
AN ORAL HISTORY OF FISHING AND DIVING IN THE CAPES REGION OF SOUTH-WEST WESTERN AUSTRALIA.

A Report to the South West Catchments Council: July 2008

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WESTERN AUSTRALIA**

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This report may be cited as:

Gaynor, A., Kendrick A. and Westera, M. (2008) An Oral History of Fishing and Diving in the Capes Region of South-West Western Australia. Project CM.01a July 2008. University of Western Australia, School of Humanities and School of Plant Biology. Report to the South West Catchments Council pp 56.

ISBN: 978-1-74052-172-7

ACKNOWLEDGEMENTS

This project was funded by the Australian and Western Australian Governments through the South West Catchments Council.

Firstly an enormous thankyou to the oral history participants whose wit, humour and honesty have made this report possible. Terry Adams, Abalone Joe, Kerry King, Peter McDonald, Colin Price, Trevor Price, Neil Taylor, Phil Tickle, Ray Walker, Peter Warrilow, John Williams, John Wise, Noel Wright, Fisher 1 and Local 1. Theirs is the real knowledge that should be tapped when and wherever possible.

Preparation of this report has been a pleasure and we feel privileged to have shared in these fascinating accounts of fishing and diving in the South West of Western Australia. Many thanks also to: Emily Hugues-Dit-Ciles, Joanna Hugues-Dit-Ciles, Carolyn Switzer and Nicola Holman (South West Catchments Council) and Martin Heller (past Australian Government Natural Resource Management Facilitator – Coastal and Marine/Coastcare) for advice and support; Neil Taylor (Department of Environment and Conservation) and Jessica Meeuwig (University of Western Australia) for advice and contacts in the region; Charlie Fox (University of Western Australia) for general advice on the structure and design of oral history surveys; Kieryn Kilminster, Helen Stephanou and Katerina Stephanou (University of Western Australia) for transcribing the interviews; Kirrily White, Gary Kendrick and Euan Harvey (University of Western Australia) for advice and contacts. The University of Western Australia, School Plant Biology for general project support.

Cover photo courtesy of W. Sharpe-Smith and the Department of Environment and Conservation. Other images throughout this document were supplied by Euan Harvey, Emily Hugues-Dit-Ciles, Martin Heller, Marion Cambridge and Mark Westera.

Participants were offered the choice of using a pseudonym or their real name. Three of the participants chose to use a pseudonym. One of these people requested we use the pseudonym “Abalone Joe”. The other two participants did not suggest a pseudonym and have been named Fisher 1 and Local 1.

We trust that government agencies will use some of this knowledge to guide management. We also hope that oral histories are utilised more often as a means to capture and record knowledge from those “on the ground” who have the first hand experience of the many scientific questions we ask. In biology and ecology we are lacking in historical knowledge or scientific studies that can be used to understand marine populations and how they may change over time. Oral histories are an excellent means to address this gap.

The recording equipment used for the interviews was not entirely reliable and we apologise for any inconvenience this caused to the participants. Transcripts were sent to interviewees for review and to ensure the material transcribed was correct. A condition of this publication is that all references are as recalled given the passage of time.

SUMMARY

Historical perspectives on the natural environment are useful in determining the kind, extent and causes of environmental change, and therefore constitute an important resource for policy-makers in the areas of conservation and natural resource management. Such perspectives can often be derived from documentary and photographic sources, though oral histories may yield information not otherwise available. This research project therefore sought to collect local knowledge of change and continuity in the marine and coastal environments of the South-West Capes region through the recording of oral history interviews with fifteen fishers and a dive operator, each with at least 20 years' experience.

Taken together, the interviews suggest changes in various marine animal populations that may be summarised as follows:

- populations of seals and whales have grown, the former over the last two decades in particular;
- populations of sharks, with the exception of white pointers, have declined;
- herring populations fluctuate, but may have declined in Geographe Bay;
- yellowfin whiting populations may also have declined in Geographe Bay, but increased at Augusta;
- King George whiting populations have declined at Augusta;
- populations of dhufish and snapper have declined;
- blue groper populations declined in the 1950s, but may be recovering;
- salmon populations are variable, though have been high in recent years;
- a decline in the size of tuna reduced their commercial viability;
- abalone may be subject to localised depletion and recovery;
- fewer large crayfish are caught;
- crab populations have declined in the south of the region, but may have increased in the north; and
- changes in other species include localised declines in mulloway and cobbler, but possible increases in populations of samson fish, sergeant bakers and breaksea cod.

The interviewees also described relevant changes to marine and estuarine environments in the region, including some specific observations of the impacts of land-source pollution and dams, and the declining health of a reef. Pollution from increasing tourism in the region was observed, but not linked with specific impacts, while changes in prevalence of some species were explained with reference to changes in ocean currents. Jetties were also identified as culturally-significant sites raising particular management issues.

A range of technological changes were described, with some linked to environmental impacts. Aboriginal people exploited a range of marine species, using fish traps and other means. Their fishing strategies relied at least in part on a detailed knowledge of patterns of breeding and migration of the various species sought, which were tied to terrestrial indicators. Traditional non-Indigenous navigation and fish-finding technologies limited the range and efficiency of fishing vessels, as—to some extent—did limited storage possibilities prior to the diffusion of refrigeration in the region in the 1950s and 60s. Several interviewees remarked on the increased catch levels—and waste—associated with changes in net materials and deployment. Drivers of technological change among commercial fishers varied, with shark fishers looking for a competitive edge, and quota-limited abalone fishers seeking greater safety. In general, increasing size and speed of boats enabled fishing over a wider area, particularly among recreational fishers. The uptake of GPS and echo-sounders have almost certainly changed patterns of recreational fishers, allowing them to exploit fish habitats with greater efficiency, if not necessarily leading to significantly larger catches. From the 1970s, professional fishers also made use of satellite images to locate productive fishing grounds.

The interviews also yielded pertinent observations on changing attitudes and the efficacy of various management strategies, including bag and minimum size limits, catch and release, marine parks, and fishing competitions. Most pointed to an increased appreciation among fishers of all types and ages, of the need for fisheries conservation, though views on the best way to manage the resources differed. Finally, some interviewees, recreational and commercial, described the non-economic values derived from their fishing activities—a factor not to be overlooked in management decision-making.

Overall, the interviews yielded a range of useful observations of past environments in the region, and changing human interactions with those environments. The observations most pertinent to management issues in the region today should be tested against other sources, including existing historical and ecological studies, as well as other historical primary sources such as photographs, newspaper reports, archival fishery records, and the journals of explorers, colonists and travellers.

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INTRODUCTION

In recent years, ecologists and natural resource managers have increasingly recognised that historical perspectives on the natural environment are useful in determining the kind, extent and causes of environmental change [1]. Forest ecologist David Forster even goes so far as to claim that ‘it is foolhardy to make any ecological interpretation of modern landscapes or environments or to formulate policy in conservation or natural resource management without an historical context that extends back decades, at least, but preferably centuries or millennia [2]. In particular, historical perspectives are essential to counter ‘shifting baseline syndrome’, by which degraded environments come to be accepted as ‘natural’, in the absence of an understanding of their prior condition [3]. This is understood to be a particular problem in fisheries. In a ground-breaking article, Jackson et al. outlined the impact of historical overfishing fishing on the world’s oceans, making a strong case that retrospective data is essential for ‘successful restoration and management of coastal marine ecosystems’ [4]. They argued that such data allows us to achieve a longer-run perspective on rates of ecological change, along with potential causes. Furthermore, by indicating what was there before, it can also demonstrate achievable restoration goals for coastal ecosystems that may well not have been contemplated with only the usual, limited perspective of recent observations at hand. Recognition of the significance of such historical perspectives led in 2004 to the establishment of the History of Marine Animal Populations (HMAP) research project, a component of the Census of Marine Life (CoML) that involves around 100 researchers worldwide using historical, ecological and paleo-ecological studies to create a picture of changes in marine animal populations over time [5].

The creation of historical perspectives may require the use of ‘non-scientific’ evidence, as a growing body of research points to the existence of significant changes in certain environments prior to their first scientific description [6]. Such perspectives can be gained in some instances from historical documents, such as photographs, log books and returns, and written descriptions. However, the recollections and observations of people with significant experience of a particular marine species, activity or environment can also provide valuable information on the extent (and in some cases also causes) of change over time. Oral history is increasingly recognised by ecologists and natural resource managers as a means by which information about past ecological conditions can be derived from local communities [7-9]. Johannes et al have argued for the value of fishers’ ecological knowledge (FEK), even though it is sometimes dismissed by scientific researchers as ‘anecdotal’ [10]. Although oral histories can provide valuable information in the absence of documentary or other sources, it is desirable, where possible, to ‘triangulate’ the data they contain, testing whether the findings they point to are verified by, or at least compatible with, evidence contained in other historical sources. Thus, for example, Saenz-Arroyo et al have successfully conducted research combining oral history interviews with a survey of historical ‘grey literature’ to provide a compelling

historical perspective on changes in Gulf grouper populations, that clearly demonstrates the ‘shifting baseline’ effect [11, 12].

The aim of this research project was therefore to contribute to the collection of relevant historical data on the marine and coastal ecosystems of the Capes region of Western Australia by conducting oral history interviews. Information was sought not only on the prevalence of particular species, but also changing use of technology, attitudes and values. The research was undertaken in conjunction with a study of the biological features of the region [13]. The project was funded through the South West Catchments Council – supported by the Australian Government and the Government of Western Australia.



Figure 1: Typical fish species caught in the Capes region- (top to bottom) samson fish (*Seriola hippos*), swallowtail (*Centroberyx lineatus*), breaksea cod (*Epinephelides armatus*), red snapper (*Centroberyx gerrardi*), queen snapper (*Nemadactylus valenciennesi*).

METHODS

From late 2005 to early 2006 fifteen fishers (recreational and commercial) and a dive operator were interviewed for their oral history of their activities around the Capes Region—Cape Naturaliste to Cape Leeuwin, Western Australia including Flinders and Geographe Bays. An initial list of potential participants was identified by Jessica Meeuwig, Neil Taylor and Mark Westera, based on their knowledge of people in the region.

Several of the interviewees were over 65 years of age and had a perspective on the Capes Region from more than fifty years before. Others had only been using the waters of the area for twenty years or so. Two people interviewed came from Aboriginal backgrounds and had experience of the traditional subsistence methods of fishing. Two of the participants had experience with commercial abalone harvest. Two had experience with estuarine fishing in the Blackwood. One has conducted his recreational fishing purely from shore, on foot, while the others have all owned and operated boats. All interviewees were male. It is necessary to bear in mind the background of interviewees in interpreting their testimony. In order to minimise repetition of this information throughout the report, a list of the interviewees, with a brief summary of their experience in the region, appears at Appendix 1.

The interviewer, Amrit Kendrick, has a Master of Science in Wildlife and Fisheries Science and is completing a Post Graduate Diploma in Science Communication. The questions she asked in the interviews were designed to encourage participants to talk about their observations and experiences along the coasts of Geographe and Flinders Bays, between the Capes and around the Blackwood Estuary. Indicative questions included:

- How long have you been fishing (or diving) in the area?
- What changes have you observed in fish stocks, distribution of marine organisms, and water quality?
- What changes have you seen in fishing activity in the region?
- Are there policies you would recommend or would like to see changed?
- What memorable experiences have you had in your fishing (or diving)?

The tapes were transcribed and the transcriptions given to interviewees for checking before their use in compiling this report. Information was then extracted from the interview transcripts by historian Dr Andrea Gaynor, and compiled in this report.

RESULTS

The common themes to emerge from the interviews were:

- change and continuity in the size and prevalence of various species of marine and coastal animals and plants;
- change and continuity in coastal environments;
- changing technologies, and their apparent effects on various species and ecology; and
- changes in attitudes and management.

Findings under each of these headings are presented below, with relevant extracts from the transcripts.

MARINE AND COASTAL ANIMALS AND PLANTS

The dominant narrative to emerge from the interviews in relation to fish in the region is that they are no longer as large or plentiful as they were. This is perhaps to be expected, as the environmentalist view that human activity has threatened habitats and led to a decline in many species provides a convenient framework for discussing environmental change. However, where interviewees described changes in specific terms, with reference to a range of evidence types, it is likely that such recollections are not largely a product of contemporary environmentalist belief.

For example, Bill Webb, an Indigenous man from the Cape Naturaliste area, suggests with reference to old photographs and his own memories that both the size and number of fish caught in Geographe Bay have declined. John Williams has similar memories in relation to Flinders Bay in the 1940s:

“I can remember in the old days people came in with their catch and they’d string them all up and they’d all stand in front of their catch and have their photos taken – huge catches of lots of dhufish and snapper and groper.”

Phil Tickle, who moved to Siesta Park in 1946, and fished professionally from 1957-1965, refers to a different form of evidence in support of his claim that the fish population has declined:

“I’ve always kept boat logs when I started professional fishing and I used to keep a daily written log of my average catch. I’ve lost a couple of years of my logs, but over five years I think it averaged out at eight point something dhufish per trip and going down through the other fish to three point something sharks per trip. And that was taking it out every day. Some of which were blown out, some we might’ve only got one, but on the other good days we’d get 30 and 20 dhufish... The average of my five years log would be an extremely good individual’s day catch for this day and age.”

Others claim to have observed a general decline over a shorter time frame. For example, Peter McDonald, who arrived in the area around 1984 and entered the dive industry around 1989, says that “you used to see a lot more big fish when you went diving.” This kind of general claim holds some value in the context of other, similar claims in relation to particular fish species, as described below.

It is perhaps not uncommon for people who go fishing unsuccessfully to complain of reduced fish numbers, but Kerry King provides a salutary reminder of the natural variation in fish numbers at particular locations: “Now, talking about the early days again. I must say, I’ve seen [times] when there hasn’t been a fish on the beaches. Because the weather, everything’s got to be right for a fish to come on the beach.” Statements about the occurrence of particular species in particular locations must be interpreted in light of this kind of variation.

SEALS

Seals (Pinnipedia) were mentioned by five interviewees, who agreed that numbers of the animals have increased around Augusta over the last 20 years, and more recently around Cape Naturaliste. Peter Warrilow, who moved to the region in the mid-1970s, stated that seal numbers have increased around Augusta, especially, since the late 1980s to mid-1990s. On some of the rocks he estimates that there are now 100-150 seals, where before there were none. When Neil Taylor first started working with the Department of Conservation and Land Management (CALM) around 1986, he visited a seal colony comprised of 15-20 adults near Augusta. Now, he says there are more than 150

seals there, with a sub-colony at Cape Naturaliste. Ray Walker, a recreational beach/rock fisher, has also observed an increase in seal numbers: “I can remember at the top of the Cape [Naturaliste] and there was probably eight of them there and now, without doing a count I think there are probably 80, a colony up there...” John Wise mentions that there is now quite a large seal colony at Injidup, and quite a lot of seals on the coast from Injidup to Canal Rocks. Wise believed that the colony at Cape Naturaliste had come from the one at Augusta, and comprised up to 80 seals. These two estimates contrast with the reports received by Neil Taylor, of around 25 seals at Cape Naturaliste. Kerry King believes that the seals at Cape Naturaliste have only really appeared in the last 7 years; previously he had only seen large sea lions, and then only just before winter.

WHALES AND DOLPHINS

Several interviewees described an increase in sightings of whales, suggesting that the animals are present in increasing numbers along the coast and in Flinders and Cowaramup Bays (and possibly also Geographe Bay). Interviewees identified humpback, sperm, blue and killer whales as present in the region. Peter Warrilow, fishing in the region from 1978, claims that:

“In the early days we would very rarely see a whale, if you did see one, it was something you got excited about; it still is actually, but because it was infrequent you took more notice of it. Now the whale numbers have increased dramatically and during their migration to the north in the early winter months, and south in spring, we see ever-increasing numbers of them and you just accept it as part of the general environment, the whales passing close to your boat. There’s numerous sightings every day; 10 – 15 – 20 whales, and we get the humpbacks going north and south and sometimes there are whales in the bay at Augusta.”

John Williams, too, noted that the population of whales had increased, and that migrating whales were starting to come into Flinders Bay and have their calves there. Terry Adams reported having observed a 50-60 foot blue whale in Flinders Bay. Local 1 also sees whales every year at Cowaramup Bay, and describes an occasion 4-5 years ago when ‘a mother whale brought her baby in, and slept inside the Bay over night’.

Ray Walker, a shore-based recreational fisher since 1962, similarly observed a large increase in the number of whales running up and down the coast. In his years of fishing he had never seen a killer whale until 2005, when he

“saw 4 of them and they were actually in a fishing frenzy. They actually picked up a fully grown three metre dolphin and they just threw it around like a rubber ball within 400 metres of the shore, in front of me and this other guy... I went and reported it to CALM and spoke to a few fishermen, I actually spoke to the guy that does the whale watching and another fisherman

who's third generation and over the years, days, hours they spent on the sea, they've never seen it".

It is unclear where this took place, but it was probably between Meelup and Cowaramup. Another toothed whale was mentioned by Terry Adams, who reported having seen a 30-foot sperm whale in the region.

Local 1, based in Dunsborough since 1984, thinks that sightings of blue whales migrating through the area have increased, and describes the area between Busselton and the wreck of the Swan as a "whale highway". This contrasts with Fisher 1, who feels that fewer whales are now seen in Geographe Bay than previously. John Wise suggests that whales have always washed up in Bunker Bay, and has a photo of one beaching that occurred there around 60 years ago. John also identified two beaches near Bremer Bay and the beaches at east Augusta as common sites for whales to become beached.

Dolphins were not mentioned by many interviewees, but Fisher 1 described their persistence in Geographe Bay, from an Indigenous perspective:

"For as long as I can remember there has always been a large pod of dolphins in the area. They've always been there. It's probably the salmon. Old stories I can tell you that were talked about, is of them rounding up salmon as a catch and bringing them in closer so that we knew that we could catch them. So there was a really close cultural connection to the dolphin."

SHARKS AND RAYS

Most of the interviewees who mentioned sharks noted that numbers of grey nurse (*Carcharias taurus*), bronze whaler (*Carcharhinus obscurus*), whiskery (*Furgaleus macki*) and gummy (*Mustelus antarcticus*) sharks appear to have declined, while numbers of white pointers (*Carcharodon carcharias*) had increased along with the rise in the seal population.

John Williams recalls that when he and his family went fishing for dhufish or groper near Augusta in the 1940s, they would often inadvertently catch sharks, suggesting that they were reasonably prevalent at that time. He believes that small sharks have since become less common in the area, 'since it was a commercial proposition to catch them'.

Noel Wright, who was fishing professionally in the 1950s-60s, describes the decline in sharks around Cape Naturaliste:

"In the early days there were a lot more sharks, a hell of a lot more sharks around. In fact, you could just throw a line over the side around the Cape, around the other side of the lighthouse, in that area there and just drift with a line without a trace on it and you [would] pull up a shark and you might get half a dozen or so, just during the afternoon, while you're fishing for other fish."

This level of prevalence is also suggested in comments by Kerry King, who started fishing professionally in 1964. King chased sharks with camouflage netting in Geographe Bay: “we used to start at Wonnerup and end up down at Eagle Bay. We’d start in September and we used to get 60, 70, 80, 90, 100 sharks a day, gummies”. Over time King invested in larger and larger boats, presumably increasing the catch effort.

Noel Wright mostly caught whiskery sharks and gummy sharks, but he also recalls that when he started fishing

“there were lots of the small grey nurse around and I used to feel sorry for the grey nurse, because they were so weighty and so docile and once you got one, it was equal to six or eight of these other sharks and of course they were bonuses, but in the end they were becoming scarcer and scarcer.”

Neil Taylor also remembers often seeing grey nurse sharks off Peppermint Grove Beach in the 1960s. Fisher 1 says that the grey nurses “used to seem pretty big when I was a kid, but then things always seem bigger when you are younger. They were fairly prevalent, especially around Smiths Beach.” A perceived decline in numbers of this species is expected, given that its conservation status in the region is ‘Vulnerable’.

When fishing for salmon in Hamelin Bay, Noel Wright also used to pull in some bronze whalers. He also observed bronze whalers following fish that were being pulled in, out around Cape Naturaliste. However, he says that bronze whalers are no longer caught or seen in this way. Noel also observed dark stains on the livers of some of the sharks he was catching in the 1970s.

Peter Warrilow has observed a decline in sharks over a shorter time frame. Peter began fishing commercially in 1978 in the area from Black Point (south of Augusta) to north of Margaret River, up to 15 miles out to sea, with operations based mainly around sharks. When he first started, they “had some enormous catches” - sometimes 200-300 sharks at a time on a 26-foot boat. He continues: “And even today we have reasonably big catches but I think the huge catches are probably less: there are not as many spectacular highs and lows; catches are more often ‘average’.” He claims that prior to the advent of fisheries management in 1988, when “anybody could come and fish in the area with any amount of gear” he observed “quite rapid decline” of bronze whaler and whiskery sharks in particular. Furthermore, even with management regimes in place, the shark fishers have “seen an increase in effort and catch rates, which at this stage are not sustainable”. They have responded to this with “continuing gear-reduction to try and reduce [the] catch, to make the fishery more sustainable”.

Ray Walker, a recreational fisher, reported that in the early 1960s he would reliably catch carpet sharks/wobbegongs (Orectolobidae) in Cowaramup bay during the summer. Ray also believes that

the increase in whales and seals has led to an increase in the number of white pointer sharks: “They hang around the top of the Cape [Naturaliste] where that seal colony is there straight down from the lighthouse, white pointers have been seen there very regularly, from there across the rocky point”. Fisher 1, too, mentioned an increase in white pointers following the increase in seal numbers at Cape Naturaliste, while John Williams noted a similar increase in white pointers associated with the increase in seals at Augusta, and moving with the salmon schools. He says that a few white pointers have even been accidentally caught.

Peter McDonald a dive operator in the region since 1989 considers that stories of increasing shark numbers are exaggerated: “People keep saying to me that there are more and more sharks appearing. But personally I think it’s because there are more eyes looking for them.” To the contrary, he believes that:

“It would be really good if we could get some sharks swimming around the Swan Wreck. This area used to have a large shark population, but again the shark fishing pressure soon wiped them out. We do have an indigenous shark here – the scalloped hammer head (*Sphyrna lewini*) – that you see, and they are out there now. You see them on most days. They are only a small shark, they are inquisitive. They’ll come up and see what all the noise is. But they aren’t coming in to bite you, they are just coming in to say hello. It’s a lucky diver who gets to see a shark when they go diving, another one to put in the memory bank.”

Noel Wright believes that the decline of sharks has led to an increase in octopus, a major food species for other fish, and that this in turn has contributed to the perceived decline in fish such as dhufish and snapper. He believes that these fish:

“gorge themselves on the abundance of octopus and other things that’s out there and the amateur goes out there and nothing will bite and blames the fishermen. But it’s not that, it’s nothing to do with it. It’s just that the sharks have been pulled out and the octopus have [been] taking over (or the food is in abundance).”

Rays [probably *Dasyatis brevicaudata* (smooth stingray) and *Myliobatis australis* (eagle rays)] were mentioned by Neil Taylor, Terry Adams and Local 1. Local 1 refers to a massive stingray living in Cowaramup Bay, while Taylor describes the local tradition of feeding rays, which he says has been going on for probably 10-15 years. Taylor notes that:



Figure 2: Smooth stingray (*Dasyatis brevicaudata*)

“people can be grossly insensitive to those animals. I know some of them have been caught, and some of the locals make them put them back before they’re killed. And the biggest guys down there, they’ve got no tails, so they can’t sting you anyway...”

Terry Adams, who began diving for abalone in the early 1960s, recalls seeing white pointers and wobbegong sharks when diving, but he never really saw many, so is not able to point to any change in distribution. He did, however, see lots of eagle rays, and interacted with them over a number of years, even marking some to keep track of ‘locals’:

“when you pull out abalone and stuff, they’d come along and try to suck on the outside of the bag to try to get a free feed. You’d give one a feed and it would go away and chomp on that for a while, but 9 times out of 10 you’d still have about 10 or 15 of them around you. And, you know, I didn’t know which ones were being the naughty ones and which ones weren’t, cause you know I’d give them a bit of a conk on the head to get them out of it, not to hurt... just to say buzz off. Because they are very friendly. So I started writing my name on a couple of them, you know just on the black side. I’d put TA and then just a date say ’69 or ’79 or ’84. Then for years that same fish when it came back you’d could still see it on him. It would just change colour. And you’d get certain ones that had been there three or four years. We had one... it must have been Flinders Bay. But he used to come down there fishing near the moorings. And this huge shadow came over me. I wasn’t going to look, because I’d seen a couple of really large white pointers off the Cape. And I thought, ‘Oh no.. this could be it’. Then all of a sudden, this massive weight just settled on top of my shoulders. I suddenly realised that it was this giant black ray. Three giant prongs sticking out of its tail, and it probably weighed about 300 kilos. And it was sitting on top of me. Anyway, he’d been a local for about 9 or 10 years. For that long. They are incredible species. And all the ray species are.”

HERRING

Herring (*Arripis georgianus*) were reported to have been plentiful in Cowaramup and Geographe Bays in the 1960s, though one interviewee suggested that fewer were now to be found in the latter bay.

From 1962 Ray Walker, a recreational fisher, would reliably catch enough herring in Cowaramup Bay to live on for a weekend there during the summer. Populations most likely varied from year to year, however. Local 1 related a story he has heard about a bumper herring season in Cowaramup Bay:

“I think it was ’75. And there were so many herring in the bay this season that people would catch them on bits of straw on hooks. I think someone got a few 40 gallon drums full, I can’t

remember, maybe in a day. There were just so many fish... [Now] I don't think you'll get that many."

Herring have also been plentiful around Geographe Bay, though one interviewee reported that numbers have declined. Around the late 1950s/early 1960s Kerry King with his parents and two brothers at Bunker Bay used to be able to "get as many herring as [they] liked". Around the same time Bill Webb, then a child, used to catch herring with his family in coastal lagoons in the area. Using a matted plant they called "Devil Creeper", they would herd the fish into the shallows where they could be speared or caught by hand. Phil Tickle has observed a decline in small fish, including herring and whiting, in Geographe bay, which he ascribes to the use of nets by commercial fishers.

WHITING

Numbers of King George whiting (*Sillaginodes punctata*) were reported to have declined at Augusta, while numbers of yellowfin whiting (*Sillago schomburgkii*) have increased there (and possibly declined in Geographe Bay).

John Williams at Augusta considers that King George whiting used to be "available in quite big numbers here but they're targeted because they are such a lovely fish and people know where you catch them. They hammer them and they're getting much harder to catch now." Colin Price, a retired professional fisherman at Augusta, says that "you don't get many" King George whiting in the river there. Colin has, however, observed a large increase in the number of yellowfin whiting at Augusta: when he first arrived there, 50-60 years ago, there were no yellowfin whiting to be caught. But in the last two years, Trevor, Colin's son, has caught "more fish than [Colin] ever thought of catching ... a terrific amount" of yellowfin whiting. Whiting (presumably yellowfin) were a staple for Kerry King in the 1950s at Bunker Bay, but he believes that they are now under threat as a result of pollution from swimmers and outboard motors. As noted above, Phil Tickle also suggested that numbers of whiting in Geographe Bay have declined over recent decades.

TAILOR

Fisher 1 has observed a decline in the catch of tailor (*Pomatomus saltatrix*) over the past 20 years, though Ray Walker emphasises the cyclical variation in the prevalence of this species:

"I've seen tailor stock seem to get a bit thin on the ground every few years, which you can put down to perhaps breeding cycles, but I've never seen them go because of over-fishing, especially where we target them [Wonnerup]. [From] 25-30 years ago [we'd] catch 15 – 20 for tea, feed the kids, have a barbeque, but every now and again, every 5-6 years you'd go up there and you wouldn't get any."

Walker also claims that the tailor at Cowaramup are bigger than even five years ago, at 2 to 2.5 kg.

DHUFISH AND SNAPPER

Several interviewees noted that dhufish (*Glaucosoma hebraicum*) and snapper (*Chrysophrys auratus*) (the two often being mentioned together) have become either smaller or less prevalent, or both.



Figure 3: West Australian dhufish (*Glaucosoma hebraicum*)

Bill Webb, for example, stated that: “When I started working with handline fishermen [around 1969], our main target then was dhufish and snapper... We used to be able to

just go out and maybe sometimes catch 80! Eighty dhufish in a few hours. ...And I mean, we’re talking of dhufish anywhere from 30 – 50 lbs! 50 lbs fish is quite rare now.”

John Williams (Augusta) also observed a decline in numbers of dhufish and snapper over several decades. John Wise, who arrived in the area in the mid-1970s, likewise considers that “with fish like dhufish, you don’t get as many now as you used to.” Phil Tickle considers that both snapper and dhufish have become harder to find, and are generally smaller:

“It seemed to be quite unusual in the early days to catch really small dhufish, which would now be undersized by regulation, but these days the people that come here and go fishing, they quite often say, ‘We caught three dhuies today, but had to let them all go’, and that’s the general story.”

Tickle claims that as well as the smaller size, fewer dhufish are being caught, although he notes that their prevalence still varies from year to year:

“last year, for some reason, for a little period around this time of the year... about 12 miles out we found this area and, over two or three days, they all had at least one good day when they got (each boat) two or three dhufish each, and a few snapper and some good fish. They were really thrilled. And I thought, it’s great to see people catch fish again, but this year it’s dead again.”

Kerry King recounts fishing at a location in the west of Geographe Bay with his Dad:

“Now I have never seen so many dhufish, there were thousands of them and they were all heading north. They were three quarters of the way to the top to right down to the bottom and you couldn’t see the bottom. They were just dhufish. We were there for an hour and they were still travelling north.....that’s the only time I’ve seen such a huge school”

GROPER

Groper (*Achoerodus gouldii*) is a highly sought-after species, and was mentioned by several interviewees. It was generally believed that spear-fishing had reduced stocks of the fish in the 1950s and 60s, but interviewees differed in opinions as to whether numbers had recovered or not.

Kerry King says that the groper around Cape Naturaliste have:

“been caught out. Somebody with spear guns cleaned them all up. Because they were right in on the shore... we used to get a lot in those days, when we’d want a change of fish. They would be from the point of [the] Cape all the way around Fish Rock.”

John Williams evocatively describes a similar impact:

“spear fishing also took a terrible toll on the groper, because [the] groper is such a big and inquisitive fish. They come swimming right up to you and almost want to smile and talk to you and the saddest days were Mondays, after a long weekend, you’d go out to the rubbish tip here and find half a dozen groper on the rubbish tip from spear fishing. They’d shot too many and didn’t know what to do with them so they took them out to the rubbish tip...Great white hunters you know, coming in and having their photos taken with these beautiful big old blue groper. And then putting them on the tip.”

Ray Walker, however, describes problems with reliance on anecdotal evidence of decline in numbers of groper, and suggests that numbers have recovered since the heyday of spear-fishing for the species in the 1950s and 60s:

“I was talking to a guy a lot older than me... and he was saying that back in the old days, in the 30’s and 40’s when he was doing it, to go and catch 8 groper off the shore in one day was a common thing. But now he was saying he’d go down and he’d see only one, that was 20 years ago because he can’t go now, he’s too old, 85! And I actually told him that what’s happening now is that there’s probably the same amount of fish around, but instead of him catching 8, what’s happening now is there are 8 people catching one. He couldn’t see it at the start, but then he could see where I was coming from. The [decline in] fish stocks of groper, according to what he’s told me, happened before my time, in the 50’s and 60’s when the spear-fishing clubs were around and they used to absolutely blast groper just about out of the water, until they were nearly extinct. There was a lot of pressure on them and amongst all the spear-fishermen these



Figure 4: Western blue groper (*Achoerodus gouldii*)

days, there seems to be an unwritten law that you don't shoot and I for one know that there are a lot more groper around now."

Two other interviewees mentioned a recovery in groper numbers. John Wise says that at Bunker Bay, since "there are only two people really fishing out of here now, we are seeing more blue groper, a lot more fish coming back." Neil Taylor also says that "blue groper is one that I'd hardly ever see, but I see a few now". Terry Adams goes even further:

"Shark netting has been going on in the Capes region for 45, 50 years. And that has been [linked] to the demise of a lot of the groper in the area. That may have been the case in the early days, but I know from having our own boats that have been net based, our catch of the blue groper was never large, it was incidental. It was very important to us, when we did catch some of course, but it was never ever a large component. And whilst we don't see as many really, really large ones around when we are diving now, what we do see is an explosion of small ones. And I don't mean just a few. You can go anywhere in the Capes region now and ... with the number of small ones that are around I'd say there's going to be a very, very large population."

He adds that although commercial fishers in the area cannot explain "why there are more juvenile blue groper out there than have ever been seen before", the observation is widespread: "It's not just myself that's saying that... all the commercial divers are saying the same thing... It's common to come across a reef now with 30 or 40" juvenile blue groper.

SALMON

There seems to be broad agreement that salmon (*Arripis truttaceus*) numbers are variable, but in recent years this species has been plentiful, compared with earlier years.

Fisher 1, with 20 years' experience in the region, notes that there is still a 'lot of salmon' around. Trevor Price, who fishes professionally in the Blackwood River at Augusta, says "I've been fishing for 38 years in the river here. And the last two to three years have been the best." He also notes that there used to be nine professional salmon fishing licenses in the river; his is the last one. He considers that "there's probably room for two or three" licenses, but also that being the sole fisher allows him to manage the fishery better:

"I've gone up in my net size over the last couple of years a 1/4 inch, which is a lot. ... You don't have to catch so many fish, especially when you fillet them. The fish are bigger, and you are leaving a lot of the smaller fish there for breeding."

Kerry King, who was born at Cape Naturaliste and has lived there for 62 years (fishing professionally from around 1964), agrees that “these last few years there’s been a lot of salmon around.” Kerry also commented on the variability of salmon populations from year to year:

“I’ve seen salmon in Easter time, stretching from the whiting patch, right to Rocky Point, just one big mass of salmon. From about 50 yards to shore, to about 200-300 yard wide.... Now you wouldn’t see that all the time, you might see it once every five or six years like that.”

He remembers times “in the early days, when you were battling to get a salmon” though he also believes the fish are very sensitive to pollution and noise.

Terry Adams has been fishing for salmon since he “was just a teeny totter”, when his father was a salmon fisher at Cheynes Beach (probably in the 1940s). He has remained interested in the fishery all his life. He says that salmon numbers:

“definitely move in spikes. Some years, environmental conditions are better on the west coast. Other years temperatures are not so good and they just stay on the east coast. [In the] last 3-4 years there has been a massive increase of fish on the west coast. Probably more than have ever been seen...”

He also thinks that some of the decline in various [other] species that has been attributed to overfishing could in fact be the result of predation by large schools of salmon:

“If you take 15 000 tonne of salmon into the Capes region, and leave them there for six weeks (which they do stay there now for six weeks), assuming those fish eat their body weight in 2-3 weeks. Immediately after spawning they are highly voracious and eat anything they can... I can assure you that 10-15 thousand tonne salmon, over that time, will eat 10 – 15 thousand tonnes of food. Put that into an equation and that’s more fish than all the recreational and all the commercial fisherman have ever caught off the Capes.”

Terry says the salmon:

“eat everything. They are voracious after spawning. Particularly on those small migration species, no matter how big they are, 30 cm or 50 cm. Garfish, squid even, or small snappers. So a school of 500 or so voracious salmon, and they move into areas such as Hamelin Bay. And they don’t leave much behind when they’ve been through. And what they do leave behind have often been pushed out onto the beach. I’ve seen tonnes and tonnes of herring washed up on the beach, where they’ve tried to evade marauding schools of salmon.”



Figure 5: Shore fishing on south west beach

Terry further suggests that the ability of large canneries such as Heinz and Kraft to buy 'offshore tuna' species from overseas has made the Western Australian salmon fishery uneconomic, particularly as the species has to be handled carefully to maintain the quality. He considers there is an opportunity for smaller catches but higher quality, value-added fish.

TUNA

Tuna (Scombridae) were mentioned by two commercial fishers, who both noted that a decline in the size of fish caught spelled the end of tuna fishing in Western Australia. Trevor Price mentioned that tuna fishers stopped catching tuna as large as those off Victoria and South Australia, so the licenses were bought out. Terry Adams also considered moving into tuna fishing for a while but only got a small quota, which would in his view not have justified the requisite investment in infrastructure. Adams explains that this was particularly critical because the area off the Capes "really wasn't the best place to fish for tuna because they were very immature... you took a lot of numbers for very little kilos". Adams also considers that:

"The Western Australian waters have been fished by the Japanese and the Chinese for many years. They pretty much stuck to their arrangement, stayed off shore, they fished mainly for those species. But when the Australians took over... they exploited way, way too many... they had excess fishing effort, which lasted three years. Three years! And that was market driven because the price was extremely high. The price dropped a little bit and the operation became nonviable. Plus the size of the fish dropped, and the fish were worth less, again. So two economic corrections, and the entire fish species was put under pressure."

ABALONE

Abalone (*Haliotis* sp.) have traditionally been used by indigenous and non-indigenous fishers as bait for groper. Kerry King, for example, never used to eat abalone, but did use them as bait. A market for abalone from the south-west of Western Australia only emerged in the 1960s, and local prices rose in the 1980s when exports to Asian destinations such as Hong Kong increased. No clear trend in relation to abalone numbers emerged from the interviews, and it appears that depletion and recovery may be quite localised in nature.

The interviewees included two professional abalone fishers: Abalone Joe and Terry Adams. Both entered the industry in the 1960s, and had views on the impacts and management of the industry. Both refer to the decision of those in the industry to take only larger abalone (Abalone Joe indicates a lower limit of 75mm) so as not to conflict with the recreational abalone fishers (who can take 60mm

abalone). The two diverge somewhat in their views on the impact of the commercial abalone industry on stock levels.

Abalone Joe describes some of the industry's lively history. In 1968 he and a friend used to go out on Saturday and Sunday morning and get 6-8 bags of abalone worth \$80, though as the market wasn't stable, it couldn't be relied upon as a source of income. Abalone Joe says that around this time, he lobbied the Minister for a licensing system, and when it was introduced, approximately 82 licenses were issued. Then the market collapsed; only about 14 people renewed their licenses; 2 of those breached the conditions so had their licenses taken away, so there are only 12 licensed abalone fishers now. In the early days the catch taken by the licensed fishers varied greatly. One of the less reputable operators allegedly outsourced his diving to "uni-students working for 10 cents per kilo or something, a few flagons of wine and a few prostitutes to keep them happy. He used to go once a day and pick up a double axle full of abalone." Competition between divers could be fierce, particularly when prices were high, and prior to the introduction of quotas. Abalone Joe recalls: "I had my flying foxes chopped down, they urinated in my tanks, they put sugar in my boat tank, and that was all abalone divers. I had a 9mm on my head one day." He considers that even in recent years, as the industry has matured, "some of the major spots get hammered too much by professionals", although in the last few years "they've started waking up." He also says that the extended period over which the abalone are taken is a concern. He used to work from October to January/February and the abalone had 8 months rest...

"But now we're starting in April, thanks to Fisheries and a few idiots that fish. We used to get abalone, in places I used to work, up to 110 – 120 mm. You won't see them now, because it's constantly worked. As soon as the weather is OK somebody's in. So hopefully sanity will prevail and we go back to this short term work."

Terry Adams is more convinced of the sustainability of commercial exploitation. He began fishing for abalone in the early 1960s, but found that there was virtually no market for it. When prices increased (to around 50c per kilogram) in the late 1960s, abalone fishers like himself:

"found that fairly large patches of abalone stock were in the Augusta, Cape Leeuwin region. And we thought that we might move over there for a few months and work it and see how it goes. We thought we had about six months work there, that was in 1969, and what's the date today? 2006. So that proved to be very wrong, in fact there is a very, very highly sustainable fishery there. Not only just there, but further up the Cape and off shore."

They mainly fished for abalone in spring. He says that the areas fished for abalone now are generally the same as those that were being fished 25 years ago - the fishers go back to the same areas. He does not, however, believe that they are being depleted; instead, he suggests that the resources available to the remaining stock mean that they mature faster:

"with abalone, there are plenty of them. We've been harvesting them for 40 odd years in the same area. And the life cycle or the generations of them, where they used to be five or six years

old, now [for] the same height and width and same size and they are probably down to four years old. So they are able to put into their system, the availability of the food chain, and move out at an earlier age. Now they are out at four years old rather than six years old. And that is just as a direct result of fishing. And in some areas they have actually increased, simply because they've had the opportunity to come out at a younger age. So really if you fish within the life cycle, whatever that may be, then the effects are limited. There is an effect on the population, but at the end of the day they have the ability to recover very rapidly. So you only got to wait just a few years and you've got the whole population back to where it was."

Adams has also observed that "Some of the areas that I know, that I call recovered reefs, are areas that have never had a lot of abalone on them. Well, 5 or 6 or 7 years later, they have heaps of abalone", and he thinks that this may be due to the predators of abalone having been caught.

John Wise, a recreational abalone fisher, recalls that there used to be many large abalone off Shelley Beach, and it used to be that he could go out to a particular spot and in five minutes get five or six abalone for a meal; around 6 years ago he went back to this place and the abalone had been cleaned out. He says: "Now, you really have to search. They're coming back a little bit..." Ray Walker believes that restrictions on abalone fishing in Perth have, over the last two to three years, put more pressure on fisheries around the Capes. Abalone Joe has, on several occasions, witnessed amateurs taking abalone in excess of the bag limits, and he spoke about the difficulties of policing those limits.

CRAYFISH

Crayfish (*Panulirus cygnus* and *Jasus edwardsii*) were eaten by Aboriginal people in the region, who identified ledges where they could bait or watch for crayfish and then spear them. Among non-Indigenous interviewees, the prevailing theme was a decline in the number of really large crayfish.

The size of crays that could be had in the region has become the stuff of legend. Thus Kerry King tells a story about an engineer who was working on the Bunbury power station, and one Sunday asked for double time:

"And they said, 'Double time, you're lucky you've got a job here. What else would you do in this Godforsaken place on Sunday?' and



Figure 6: Crayfish or Rock lobster (*Panulirus cygnus*)

he said, 'I would go diving for crayfish, we have big crayfish here, six feet long'. And so they said, 'All right, you catch a crayfish, 6 ft long, and we'll pay you double time'. So he went down to Gracetown Bay, free-dived with a gidgie, and he presented them on the Monday with a crayfish that was 6ft 2 inches long, from the tip of its tail to the tip of its feelers."

Some of the interviewees also, however, offered first-hand accounts of large crays. John Wise recalls camping at Shelley Beach around the early 1950s and seeing some divers come out of the water with huge crayfish, of a size not seen any more. Similarly, Neil Taylor says that when he would go out on his boat to catch some crays for his family, he used to be able to "jump off and get a large crayfish, a jumbo crayfish". However, he believes that in the last five or six years, since the commercial cray fishing fleet has been coming down to the Capes, the population of large crays has been "literally cleaned out", particularly in the areas close to shore.

CRABS

Few interviewees referred to crabs (*Portunus pelagicus*), but it appears that changes in the prevalence of crabs may be regionally-specific, with decline in the south of the region, and increase in the north.

John Williams recalls that at Augusta in the 1940s:

"For groper we used to catch crabs on the rocks and just put a whole crab on the hook. There were lots of crabs out here in those days and that's one of the sad things about being a keen fisherman, is seeing what's happened to the species."

He also refers to the current taking of king crabs (probably *Pseudocarcinus gigas*) at depths of over 100 m, for export to Hong Kong. Fisher 1 has observed an increase in crab populations in Geographe Bay, which he ascribes to a reduction in netting (as crabs were often taken as by-catch). Furthermore, both Fisher 1 and Bill Webb have observed an increasing number of mud crabs (possibly *Scylla serrata* or *Scylla olivacea*), a warmth-loving species previously not seen around Busselton.

OTHER AQUATIC ANIMALS

Interviewees referred to a range of other aquatic species. John Williams refers to an attempt to breed salmon trout in the Blackwood River a few years ago, which failed because the water was not kept sufficiently cool and clear. Others referred to the past or present prevalence of various wild species: Colin Price notes that yellow eyed mullet are common around Augusta; Kerry King would sometimes see a parrot fish or rock cod when fishing for whiting in Bunker Bay; Local 1 noted that cockles are still to be found in Cowaramup Bay: "Not as big, and not around the bay as much. But over the back there are heaps."

Ray Walker mentions that numbers of Mulloway have declined near the mouth of the Willyabrup River, perhaps due to dams on it:

“Willyabrup used to be an absolute spot-on area for catching mulloway... when the banks broke in winter all the little shrimps and black bream and all that got washed out, so there was a regular feed there. That coincided with their breeding time, so all the big females who came in there would know that there’s feed there for their breeding. And these things have stopped running. I haven’t caught a good mulloway there for 15 years.”

Fisher 1 also believes that a change in river water quality has affected the prevalence of cobbler. He says:

“the freshwater cobbler has receded from the mouth of the Vasse River and when I was younger we used to go along and catch 10 cobbler in one spot, but that doesn’t happen anymore because its too salty.”

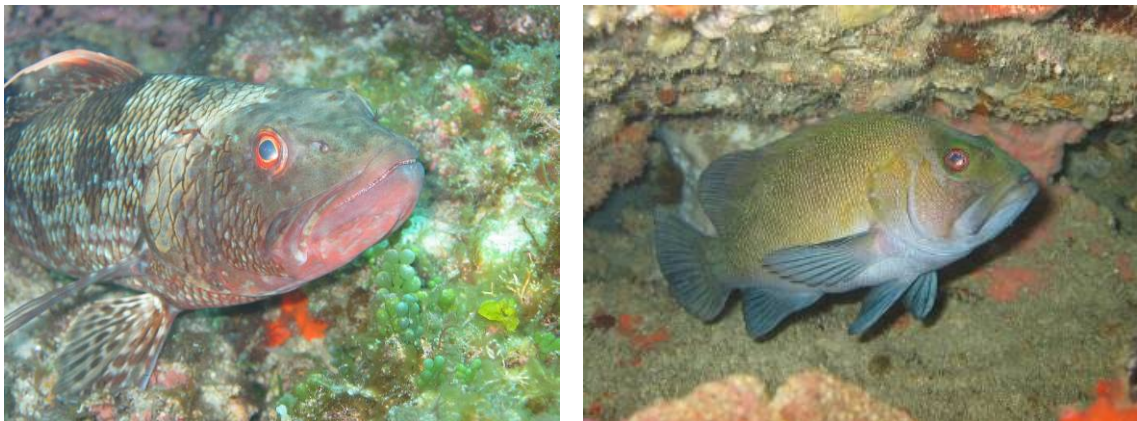


Figure 7: Sergeant baker (*Aulopus purpurissatus*) and Breaksea cod (*Epinephelides armatus*)

In contrast, Phil Tickle has observed an increase in numbers of samson fish, sergeant bakers and breaksea cod that are caught:

“It was a bit unusual to catch a samson fish, whereas now, as the other fish are going down, they have certainly bred up. Another fish that wasn’t often caught, or two other fish that weren’t caught anything like they are now, were Sergeant Bakers, they were quite an unusual fish, now they’re almost flooded out there, they can be quite numerous. And another fish that doesn’t seem to have suffered to the same degree, or has certainly increased in numbers is the breaksea cod.”

Finally, John Williams describes the South African leg worms that arrived with ballast from Cape Town deposited around Flinders Jetty by shipping in the 19th century. “This is one of the only places in Western Australia where there are these beautiful big leg worms and they grow up to metres long and [make] beautiful bait..”

BIRDS

Although the interviews focused on fishing, a few interviewees made passing reference to birds. Peter Warrilow considers that numbers of pelagic birds such as albatrosses have remained fairly consistent. Ray Walker described a similar consistency in the shore bird population, even though Local 1 mentioned that many people - especially surfers - take their dogs to the beach, where they chase birds. Neil Taylor described efforts to monitor and protect the red-tailed tropic birds; he also notes that gulls are prevalent; crows, kookaburras and pink & grey galahs are present, as is a large colony of white corellas (in town).

SEAGRASS AND SEAWEED

Four interviewees commented on changes to the seagrass in and around Geographe Bay, agreeing that it has thinned in some areas.

John Wise recalls seeing the floor of Geographe Bay after Scallop trawlers had passed: “it looked like a bulldozer had gone through. It had just torn the seagrass to bits.” Noel Wright, who started fishing in the area in the late 1940s/early 1950s has



Figure 8: Seagrass meadow Geographe Bay (mainly *Posidonia* and *Amphibolis* spp.)

observed that in some places the seagrass appears to be thinner; more sand is visible. However, this change is ‘not very noticeable’, and confined to a few areas only. Fisher 1 considers that around Busselton over the last 20 years or so, the sandy patches have grown as the seagrass has become sparser. Peter McDonald, of the Dive Shed in Busselton also noticed changes in the seagrass:

“Diving on some of the deeper seagrass beds around the Cape area there, you can see how healthy they are. Because there is little impact. People aren’t anchoring there, and there isn’t a lot of human impact on that. But you come into the shallower points, especially near Busselton Jetty and the boat ramps and especially where all the moorings and everything are put around the bay, and [you] can see how it’s either wiped the seagrass bed right out, or has damaged it significantly.”

Noel Wright described the role played by the seaweed in protecting the coast and providing habitat for snakes: “we always looked for the first blows to bring in the seaweed, because it’s protection for the edge here and the more seaweed that’s there, the more protection we get... the dugites love it when it gets there.”

MARINE AND COASTAL ENVIRONMENTS

Several interviewees commented on perceived changes in the coastal environment, centred around issues of contamination of rivers and streams with nutrients and pesticides; reduction of runoff through the construction of dams; and tourism-related impacts (in the form of higher levels of noise, rubbish and other pollutants). Observations were also made in relation to changes (particularly anthropogenic ones) in estuary and reef environments, and to currents and water temperatures. Finally, the social and environmental dimensions of jetties were described by two interviewees, and one Indigenous interviewee gave an overview of his perception of important habitats for marine life.

NUTRIENTS AND PESTICIDES IN RUNOFF

Some interviewees were concerned about the effects of nutrients and pesticides coming down in the rivers in the region, with a particular focus on the Blackwood River. Colin and Trevor Price were concerned about the nutrient and insecticide load in the Blackwood River, and also about the salinity, especially in light of plans to drain Lake Dumbleyung into the river (which Trevor Price fears will “pickle” it). Peter Warrilow also believed that the quality of water around the mouth of the Blackwood River was affected by nutrients and pesticides in runoff, and occasionally small oil spills from passing shipping. John Williams and Colin and Trevor Price all commented on algal blooms in the Blackwood in recent years, with Williams describing them as “the worst I’ve ever seen.” Colin and Trevor Price, too, indicated that there were large amounts of algae in the Blackwood in 2005/06. However, Trevor Price, too, thought that on the whole, the condition of the Blackwood River had not changed much over the last 40 years or so.

Peter Warrilow felt that in spite of some localised problems, the water quality offshore was “very, very good... one of our greatest assets.”

Terry Adams, who has fished around the region from the 1950s-60s says that from the 1970s, when the south-west became more populated and developed, he noticed a lot of changes in the water.

“Some of the days, things would happen and we’d have trouble catching certain products. Different species of fish would disappear, and different shellfish would disappear. And the majority of all that was because of local contamination. Run off from farms, run-off from dams. In the early days they used copper sulphate in dams to clean them out, or aluminium sulphate and they got into the water systems. Poor old molluscs and the shellfish couldn’t tolerate that. Only needed one part per five million and they’d keel over. So a lot of that had an effect in the local areas.”

He recalls that in the 1970s chemicals were used for defoliation in order to reduce fire risk, and that became a problem in several creeks and the Blackwood River in particular. In the early 1980s there

was an event in which, as Terry puts it, “the whole thing just died, we lost all of the molluscs.” Experts from the eastern states were sought, but they were unable to explain the incident. Terry and others therefore collected information themselves and compiled a list of recommendations to try to address the problem. Their efforts were reported on the front page of the *Daily News*. This, Terry says, saw him:

“branded a bloody raving fool [but] people who knew me knew I wasn’t. They knew I had shit returns and knew it wasn’t just something out [of] a text book. So it was a bit of an issue for about a year, but then it basically went away. People forgot all about it and got onto the business of it. A couple of years later, stocks started to return, increased over the years and they are pretty much back to normal now, but that’s in one area. Other areas they are still destroyed, only localised, but where ever you go you see the effects [of pollution from land-based sources].”

Adams considers that this kind of pollution, in nursery areas for fish, has had more serious impacts on fish stocks than amateur or commercial fishing. This effect is even seen in “some of the wrack areas in Geographe Bay.” He believes that effects are often worst the year after a major flow, and they may be found at all scales, including small creeks: “You can go anywhere you like up and down the Capes system here and have a look at what was and is, and you’ll notice, or understand. There’s hardly anywhere on those outlets where there isn’t some contamination.” He also believes that the salinity in runoff is not the problem, but other contaminants.

DAMS

Three interviewees mentioned the effect of dams on inshore coastal water quality. As noted above (under ‘Other Species’) Ray Walker has observed a reduction of flow in the Willyabrup River, due to dams upstream, and he believes that this has led to a reduction in prey for breeding mulloway in the area. Local 1, who is based in Cowaramup, also mentioned that dams reduced the water quality of local creeks, leading to a loss in fish habitat.

Abalone Joe is critical of the large dams allowed by the Margaret River Shire Council, not only because of their inefficiency, but also because of their effect on fish:

“There used to be at least 14 creeks running 12 months a year from here [Dunsborough region] to Augusta, and I know because I used to fish in front of the creeks because that’s where the nice big numbers are and I used to fish there and get the best abalone of the lot. Thick, fat, huge. Over the last 10-15 years, since all these big water holes have been created here, there is no running water any more; it sits there and evaporates, just for [aesthetics], just for looks...”

TOURISM IMPACTS: BOATS, NOISE, POLLUTANTS

Several interviewees had observed an increase in various forms of pollution associated with the growing numbers of holidaymakers visiting the area; some felt that this was having, or might have, significant detrimental environmental effects.

Ray Walker expressed concern over the increasing number of recreational boats in Eagle Bay, Meelup, Rocky Point, and the oil they released into the water. Kerry King was similarly concerned about the impacts of boats with outboard motors, and swimmers with “handfuls of sunburn cream on them. They dive in there [and] over a few hours, you can see that oil going out to sea for miles.” He believes that this, and the oil from outboards, will eventually “kill the ground and fish”; the fertiliser used on vineyards in the region only compounds the problem. Kerry also believes that the numbers of people and boats are also creating a shorter-term problem: “It’s the noise that’s frightening. I’m talking about the inside fishing, it’s why the people are grizzling, they can’t get a fish off the beach, its because of the noise and the pollution and too many of them.” In a similar vein, Local 1 expressed reservations about the effect of mass tourism on the coastal environment, as well as the local community.

Neil Taylor has observed a lot of rubbish on the coast between Cape Naturaliste and Dunsborough, especially after salmon season and Easter - mostly packaging but also bait, broken thermos flasks etc. He sees rubbish disposal in the area as a significant problem, which may require more public education so that people take their rubbish with them (instead of an expensive system of bins from which rubbish has to be collected).

ESTUARINE ENGINEERING

Some interviewees commented on anthropogenic and non-anthropogenic changes in estuarine environments in the region, and some of the perceived effects of these changes.

Bill Webb believes that drainage of low-lying land south of the Dunsborough-Busselton road has resulted in the loss of important fish breeding sites. Noel Wright also remembers coming along the road between Busselton and Dunsborough in 1936 after a cyclone and finding that the low-lying area was flooded. He thinks one day the same thing may happen again. He has also observed shifts in the shoreline in this area: sand moves from Dunsborough around to Busselton, and as it does the drains tend to move northward.

Bill Webb suggests that in the Wonnerup estuary the combination of elevated nutrient levels and the installation of flood gates (which he believes prevent flushing of the estuary), have led to algal

blooms, deoxygenation and large-scale fish kills. He describes the complex system of interconnected lagoons around the estuary, and how as the water receded in summer, fish:

“could still get out and they could still come through and feed and breed... and as the tide started dropping, well the fish would know as the tide dropped, they'd need to move back out. And that's what we've seen behind some of the big flood gates... they get caught behind there because they close the flood gates right up, so the water does not go back in there and our feeling is that they should be a bit more considerate in getting all the cows off there and allowing the water to go back in”.

In Bill's view the fish mainly affected by this problem are smaller species like whiting, mullet, pilchards, bream, and herring, as well as small tailor. Bill says that these fish rely on tidal movement: “they really need that salt water, so if that goes in, you'll see them come in a lot”. Their range, however, is restricted to certain parts of the estuary.

Hardy Inlet, at the mouth of the Blackwood River, was also subject to a local engineering initiative in 1945. John Williams tells the story:

“When I first used to come down here the river mouth was about 2 kms around the coast and Jimmy Woods, the pilot of a plane, used to come and land on the beach and do joy rides here in the 1940s. Then that migration of the river mouth had a disastrous effect on the river, the river was silted up and there were very few fish in the river. So some local fishermen decided to put a new mouth so they went down there with a horse and a scoop and they dug a channel and of course nature did the rest and soon the daily influx and outflux of the tide dug a new mouth, right in by where the playground is now... and the river changed completely. It then contained fresh clean sea water and the fish population went up enormously in the river and pelagic species came in from the ocean into the river—mulloway and big skipjack—and the whole fishing situation improved. ...the people who lived here enjoyed having fresh water in the river. But slowly, slowly since then, that was in the 1940s, the mouth has gradually migrated further east again and it's now around nearly as far at the end of what we call the Deadwater, which was part of the old river system and it will meet a big ironstone ridge there. It won't go any further than that and the locals are frightened that when it gets there it's going to silt up again and block the river off. So what will happen then when the winter floods come, the water has to get down to the sea somewhere and it takes the line of least resistance. So there's a lot of conjecture now as to where the mouth will end up. And those people who can remember how nice the river was when the mouth was back here are having some discussions about the possibility of putting a new river mouth in.”

Colin Price was one of those involved in the scooping operation. He, too, notes that the river mouth is “gradually going back, and it's going right the way down. It will end up where it was”. He opposes a marina, and thinks the bar should just be removed again.

JETTIES

Jetties were discussed by two interviewees, as a significant element in the coastal environment. Where they are functional, they can be important community sites, but also sites of potential conflict and increased human impact.

John Williams described how he made his own diving gear in order to explore around the pylons of the old Flinders Bay Jetty, which was, he says “a great habitat for fish”, as well as a place where interesting old crockery could be found. As noted above, it was also home to exotic South African leg worms. Neil Taylor talks about changing uses of the more enduring Busselton Jetty, which prior to sustaining severe damage during Cyclone Alby in 1978, was a centre for local community life:

“Particularly on a really hot holiday, in the afternoon, like school holidays, everyone would come down to this fish and chip shop there. The whole family would be swimming and eating fish and chips on the beach and you just about knew everyone else on the beach.”

More recently, however, there has been conflict between the needs of an underwater observatory at the end of the jetty, and fishers who insist on fishing from the end of the jetty. Boats can also come in and fish close to the observatory, and some divers ignore the signs telling them not to dive there. Neil believes that in this instance, the marine environment experience that is being sold to visitors is incompatible with continuing recreational fishing in the

immediate vicinity. He also believes that the quality of the environment around the jetty has declined. Furthermore, there is a lot of rubbish in the area: fishing line as well as “buckets and plastic bags, and hats and fishing knives, everything”. A lot of the rubbish comes from the increase



Figure 9: Geographe Bay and Busselton Jetty



Figure 10: Gnarabup boat ramp / jetty

in packaging (of bait etc.), which is taken onto the jetty or boats, and accidentally flies into the water. Bottles and cans, however, are sometimes thrown.

REEFS

Four interviewees referred to decline in the health of reefs in the area. Peter McDonald noted the apparent effect of the Busselton canal development on the reefs offshore from Forrest Beach:

“[this was] an area that we used to take the schools for snorkelling tours and stuff like that, but with the development of the canal lots at Busselton, going through the fossil layer there just puts a fine powder over everything, and the reef that was very vibrant and healthy is now just a skeleton of itself.”

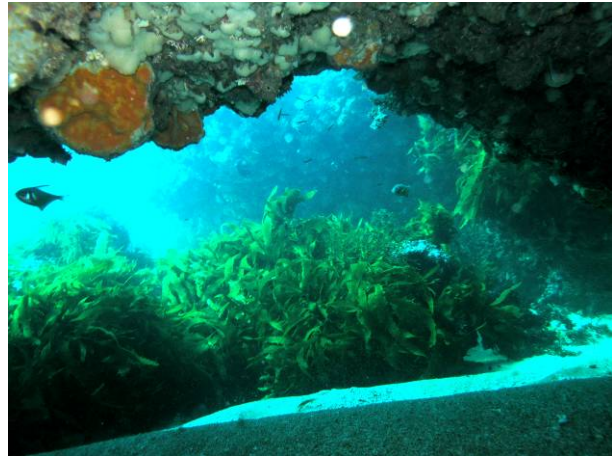


Figure 11: Cave in limestone reef.

Neil Taylor observed a similar change in what is presumably the same reef (off Forrest beach):

“I would go there with my spear gun and spear a couple of fish, get a couple of crays, but the reef was just alive. You’d go there now and it’s covered in green slime. You know, it’s just a shadow of its former self. I don’t understand what’s happened there in terms of the change in the reef, but it used to be really attractive and now it’s pretty dismal to look at a lot of it.”

Terry Adams also noted the demise of coral in Geographe Bay due to sediments, while Peter McDonald believed that some reefs in the area had suffered from trampling.

IMPORTANT HABITATS

Fisher 1, a younger Indigenous man, listed areas that he understands to be particularly important breeding sites for marine species. They included the Wonnerup estuary, Cowaramup, Canal Rocks:

“definitely some of those rocky spots, because there is a lot of activity just around that area. And then also some of those ones that are out from the coast a bit, particularly when you go down towards Windy Harbour. There are a few rocks out there that have a large dhufish population – and a lot of juvenile species. Down near Augusta [there] are particular areas.”

CURRENTS AND WATER TEMPERATURE

Some of the interviewees described their perceptions of the qualities of the area, and changes in it, with reference to ocean currents. Peter Warrilow believes that the Capes area in general is quite species-rich because of the interaction of the warm Leeuwin current with the cool Capes current. John Wise described his belief that the currents are changing, offering this observation as evidence:

“we’re getting tropical fish, golden trevally, dart, things like this. The other fish that we used to see a lot of, not that Kerry and I fish that far out these days, but very rarely do we catch a sweep, whereas once upon a time you’d always catch sweep. It’s gone to the cold water...”



Figure 12: The Leeuwin and Capes Currents, from CSIRO 2001 [14]

John has also heard reports that mud crabs were being caught at Augusta, Denmark and at Bunbury, and commercial fishermen in Fremantle told him that they were catching swordfish and billfish 200 kms west off Cape Naturaliste because they said when you look at a satellite photograph—those boats are downloading infrared photos—it showed a huge pool of warm water, 200 kms west of Cape Naturaliste and that’s where they were targeting and they were unloading trunks of fish, no tails no heads, up to 9ft long.

Bill Webb, too, believed that in recent years people have been catching more northern species such as mud crabs (possibly *Scylla serrata* or *Scylla olivacea*), Spanish mackerel (*Scomberomorus commerson*), baldchin groper (*Choerodon rubescens*) and coral trout (*Plectropomus leopardus*) around the Capes—an indicator, perhaps, of warmer water further south than previously.

TECHNOLOGIES

Technological systems are an important element of the historical context, which must be taken account of when seeking to explain observations of change in marine environments and animal populations. Most obviously, larger, more powerful boats and GPS technology have enabled more fishers to fish further from shore. This section therefore presents and discusses observations of the kinds of fishing technologies used in the region, as well as some perceptions of their effects. All of those interviewed referred to technologies and technological change, with many concerned about the impact of the greater efficiency achievable with GPS, echo-sounders and faster boats, as well as nylon nets.

ABORIGINAL TECHNOLOGIES

Bill Webb, an Indigenous man from the Cape Naturaliste area, says that the species traditionally eaten by the Wardandi Aboriginal people included sharks, salmon, dhufish, and groper, which would occasionally be speared. However, the main species of fish eaten were those caught in fish traps, predominantly whiting, mullet, bream, pilchards, small tailor and herring. Stories about the fish traps go back to the Baudin expedition in 1801 when, Bill says, the visiting French used the fish traps in the Wonnerup Estuary. The traps were very productive, providing food for clan groups for around the area (as well as the French navigators). The traps relied, however, on the channels being open, so the fish could move in and out freely. Now, such movement is often restricted by flood gates in various areas, especially Wonnerup. Bill says that Aboriginal people would “visit the fish traps, at a certain level when the stakes were just starting to show out of the top of the water. So when they rushed the lagoon area on the one side, they’d start spearing as many [fish] as possible, dirtying up as much water and making the fish panic, more than anything, to spew out through the keyhole and they they’d use the kali, or the two long handled boomerangs, to just slice through the water, and as the fish are pouring out like that, you can cull them quite easily”.

The Aboriginal people of the area also ate abalone, periwinkle, and crayfish, the latter of which they would catch (at least in recent times) by tying up kangaroo bones and throwing them under ledges as bait to attract the crays. John Wise also says that there are shallow depressions in rocks in the region, where Aboriginal people used to crush abalone to catch groper.

Aboriginal people were also adept at interpreting changes in various terrestrial species as indicators of seasonal changes that also influenced the behaviour of fish. For example, Bill said: “As you can see now, the marri [are flowering]. That tells us that the salmon and the herring are around, so they’re precise to changes in the atmosphere and water temperature as well. [This] is when they’ll come to breed. From those sorts of signs we can utilise and... go to those places where we catch fish.” Bill gave another example: “in [a place in Geographe Bay] there, and that’s specifically for the skipjack, because end of March, April – April, May they start to school up and that would be another sign. We like [‘Inge bush’?] what Injidup is named after, our big cape over here, [Inge?] is the place of the ceremonial pea plant and we know when that flowers, we know they’re there and they’ve migrated to come in to breed, so that’s why the fish traps are there. In 1969, when Bill was fishing professionally, he walked out into shallow water at this place at night and when he turned the torch on he saw thousands and thousands of skipjack schooling there.”

TRADITIONAL NON-INDIGENOUS FISHING, NAVIGATION AND FISH-FINDING

There is a rich non-Indigenous fishing lore that describes the best bait and rig to catch particular species. Some of this knowledge is closely guarded by individuals or groups, but some was touched

on incidentally during interviews. For example, Kerry King said that in order to catch groper, he “used to [get] the abalone, get a bag full of them, crush them all up” (like John Wise claims that Aboriginal people in the region did). Other interviewees referred to methods of locating fish prior to the days of GPS and echo-sounders. Phil Tickle says that from the 1940s until the advent of GPS (which became widely available from the mid-1990s), most fishing was done either with reference to landmarks, or by looking at the bottom in shallow water. The first technique was limited to fishing within eight miles of the shore. Without GPS, fishers:

“relied on finding a spot by land and marking it by lining [it] up... with land marks, and that in itself was quite an art, though I don’t think many novices would realise how you would actually do this. You can only do this, of course, within easy sighting distance of your coastline and this is where you fish further out, say beyond 10 or 12 miles of a low coastline and it was pretty well impossible to find it twice, but with a GPS it’s very simple...”

Bill Webb describes the captain of his commercial fishing vessel navigating in this fashion to prime dhufish sites around 1969; Neil Taylor, too, remembers fishing in this way, using a tall tree or chimney on shore to navigate. The second technique relied on use of a “water glass,” and was limited to shallow water. Tickle explains that most of the local fishermen who fished in Geographe Bay in the 1940s and 50s

“had glass panels built into the bottom of their boat, like a box with a glass viewing panel in the hull, and just cruised slowly along, gently up to about the 20 metre mark. They were 10 fathoms deep [and] when visibility was good you could see the bottom and pick out fish.”

Fish targeted in this way included dhufish, snapper, groper, queen snapper and other “bigger varieties.” Noel Wright was drawn into fishing professionally after the war when he was fascinated by other fishers talking about how they used the water glass to look for fish and catch them.

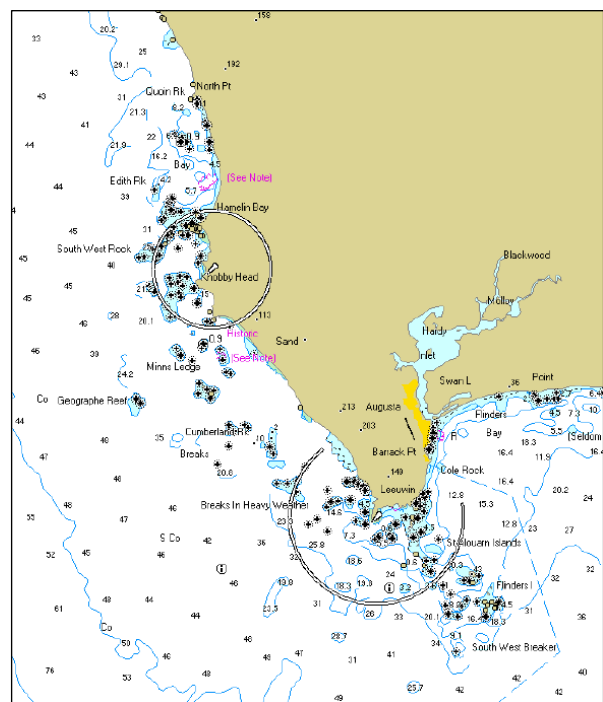


Figure 13: GPS chart output of Cape Leeuwin, from Garmin 2006

STORING AND PRESERVING FISH

John Wise describes how Kerry King, as a young boy living on 300 acres at Cape Farm (Bunker Bay):

“they had no refrigeration, so Kerry’s dad would say (there were three boys, Kerry and two brothers) ‘fish for tea, get one or two salmon, but there’s no point in catching any more because we can’t keep them.’ Although they smoked a lot of fish to keep, a lot of herring.”

The ability to keep the fish was understood here as a limitation on the number of fish to be caught, although as John Williams’ story about the blue groper dumped by spearfishers suggests, lack of refrigeration did not always stop fishers taking more than they could eat in a day.

Kerry also remembers that in his youth, the dhufish boats that used to anchor in Bunker Bay would go out for approximately two weeks at a time, and they would keep only the dhufish they needed, letting the others go, cleaning each fish carefully inside and out, and keeping it on ice and salt. The fishermen would anchor at Bunker Bay to eat, as it was a safe anchorage, and barter fish for fresh milk, mulberries and figs from the King family at Cape Farm.

GEAR (NETS, DIVING, ETC.)

Several interviewees referred to the changes in the type of nets used in fishing in the regions, with some criticism of the waste involved in net fishing. Commercial shark fishers adopted the new style of nets, along with larger and faster boats, largely in order to remain competitive. By contrast, technological change among commercial abalone fishers appears to have been driven largely by safety concerns, as the drive to increase efficiency was limited by the quotas.

Phil Tickle, Noel Wright, and Kerry King spoke of how, after the Second World War, some fishers bought up old camouflage nets, and adapted them for use in fishing by rigging them with lead weights and corks. However, soon more efficient nylon nets came into use. Phil Tickle describes the changes:

“nets went from being just a cotton net, to stretchy nylon nets that grabbed the fish. Of course these were much more efficient at getting fish like dhufish and other fish with gill plates and little corners on their mouths that get stuck in the net. The sad part of it is that, apart from the [fact that] fish that are pulled 24 hours later aren’t as good quality as the freshly caught fish, they tend to roll out of the net as the net’s being pulled.”

Phil says that these nylon nets are still being used in Geographe Bay, though it appears (to him) that relatively little is caught. Phil has been trying for years to have the use of such nets banned. He points to South Australia, where all of the main bays around the Eyre Peninsula and gulfs are closed

to nets, and when Phil visited there two years ago, the small fish were plentiful. In a similar vein, John Williams discussed the size and wastefulness of shark nets used from the 1950s, when nylon replaced the camouflage nets. He says that there used to be about eight commercial fishers based in Augusta using nets; now only a couple do.

The waste involved in set netting was described by three interviewees. Noel Wright suggested that some wastage was weather-related:

“If you set a net, you had to go back next day to pick it up and if the weather came up and you couldn’t get out, all the sharks would go off. And you know I’ve seen some days there when it’s been absolutely terrible. You know, you’re looking for fresh sharks and these sharks have been there for a day and a half and it’s terrible, you have to throw them back, throw them back.”

When he first began fishing, they were setting nets every day if the weather was good enough to do so.

Noel Wright, who started fishing for shark after the Second World War, describes the pressures that led to the adoption of new, more efficient gear within the fishing industry, including more effective nets and faster boats:

“...we got pressure from the other shark fishermen, the Mandurah shark fishermen pushed on the Bunbury fishermen. They pushed us, and you had to get faster and better and lighter gear, you know, more catchable gear and it went from camouflage nets to hemp nets and then to nylon and we changed each time, just to keep up with it. Boats became a bit slow and if you got a faster boat you could get out quicker and pull your nets before the others were out there, then you got a better position to put your net for the next night.”

Hydraulic winches and longer nets were also deployed in the scramble to catch the sharks.

Technology for diving, too, became more efficient and widely available over time, though even before the widespread availability of commercial snorkelling gear, some keen divers improvised their own. John Williams in Augusta was one of them:

“Well, we used to make the goggles out of big card tubing or tractor tubing, cut a ring and then cut two little holes for the eyes and glue some Perspex, and snorkels could be made out of anything. When I learned to swim in Fonty’s Pool in Manjimup, we used to breathe through bulrushes. You’d get an old bullrush and poke the pith out of it with a piece of wire and that was our hollow tube. And having access to plastic tubing from the hospital, I used to make better snorkels. But, we used to glue mud flaps onto the soles of my sandals to make flippers.”

He used this gear to explore around the remains of Flinders Bay jetty. By the early 1950s, John had purchased snorkels and flippers and was able to dive on shipwrecks in the area.

Those working in the abalone fishery also adopted new diving technologies as they became available. Terry Adams describes some of the factors driving technological decision-making among the fishers:

“We used to free dive, pretty small boats, shallow coastal areas only. Pretty basic, dived anytime we felt like it, stayed out as long as we felt like it. I was young and bullet proof. As time went on and we got a bit older, I suppose that came into it, and we had to start doing scuba. We had restrictions on what we could do, air wise. We improved our gear that way and got slightly bigger boats.... [Later we] used oxygen to decom. Using air tables, we were able to extend our hours out that way. We stayed away from mixed gases, simply because it was fairly clear to all of us that if we were on the mixed gases eventually we were going to reach the limits on mixed gases as well. So we decided to keep away from that, which I think was the best decision we ever made... at the end of the day if you had quota you could only take so much product. So I think if you’ve got quota you don’t really need to do the maximum amount of time. You can probably do it in less... Then we moved into the shark cages, which are hydraulically driven, with warm water piped to you, and a system of communication with the top which improved it. And then we got pretty efficient at what we did. The majority of people use the cage now. Some obviously don’t. Some just use the shark pods. Some just use the mobile cage with the mobile electric motor to pull you along. The cage gives you a little bit more protection, you know, if there is something around that’s a little bit on the hungry side. Given the fact that we had a couple of guys in our industry that were attacked, one lost his life and one guy was bitten fairly severely, we were pretty well aware of it. We had one guy die of an embolism. We’ve had a few tragedies in our own day so we probably have become more aware in that respect. You’re going to have some pretty disastrous effects if you didn’t do it properly and before we got unlucky, we chose to make it as safe as we could by using cages. And they are still used today.”

Cages require bigger boats, 22ft and upwards, but this has become feasible because the price of abalone has increased. The main limitations that drove the adoption of different technologies, as described by Adams were, firstly, limitations on free diving as the divers aged; secondly, a desire to extend the number of hours one could dive for; thirdly, and probably most important, were safety considerations. The need to adopt technology to increase efficiency (and thus the size of the catch) was limited, however, by the quota in this industry.

CHANGES IN MOTORS AND SIZE OF BOATS

There was wide agreement among interviewees that increases in the size of boats, and the power and reliability of motors, enabled increases in catch efficiency and size. However, we should not underestimate the capacity of fishers in the mid-twentieth century to follow fish along long stretches of coastline. When Kerry King was young, in the 1950s, the dhufish boats that used to anchor in Bunker Bay were 28-35 footers, some fitted with Lister diesel engines, though they mostly travelled

under sail. All were “based up the coast from Fremantle”, and after fishing around the Capes would sail back up there with the sea breeze. Local fishers, too, could be quite mobile. Phil Tickle used to fish inside Geographe Bay, until he built a bigger boat in 1957. Thereafter, he

“...was generally fishing four or five areas seasonally, in the early part of the year. I virtually moved outside the Bay when I got the bigger boat, just the odd times I’d fish in a 19 fathom or a 38 metre sort of rough area in the Bay, otherwise I’d be fishing on the Naturaliste Reef area which is 30 miles north, or early in the season I’d be fishing around the Cape, coasting from Cape Naturaliste down to about as far as Cowaramup where generally it was my daily sort of run from here [Siesta Park]. Then probably early in the season, say October, early November, I’d move down to Hamelin Bay and moor the boat there and travel down by road daily. Again in the Autumn, say through April, roughly, I’d fish down there which seemed to be a good time for dhufish and in between times in the summer, I’d generally fish well west of the Cape...So, I used to fish generally in that line out about 12 miles west of the Cape in the middle part of the summer and the Bay was secondary really. The Bay at that stage seemed to be a bit quieter, there were a lot more fish west, but I think it’s getting to the stage where both areas now are pretty heavily fished anyway.”

Increases in the size and mobility of commercial fishing boats in recent years led two interviewees to suggest that consideration should be given to restricting their movements, to achieve more sustainable harvesting. Thus John Wise notes that one of the cray fishing boats, “is 60 ft long and she can travel at 43 knots and so she can be here from Greenhead with all her pots within 24 hours.” He believes that this means that the crays can be exploited too efficiently, so professional cray fishers should be limited by zones, as well as by quota. Neil Taylor, too, believes that commercial cray fishers should be limited by zone:

“there used to be a different zoning scheme for rock lobster. The local fishermen then virtually fished sustainably (there were only a few of them anyway) because it was their area. At the moment you have so many boats that can come to this area and go up to Jurien, that, well they don’t really have their area. They have an enormous variety of coastline. So, grab it where you can, when you can.”

This effect has been exacerbated, Neil says, by the increasing size of the professional fishing boats, which means that they are not limited by the weather to the same extent as the smaller boats were in the past: now, they “are of a size that there are only a handful of days, literally, where they can’t go out.” Still, however, some fishers misjudge the weather, and wrecks are not unknown.

Some interviewees linked increases in the size and speed of boats with an extension in the range and efficiency of recreational fishers. John Williams described the transition from heavy timber boats with inboard motors, to aluminium and fibreglass ones with outboard motors (which he says were devised by the British for the invasion of Normandy, subsequent to which Seagull brand outboards

“flooded the market”). This change, he says, allowed recreational fishers to “travel a lot further and got to fishing areas that they couldn’t get to before”. This trend has continued, to the extent that when new fishing areas are discovered, they can be rapidly and readily exploited. John says:

“Just recently there’s been a big fish habitat further down the coast, a bit further out at sea, a bit further away from here than previously known. But because of the bigger and better boats and the bigger and better equipment, everybody knows about this place that they call the ‘kidney’. It’s [between] here and Black Point and any time you go down to the kidney now there’s three or four more boats there, all [fishing].”

Commercial fisher Peter Warrilow likewise emphasises that the increased availability and use of “bigger boats with more reliable motors that travel even further” by recreational fishers means that the effort in that sector has “increased dramatically”. Kerry King, on the other hand, emphasised the noise and oil pollution associated with outboard motors, and the impact that this is having on the marine environment.

GPS AND ECHO-SOUNDERS

The uptake of GPS and acoustic technologies was one of the most frequently-noted changes in fishing in the region. Several interviewees gave their views on the impact of these technologies, with most believing that they have increased the efficiency of fishing to the detriment of fish stocks. Neil Taylor observed that many recreational fishers now have better boats and equipment than professionals, and that the uptake of navigational and fish-finding technologies over the last 20 years has meant that the “ability to catch fish has been heightened enormously to the average punter.” Phil Tickle, who has seen the change from cotton to nylon fishing lines, then the advent of electronic fishing aids, thinks that the latter “have made it a lot easier to catch fish. But unfortunately it’s having a pretty adverse effect on the fish population.” Bill Webb and John Williams also expressed concern at the effects of electronics, which they expressed in terms of an ethics of fishing: that is, they felt these technologies gave fishers an unfair advantage over the fish.

Commercial fishers such as Terry Adams are concerned about the way in which the new technologies allow recreational fishers, whom he believes may not be so concerned for preservation of the resource, to exploit highly localised fish stocks. Adams also resents the way in which the new technologies allow recreational fishers to make use of commercial fishers’ hard-won knowledge:

“The commercial fisherman who has 20, or 30 years of knowledge, who happens to be fishing, when they see you they just lock you in. And they check out those spots after. Basically all those little spots you learn over the years, they can learn in a very small amount of time with a GPS.”

Commercial fisher Peter Warrilow expressed similar concerns:

“We see that in our day to day operations where 10 or 15 years ago a big boat in our area was a 15 or 16ft aluminium boat with a 50 hp motor, now we’re seeing 25-30 ft boats with 200 hp motors or inboard diesels with the latest electronic equipment, out fishing where we are, they come out alongside our boats with their GPS just to plot our ground and go back later to fish it. So they’re using our experience that we’ve accumulated over the years and they’re using today’s technology to pirate our knowledge that we want to keep to ourselves to protect fish stocks and I guess our own catching capacity.”

Noel Wright, too, observed this pattern:

“the biggest change of the lot is the number of boats with sounders and GPSs. You know, you used to take a whole lifetime to find a patch and you’d try to keep it to yourself, whereas you might be on it and these guys with the GPSs come screaming by, wave to you and digit-digit, and mark it down. Over a period of time, one special patch became everybody’s special patch...”

However, it is not inevitable that these technologies will be used to over-exploit particular fish habitats. For example, John Wise says that he and Kerry King:

“both used GPSs, we both use colour sounders when we’re fishing. I argue that if you are responsible, you can use them to save fuel, so Kerry and I might go once every six months to a spot to catch a fish, you don’t stay and hammer that spot.”

Phil Tickle proposes that GPS could also be used to collect information on the areas targeted by commercial fishers, for conservation and management purposes.

Ray Walker believes GPS and echo sounders increase the number of fish caught by recreational fishers, which he says is a bad thing. However, Noel Wright suggested that the new technologies could also have a more direct impact on fish: he believes that fish are scared off by echo sounders (and has carried out experiments that seem to demonstrate this effect).

ENVIRONMENTAL SCIENCE

A few interviewees referred to the way in which some commercial fishers were making use of scientific information in order to target particular species more effectively. One recent example was given by John Wise (above, under ‘Currents and Water Temperature). Terry Adams, who began fishing commercially in 1963, described the beginnings of fishers’ use of this kind of information:

“It was only the early 70s that people realised that water temperature had an effect on fish, on fish stocks. Many early scientists started talking about [how] migration of salmon, herring and tuna species, shark species and other fish species was related to water temperatures. With some

of the satellite images that were coming on board then, we started to get a better handle on that. Science at that time affected fishing. We took our own temperatures at sea but we could only take surface temperatures. When the opportunity came along, when we started to match that with satellite imagery, which was in the early 70s, along with our historical knowledge, along with the movement of those species, we started to get a feel for what was happening. That took place in the seventies, and the majority of fisheries I suppose understood then that knowledge gave them the opportunity to target their fishing.”

However, Terry Adams also points out that fisheries science can sometimes produce false estimates by ignoring the way in which some fish live in very limited areas (for example, populations of breaksea cod on one reef cannot be extrapolated to other reefs, as breaksea cod may not live there).

ATTITUDES AND MANAGEMENT

Oral history interviews provide evidence not only for changes in marine animal populations, coastal environments, and fishing techniques, but also changing attitudes toward fishing and its management. A dominant narrative involves a shift from untrammelled exploitation to an understanding that takes must be limited for sustainability. Kerry King experienced this transition personally:

“Well, you know we only have ourselves to blame for this [catching all the big fish and crays]. It’s greediness. Instead of going out there and getting half a dozen, you know just getting enough for your feed, they want to go out there and they want to catch enough for a month, two months. I was one of them, you know, go out there and catch, catch, catch; kill, kill, kill. Now you look back at the time and realise that it was wrong. You shouldn’t do that sort of thing.”

Most interviewees agreed that limiting catches was desirable and necessary, though views on the efficacy of the various kinds of limit diverged at times. Information on attitudes is not only useful for informing future management programmes, but may also assist with the estimation of past fishing impacts, and interpretation of data relating to same.

ABORIGINAL

Both Indigenous interviewees mentioned limits. Bill Webb spoke of customary restrictions:

“as we utilised it we weren’t allowed to deplete anything. It was against the law and our custom. So they were only allowed to take so many eggs out of bird’s nests. If the swans were getting ready to fly, it was just a nice prime time, out of a flock of swans we were only allowed to take two, if they had eight chicks. So that’s how the law and the customs operated.”

Fisher 1 gave a more personal perspective, not explicitly situated within an indigenous cultural framework, but certainly existing within one: “My old man was always strict about [limits]; also

whether it was male or female. We usually tried not to take females, mainly males, and not juveniles, or the small ones.”

BAG AND MINIMUM SIZE LIMITS

Phil Tickle says that in Geographe Bay, “I don’t find many people complaining about bag limits.” This may be, at least in part, because people are unable to catch that many fish, or have no desire to. Phil says: “I’ve never heard of anybody catching a bag limit of whiting...” Peter Warrilow supports the use of bag limits, but is critical of minimum size regulations, because, as he puts it, “very few professional or recreational fishermen can catch an undersize fish and successfully release it. In shallow water there may be one or two survive, but certainly out in the deeper water they die.” In Peter’s view, it would be preferable to reduce the bag limit and have no size limit:

“If they take three small dhufish instead of three great big ones, I think we are far better off ... we should be focusing on protecting the bigger breeding stock rather than the small juvenile stock that probably has a fairly high mortality rate anyway.”

Some have already adopted this approach voluntarily. John Wise’s son, for example, says “Big crayfish? Let’s leave them behind Dad, the breeders. I want my kids to have the same sort of experience and catch the same sorts of things that I’ve caught.”

CATCH AND RELEASE

Phil Tickle has observed an increase in the proportion of children who wish to catch but not kill fish:

“Kids are very good, they quite often bring up a good fish, an able fish in the bucket and show me and ask me what it is and they have it swimming the bucket of water and then they let it go. There is a big attitude change with kids and recreational [fishermen] that either release, or tag and release and just enjoy catching a fish and not many people abuse the privilege. By way of contrast, Phil says that “Years ago I used to be growling at kids all the time, for gidging every damn thing they see and throwing it off.”

Although Peter Warrilow (above) was not convinced of the ability of most recreational fishers to catch fish and release them such that they survive, some fishers have changed their approach specifically in order to increase survival rates. For example, Ray Walker, a recreational fisher since 1962, says:

“98% of the time I lure fish, then I release them. We’ve gone down there last year, caught 14 – 20 [salmon] in a day, let them all go. My fishing habits have changed a bit, I used to be one of these people who used to use light lines and you play the fish until it’s nearly dead and let it go and think you’ve done the right thing. Nowadays I use the heavier lines, I get them in quicker

and I let them go while they still have a little life left in them. ... I think that fishing habits have got to change for people if they want to protect the species.”

For divers, too, the emphasis has shifted from killing fish, to recording them photographically. Peter McDonald, who has been in the dive industry in the Dunsborough area since 1989, described how in the..

“old days it was like go out, kill and hunt. That is why you went scuba diving, because you had to collect something. Either for dinner or people were going out trophy fishing for the biggest fish, or for the shells and stuff like that. Now people go out with a camera, and that is all they are armed with, rather than a gun. I think that’s basically been through education, through the dive instructors... It’s better to take a photo and take a memory than take a gun and shoot it and not see it again the next day.”

MARINE PARKS/PROTECTED AREAS

Some interviewees indicated that they supported the concept of a marine park, with Terry Adams offering some more detailed views:

“I think when we talk about the Capes now, I think the biggest thing it’s lacking now is the opportunity to talk about the social problem of implementing a successful marine parks system, that doesn’t have to be managed and have exorbitant dollar costs and can also earn the respect of all and sundry who might use it in the future. Because, without those fundamentals it will not work.”

He is also convinced that marine parks should be habitat-driven, and should include a few protected areas, each including 2-3 habitats, rather than one area with all of the habitats. He describes the need for education, but also considers that marine conservation is ahead of terrestrial conservation in some ways, as many of the native species are still there in reasonable numbers. Still, he is concerned that management by ‘bureaucrats’ may not effectively tackle the big issues: “They can make a mistake, and it doesn’t matter, they can walk away from it.”

Neil Taylor, who has been working as a local liaison person for CALM, described the way in which he has been consulting widely with local people, including professional fishermen, about the proposed Capes Marine Park, finding out about attitudes towards a park, and what it might mean in terms of people’s current uses of the area.

FISHING COMPETITIONS

Two interviewees noted their concern about the impact of fishing competitions on fish stocks. Terry Adams outlined the potential effects of one large fishing competition (as an example of how

recreational fishers often fail to see the “big picture” of their cumulative impact), while John Williams described the demise of fishing competitions in Augusta, in the wake of heightened sensitivity to conservation:

“I personally was involved in a Voluntary Sea Search and Rescue Group here and relied in our annual fishing competition to raise money to keep our rescue boat in good order and so on. But I did notice after four or five years of running this competition that a lot of fish were killed unnecessarily, so we stopped running fishing competitions... it was making us a lot of money and we did rely on it and it was good and it was popular with the people but it wasn't popular with the fish... Initially I was torn, because it did get a lot of kids interested in fishing and I think it's nice to teach kids how to fish and to fish responsibly. So we'd give them a little talk before the competition started. You know, if you catch anything that's undersized put it back and so on. Anyway, now we've abandoned fishing competitions because they're probably not good for the fish.”

By way of contrast, Bill Webb says that in 2005 the Wardan Cultural Centre launched an annual fishing competition, “and what we deliver there is our cultural understanding about the oceans. Only take what you need for a feed but also trying catching and put them back, and treat them gently so you know they'll live.” Entrants are also encouraged to be aware of hazards such as slippery rocks, and to observe changes in the behaviour of fish. Bill hopes that such observations might be passed on “to someone, like a scientist or something, [who should ask], ‘Oh let's have a look and see what's happening there’”, leading to a greater understanding of any changes. The competition is therefore conducted with a view to encouraging greater sensitivity to both Indigenous culture, and the marine environment.

FISHING INDUSTRY

Several interviewees described their views on changes over time in the fishing industry. Some argued for reducing numbers of licenses and implementing strict quotas, to limit the potentially negative effects of commercial fishing and ensure that the maximum value is extracted from the fishery. For example, Ray Walker compared the estimates of value derived from a fish caught by a commercial fisher, with the much larger amount of money spent in the region by recreational fishers. Terry Adams, however, acknowledges that lots of people want to eat fish (without necessarily having to catch it themselves), and that we shouldn't import it from overseas. He believes that the top priority is therefore to “Be responsible for our own oceans. And that's a must.”

Phil Tickle was critical of the limited entry licensing system, as he believed that it gave established fishers what they considered to be a semi-permanent right to fish, amounting to ownership of the ocean. In Phil's view, the ocean should be a common resource, but because of the entrenched license

system, fishing rights have to be bought back at public expense. Others, however, felt that licensing of fishers could produce good outcomes. Recreational fisher Ray Walker, for example, felt that the abalone industry was an example of a well-managed fishery, because of the strict quotas. Abalone Joe says that in addition to an agreement among abalone fishers that they will take larger specimens than the recreational limit, “if an area is not really healthy at the moment and it needs recovery, we voluntarily cut our quota down by 50 kg each, to allow the area to recuperate.” Peter Warrilow also suggests that there has been a change in the attitude of professional fishers:

“in the early days it was a rape and pillage mentality by some fishermen. They thought that they had God’s given right to take whatever they wanted, whenever they wanted, and however they wanted and I think we’ve come a long way from that now and the majority of fishermen are fairly responsible. They want a sustainable fishery, not only for this generation but for future generations and I think, on the whole, the professional industry wants to be part of the solution rather than part of the problem....”

Peter also considers that one of the ways in which professional fishers have responded to the challenge of sustainable fisheries is to catch fewer fish and add value to those caught:

“where once upon a time we’d catch anything and freeze it and send it to the markets frozen, now we pack everything away on ice, they’re handled properly, they’re packed in specially insulated ice boxes, taken to Perth and either sold at auction or privately and we’re selling our fish to the public as a far superior quality product, I feel, and that’s being reflected in steadily increasing fish prices that we’ve seen in recent years. It’s probably good that the prices are increasing and probably compensate for catching, or being able to catch less fish in the future.”

Two commercial fishers felt that the system of licenses for particular species discouraged a more sustainable use of diverse resources by fishers: where they used to target various species when and where they were most prolific, they were forced by licenses to chase only a limited range of species. Trevor Price described this increasing specialisation in the industry:

“when I started fishing about 30 or 35 years ago I used to catch shark for probably 7-8 months of the year, but then when the weather was bad, I’d come into the river and catch whiting or black bream or whatever, through the winter. Through the cray season, we’d spend five months catching crayfish. We’d alternate that with the shark. But as I say, when the weather was bad we’d come back down into the river. ... But now that the fisheries have limited a lot of fishermen to what they can catch I... got out of shark and crayfish. I sold those licences off. And I just work the river now. And the couple of shark boats that are here are just specifically chasing shark. They’ve gone bigger and got bigger boats. Like we used to use 30-35 ft boats, 30 years ago. These guys have got 50-60 ft boats now, and they just chase shark. Crayfishermen just chase crayfish. The tuna boats, well there are virtually no tuna boats left, but when they were finishing up they were just chasing tuna.... fisheries have limited us guys to one or two fish species..., and instead of just picking the good times out of each fishery, now you are just sort of fishing for the one species.”

Terry Adams similarly spoke of the opportunistic nature of fishing in the 1960s:

“we mainly fished the abalone in the spring. Summertime is pretty difficult because there isn’t a lot of movement on the bottom, and they are pretty difficult to spot, plus the fact with the change in conditions. So we chased other things – and that just happened to correspond to tuna fishing. A little bit later, I suppose towards autumn, still a bit lean [so we] went Salmon fishing which took place then. Then we did other things like cray fishing and shark fishing. We pretty much did it all, just fished them when available and in sustainable numbers. We lasted about ten years doing it that way. Fisheries eventually went through and decided that we should all be put into boxes.... [In doing so] They had created fisheries with limited amount of people in it, but the way they did it, they actually took away the right to be able to fish on an opportunistic basis. Which is really [the] key to sustainable fishing. Because if there is not too much of one stock around there is usually plenty of something else. If it’s a 5 year, 10 year or 20 year, 30 year cycle, if you only take what fish you can when there is easy access to the product, then you are basically just taking the top end off.”

When questioned, however, Terry states that he was allowed to fish for tuna,

“a bit of shark, off shore fishing, hand lining, salmon, near-shore netting, abalone, scallops. That’s pretty much about it, I suppose. But when you put it all together, there really wasn’t enough of any one thing to focus a fairly high infrastructure on it.”

Some interviewees argued for an end to commercial net fishing, because of the by-catch. John Wise considers it wrong that “shark fishermen can set their nets within 400 metres of the shore in Geographe Bay”, especially given the waste in by-catch. Ray Walker believes that netting for sharks places pressure on groper, which are caught as by-catch. However, Phil Tickle remembers that in the early days of set-netting, when re-rigged army camouflage nets were used, by-catch was recognised as a problem, so it became “almost a sacrilege to set your nets on what was regarded as good dhufishing or good bottom fishing terrain.” Terry Adams also gives an example of commercial net fishers reducing their catch to a manageable, reasonable size:

“When we pick up 50 tonne and... if you only want 20 tonne, so you drop the head line down and let the rest outside, until you say, ‘Oh no that’s about enough. We can handle that amount.’ So we know you can do it.”

CONFLICT BETWEEN COMMERCIAL AND RECREATIONAL FISHERS

Some interviewees directly addressed the issue of conflict between commercial and recreational fishers. John Williams says:

“There’ve only been a few professional fishermen and they’re usually popular people in the community. Everyone realises they’ve got their job to do. I think there’s a bit of conflict further

up on the beaches where the commercial salmon fishermen want the beach to themselves so they can run their nets around the fish and then the recreational fishermen say, 'I was here first.'"

Speaking from the other side of the divide, professional abalone fisher Terry Adams says: "I'm more than happy that the recreational people get a feed. I think its part of being an Australian. It's just bad when people decide to get a bit greedy." He also feels that commercial fishers have been used as scapegoats for declining fish stocks in Geographe bay, when he believes that the major problem is pollution. He says that commercial fishers:

"have an absolute will for the fishery to continue. Because without fish to catch, they don't have a job. And they like to see everybody catching a lot of fish – as long as there is fish there. They are basically misunderstood by the majority of people."

VALUES

The interviews yielded a range of perspectives on the values derived from fishing and other interactions with the marine and coastal environments of the region. John Wise is one recreational fisher who acknowledges that particularly with high fuel prices, it usually costs recreational fishers more to go out on boats and catch fish than to buy them, "But we enjoy being out". Similarly, Ray Walker says:

"I fish for enjoyment. If I didn't enjoy it, I wouldn't bother going. Now why would you bother getting up at 5 o'clock in the morning to go fishing if you don't enjoy it. And I can come home without a fish and be a little bit disappointed, the fact that I'm not going to have one to eat is the disappointment, its not the fact that you didn't catch any, because you get the salt air through your nostrils, and you know just being there is what it's all about. There's always something happening; you can always see something like finding a new patch of abalone or red rock crabs, there's always something. If it was boring and every time you went nothing happened, it was the same week after week, well you'd pack it in wouldn't you. I can be there and just sit and watch in case you do see an orca jump out the water or whales or whatever and not even have a fishing rod, just the fact that you're down there. If you go at the prime hour in the summer, if you're there from, 4.30 to 6.30 am, it's the best two hours of the day and who cares about the rest. You can mow the lawns any time."

Neil Taylor, described a more general attachment to place: "I really love this area and understand it to some extent and really try to get people to appreciate the spot here."

In addition to the obvious monetary rewards from abalone, Abalone Joe expressed his attachment to the industry:

“I feel that I started this [industry] and I want to protect this. I could sell my licence tomorrow and get out and live happily ever after, because I couldn’t raise the money, even if I live to 100. The licences are worth tonnes of money now, but I feel attached. I started it and I’m sticking to it for a long time yet.”

He also loved the challenge of working in the ocean:

“in the early days, I used to work at least 280 days, winter, summer and... winter if the weather was anywhere near workable, I used to go in sometimes 6-8 ft swells and find a hidden spot of a cave and just get my 30 kg or 40 kg in, just to be happy. It was not too much the money, it was beating the ocean, you know that male pride, I had to win, and I did, I’m still here. That was the challenge.”

It is also worth noting that whilst commercial fishers make a living by extracting resources from the marine environment, they can also feel a sense of belonging to that environment. In Terry Adams’ case, this is reflected in a deep understanding and appreciation of the various species he encounters underwater, tinged with wonder and humour:

“The eagle rays are the acrobats of the underwater world. When they want to show off they just do. Same for some of the other creatures, which are highly amusing, especially the large cuttlefish. They are almost human the way they act. A lot of other fish species, some of the scalyfins, some of the guppies, the species they all have their own personalities. And that’s something that you take for granted down there. I mean having been a spearfisherman, in the early days, (mind you I haven’t carried a spear for more than 30 years), I did know that to be successful you had to know the habits of all the different fish. I guess I learned that when I was young, the different habits so that I could spear them. But when I actually dived with them, they used to come. I know that if you are diving with fish without a spear, I don’t know what it is, but they treat you totally different to if you are carrying a spear gun. People can say that they don’t have any what is it ‘logic’ or whatever. But that is crap. I’ve seen it time and time again. They know if you are going about to be a threat to them or if you are not. It’s amazing. One day, it’s one of the things I have always said I’d do, is sit down and write down all the experiences and habits and the characteristics and mannerisms of all the different types of fish that you meet when you are working commercially. Because they’ll stay with you all day. Same with dolphins. We had them down in different areas, in Augusta and also down further on the south coast. They’d hear you coming, they’d stay with the boat and travel to where you were and by the time you got into the water they’d be sitting down there waiting for you. We’ve even had them, I’ve had dolphins sort of go along and looking for abalone for me. And then when I’ve gone across to them, there’s a patch of 20 abalone sitting on a reef. And they’d just sit back and I’d look at them and I’d measure one and say, “Oh no they are all too small” and leave them there. And [they] went off their trolley! They’d swim back again and say, ‘No no no!’ and I’d say, ‘but they are too small’ go onto the next. It’s just remarkable. They go lifting the weed up to look for them alongside you, and so do seals. New Zealand fur seals and

Australian sea lions. They do the same thing. Except for fur seals, they'd come along and very regularly just take your bag away, especially when your bag is suspended by a parachute, and they'd put their head between it and decide to play hide and seek. Pretty often that is, too often... You always find it. But when you do they sort of have a little giggle at it, they swim around you at around 100 mile p/hr, blow bubbles. Then all of a sudden they all disappear in a hurry, and you know exactly what's going on then. Someone's looking for a good feed. Everything has a light side to it."

CONCLUSION AND RECOMMENDATIONS

The interviewees' observations comprise a valuable source of information on past environmental states and environmental changes in the region. Any of these observations that are of particular interest in terms of current management strategies should be made the subject of further research encompassing existing relevant historical and scientific studies, and other historical primary sources, such as photographs, newspaper reports, archival fishery records, and the journals of explorers, colonists and travellers.

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APPENDIX 1: INTERVIEWEE SUMMARY INFORMATION

Terry Adams started fishing 1950s/60s; commercially since c.1963 (moving to a focus on Abalone). Has fished all around the region.

Kerry King, b.c.1944 at Cape Naturaliste. Grew up on Cape Farm in Bunker Bay. Started fishing (as a professional) c.1964.

Peter McDonald b.1961, has been living in and around Dunsborough since 1984; has been in the dive industry since c.1989.

Colin Price arrived in Augusta 50-60 years ago; worked as a professional fisherman.

Trevor Price, Colin's son, has been fishing professionally for c.38 years in the Blackwood river.

Neil Taylor, raised on a farm in Ludlow; returned to the area c.25 years ago, living in Yallingup then Busselton, and working as a local liaison officer for CALM.

Phil Tickle moved to Siesta Park (near Busselton) in 1946; fished professionally 1957-1965 (as a charter operator).

Ray Walker. b. 1950 in Margaret River; lived in Cowaramup when young. Has been a beach/rock recreational fisher since 1962.

Peter Warrilow. Professional fisher since 1978. Mainly fishing for shark, from south of Augusta to north of Margaret River.

Bill Webb. Indigenous. b.1952 in Perth, moved to the Cape Naturaliste region when young. Fished professionally from age 15-24. His father was a professional fisher too, around Dunsborough.

John Williams b.1932. Grew up in Manjimup but visited Augusta frequently for holidays. Upon graduating as a medical doctor, he moved to Augusta.

John Wise arrived from Darwin 1955; bought a block of land the region c.1975.

Noel Wright of Marybrook, started fishing professionally in the late 1940s/early 1950s; based in Geographe Bay.

Abalone Joe arrived in WA from Germany when he was 26. Began diving for abalone around 1968, and has been involved in the industry ever since.

Fisher 1. Indigenous. Has spent approximately 20 years around Geographe Bay.

Local 1 b.1970; has been surfing around Cowaramup Bay for at least 20 years.