropical Traders* may have harvested up to 42,000 green turtles between 1960 and 1972.

The exclusive licence first operated by Stan Stojanovich, then *West Coast Traders*, reportedly harvested 3,000 turtles each season, equating to a harvest of 27,000 turtles between 1964 and 1973 (Halkyard, 2005). Stojanovic also harvested turtles two years prior to applying for an exclusive licence for the same turtle grounds (Fisheries Department, 3rd June 1964, 1964/0325, Cons 1598, fol. 2), although it is unclear how many turtles were harvested during this time.

Based on the catch rates provided by the fishermen themselves, at least 69,000 green turtles were harvested from Western Australian waters ranging from the southern end of the Ningaloo Reef to the Montebello Islands in the space of 13 years. This evidence indicates that the licensed fishing vessels consistently filled their maximum allowable quota each season.

Year	Location	Weight (lb) – live weight (min.)	Weight (lb) – live weight (max.)	Weight (lb) – processed / dressed / landed (min.)	Weight (lb) – processed / dressed / landed (max.)	Number of turtles (min.)	Number of turtles (max.)
1837	Cape Villaret & South Turtle Isle – Geographe Shoals	8,048	8,048	5,636	5,636	30	30
1840	Barrow Island	15,680	15,680	10,453	10,453	63	63
1851	WA	248	248	165	165	1	1
1901	North West	4,740	4,740	3,160	3,160	19	19
1902	WA	2,016	2,016	1,344	1,344	8	8
1909	Lacepede Islands	7,440	7,440	4,960	4,960	30	30
1925	Depuch, Forresterie and Turtle islands	48,780	48,780	32,520	32,520	834	834
1922	Lacepede Islands	11,250	11,250	7,500	7,500	50	50
1923	North West	23,829	23,829	15,886	15,886	169	169
1829-1929	Carnarvon	45,150	45,150	30,100	30,100	350	350
1 July 1933 – 30 June 1934	Flying Foam Pass, Dampier Archipelago, Montebello Islands	216,000	288,000	144,000	192,000	1,080	1,440
1939	Near Cossack	30,535	30,535	20,353	20,353	155	155
1 July 1958 – 30 June 1959	Lacepede Islands	4,552	4,552	3,035	3,035	25	25
1 July 1959 – 30 June 1960	WA	40,000	50,000	26,667	33,333	284	355
1 July 1960 – 30 June 1961	Islands of the Dampier Archipelago and between Onslow and Broome	69,259 (incl. 5 ton turtle eggs)	69,259	49,906	49,906	426	426
1 July 1961 – 30 June 1962	Onslow	140,786	140,786	93,858	93,858	1,393	1,393
1 July 1962 – 30 June 1963	Block 2114	135,942	135,942	90,628	90,628	1,007	1,007
1 July 1963 – 30 June 1964	Block 2114	214,523	321,784	143,015	214,523	1,262	1,888
1 July 1964 – 30 June 1965	Blocks 2113, 2213 and 2512	1,104,347	1,304,447	736,232	869,632	6,095	7,584
1 July 1965 – 30 June 1966	Blocks 1622, 1722, 2113, 2114, 2213 and 2513	1,149,800	1,149,800	766,533	766,533	6,533	6,533
1 July 1966 – 30 June 1967	Blocks 1623, 1624, 2113, 2213, 2313 and 3215	524,372	814,171	349,581	524,372	2,979	4,626
1 July 1967 – 30 June 1968	Blocks 1623, 2313, 2413 and 3215	594,888	887,457	396,592	591,638	3,380	5,042
1 July 1968 – 30 June 1969	North West Cape, Montebello Islands, Long (aka Serrurier) Island, Thevenard Island and Block 2513	879,421	1,326,892	586,281	894,595	4,886	7,372
1 July 1969 – 30 June 1970	WA	449,907	674,860	299,938	449,907	2,499	3,749
1 July 1970 – 30 June 1971	Block 2213, Point Maud, Robb's Jetty and WA in general	460,416	1,043,015	306,994	689,343	2,558	5,745
1 July 1971 – 30 June 1972	Block 2213 and WA in general	309,357	491,760	206,238	327,840	1,719	2,732
1 July 1972 – 30 June 1973	Block 2213 and WA in general	403,635	629,820	269,090	419,880	2,242	3,499
Totals		6,894,921	9,530,261	4,600,665	6,343,100	40,077	55,125

Table 1. Summary of green turtle harvest (weights and numbers) between 1837 and 1973 based on documentary evidence. Note: harvest during the early to mid-1800s was a combination of European subsistence harvest and harvest to deliver back to the Swan River colony. The harvest for the remaining years was commercial harvest. These data have been summarised from the catch records detailed at Appendix B. Please refer to Appendix B for source data, a complete reference list and the assumptions for how these figures were derived. Note: unless otherwise indicated in the records, a conversion factor of 1.5 is used to convert landed data to equivalent live weight (DFF, 21st Apr 1967, 1950/0248v1, Cons 1598).

Turtle fishing contracts stipulated that the minimum weight for turtles needed to be 120 lb (dressed), which equates to a harvest of adults and large, immature green turtles (Weaver, 1998; Limpus, 2002).

It should be noted that the process of deriving an estimate of the overall fishing effort from catch records is open to interpretation. In many instances, catch record data was deficient or inconsistent. In one season the total catch recorded for the year might not necessarily equal the total sum recorded for each fishing block. Total quantities might also be expressed as live weight in one instance, yet recorded as landed or processed weight in another. As a result of these discrepancies, the total quantities were expressed in a range (Table 1). Catch records might also be stipulated in calendar or financial years, or the timeframe might not be stipulated at all, making the catch records susceptible to exaggeration if all these values were simply added together. On the whole, a greater number of catch returns were stipulated in financial years rather than calendar years. For this reason, the values at Table 1 (1958-1973) were derived from financial year estimates (Appendix B) at the exclusion of calendar year estimates or estimates where calendar or financial year was not clear, even though the financial year doesn't necessarily coincide with the turtle fishing season. In determining the number of animals harvested (if not already stipulated), the average turtle weight has been derived from the preceding and proceeding known turtle weights, rather than applying a standard average turtle weight across all fishing seasons. It was hoped this might better reflect industry trends. Other assumptions were applied to the data in deriving these estimates, and are explained at Appendix B.

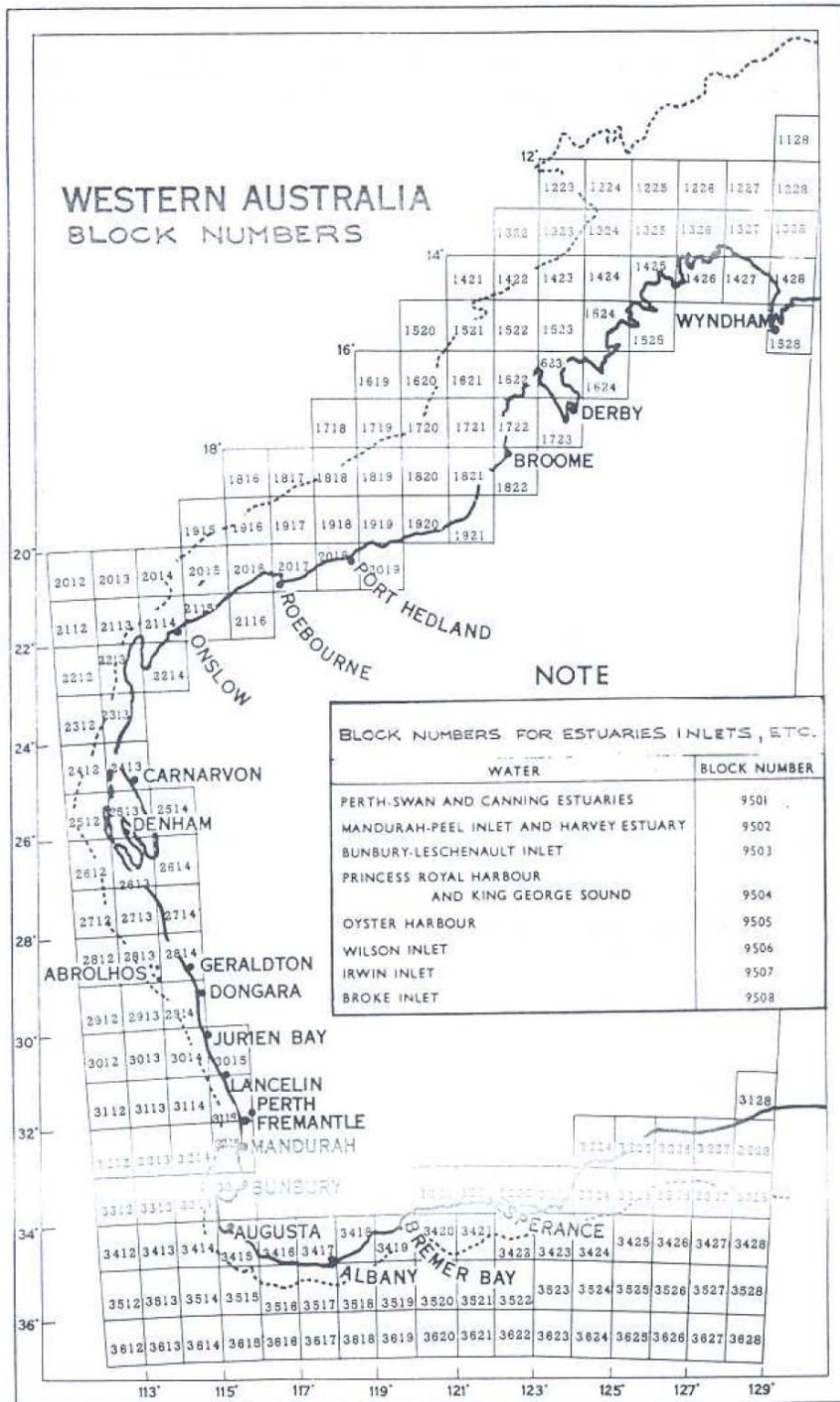


Figure 2. Map of Western Australian fishing blocks. 1968-69. Source: Commonwealth Bureau of Census and Statistics, Western Australian Office (1971).

OTHER TURTLE FISHERIES

Loggerhead turtle fishery

The loggerhead turtle was not a main target species of the commercial turtle industry, however there is documentary evidence that the take of loggerheads may have occurred in certain areas. The Fisheries Inspector at Shark Bay made the following statement in 1923:

We have a fair number of both green and loggerhead and both are suitable for what they are being marketed for. (Fisheries Department, 1924, 1923/0164, Cons 477)

The following was noted in a newspaper article from 1922:

On the islands further south [of Lacepede Islands] a very large number of loggerhead turtles exist. This species very much resemble the green turtle, and are often used by mistake for edible purposes. They are of a very coarse nature and the flavour if converted into soup is easily detected by the ordinary epicure. (Fisheries Department, 1923, 1922/0058, Cons 477, fol. 46)

Loggerheads were listed as a commercial species in the list of commercial fishes published by the Australian Standing Committee on Fisheries (Fisheries Department, Sept 1962, 1965/0190 v1, Cons 5602, fol. 24).

Loggerheads were also considered by some to be detrimental to the economical varieties of turtle. In 1950, based upon his work in the turtle industry at British Honduras, RV Randal suggested that steps should be taken to keep down the numbers of the loggerhead or 'rogue' turtle. According to Randal, rogue turtles preyed upon the eggs and young of other varieties, including the economical green and hawksbill turtles. Failure to cull the rogue turtle was predicted to result in a reduction in the numbers of economically viable species through predation (DFF, dec 1950, 1950/0248v1, Cons 1598, fol. 9).

'Million Turtle' fishery

Descriptions of a hybrid species of turtle appear in Department of Fisheries' files around 1924. This species was referred to as the 'Million Turtle', with the following description written by a Fisheries Inspector,

Coming into western waters (Cossack) we find the turtles change considerably – the turtles shipped from Cossack were not proper green turtle. There is a turtle known as half-caste – which means it has a Hawksbill shell but it is not 'imbricate' that is one shell is not overlapping the other like the shingles on a roof – each flake fits into the back with an overhanging edge. The Million Turtle which [is] apparently a separate species is not Green Turtle nor can it be called proper Hawksbill – the shell or flake show a pattern like the rising sun emblem... (Fisheries Department, 25th Jan 1924, 1923/0164, Cons 477, fol.

7)

Given the above description of the carapace, it's possible that the Million Turtles were juvenile green turtles which are described with having a 'strikingly patterned, chestnut-brown coloured carapace' (Marine Conservation Society, 2009). This notion is supported by the following description regarding the size of the animal:

The Million Turtle does not grow very big and you had better advise the Rockingham people to take notice of the difference when they buy at Cossack again. ((Fisheries Department, 25th Jan 1924, 1923/0164, Cons 477, fol. 8)

If this assumption is correct, juvenile green turtles formed a component of the commercial turtle harvest in the Cossack area during the 1920s.

Recreational harvest

While this paper doesn't attempt to quantify the historical recreational harvest of turtles, documentary evidence indicates that a recreational fishery for nesting turtles existed in populated areas such as Exmouth and Port Hedland (DFF, 25th Nov 1968, 1950/0248v1, Cons 1598, fol. 105; DFF, 30th Jun 1968, 1950/0248v1, Cons 1598, fol. 100).

CONCLUSION

The depletion and elimination of marine turtle populations as a consequence of large-scale, unsustainable commercial exploitation has been well documented (e.g. King, 1995; Dodd Jr., 1995; Lutcavage *et al.*, 1997; Bjorndal and Jackson, 2003). The life history of marine turtles (i.e. long-lived, slow-maturing, low recruit survival rate and high nesting/feeding site fidelity) makes them especially prone to over-exploitation (Heppell and Crowder, 1995; Limpus, 2002; Daley *et al.*, 2008). Previous studies have shown that even small, long-term increases in annual mortality from anthropogenic sources above natural mortality levels will cause population declines (Limpus, 2002).

The evidence presented in this paper indicates that significant commercial fishing of marine turtles occurred in Western Australian waters and that the harvest was most intense during the decade prior to the cessation of the industry with reports of localised depletions. While there was some regulation by the State Government, there was little scientific monitoring. In the absence of monitoring data, it is argued that a potential harvest of 69,000 green turtles and 31,723 hawksbill turtles exceeded the sustainable harvest and had a substantial impact on Western Australian marine turtle populations.

Given the requirement to harvest large immature or adult turtles during the peak of the industry as a consequence of minimum size restrictions, it is argued that anthropogenic pressures were further exacerbated by the loss of adult turtles from the population. Adult survival rates have been demonstrated to be the most sensitive life history stage and high survivorship of adult marine turtles is required to maintain population stability (Heppell and Crowder, 1995; Limpus, 2002, Daley *et al.*, 2008).

If harvesting is biased towards females, sustainable harvest rates are further reduced (Choquenot, 1996). Whereas other marine turtle fisheries have impacted disproportionately on female turtles at the critical life stage when they come ashore to nest, this did not appear to be an overly common practice in the Western Australian commercial turtle fishery. Nevertheless, oral history evidence indicates that a large proportion of the overall catch (up to two-thirds) may have consisted of female turtles (M. Plug, personal communication, Nov 2005).

During the peak of the industry in the 1960s and early 1970s, the bulk of the fishing effort took place between March and August, outside of the summer breeding season. Given that green turtles exhibit high levels of fidelity to foraging areas over extended time scales, foraging populations would have been most vulnerable to the large-scale, concentrated fishing effort in the two exclusive licence areas (Broderick *et al.*, 2007; Daley *et al.*, 2008). Consequently, there would have been a serious reduction in the localised green turtle foraging populations between Point Maud and the Montebello Islands. This is supported by oral history evidence that turtles were always harvested from the back of the reef where they were 'feeding off the weed' and that none were caught in close to shore (Weaver, 1998). Limpus (2002) also suggested that the harvest of breeding migrants aggregated for courtship as well as internesting females would have resulted in some reduction of the nesting population.

It is likely that the fishing effort for the tortoise shell industry had a significant impact on hawksbill turtle populations in the State's north, however it is difficult to pinpoint where the fishing effort was concentrated and which foraging and/or breeding aggregations were most impacted.

It should be noted that oral history evidence from those directly involved with the fishery contradicts the notion that the commercial turtle harvest caused a decline in green turtle numbers. The commercial turtle fishermen reported no significant changes in the success of the turtle harvest from year to year: fishing effort was consistent, the quota was reliably harvested and turtle numbers were not observed to diminish (McGowan, 2005;

D.Plug, personal communication, 15th Nov 2005; M. Plug, personal communication, 15th Nov 2005).

Anecdotal reports of declines in the numbers of nesting green turtles on the north west coast may also be attributed to factors other than over-exploitation such as large inter-annual differences in the proportions of females making breeding migrations and nesting, and natural variations in the El Nino Southern Oscillation (ENSO) Index (Daley *et al.*, 2008; Great Barrier Reef Marine Park Authority, 2009).

Conversely, it has been documented that the effects of a commercial turtle harvest may not be immediately apparent and that the actual magnitude of the effect on marine turtles may not appear until decades later (Lutcavage *et al.*, 1997; Daley *et al.*, 2008). This may give the false impression that continued exploitation will not be detrimental to the population being harvested (Lutcavage *et al.*, 1997).

Despite the commercial turtle harvest, Western Australian green and hawksbill turtle populations are the largest in the Indo-Pacific region and some of the largest remaining in the world (DEC, 2008). Commercialisation of the Western Australian turtle fishing industry never reached the magnitude of turtle fisheries elsewhere in the world where animals were harvested in their hundreds of thousands (Lutcavage *et al.*, 1997, McClenachan *et al.*, 2006). Furthermore, the turtle fishing industry reached its peak in the 1960s and the early 1970s which was a belated establishment relative to turtle fisheries conducted elsewhere. In Queensland for example, a substantial turtle meat and soup industry had been established by 1896 (Daley *et al.*, 2008). In the Cayman Islands, exploitation of green turtles commenced in 1655 and the fishery had collapsed by 1790 (Bjorndal and Jackson, 2003).

There are a number of contributing factors as to why the W.A. turtle fishing industry never achieved the full-scale commercial exploitation documented elsewhere, particularly in the early years, despite numerous attempts by keen entrepreneurs: lack of suitable refrigeration points along the north-west coast, improper treatment of raw material, insufficient capital, shortage of suitable labour in the north, a lack of knowledge of local conditions and the large distances to the export markets. Competition with established markets in Queensland and overseas also proved prohibitive.

It should be noted that the estimates of take and fishing effort presented in this paper may be underestimates of the actual historical exploitation that took place. The export trade tables for tortoiseshell reflect interstate and international trade figures only and there is no data that indicates the amount of shell that was collected for local Western Australian markets. Those possessing exclusive licences and professional fishermen's licences were

required to submit catch returns, including take of turtles, to the Fisheries Department, however many of these records appear to be missing from the archives.

Even though commercial fishing pressure on W.A. marine turtle populations ceased nearly 40 years ago, it is likely that the historical harvest increased the vulnerability of green and hawksbill turtles to modern-day pressures and if the depletion in turtle numbers was severe enough, full recovery of the turtle population could take several generations (Daley *et al.*, 2008; Limpus, 2002). The ongoing management of human impacts on marine turtles is required to ensure the long-term conservation and viability of marine turtles in the State.

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Appendix A: Commercial export of hawksbill tortoise shell from Western Australia from 1869 to 1953.

Year	Weight (lb unless otherwise stated)	Weight (lb)	Value (pre-decimal £)	Value per lb to the nearest whole shilling - values marked * are an average of the preceding and proceeding known values per unit weight	Standardised weight (lb) - based on explicit catch/export records or value estimates	Standardised weight (kg) - (assuming 1lb ~ 0.45kg)	No. Animals (assuming 1kg min) †	No. Animals (assuming 2 kg max) †	No. Animals (assuming 1.06kg avg) ‡	Notes
1869	643	643	482.5.0	15/-	643	292	292	146	275	
1870	289	289	269.15.0	15/-	289	131	131	66	124	
1871			170	*15/-	227	103	103	51	97	
1872	600	600	450	15/-	600	272	272	136	257	
1873	340	340	255	15/-	340	154	154	77	145	
1874			60	*15/-	80	36	36	18	34	
1875			146	*15/-	195	88	88	44	83	
1876			66	*15/-	88	40	40	20	38	
1877			105	*15/-	140	64	64	32	60	
1878			15	*15/-	20	9	9	5	9	
1879										
1880										
1881										
1882			125	*15/-	167	76	76	38	71	
1883			10	*15/-	13	6	6	3	6	
1884			30	*15/-	40	18	18	9	17	
1885										
1886			60	*15/-	80	36	36	18	34	
1887						0	0	0	0	
1888			90	*15/-	120	54	54	27	51	
1889			35	*15/-	47	21	21	11	20	
1890			15	*15/-	20	9	9	5	9	
1891										
1892	197 packages	?	260	*15/-	347	157	157	79	148	
1893	14 packages	?	399	*15/-	532	241	241	121	228	
1894										
1895	8 packages	?	203	*15/-	271	123	123	61	116	
1896			527	*15/-	703	319	319	159	301	
1897			243	*15/-	324	147	147	73	139	
1898	9 packages	?	225	*15/-	300	136	136	68	128	
1899			20	*15/-	27	12	12	6	11	
1900	0 15 1/2	?	94	*15/-	125	57	57	28	54	
1901			10	*15/-	13	6	6	3	6	
1902	62	62	10	*15/-	62	28	28	14	27	
1903	223	223	85	*15/-	223	101	101	51	95	
1904										
1905										
1906										
1907										
1908										
1909	271	271	148	*15/-	271	123	123	61	116	
1910										
1911	306 (cwt or lb)	306	180	*15/-	306	139	139	69	131	
1912										
1913	209	209	52	*15/-	209	95	95	47	89	
1914										Claims of 21/- per lb in Inspector's report. Very best shell realising as high as 160/- in London
1915										

Year	Weight (lb unless otherwise stated)	Weight (lb)	Value (pre-decimal £)	Value per lb to the nearest whole shilling - values marked * are an average of the preceding and preceding known values per unit weight	Standardised weight (lb) - based on explicit catch/export records or value estimates	Standardised weight (kg) - (assuming 1lb ~ 0.45kg)	No. Animals (assuming 1kg min) †	No. Animals (assuming 2 kg max) †	No. Animals (assuming 1.06kg avg) ‡	Notes
1916	335	335	237	14/-	335	152	152	76	143	
1917	22	22	22	20/-	22	10	10	5	9	
1918	4	4	4	20/-	4	2	2	1	2	
1919										
1920	267	267	220	16/-	267	121	121	61	114	Fisheries Annual report notes 7/- to 15/- per lb. Prices early in 1920 reached as high as 120/- per lb prior to end of year slump
1921	1136	1136	645	11/-	1136	515	515	258	486	
1922	873	873	645	15/-	873	396	396	198	374	
1923	1342	1342	1109	17/-	1342	609	609	304	574	
1924	1703	1703	1629	19/-	1703	772	772	386	729	
1925	1225	1225	934	15/-	1225	556	556	278	524	
1926	2953	2953	2775	19/-	2953	1,339	1,339	670	1,264	Note discrepancy between export value and catch values reported in Fisheries Annual reports. Annual report indicates a value of 14/- per lb.
1927	1753	1753	1411	16/-	1753	795	795	398	750	
1928	2271	2271	1661	15/-	2271	1,030	1,030	515	972	Note discrepancy between export value and catch values reported in Fisheries Annual reports. Annual report indicates a value of 22/- per lb.
1929	1592	1592	856	11/-	1592	722	722	361	681	
1930	126	126	73	12/-	126	57	57	29	54	
1931	674	674	291	9/-	674	306	306	153	288	Fisheries annual report notes avg value of catch for three separate pearl fisherman: 13.7, 5 and 3.07 shillings per pound.
1932	1609	1609	932	12/-	1609	730	730	365	689	Fisheries annual report notes avg value of catch for four separate pearl fisherman: 9.22, 13.17, 9.04 and 6 shillings per pound.
1933	442	442	162	7/-	442	200	200	100	189	
1934	1027	1027	611	12/-	1027	466	466	233	439	
1935	1949	1949	668	7/-	1949	884	884	442	834	Fisheries annual report notes avg value of catch for five pearl fisherman (year ended June 1935): 7.52, 8.24, 8.22, 7.86, 7.72. Also notes avg value of catch for four pearl fishermen (year ended Dec 1935): 18.25, 8.85, 1.92 and 1.12
1936	533	533	262	10/-	533	242	242	121	228	Fisheries annual report notes 292 lb = 133 pounds value = avg 9.11 shillings per pound - total for the year 1936. Two licensed pearl fishermen - avg = 10.16 and 9.71 shillings per pound
1937	364	364	203	11/-	364	165	165	83	156	
1938	728	728	248	7/-	728	330	330	165	312	T. Clifford's excl lic file (1940/0095) notes 22/- per lb. Avg value catch for three pearl fishermen (year ended Dec 1938): 5.07, 5.30 and 5 shillings per pound
1939	360	360	136	8/-	360	163	163	82	154	
1940										
1941										
1942										
1943										
1944										
1945										
1946			36	*4/-	180	82	82	41	77	
1947										
1948	281 cwt	31,472	1002	0.7/-	31472	14,276	14,276	7,138	13,468	
1949	58 cwt	6496	1127	3/-	6496	2,947	2,947	1,473	2,780	
1950	3 cwt	336	448	27/-	336	152	152	76	144	
1951	6 cwt	672	750	22/-	672	305	305	152	288	
1952	3 cwt	336	440	26/-	336	152	152	76	144	
1953	3 cwt	336	330	20/-	336	152	152	76	144	

Year	Weight (lb unless otherwise stated)	Weight (lb)	Value (pre-decimal £)	Value per lb to the nearest whole shilling - values marked * are an average of the preceding and proceeding known values per unit weight	Standardised weight (lb) - based on explicit catch/export records or value estimates	Standardised weight (kg) - (assuming 1lb ~ 0.45kg)	No. Animals (assuming 1kg min) [†]	No. Animals (assuming 2 kg max) [†]	No. Animals (assuming 1.06kg avg) [‡]	Notes
Total					69,937	31,723	31,723	15,862	29,928	

[†] Mack, D (1983). 'Worldwide Trade in Wild Sea Turtle Products: An Update' in *Marine Turtle Newsletter* 24:10-15

[‡] Turtle Trax (1997). 'Cuba Proposes to Allow Trade in Endangered Hawksbills'. www.turtles.org/bekko.htm. Last modified 21st June 1997. Accessed 1st Feb 2009.

Appendix B - Commercial harvest of green turtles in Western Australia from 1837 to 1973. The yellow-shaded cells are the values used to produce the summary table in the body of the document. Values not marked by an asterisk have been explicitly stipulated in the records. Values marked with an asterisk have been derived from values explicitly stipulated in the records.

Year	Location	Weight (lb unless otherwise stated)	Weight (lb) - live weight	Weight (lb) - landed / processed / dressed weight	Conversion factor	No. Animals	Avg. live weight per turtle (lb)	Value	Value per unit weight	Catch effort / Month(s) of production	Licensee / Fisher	Reference	Notes and Assumptions
1837	Cape Villaret	160	160	*107	1.5	1	160				Stokes	Stokes, 1846 Vol 1	John Lort Stokes - 1837-43 <i>Beagle</i> voyage
	South Turtle Isle - Geographe Shoals		*7,888	*5,259	1.5	*29	272 (avg of two known turtle weights harvested by Stokes)			4 hours	Stokes	Stokes, 1846 Vol 2	John Lort Stokes - 1837-43 <i>Beagle</i> voyage. One green (not the largest) weighed 385 pounds. Average between 160 and 385 = 272
1840	Barrow Island	7 tons	*15,680	*10,453	1.5	*63	*248 (avg of preceding and proceeding known values)				Stokes	Cox, 1977	John Lort Stokes - 1837-43 <i>Beagle</i> voyage. Turtle meat given to friends at Swan River settlement. Note: Limpus (2002) suggested that 7 tons of turtle would equate to 70 animals.
1851	WA		*248	*165	1.5	1	*248 (avg of preceding and proceeding known values)					Helpman, Vol 4 Exploration Diaries, 1851	
1889	North west								2/- to 2/6 per lb			Dept of Aborigines and Fisheries. 1909. <i>Turtles Dried: Calipash and Calipee</i> , 1911/1008, Cons 652, microform.	Calipee sold each year to Captain Davis
1901	WA		*4,740	*3,160	1.5	*19	*248 (avg of preceding and proceeding known values)	£237	*1/- per lb			Statistical Register of Western Australia for 1902 and Previous Years (1904)	Turtle soup. Assume same value per unit weight as 1902.
1902	WA	12 cwt	*2016	1344	1.5	*8	*248 (avg of preceding and proceeding known values)	£65	Approx 1/- per lb			Statistical Register of Western Australia for 1902 and Previous Years (1904)	Dried turtle. Conversion factor likely to be higher than 1.5
1909	North West Cape to Cape Preston								1/6			Annual Report of the Chief Inspector of Fisheries (1911)	
	Lacepede Islands	56 (calipash and calipee)	*4,960	*3,307	1.5	20	*248 (avg of preceding and proceeding known values)				H Hunter, Boolgin Station, Cape Levique (King Sound) Sydney Hadley, Sunday Island Mission	Dept Aborigines and Fisheries, <i>Turtles. Exclusive license for export of. Application of E.J. Thorley Gibson and T. Kerrison Bellis</i> , 1911/1343, Cons 652; Dept of Aborigines and Fisheries. 1909. <i>Turtles Dried: Calipash and Calipee</i> , 1911/1008, Cons 652, microform.	Note: 56 lb refers to weight of calipash and calipee only. Assume live weight much higher, therefore used average of 165 lbs per turtle to calculate live and landed weight.
	Adele Island (Lacepede Islands)	1 case (calipee)	*2,480	*1,653	1.5	10	*248 (avg of preceding and proceeding known values)			5 days		Dept of Aborigines and Fisheries. 1909. <i>Turtles Dried: Calipash and Calipee</i> , 1911/1008, Cons 652, microform.	Of the 15 turtles caught, some were hawksbill though exact number not stipulated. Assume 10 green and 5 hawksbill. Case contained calipee only. Assume live weight much higher, therefore used average of 248 lbs per turtle to calculate live and landed weight.
1922	Lacepedes and adjoining islands up to and including Callience Reef and Adele Island	200-250 lbs	11,250	7,500	1.5	50	225 (avg of 200 and 225)					Fisheries Dept, 1922 - 1939, <i>Fisheries - Broome - Preserving Company - Excl. Lic. To take turtle from Lacepede and adjoining Islands</i> , 1922/0058, Cons 477	
1923	North west		*23,829	*15,886	1.5	169	*141 (avg of preceding and proceeding known values)		£1 per head			Chelonia Co. Ltd	1919/0025 v2 - H Baron Rodway - Excl Lic to farm turtles - Cape Preston to Cape Lambert
1925	Cossack area	48,780	48,780	*32,520	1.5	834	58			May - August	Roebourne Produce Company	6043A/1 - Working notes of Mr William Carse, Roebourne Produce Company	124 turtles = 6,500 lbs; 130 turtles = 5,400 lbs; 249 turtles = 9,400 lbs; 179 turtles = 11,000 lbs; 123 turtles = 9,336 lbs; 29 turtles = 7,114 lbs (Averages = 52, 42, 38, 61, 76 and 245 respectively). Average of averages = 86. Note: 48,780 divided by 834 = 58. Gone with 58 to avoid discrepancies in the table.
	Depuch, Forrestiere and Turtle Islands		*6,844	*4,563	1.5	118	*58			May	Roebourne Produce Company	Fisheries Dept, 1925, <i>Roebourne Produce Coy. Ltd. Turtle factory, Cossack</i> , 1925/0205, Cons 251; Fisheries Dept, 1924 - 1931. <i>Fisheries - W. Benstead - Excl. Lic. - Turtles - DeLambre, LeGendre, Forrestiers, Redout, DePuch and Turtle Islands</i> , 1924/0015, Cons 477	Not factored into summary table to avoid double up. Assume totals form part of the statistics contained in 6043A/1.
1929	Carnarvon		*45,150	*30,100	1.5	350	*129 (avg of preceding and proceeding known values)					Colebatch, 1929	Note: Catch taken sometime between 1829-1929
1931	Montebellos	None less than 200 lb									Montebello Sea Products Ltd/Australian Canning Company (Hamley and Turner)	Vittenbergs and Brehaut, 2000. <i>The Sunday Times</i> , July 26, 1931	
1 July 1933 - 30 June 1934	Montebellos	None less than 200 lb	*67,600	*45,067	1.5	338	200	£856	1/4 per lb for extract	to 23 Dec 1933	Montebello Sea Products Ltd/Australian Canning Company (Hamley and Turner)	Fisheries Dept, 1931 - 1959, <i>Fisheries - Australian Canning Company - Excl Lic - Turtles and Dugongs at Monte Bello Islands</i> , 1934/0012, Cons 477; Fisheries Dept, 1938 - 1956, <i>Fisheries - Information regarding possibilities of WA fishing industries (whaling, turtle and dugong)</i> , 1921/0170, Cons 477	Not factored into summary table. Assume totals form part of the statistics from http://nla.gov.au/nla.nes-page34507 . Assume avg weight per turtle = 200 lb based on evidence that no turtles were less than 200 lb.

Appendix B - Commercial harvest of green turtles in Western Australia from 1837 to 1973. The yellow-shaded cells are the values used to produce the summary table in the body of the document. Values not marked by an asteric have been explicitly stipulated in the records. Values marked with an asteric have been derived from values explicitly stipulated in the records.

Year	Location	Weight (lb unless otherwise stated)	Weight (lb) - live weight	Weight (lb) - landed / processed / dressed weight	Conversion factor	No. Animals	Avg. live weight per turtle (lb)	Value	Value per unit weight	Catch effort / Month(s) of production	Licensee / Fisher	Reference	Notes and Assumptions
	Flying Foam Pass, the Dampier Archipelago and as far out as the Montebellos	None less than 200 lb	*216,000 - 288,000	*144,000 - 192,000	1.5	*1,080 - 1,440	200	£540 - £720	10/- per turtle	Nine months prior to April 1934 (30-40 per week)	Montebello Sea Products Ltd (Colin Gregson)	http://nla.gov.au/nla.news-page34507 - 'Calipash and Calipee: Turtle-divers of the North-West.' The Courier Mail, Brisbane, April 7 1934. Cruise of the Silver Gull, 1934	
1939	Near Cossack		*29,605	*19,737	1.5	*155	*191 (avg of preceeding and proceeding known values)	£77.5.8	*10/- per turtle	six months	Westella Canning Company (Gardiner and Rowden)	Dept Industrial Development, <i>Westella Canning Co. re Manufacture of turtle soup, canning of crayfish, sheeps tongues etc.</i> , 1938/0001, Cons 961	Assume 10/- per turtle based on market price in 1935 (Montebello Sea Products Ltd). Six turtles were initially shipped as a trial, several additional shipments were received later in the year.
1 July 1958 - 30 June 1959	Lacepede Islands	4,552	4,552	*3,035	1.5	25	182	£113	6d per lb	February (1959)	North West Enterprises	1958/0148 (1958-1959) - James Mazza and RE Russell - Excl Lic to take turtles from North West Cape - Wyndham; 1959/0015 - North West Turtle Industry - Treatment of turtles for export	Caught more than 100 turtles during one shore excursion which lasted a matter of hours. Kept only 25. Smallest 100, largest 288
	Unknown	14 cases	*2,472	1,648	1.5	*14	*182 (season avg)			February (1959)	Unknown	Monthly Service Bulletin, WA Fisheries Dept, Vol 8, No.s 1-12, 1959.	Only one exclusive licence operating in Feb 1959. Assume same licensee responsible for producing 14 cases of product (i.e. North West Enterprises). Not factored into summary table. Assume totals form part of the statistics contained in 1958/0148 and 1959/0015
1 July 1959 - 30 June 1960	Unknown	40,000 - 50,000	40,000 - 50,000	*26,667 - 33,333	1.5	*284 - 355	*141 (avg of preceeding and proceeding known values)			?	?	1959/0015 - North West Turtle Industry - Treatment of turtles for export	
1 July 1960 - 30 June 1961	Unknown	38,706	*58,059	38,706	1.5	*415	*141 (avg of preceeding and proceeding known values)	£1935	1/0 per lb	1960-1961		Fisheries Dept, Monthly Service Bulletin, Vol.11, No. 2, March 1962; Monthly Service Bulletin, No. 7, 1962; 1966/493 v1 (1960-1979) - Fisheries - Statistics - General	Conversion factor 1.5. Assume 194 lb turtle.
	Islands of Dampier Archipelago and between Onslow and Roebourne	5 ton	11,200	11,200	0	128,000 turtle eggs @ 1/1000 survivorship = 11 animals	*141 (avg of preceeding and proceeding known values)			?		1966/493 v1 (1960-1979) - Fisheries - Statistics - General	Included in summary table - exact dates of collection are unknown but turtle egg harvest (whether from beaches or gravid females) not shown anywhere else so assume they won't be double counted. Assume one in one thousand survival rate (Gulko D. and Eckert K. 2004. <i>Sea Turtles: An Ecological Guide</i> . Mutual Publishing, Honolulu) = 11 turtles. Limpus (2002) notes eggs were most likely to be green turtle eggs.
1 July 1961 - 30 June 1962	Onslow	91,483	91,483	*60,989	1.5	*906	*101 (season avg)			*Jul - Sept	West Coast Enterprises	1959/0015 - North West Turtle Industry - Treatment of turtles for export; 1950/0248 v1 - WA Turtles - General File (excerpt from <i>The Australian Exporter</i> - September)	60,993 lbs held in cold storage, remainder held on freezer boats (incl. 664 cartons weighing 30,490 lb). Other references for West Coast Enterprises for the same year cite between 89,600 lbs and 40 tons of take - general figures. Assume the most specific figures are the most accurate and therefore included in table. Excerpt dated September - describes 40 tons of turtle meat processed in first six weeks of operation - assume this occurred in latter half of year
	Onslow	49,303	49,303	*32,869	1.5	487	101 (49,303 divided by 487)			Oct-Nov 12 months ended Dec 31, 1931	Tropical Traders	Dept of Fisheries and Fauna, 1950 - 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598	487 turtles caught in 16 days
	?	54,160	*81,240	54,160	1.5	*804	*101 (season avg)				?	Fisheries Dept, Monthly Service Bulletin, Vol 11, No.7, Aug 1962	Not factored into the summary table - catch for the calendar year --> potential double-count
1 July 1962 - 30 June 1963	2114	90,628	*135,942	90,628	1.5	*1,007	*135 (avg of preceeding and proceeding known values)	\$11,781	12-13c per landed weight	1962-63		Dept of Fisheries and Fauna, 1950 - 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598	
	North west	102,623	*153,934	102,623	1.5	*1,140	*135 (avg of preceeding and proceeding known values)			?		1966/493 v1 (1960-1979) - Fisheries - Statistics - General	Not factored into the summary table - unable to determine whether catch taken inside the financial year --> potential double-count
	? Islands of Dampier Archipelago and between Onslow and Roebourne	48,463	*72,739	48,493	1.5	*539	*135 (avg of preceeding and proceeding known values)			?		WA Fisheries Dept, Monthly Service Bulletin, Vol. 12, No. 7, July 1963	Not factored into the summary table - unable to determine whether catch taken inside the financial year --> potential double-count
		53 cartons	*3,651	*2,434	1.5	*27	*135 (avg of preceeding and proceeding known values)			?	West Coast Enterprises	1950/0248 v1 - WA Turtles - General File	664 cartons = 30,490 lbs (West Coast Enterprises, 1961). Not factored into the summary table - unable to determine whether catch taken inside the financial year --> potential double-count.
1 July 1963 - 30 June 1964	2114	214,523	*321,784	*214,523	1.5	1,888	170 (321,784 divided by 1,888)			Aug-Oct	Tropical Traders	1963/0195 - Turtles - Tropical Traders Ltd - Appn Excl Lic to take turtles in the area from Point Maud	
	63	214,523	*321,784	*214,524	1.5	*1,888	*170 (season avg)					1967/137 v1 (1955-1963) - Fisheries Statistics from 1952 to 1963 - North West	Block 63 potentially referring to a different block numbering system. Total the same as for block 2114. Assume this is correct.
	2114	214,523	*321,784	214,523	1.5	*1,888	*170 (season avg)	28,816	12-13c per landed weight	1963-64		Dept of Fisheries and Fauna, 1950 - 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598; Limpus, 2002	214,523 lbs recorded as both live weight and landed weight for the same year in different references. Given the value provided in 1950/0248 v1, 214,523 lbs must be the landed weight.

Appendix B - Commercial harvest of green turtles in Western Australia from 1837 to 1973. The yellow-shaded cells are the values used to produce the summary table in the body of the document. Values not marked by an asteric have been explicitly stipulated in the records. Values marked with an asteric have been derived from values explicitly stipulated in the records.

Year	Location	Weight (lb unless otherwise stated)	Weight (lb) - live weight	Weight (lb) - landed / processed / dressed weight	Conversion factor	No. Animals	Avg. live weight per turtle (lb)	Value	Value per unit weight	Catch effort / Month(s) of production	Licensee / Fisher	Reference	Notes and Assumptions
	WA	214,523	214,523	*143,015	1.5	*1,262	*170 (season avg)			?		Limpus, 2002	
	WA	255,477	*383,215	255,477	1.5	*2,254	*170 (season avg)			*year ended 31 Dec 1963 (as per other Monthly Service Bulletins)		WA Fisheries Dept, Monthly Service Bulletin, Vol. 13, No. 10, Oct 1964	Not factored into the summary table - catch assumed to be for the calendar year --> potential double-count
1 July 1964 - 30 June 1965	2213	349,390	349,390	*232,927	1.5	2,430	144			?	Tropical Traders	Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598; Limpus, 2002	Not factored into the summary table - unable to determine whether catch taken inside the financial year --> potential double-count
	2213	435,049	*652,573	435,049	1.5	*3,794	*172 (=avg 200 +144)			Aug - Oct (1964)		1965/0325 - WA Fisheries Statistics - Monthly Tabulations, 1964;	
	2113	400,200	400,200	*266,800	1.5	2,001	200			Jul - Oct (1964)	West Coast Traders	Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598; Limpus, 2002	
	2113	400,200	*600,300	400,200	1.5	*3,490	*172 (=avg 200 +144)			Jul - Oct		1965/0325 - WA Fisheries Statistics - Monthly Tabulations, 1964	Monthly tabulations of landed weight equate to 400,200. Therefore assume 400,200 lbs is landed weight, not live weight as noted in 1950/0248 v1).
	2512	34,383	*51,574	34,383	1.5	300	*172 (=avg 200 +144)			July (1964)		1965/0325 - WA Fisheries Statistics - Monthly Tabulations, 1964	
	2114	869,632	*1,304,448	869,632	1.5	*7,584	*172 (=avg 200 +144)	\$104,536 - 113,052		1964-65		Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598	Total catch for block 2114 equals combined total for blocks 2213, 2113 and 2512. 2114 doesn't appear in monthly tabulation statistics and mention of the other blocks doesn't appear in other references. Assume totals are a duplication rather than separate fishing effort. 1965/0324 contains the most detailed catch records so assume these are correct (i.e. blocks 2213, 2113 and 2512). Note: Block 2113 is adjacent to block 2114.
	WA	749,590 or 869,632	749,590 or 869,632	*499,727 or 579,757	1.5	4,431	*172 (=avg 200 +144)			?		Limpus, 2002	Not factored into the summary table - unable to determine whether catch taken inside the financial year --> potential double-count
	WA	869,632	*1,304,448	869,632	1.5	*7,584	*172 (=avg 200 +144)			?		369/65 - Fisheries Annual Report - 1964	Not factored into the summary table - unable to determine whether catch taken inside the financial year --> potential double-count
1 July 1965 - 30 June 1966	2114	800,600	*800,600	*533,733	1.5	*4,549	*176 (avg of preceeding and proceeding known values)			1965-66		Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598	
	2114	368,400	*552,600	368,400	1.5	*3,140	*176 (avg of preceeding and proceeding known values)			Sept-Oct (1965)		Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598	Not factored into summary table to avoid potential double-count. Assume totals for Sept-Oct form part of the annual totals contained in 1950/0248 v1.
	2513	132,900	132,900	88,600	1.5	*755	*176 (avg of preceeding and proceeding known values)			Nov		Fisheries Dept, 1962-1975, Fisheries - Production Figures. Shark Bay & Carnarvon. Block No. 2613, 2513, 2413, 1966/0345, Cons 1759	
	2213	76,100	*114,150	76,100	1.5	*649	*176 (avg of preceeding and proceeding known values)			July - Aug (1965)		Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598	
	1722	600	*900	600	1.5	*5	*176 (avg of preceeding and proceeding known values)			Aug (1965)		Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598	
	2113	65,000	*97,500	65,000	1.5	*554	*176 (avg of preceeding and proceeding known values)	25c per processed lb		May-June (1966)	Stojanovic	Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598; Fisheries Dept, 1964 – 1969, Stojanovic – Exclusive Licence to take turtles, 1964/0235, Cons 1598	
	1622	2,500	*3,750	2,500	1.5	*21	*176 (avg of preceeding and proceeding known values)			Sept (1965)		Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598	
1 July 1966 - 30 June 1967	WA	524,372	524,372	*349,581	1.5	*2,979	*176 (avg of preceeding and proceeding known values)			1966-67		Dept Fisheries and Fauna, 1960 - 1979, Statistics - General, 1966/493 v1, Cons 4169	
	WA	357,454	357,454	*238,303	1.5	*2,031	*176 (avg of preceeding and proceeding known values)			?		Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598; Limpus, 2002	Not factored into the summary table - unable to determine whether catch taken inside the financial year --> potential double-count
	2113	40,000	*60,000	40,000	1.5	*341	*176 (avg of preceeding and proceeding known values)	25c per processed lb		July (1966)	Stojanovic	Fisheries Dept, 1964 – 1969, Stojanovic – Exclusive Licence to take turtles, 1964/0235, Cons 1598; Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598	
	2313	316,580	*474,870	316,580	1.5	*2,698	*176 (avg of preceeding and proceeding known values)			July - Oct (1966)		Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598	
	2313	27,000	*40,500	27,000	1.5	*230	*176 (avg of preceeding and proceeding known values)			May (1967)		Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598	
	3215	74	*111	74	1.5	*1	*176 (avg of preceeding and proceeding known values)			Sept (1966)		Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598	
	2213	138,068	*234,715	138,068	1.5	*1,334	*176 (avg of preceeding and proceeding known values)			June (1967)		Dept of Fisheries and Fauna, 1950 – 1974, W.A. Turtles, 1950/0248v1, Cons 1598	

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Year	Location	Weight (lb unless otherwise stated)	Weight (lb) - live weight	Weight (lb) - landed / processed / dressed weight	Conversion factor	No. Animals	Avg. live weight per turtle (lb)	Value	Value per unit weight	Catch effort / Month(s) of production	Licensee / Fisher	Reference	Notes and Assumptions
	1623	1,100	*1,650	1,100	1.5	*9	*176 (avg of preceeding and proceeding known values)			Apr-June (1967)		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598	
	1623	800	*1,200	800	1.5	*7	*176 (avg of preceeding and proceeding known values)			Dec (1966)			
	1624	750	*1,125	750	1.5	*6	*176 (avg of preceeding and proceeding known values)			May (1967)		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598	
1 July 1967 - 30 June 1968	WA	887,457	887,457	*591,638	1.5	*5,042	*176 (avg of preceeding and proceeding known values)			1967-68			
	WA	299,030	*448,545	299,030	1.5	*2,549	*176 (avg of preceeding and proceeding known values)			year ended 31 Dec 1967		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598; WA Dept Fish and Fauna, Monthly Staff Bulletin, Vol.s 18-19, No. 7, July 1969	not factored into the summary table - catch recorded in calender year --> potential double-count
	WA	509,510	509,510	299,030	1.7	*2,894	*176 (avg of preceeding and proceeding known values)			year ended 31 Dec 1967		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598; Limpus, 2002	Not factored into the summary table - catch recorded in calender year --> potential double-count
	1623	520	*780	520	1.5	*4	*176 (avg of preceeding and proceeding known values)			Jul - Aug (1967)		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598	
	2313	248,478	*372,717	248,478	1.5	*2,118	*176 (avg of preceeding and proceeding known values)			Jul-Aug		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598	
	2413	93,520	*140,280	93,520	1.5	*797	*176 (avg of preceeding and proceeding known values)			Sept (1967)		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598	
	2413	54,000	*81,000	54,000	1.5	*460	*176 (avg of preceeding and proceeding known values)			June (1968)		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598	
	3215	74	111	74	1.5	*1	*176 (avg of preceeding and proceeding known values)			Sept (1967)		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598	
	Robb's Jetty	435,760	*435,760	*290,507	1.5	*2,476	*176 (avg of preceeding and proceeding known values)	\$17,430		year ended 30 June 1968	Tropical Traders	Dept Fisheries and Fauna, 1965 - 1975, <i>Processors Licence - QUF Industry - Robbs Jetty</i> , 1966/0169, Cons 1598	Not factored into summary table - total reflects weight of turtles processed at Robb's Jetty. Assume totals form part of the weight/number of turtles caught by Tropical Traders in its various fishing blocks (1950/0248 v1).
1 July 1968 - 30 June 1969	WA	879,421	879,421*	*586,281	1.5	*4,886	180* (season avg - West Coast Traders)			1968-69		Dept Fisheries and Fauna, 1960 - 1979, <i>Statistics - General</i> , 1966/493 v1, Cons 4169	
	WA	744,483	744,483	362,027	2.1	*4,136	180* (season avg - West Coast Traders)			year ended 31 Dec 1968		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598; WA Dept Fish and Fauna, Monthly Staff Bulletin, Vol.s 18-19, No. 7, July 1969	not factored into the summary table - catch recorded in calender year --> potential double-count
	2513	399,315	*598,972	399,315	1.5	*3,328	180* (season avg - West Coast Traders)			Jul - Oct (1968)		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598	
	Robb's Jetty	559,850	*559,850	*373,233	1.5	*3,110	180* (season avg - West Coast Traders)	\$18,841		year ended 30 June (1969)	Tropical Traders	Dept Fisheries and Fauna, 1965 - 1975, <i>Processors Licence - QUF Industry - Robbs Jetty</i> , 1966/0169, Cons 1598	Not factored into summary table - total reflects weight of turtles processed at Robb's Jetty. Assume totals form part of the weight/number of turtles caught by Tropical Traders in its various fishing blocks (1950/0248 v1).
	North West Cape, Montebellos, Long Island, Thevenard Island	727,920	*727,920	*495,280	1.5	4,044	180				West Coast Traders - Stojanovic	Fisheries Dept, 1964 – 1969, <i>Stojanovic – Exclusive Licence to take turtles</i> , 1964/0235, Cons 1598	Average weight for each turtle = 180 lbs (in the shell)
1 July 1969 - 30 June 1970	WA	356,241	633,445	356,241	1.8	*3,519	*180 (avg from previous season)			?		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598; Limpus, 2002	Not factored into the summary table - unable to determine whether catch taken inside the financial year --> potential double-count
	WA	449,907	*674,860	449,907	1.5	*3,749	*180 (avg from previous season)	\$26,994	\$6 per lb landed weight	year ended 30 June 1970		Dept Fisheries and Fauna, 1971 - 1981, <i>WA Fisheries Statistics - annual and six monthly production figures</i> , 1966/0212 v2, Cons 5602	
		449,907	449,907	*299,938	1.5	*2,499	*180 (avg from previous season)			year ended 30 June 1970		Dept Fisheries and Fauna, 1960 - 1979, <i>Statistics - General</i> , 1966/493 v1, Cons 4169	
	North West Cape	24,000	*24,000	*16,000	1.5	*133	*180 (avg from previous season)			to 21 Mar 1970		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598	Not factored into summary table to avoid potential double count. Assume totals form part of the Statewide total contained in 1966/0212 v2 and 1966/493 v1)
1 July 1970 - 30 June 1971	WA	398,139	*597,208	398,139	1.5	*3,318	*180 (last known avg)			?		Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles</i> , 1950/0248v1, Cons 1598; Limpus, 2002	Not factored into the summary table - unable to determine whether catch taken inside the financial year --> potential double-count
	WA	460,416	*690,624	460,416	1.5	*3,837	*180 (last known avg)	\$23,021	\$5 per lb landed weight	year ended 30 June 1971		Dept Fisheries and Fauna, 1971 - 1981, <i>WA Fisheries Statistics - annual and six monthly production figures</i> , 1966/0212 v2, Cons 5602	
	WA	460,416	460,416	*306,994	1.5	*2,558	*180 (last known avg)			1970-71		Dept Fisheries and Fauna, 1960 - 1979, <i>Statistics - General</i> , 1966/493 v1, Cons 4169	

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Year	Location	Weight (lb unless otherwise stated)	Weight (lb) - live weight	Weight (lb) - landed / processed / dressed weight	Conversion factor	No. Animals	Avg. live weight per turtle (lb)	Value	Value per unit weight	Catch effort / Month(s) of production	Licensee / Fisher	Reference	Notes and Assumptions
	Pt Maud	1,923 cartons	*132,453	*88,302	1.5	*736	*180 (last known avg)			?	Tropical Traders	Dept of Fisheries and Fauna, 1963 – 1973, <i>Fisheries – Turtles – Tropical Traders LTD Application Excl. Licence to take Turtles – In the area from Pt Maud, 1963/0195, Cons 1759</i>	Calculate the weight of each carton by assuming 664 cartons = 30,490 lb as per 1961 (1959/0015). Not factored into summary table. Assume total catch for Tropical Traders has been incorporated into total weight of turtle processed at Robb's Jetty (163/66)
	Robb's Jetty	462,128	*462,128	*308,085	1.5	*2,567	*180 (last known avg)	\$23,106.40		?	Tropical Traders	Dept Fisheries and Fauna, 1965 - 1975, <i>Processors Licence - QUF Industry - Robbs Jetty, 1966/0169, Cons 1598</i>	Not factored into the summary table - unable to determine whether catch taken inside the financial year --> potential double-count
	Robb's Jetty	444,335	*444,335	*296,223	1.5	*2,469	*180 (last known avg)	\$24,962		year ended 30 June 1971	Tropical Traders	Dept Fisheries and Fauna, 1965 - 1975, <i>Processors Licence - QUF Industry - Robbs Jetty, 1966/0169, Cons 1598</i>	
	WA		*598,680	*393,120	1.5	3,276	*180 (last known avg)	\$36,261	\$11 gross	year ended 30 June 1971	West Coast Traders	Dept Fisheries and Fauna, 1966 - 1975, <i>Processing licence - West Coast Traders 'East Winds', 1966/0262, Cons 1598</i>	No weights provided - only numbers of turtles harvested
	2213		*540,000 - 720,000	*360,000 - 480,000	1.5	3000-4000	*180 (last known avg)					Limpus, 2002	Not factored into summary table. Less generalised data available.
1 July 1971 - 30 June 1972	WA	264,096	*396,144	264,096	1.5	*2,201	*180 (last known avg)					Dept of Fisheries and Fauna, 1950 – 1974, <i>W.A. Turtles, 1950/0248v1, Cons 1598; Limpus, 2002</i>	Not factored into the summary table - unable to determine whether catch taken inside the financial year --> potential double-count
	WA	206,238	*309,357	206,238	1.5	*1,719	*180 (last known avg)			year ended 30 June 1972		Dept Fisheries and Fauna, 1971 - 1981, <i>WA Fisheries Statistics - annual and six monthly production figures, 1966/0212 v2, Cons 5602</i>	
	2213		*540,000 - 720,000	*360,000 - 480,000	1.5	3000-4000	*180 (last known avg)					Limpus, 2002	Not factored into summary table. Less generalised data available.
	WA		*491,760	*327,840	1.5	2,732	*180 (last known avg)	\$37,105		year ended 30 June 1972	West Coast Traders	Dept Fisheries and Fauna, 1966 - 1975, <i>Processing licence - West Coast Traders 'East Winds', 1966/0262, Cons 1598</i>	No weights provided - only numbers of turtles harvested
1 July 1972 - 30 June 1973	WA	269,912	*404,868	269,912	1.5	*2,249	*180 (last known avg)	\$13,296	5c per lb landed weight	1972-73		Dept Fisheries and Fauna, 1960 - 1979, <i>Statistics - General, 1966/493 v1, Cons 4169</i>	
	WA	183,089 kg	*403,635	*269,090	1.5	*2,242	*180 (last known avg)	\$16,739		1972-73		Dept Fisheries and Fauna, 1971 - 1981, <i>WA Fisheries Statistics - annual and six monthly production figures, 1966/0212 v2, Cons 5602</i>	Not factored into the summary table - two references vs one
	WA	269,912	*404,868	269,912	1.5	*2,249	*180 (last known avg)	\$13,296	5c per lb landed weight	year ended 30 June 1973		Dept Fisheries and Fauna, 1971 - 1981, <i>WA Fisheries Statistics - annual and six monthly production figures, 1966/0212 v2, Cons 5602</i>	
	WA		*629,820	*419,880	1.5	3,499	*180 (last known avg)	\$45,487		year ended 30 June 1973	West Coast Traders	Dept Fisheries and Fauna, 1966 - 1975, <i>Processing licence - West Coast Traders 'East Winds', 1966/0262, Cons 1598</i>	
	2213		*540,000 - 720,000	*360,000 - 480,000	1.5	3000-4000	*180 (last known avg)					Limpus, 2002	Not factored into summary table. Less generalised data available.