FISHERIES PROJECT

THE OVERSEAS CATCH

The state of recreational fisheries management abroad

Randall Bess
Foreword by Graeme Sinclair

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About the New Zealand Initiative

The New Zealand Initiative is an independent public policy think tank supported by chief executives of major New Zealand businesses. We believe in evidence-based policy and are committed to developing policies that work for all New Zealanders.

Our mission is to help build a better, stronger New Zealand. We are taking the initiative to promote a prosperous, free and fair society with a competitive, open and dynamic economy. We develop and contribute bold ideas that will have a profound, positive, long-term impact.

ABOUT THE AUTHOR

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ABBREVIATIONS

ARMP	Abalone Recovery and Management Plan
ARMS	Aquatic resource management strategies
ARUPS	Aquatic resource use plans
CATCH	Catch Accountability Through Compensated Halibut
CCA	Coastal Conservation Association
CCL	Combined Catch Limit
CSP	Center for Sportfishing Policy
CSP	Catch Sharing Plan
DFO	Department of Fisheries and Oceans (Canada)
EEZs	Exclusive economic zones
FRDC	Fisheries Research and Development Corporation
FMPs	Fishery management plans
IFQ	Individual fishing quota
IPHC	International Pacific Halibut Commission
IQMI	Integrated Quota Management Inc
ITQ	Individual transferable quota
IVQ	Individual vessel quota
MSC	Marine Stewardship Council
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
QMS	Quota management system
Recfishwest	Western Australian Recreational and Sport Fishing Council
RQE	Recreational quota entity
SPR	Spawning potential ratio
TAC	Total allowable catch
WAFIC	Western Australian Fishing Industry Council

Foreword

Graeme Sinclair
MNZM

We started filming the Gone Fishin series 25 years ago. At that time, the quota management system was newly introduced and recreational fishing limits were exceedingly generous. A National Research Bureau survey on the importance of recreational fishing had also been published in October 1991.[1]

The survey stated that 914,000 Kiwis over the age of 16 went fishing at least once a year and spent $745 million annually in pursuit of their recreation.[2]

We used this survey to convince the television networks that there was an audience just itching to embrace a fishing show. We were proved correct!

This report highlights what several other nations are doing to enhance recreational fisheries management. In every case, it is acknowledged that while recreational interests are important they are not the only sector with entitlement to the resource.

We have a shared fishery. Recreational, commercial and iwi interests all have their entitlement, but at what cost?

The quota management system has been in place for 30 years and would benefit from adjustments here and there. Recreational limits have been addressed in some areas and clearly need to be in others.

Estimates of population growth are, in some cases, daunting. For example, the population of the broader Auckland area is expected to double in the next 20 to 30 years. Clearly, this will have a profound impact on the local fishery.

By evaluating what other nations have done, we can perhaps learn from mistakes and gain valuable insights.

I strongly believe in the idea of "shared, sustainable future fisheries".

I also have an expectation that the groups that harvest seafood will seek to do so responsibly and work together.

My choice is to catch my own fish, but for three-quarters of the population their seafood is harvested by the commercial sector.

What is best for the fishery? Surely that should underpin any decisions we make?

What is best for our truly unique, shared fishery both now and in the future?

I was recently filming in Fiordland where a group called the Guardians of Fiordland advise on the management of marine resources.

One of the "group" told me that, when they first came together, discussions were often heated. "We realised that if people were not prepared to listen and compromise there would be no way forward. We came

1. National Research Bureau (1991). *The Economic worth of recreational fishing in New Zealand. Recreation research report*. National Research Bureau Ltd: Auckland.
2. Ibid.

up with the phrase, ‘Gifts and Gains’. If you want to get something then also consider what you are prepared give.”

We can learn a great deal from the offshore management of recreational fisheries but, in the end, this is our place and we need to take responsibility for our future.

So, read this report, evaluate its contents and become better informed.

Remember, we share the resource, so our endeavours have to preserve the integrity of fish stocks, and the decisions we make today lay the foundation for our future.

Tight lines!

Executive summary

The basics of fisheries management are simple: set a total allowable catch (TAC) that maintains fish stock sustainability, allocate the TAC across fishing sectors and set enforceable rules that keep each sector to its allocation. But, it is easy to make a mess of the details.

New Zealand has an impressive track record in setting TACs for most fish stocks, despite an ever-decreasing research budget in real terms. However, TAC setting at a large spatial scale (for example, quota management area) does not prevent localised depletion, which raises important questions regarding what we consider constitutes sustainability.

New Zealand has a less impressive record with allocating TACs. While convention first allocates a TAC to Māori customary fishing, then to recreational fishing and lastly to commercial fishing, the proportions are at the full discretion of the Minister for Primary Industries. Though discretion vested entirely in the Minister has its advantages, ministerial decisions are subject to various pressures and remain a political fight.

New Zealand has had an even harder time setting enforceable rules that keep each fishing sector within its TAC allocation. As part of the Treaty of Waitangi settlement, Māori customary allocations change as needed, but the rules for reporting customary catch need an overhaul. Recreational fishing rules fail to constrain catches to allocations, and no reporting rules exist. The recent disclosures about commercial misreporting of catches, discarding and high grading raise serious questions about administration of the quota management system (QMS).

The New Zealand Initiative's report titled *What's the Catch? The state of recreational fisheries management in New Zealand* was released on 14 September 2016. It outlines fisheries management in New Zealand and highlights the problems with the basics.

We wanted to learn how other fishing nations face these problems. In particular, we were interested in how they dealt with issues arising from growth in demand for recreational fishing, which is increasingly important for regional and national employment and providing social, cultural and psychological benefits. Some nations address these problems better than others, and this second report investigates what works well and not so well.

This report summarises the observations recently gathered from experiences of fisheries management overseas. These observations will be useful in debating the future state that we want for New Zealand's recreational fisheries, while considering the increasing pressure on limited fisheries resources and ensuing conflicts between fishing sectors.

The overseas fisheries covered in this report include the recreational red snapper fishery in the United States' Gulf of Mexico, the northern California recreational-only red abalone fishery, the recreational halibut fishery in British Columbia, Canada, and the way recreational fisheries are managed in Western Australia.

Gulf of Mexico recreational red snapper fishery

The red snapper fishery exemplifies how controversial a fishery can become when management fails one sector. Many of the private boat anglers feel animosity towards the federal government for what they perceive to be ongoing partiality for commercial fishers. And many commercial fishers believe that private boat anglers and their representatives are blaming others for the problems they have caused by exceeding TAC allocations, which pose a risk to rebuilding the fishery.

The primary success in this fishery is that it shows what is possible when effective rebuild measures are implemented. The red snapper TAC needed a 45 percent reduction to achieve a substantial increase in abundance, which has nearly tripled during the past decade. However, recreational landings have increased at a greater rate. Emergency measures were introduced to avoid further overages of the recreational TAC allocation. Private boat anglers now have just nine days to fish for red snapper in federal waters. The outlook is even less favourable.

Tensions are also mounting between the fisheries management organisations in the federal government and the five Gulf states. This has led to a concerted effort amongst the Gulf states to assume responsibility for managing the red snapper fishery. If passed, a legislative bill to remove federal management of the red snapper fishery could reverberate to other fisheries in federal waters. The high degree of uncertainty about the future of red snapper management may well increase, when considering the new federal government administration and legislature.

Northern California recreational-only red abalone fishery

The red abalone is the largest abalone species. The world record is 12.32 inches (313 millimetres). The red abalone fishery in California presents a unique opportunity to compare the same species in quite different circumstances. The once thriving commercial and recreational fisheries in southern California highlight what happens when ineffective management persists. It failed to adapt to changes in stock levels, fishing effort and adverse natural conditions. Decades later, abalone populations cannot support any fisheries.

North of San Francisco Bay has never been open to commercial abalone fishing. The red abalone recreational fishery in northern California is the largest in the world. It has remained healthy mainly because of the remote coastline and harsh weather conditions that constrain recreational fishing. The red abalone populations are, however, also subject to adverse natural conditions, which are having a detrimental effect on the fishery.

Collaborative efforts are being directed at finding ways to better ensure the red abalone fishery remains sustainable, and improved capacity for adapting to adverse natural conditions is central to this. The Nature Conservancy, scientists and a group of dedicated local and regional recreational divers are focusing on improving data collection and integrating the data into efficient, science-based management decision making. The challenge, however, is for the California Department of Fish and Wildlife to fully accept the extent to which others are prepared to collaborate.

This collaboration has potentially widespread benefits for strengthening both management and community capacity. The dedication of these people demonstrates how those with recreational interests can take up a stewardship role in the fullest sense. These efforts, along with others, show that stewardship is not limited to those with interests in commercial quota.

The efforts also show the potential benefits for government organisations when willing to work with non-governmental organisations and volunteers and when valuing what they provide to scientific research and monitoring and management decision making.

British Columbia recreational halibut fishery

Since New Zealand implemented the QMS in 1986, fisheries economists have suggested the solution to problems in managing recreational fisheries is to integrate them into the QMS. The theoretical appeal of integration is it would allow markets to determine whether the value of the next fish caught was greater for recreational or commercial fishers (for example, transfers of quota between sectors). In theory, this type of integration is something of a Holy Grail, but how feasible is it in practice?

British Columbia's recreational halibut fishery is the best example of two-way quota transfers for private anglers and others. If a private angler, fishing guide, or operator of a charter boat, fishing lodge or marina wants to fish beyond the catch limits and time available under the normal recreational fishing licence, they must first acquire an experimental licence and then lease or purchase halibut quota.

But, this is not without controversy. Recreational representative organisations object to the experimental licence in principle, along with the quota-based system for managing the commercial fishery. One of these organisations strongly prefers that the recreational sector gains access to a greater proportion of the halibut TAC. The commercial halibut fishers sensibly object to any TAC reallocation without full compensation.

If recreational quota acquisitions prove successful, the political fight over who gets how much halibut might well get resolved by letting people trade. That aside, the recreational fishing sector is pursuing ways to enhance the management of recreational fisheries, which will likely lead to some form of funding recovery beyond the current recreational licence fees.

Western Australia's management of recreational fisheries

When considering the plight of recreational fisheries management in New Zealand, it may be surprising to learn that Western Australia has a reputation for well-managed recreational fisheries. This reputation can be attributed to the Western Australia Department of Fisheries preparing for increased competition for limited fisheries resources, because of population growth and coastal development, and the ensuing conflicts that can adversely affect fisheries management.

For this purpose, the Department has emphasised the need to resolve intersectoral allocation issues, including development of a

reallocation mechanism to shift TAC allocations between fishing sectors. The Department continues to assert that allocations between sectors can, and should, change over time to reflect changes in social values.

What also stands out in Western Australia is that the government has agreed to fund one recreational and one commercial representative organisation to carry out service level agreements, thereby recognising them as the peak bodies or central points of contact and referral for sectoral issues. The funding for service level agreements includes accountability requirements upheld through strong governance arrangements. These alter organisational roles and intersectoral dynamics, thereby providing incentives to work through differences and collaborate in finding workable solutions.

The sole recreational representative organisation, the Western Australian Recreational and Sport Fishing Council (Recfishwest), is funded from a portion of the annual fees from recreational fishing licences. At that time, a new licence was established with broad public support, due to the database for licences providing more cost-effective approaches for data collection and the most comprehensive surveys conducted in Western Australia. The remainder of the licence fees are used to fund research and projects aligned with the priorities of the recreational fishing sector.

The Department and its ministers have made ongoing investments in human and financial resources to improve the management of recreational fisheries, openly stating the amount spent for these improvements. The trust and confidence that Western Australians have in the Department achieving its aquatic resource management objectives is reflected in an 86 percent public satisfaction rating. While Western Australia continues to face challenges in managing competing fishing sectors, the evidence shows the Department and broad sector-level representative organisations are doing some things well.

What is working well and not so well in the above four locations will help formulate proposed policy recommendations that will be set out in the third report in this series. It is important these recommendations uphold the secure rights associated with quota holdings and the principles of the Treaty of Waitangi and related Treaty settlement obligations.

Introduction

New Zealand risks losing its recreational fishing heritage because of managerial neglect or complacency. No one wants to contemplate that, unless we do things differently, recreational fishing will increasingly come under threat in New Zealand. But, that is the circumstance we face.

The neglect stems from continuing to manage recreational fisheries in the same way since this first began in the 1980s. The trend since has been to steadily shrink daily bag limits, increase minimum legal sizes and, if things get really bad, decrease season length. Strong reliance on these traditional management measures alone is doomed to fail, because they will inevitably diminish the recreational fishing experience. The fundamental flaw in this management approach is highlighted in our first report, *What's the Catch? The state of recreational fisheries management in New Zealand*.

The Ministry for Primary Industries (MPI) was quick to deny it was complacent in managing recreational fisheries, noting it had made improvements during the past few years. But, we remain concerned about funding for a new recreational fishing team of only two staff. This team is unlikely able to cope with the pressures caused by growth in the recreational fishing sector and conflicts with other fishing sectors. MPI's current Future of our Fisheries review and the independent advice by the Technical Advisory Group provide confidence that improvements will be made, but the management of recreational fisheries is largely outside the scope of review.

The overwhelming response to *What's the Catch?* directed attention towards the recent disclosures of misreporting commercial catches and illegal discarding. The message was clear: MPI must resolve these fisheries problems before recreational fishers should accept further constraints placed on their access to fisheries resources.

It will be difficult for the recreational sector to accept necessary changes if it does not see the commercial sector as bearing its share of the burden. As Terry Williams-King from *The Fishing Show* put it on *Radio Live*, everyone has to do their part to fix the problems. Similarly, Graeme Sinclair, from *Gone Fishin'*, emphasised that all sectors need to plan for more effective management, while warning of the pressure that a growing population will place on fisheries resources.

With these responses in mind, I went overseas to find out how other fishing nations address the basics of fisheries management and resolve ensuing problems. I observed what Mr Williams-King, Mr Sinclair and others alluded to, which is increasing interest in integrating recreational fisheries into fisheries management processes. What I found is that, without some level of integration, competing fishing sectors just continue demanding that their rights prevail over others, with the resulting fights hurting each sector and the shared fishery.

I also found that integration can be defined quite differently, depending on the circumstances, and it is more suitable for those fisheries where

the level of shared interest is high. At its most basic, integration is about considering all the effects that fishing has on fisheries resources, including effects on bycatch and ecosystems. Broadening consideration of these effects complicates the basics of fisheries management but can ultimately lead to their improvement. All four fishing jurisdictions I visited provide insights into integration.

The red snapper fishery in the Gulf of Mexico demonstrates a fishery in a conflict crisis, despite a successful stock rebuild. I chose to visit this fishery because it highlights increasing tensions between competing sectors, which far exceed what we have experienced in New Zealand. This fishery shows the disruption that can happen when recreational fishers encounter failed management, while a quota-based management system revitalises a distressed commercial sector. It also shows innovation in the charter for-hire fleet. Some are operating as commercial boats and can provide recreational fishers with new opportunities to fish, while blurring the traditional distinction between the sectors.

The red abalone fishery in northern California was chosen because it provides a useful example of citizen science, or, in this case, regional and local recreational divers' knowledge and time on the water being integrated into the management of the abalone populations. The Abalone Working Group's dedication shows that a stewardship role in the fullest sense can extend to those with interests in recreational fishing. The challenge, however, is in the government fully accepting the extent to which others are prepared to collaborate.

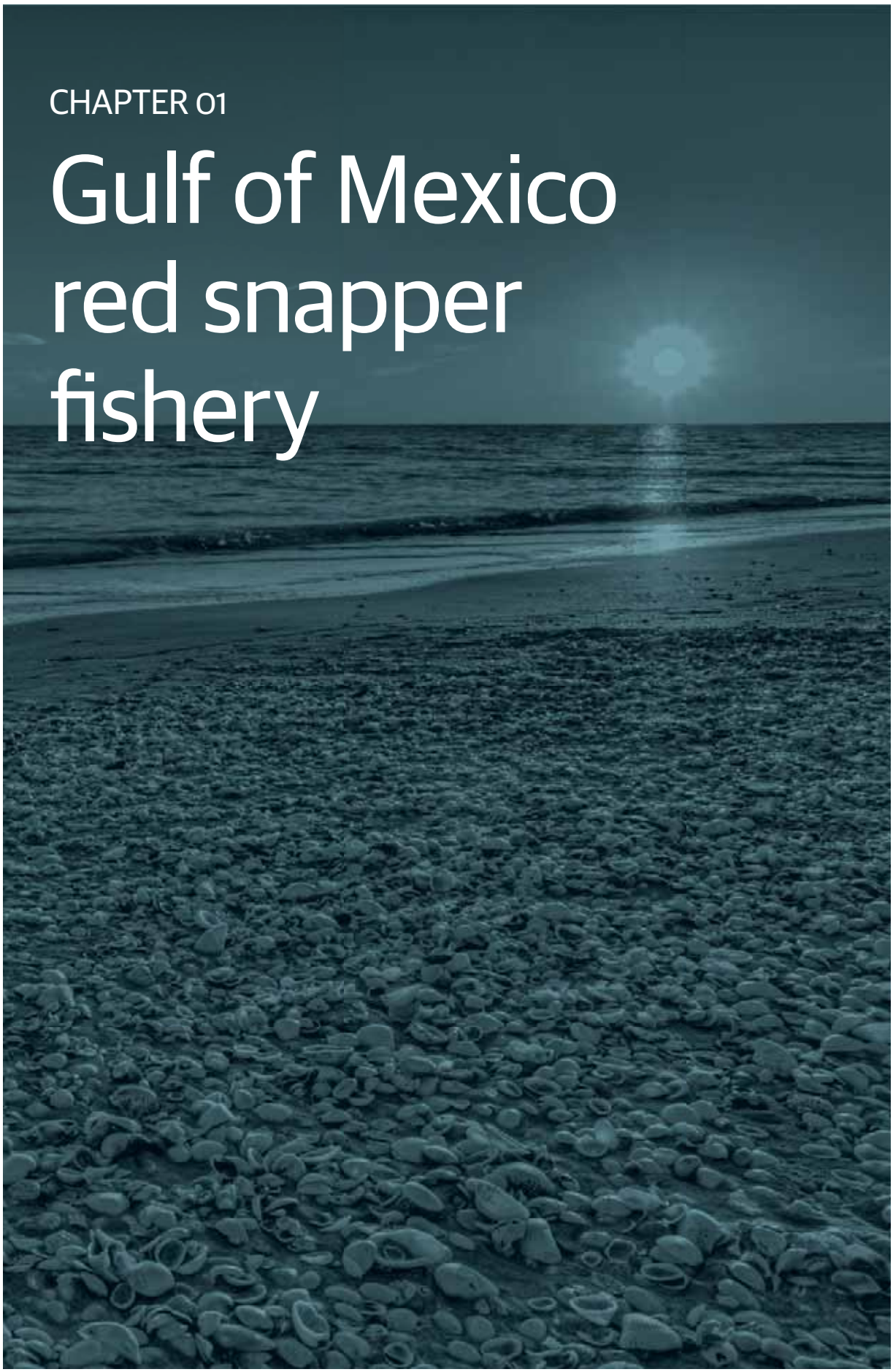
The halibut fishery in British Columbia was selected because it is so novel, or, more specifically, the best example of a market-based mechanism for transferring quota between sectors and within the recreational sector. It shows how recreational representative organisations can work alongside international, national and provincial management organisations, despite objections to the way the recreational halibut fishery is managed. Furthermore, the recreational fishing sector continues to pursue ways to enhance the management of recreational fisheries, even though it will likely increase the fees charged for fishing.

Finally, I visited Western Australia because of its reputation for well-managed recreational fisheries. Different sectors there collaborate for the good of the fishery, and there is a high level of public trust and confidence in the way the fisheries are managed. What stands out is their distinctly bold efforts to address total allowable catch (TAC) reallocation issues. These are typically the most contentious component of getting the basics right or to an outcome tolerated by all concerned.

New Zealand is not unique in the world. Other places face similar challenges to addressing the basics and ensuing problems. Improving our own fisheries management will be easier if we learn from the successes and failures of other nations.

CHAPTER 01

Gulf of Mexico red snapper fishery



The Gulf of Mexico's red snapper fishery illustrates what New Zealand's fishing future could be, if we do not act soon. The fishery is now rebuilding after being overfished. Abundance has almost tripled over the past decade, but recreational landings have increased at an even greater rate. The fishery's management is consequently considered the most controversial in the United States.[3]

The recreational sector has consistently exceeded its TAC allocations, and by as much as 50 to 88 percent in some years. In 2014, a federal court decision prompted emergency measures, including a 20 percent scientific buffer on the TAC allocation for recreational anglers and charter boats. Private anglers now have just nine days to fish in federal waters, where most red snapper is caught. The daily bag limit has remained at two fish.

In contrast, the commercial sector has thrived during the past decade. Some attribute success to the individual fishing quota (IFQ) programme in place since 2007. Others give more credit to reducing the TAC by 45 percent and implementing bycatch reduction measures in the shrimp fishery that has historically taken large volumes of juvenile snapper as bycatch.

Nonetheless, tensions are mounting because quota holders are able to fish year round in federal waters to catch their TAC allocation, while those who fish recreationally from private boats face a future of a diminishing number of days to fish.

Tensions are also increasing within the recreational sector. This was recently split into private boat anglers and those who operate federally permitted "for-hire" boats. "Sector separation", as it is known, also split the recreational TAC allocation, which allows the for-hire boats 40 or more days each year to fish for red snapper. Other sources of tension include efforts to develop an IFQ system for the for-hire boats.

Private boat angling interests have pushed for the red snapper fishery gaining game fish (recreational-only) status. Accordingly, suspicions are directed at their efforts to remove federal management of the fishery and shift it to Gulf state-level authorities. Lobbying is intense in the lead up to a decision by the new federal government administration and legislature.

1.1 Red snapper fishery

The Gulf is bounded by Mexico, Cuba and the five Gulf states: Florida, Alabama, Mississippi, Louisiana and Texas. The Gulf encompasses various ecosystems and habitats over a wide continental shelf, providing feeding, spawning and nursery grounds for over 50 commercially harvested fish and shellfish species. Red snapper (*Lutjanus campechanus*) comprise only part of the reef fish fishery in the Gulf.[4]

3. Cowan, J.H. Jr, Grimes, C.B., Patterson, W.F. III, Walters, C.J., Jones, A.C., Lingberg, W.J., Sheehy, D.J., Pine, W.E. III, Powers, J.E., Campbell, M.D., Lindeman, K.C., Diamond, S.L., Hilborn, R., Gibson, H.T., and Rose, K.A. (2011). Red snapper management in the Gulf of Mexico: Science- or faith-based? *Reviews in Fish Biology and Fisheries*, 21(2), 187–204.

4. Würsig, B., Jefferson, T.A., and Schmidly, D.J. (2000). *The Marine Mammals of the Gulf of Mexico*. Texas A&M University Press: College Station, Texas.

The commercial fishery for red snapper originated in waters along northwest Florida before the Civil War began in 1861. Since the early 1900s, the fishery has been primarily concentrated in the western Gulf.[5] Starting in the 1950s, the capacity of the commercial fleet greatly increased and, coupled with technological innovations, led to significant increases in red snapper landings.

At the same time, the Gulf of Mexico shrimp fishery rapidly expanded. Because juvenile red snapper (age 0–1) are caught as bycatch in shrimp trawls, the shrimp fishery became a significant cause of red snapper mortality.[6] Historically, the shrimp fishery has taken 10 times the number of red snapper as have the commercial and recreational fishing sectors combined.[7]

Red snapper is the largest revenue-generating commercial reef fish species in the northern Gulf of Mexico.[8] Throughout the Gulf states, red snapper is considered an iconic recreational species since the sector expanded significantly in the 1950s. Annual recreational landings of red snapper increased from 500,000 pounds (227 metric tonnes) during the 1950s to over 5 million pounds (2,268 metric tonnes) by the 1990s. The Gulf of Mexico recreational red snapper catch accounts for 41 percent of all United States marine recreational fish catches, generating employment for more than 84,000 full- and part-time people.[9]

Most of the red snapper biomass is found in federal waters where snapper congregate over structures on the benthos (bottom). As a result, these sites can be easily overfished. For example, Texas-based recreational anglers commonly travel 20 to 50 miles (32 to 80 kilometres) or more offshore to their favoured fishing grounds.

The size of the recreational boats needed to safely travel these offshore distances created a distinct fishery, referred to as the headboat or party boat fishery, which began in the 1930s. These large-size boats are designed to accommodate around 60 to 100, with some up to 200, anglers, with red snapper fishing trips generally lasting for one half to one full day.

A charter boat fishery also exists. However, some charter boats can accommodate more anglers than some headboats.[10] The main distinction

5. Keithly, Jr., W.R. (2001). Initial allocation of ITQs in the Gulf of Mexico red snapper fishery. In Shotton, R. (ed) *Case Studies on the Allocation of Transferable Quota Rights in Fisheries*. FAO fisheries technical paper 411. Food and Agriculture Organization of the United Nations: Rome (www.fao.org/docrep/005/Y2684E/y2684e11.htm#P0_0).

6. National Oceanic and Atmospheric Administration (No date). *Historical Overview (1800s-present): How has the red snapper fishery changed over time?* (http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/red_snapper/ overview/index.html).

7. SouthEast Data, Assessment and Review (2005). SEDAR 7 advisory report, Gulf of Mexico red snapper. Review workshop: New Orleans, Louisiana, 4–8 April.

8. Gulf of Mexico Fishery Management Council (2015). *Red Snapper Allocation: Final Amendment 28 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico*. Gulf of Mexico Fishery Management Council: Tampa, Florida (http://gulfcouncil.org/docs/amendments/Final%20Red%20Snapper%20Allocation%20-RF%20Amendment%2028.pdf).

9. Gulf of Mexico Fishery Management Council and National Oceanic and Atmospheric Administration (2010). *Gulf of Mexico Regional Summary*. United States. See also Doerpinghaus, J., Hentrich, K., Troup, M., Stavrinaky, A. and Anderson, S. (2014). An assessment of sector separation on the Gulf of Mexico recreational red snapper fishery. *Marine Policy*, 50, 309–317.

10. Gulf of Mexico Fishery Management Council (2016). *Red Snapper Management for Federally Permitted Charter Vessels: Draft Amendment 41 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico*. Gulf of Mexico Fishery Management Council: Tampa, Florida.

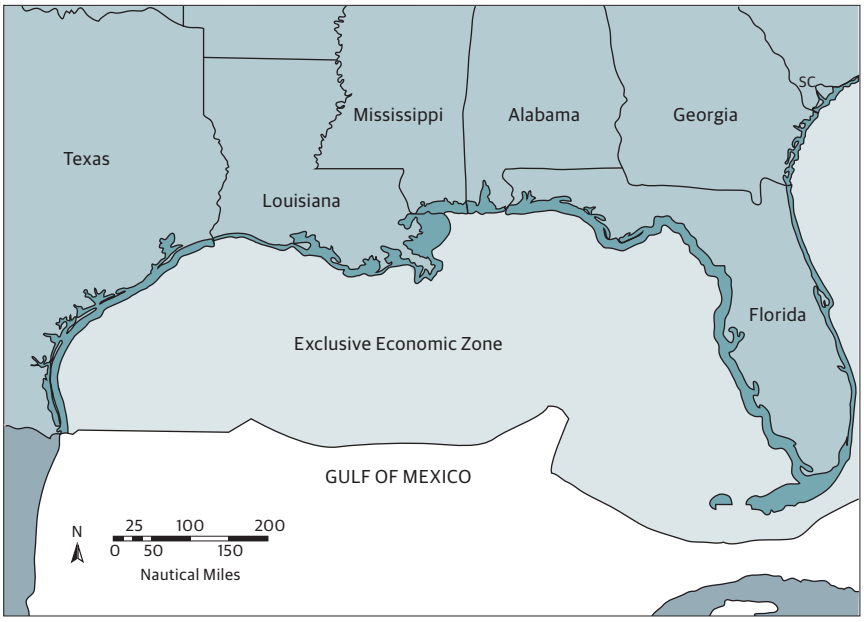
between charter boats and headboats is that charter boats charge a fee for the entire boat, regardless of the number of anglers, while headboats charge per angler. Charter boats and headboats are collectively referred to as the for-hire fishery.

Large numbers of anglers also fish for snapper from private boats. In 2012, it was estimated that private boat anglers accounted for 61.1 percent of recreational red snapper landings, followed by charter boats (24.8 percent) and headboats (14.1 percent).[11]

1.2 Federal versus state fisheries management

For most coastal states, federally managed waters begin 3 miles (4.8 kilometres) offshore and extend to 200 nautical miles (322 kilometres). Federal waters begin 9 miles (14.5 kilometres) offshore of the Florida and Texas Gulf coasts. In 2016, Mississippi, Alabama and Louisiana Gulf coasts also had federal waters begin 9 miles offshore, although, historically, federal waters began outside 3 miles (refer map 1).

Map 1: Gulf of Mexico state and federal fisheries management boundaries



Source: NOAA

1.2.1 Federal fisheries management

The Magnuson-Stevens Fishery Conservation and Management Act (the Magnuson-Stevens Act) authorises the federal government

11. Gulf of Mexico Fishery Management Council (2015). *Red Snapper Allocation: Final Amendment 28 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico*. Gulf of Mexico Fishery Management Council: Tampa, Florida (http://gulfcouncil.org/docs/amendments/Final%20Red%20Snapper%20Allocation%20-RF%20Amendment%2028.pdf).

to regulate fishing in federal waters. For this purpose, the Fishery Conservation and Management Act 1976 established eight agencies, referred to as Regional Fishery Management Councils, which the US Secretary of Commerce oversees.

"A private boat angler residing in Texas over 17 years of age must have a valid fishing licence and saltwater "endorsement" to possess in state waters any fish taken in federal waters or possess fish on a boat in the tidal waters of Texas"

Each Council is responsible for developing fishery management plans (FMPs) for the fish stocks in their respective regions, amendments to the FMPs and recommended management measures. Each FMP sets out how a fishery is managed in terms of regulated gear types, seasons, catch limits and licences. Proposed changes are submitted to the National Marine Fisheries Service (NMFS) for further review.

NMFS is an office of the National Oceanic and Atmospheric Administration (NOAA) and is also known as NOAA Fisheries. It is responsible for approving, disapproving or partially approving Council recommendations and implementing regulations.

1.2.2 Recreational permits, licences and regulations

Since 1996, headboats and charter boats have been required to hold a federal permit to fish for red snapper and other reef fish in the Gulf of Mexico federal waters. Since 2004, a moratorium has been in place on the issuance of new federal reef fish for-hire permits. Those boats without a federal permit are restricted to fishing for reef fish in Gulf state waters. No limit is in place on the number of state licenced for-hire boats.

As is common with setting season length, the season for the federally permitted for-hire boats has varied according to the number of days estimated to catch its portion of the TAC allocation. Since 2011, the for-hire season has ranged from 42 to 48 days, except for nine days in 2014 (when an emergency rule was implemented).

Private boat anglers obtain fishing licences through state government agencies. For example, the Texas Parks and Wildlife Department administers a licence system for both fresh water and saltwater fishing. Various fishing packages are available for both Texas residents and non-residents.

A private boat angler residing in Texas over 17 years of age must have a valid fishing licence and saltwater "endorsement" to possess in state waters any fish taken in federal waters or possess fish on a boat in the tidal waters of Texas. The fee for the 2016–17 fishing licence and saltwater endorsement is US$35, while the same package for a non-resident is US$63. The one-day all-water (fresh water and saltwater) licence is US$11 and US$16, respectively.[12]

From 2000 to 2012, the Gulf states, except Texas, recorded increases in the annual number of saltwater fishing licences sold; for this period, the total number of licences increased 11.5 percent.[13] Because no limit is in place on the number of Gulf state fishing licences that can be sold, recreational fisheries are maintained as open access.

12. Texas Parks and Wildlife Department (2016). *Outdoor Annual Hunting & Fishing Regulations 2016–17*. Texas Parks and Wildlife Department: Austin, Texas.

13. Gulf of Mexico Fishery Management Council (2015). *Recreational Red Snapper Sector Separation: Final Amendment 28 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico*. Gulf of Mexico Fishery Management Council: Tampa, Florida.

"The recreational red snapper fishing season in federal waters was all year round until 1996. Since then, it has been continually reduced to meet rebuilding plans dictated by the Magnuson-Stevens Act: 330 days in 1997, 194 days in 2007 and 28 days in 2013. As a result of an emergency rule, the season was reduced to nine days in 2014, which continued for 2015 and 2016"

As well, because state licences do not include a red snapper endorsement, state licence systems do not tally the number of red snapper fishers in state or federal waters. Estimates of the number of fishers, red snapper landings and average weights are based on data collected through various survey methods.[14]

Texas state waters are open all year for recreational red snapper fishing, with a four-fish daily bag limit and 15 inch (38.1 centimetre) minimum legal size. Florida, Alabama, Mississippi and Louisiana have a two-fish daily bag limit, a 16 inch (40.6 centimetre) minimum legal size and considerable variation in the length of their fishing seasons.

The recreational red snapper fishing season in federal waters was all year round until 1996. Since then, it has been continually reduced to meet rebuilding plans dictated by the Magnuson-Stevens Act: 330 days in 1997, 194 days in 2007 and 28 days in 2013. As a result of an emergency rule, the season was reduced to nine days in 2014,[15] which continued for 2015 and 2016.

The federal recreational red snapper daily bag limit was reduced from seven fish per day in 1990 to four in 1998. The limit has been two fish per day since 2000. This bag limit also applies to recreational anglers on board for-hire boats fishing in federal waters. A zero bag limit is also in place for the captain and crew of for-hire boats.[16]

In federal waters, the recreational red snapper minimum legal size has increased from 13 inches (33.0 centimetres) to 14 inches (35.5 centimetres) in 1994, to 15 inches (38.1 centimetres) in 1995 and to 16 inches (40.6 centimetres) in 2000, which remains in place.[17]

1.3 Rebuilding the red snapper fishery

The Gulf of Mexico Fishery Management Council (Gulf of Mexico Council) placed the red snapper fishery under the Reef Fish Fishery Management Plan in 1996. The Magnuson-Stevens Act requires all fish stocks with an FMP to be assessed to determine whether it is overfished or undergoing overfishing that could lead to the stock being overfished.[18]

The red snapper fishery has, however, been classified as overfished since 1984, and, over the decades, several regulatory measures have been

14. National Marine Fisheries Service (2015). *2015 Gulf of Mexico Red Snapper Recreational Season Length Estimates*. National Marine Fisheries Service, Southeast Regional Office: St Petersburg, Florida (http://sero.nmfs.noaa.gov/ sustainable_fisheries/lapp_dm/documents/ pdfs/2015/rs_2015_rec_quota_projection.pdf).

15. Gulf of Mexico Fishery Management Council (2014). *Emergency Action to Set Red Snapper Accountability Measures for the Recreational Sector of the Gulf of Mexico Reef Fish Fishery*. Gulf of Mexico Fishery Management Council: Tampa, Florida (http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/reef_fish/2013/rs_2014_rec/documents/ pdfs/gulf_rs_2014_emergency_action_ea.pdf).

16. Texas Parks and Wildlife Department (2016). *Outdoor Annual Hunting & Fishing Regulations 2016–17*. Texas Parks and Wildlife Department: Austin, Texas.

17. Ibid.

18. National Oceanic and Atmospheric Administration (No date). *Historical Overview (1800s-present): How has the red snapper fishery changed over time?* (http://sero.nmfs.noaa.gov/ sustainable_fisheries/gulf_fisheries/red_snapper/ overview/index.html).

used to reduce fishing mortality and rebuild the stock.[19] Under the Reef Fish Fishery FMP, the Gulf of Mexico Council continued using various regulations for these purposes. The regulatory measures led to incremental improvements in the red snapper stock, but by 2004 the biomass had increased only marginally.[20]

In 2005, the Gulf of Mexico Council implemented a rebuilding plan for the red snapper fishery that put more restrictive regulatory measures in place. The red snapper TAC was reduced by 45 percent, from 9.12 million pounds (4,137 metric tonnes) in 2006 to 5 million pounds (2,268 metric tonnes) in 2008 and 2009.

The combination of measures in the rebuilding plan has led to the red snapper biomass almost tripling from 2005 to 2012. In 2012, NMFS declared that overfishing of the stock had ended, although it remained classified as overfished, and so the rebuilding plan is continuing until 2032.[21]

A biological improvement is now observable in terms of increased biomass and larger, more productive, red snapper.[22] However, most of the red snapper caught are relatively young (less than 10 years of age) and have not yet reached their peak productive years. It is a long lived species that can reach well over 50 years of age, with older red snapper females producing the most eggs.[23]

In 2013, the Gulf of Mexico Council increased the TAC to 11 million pounds (4,990 metric tonnes) and 14.3 million pounds (6,486 metric tonnes) in 2014. The Council will continue with restrictions on fishing to increase stock abundance and allow red snapper to reach older ages and larger sizes.[24]

1.3.1 Catch shares

The red snapper rebuild plan included an IFQ programme for the commercial fishery implemented in 2007. In the United States, quota-based management systems are generally referred to as catch shares, which include IFQ. The Magnuson-Stevens Act was reauthorised in 2006 to include IFQ programmes and provisions that recognise catch shares as tools that should be available for use in any fishery. These provisions required the setting of TACs and other accountability measures to end and prevent overfishing by 2010, along with general guidelines for designing catch shares to help rebuild overfished stocks by 2032.

19. Diamond, S., Hedrick-Hooper, T., Stunz, G., Johnson, M., and Curtis, J. (2011). *Reducing Discard Mortality of Red Snapper in the Recreational Fisheries using Descender Hooks and Rapid Recompression: Final Report*. Grant Number NA07NMF4540078. Texas Tech University: Lubbock, Texas.

20. Ibid.

21. Gulf of Mexico Fishery Management Council (2014). *Reef Fish Amendment 28 Red Snapper Allocation and Recreational Accountability Measures*. Gulf of Mexico Fishery Management Council: Tampa, Florida (http://sero.nmfs.noaa.gov/ sustainable_fisheries/ gulf_fisheries/reef_fish/2013/am28/documents/pdfs/allocation_accountability_guide.pdf).

22. Ibid.

23. National Oceanic and Atmospheric Administration (No date). *Historical Overview (1800s-present): How has the red snapper fishery changed over time?* (http://sero.nmfs.noaa.gov/ sustainable_fisheries/gulf_fisheries/red_snapper/ overview/index.html).

24. Ibid.

ABOVE: *Gulf Wild snapper*
Source: Environmental Defense Fund

NOAA has developed a Catch Share Policy and has focused on developing IFQ programmes in various fisheries. The Policy states NOAA's support for designing and implementing catch share programmes for the commercial and recreational fisheries, as appropriate, but it does not advocate the use of private angler catch shares.[25] Sixteen programmes for commercial fisheries are now managed by six of the eight Councils.[26]

Implementation of catch shares (IFQs) for the Gulf of Mexico red snapper fishery has continued to be controversial. The criticism directed at the Gulf of Mexico red snapper fishery is that, by allowing quota to be consolidated or held by a few individuals or entities not directly involved in fishing, "sea lords" are created. Opponents frame it as being similar to landlords or plantation owners who make their living by renting quota to fishers, who are beholden to them like tenant farmers or "sharecroppers".[27]

The IFQ programme for the red snapper fishery has a quota aggregation cap of 6 percent of total quota holdings, which is considerably lower than

25. National Oceanic and Atmospheric Administration (2009). *Catch Share Policy*. Department of Commerce: Washington, DC (www.nmfs.noaa.gov/sfa/management/catch_shares/about/documents/noaa_cs_policy.pdf).

26. National Oceanic and Atmospheric Administration (No date). *Catch Shares*. (www.nmfs.noaa.gov/sfa/management/catch_shares/index.html).

27. Refer to Raines, B. (24 January 2016). *Kingpins of the Gulf make millions off red snapper harvest without ever going fishing* (www.al.com/news/index.ssf/2016/01/kingpins_of_the_gulf_make_mill.html)

those in New Zealand.[28] Nonetheless, the controversy over the consolidation of quota holdings persists.

"Despite the stock continuing to rebuild, the demand for recreational fishing has grown at a faster rate. Recreational landings are three-to-four times higher now than in 2007"

The Gulf of Mexico red snapper IFQ programme has brought about notable changes, such as allowing commercial fishers to fish year round to catch their quota. This arrangement replaced the use of closures, 2,000 pound (907 kilogram) trip limits and derby-style openings that allowed fishing only during the first 10 days of each month. When this "race to fish" ended, fishers were able to provide markets with steady supplies of red snapper at higher prices. They reported having more time to avoid under-sized snapper and, therefore, they reduced discard rates.[29]

Reduction of undersized red snapper discards was supported by the commercial minimum legal size being reduced from 15 inches (38.1 centimetres) to 13 inches (33.0 centimetres), mandatory use of bycatch reduction tools and, moreover, a shrimp trawl fishing effort threshold to minimise bycatch in shrimp trawls. The reduction in bycatch has helped the red snapper stock to rebuild.

1.4 Intersectoral total allowable catch allocations

In 1990, the red snapper TAC was allocated so that 51 percent went to the commercial sector and 49 percent to the recreational sector, based on the historical average of red snapper landings by sector from 1979 to 1987. The commercial sector has operated under its TAC allocation, while the recreational sector has consistently exceeded it, except in 2010 when the Deepwater Horizon MC252 oil spill occurred.[30] In 2008, recreational sector landings exceeded the recreational TAC allocation by 51 percent, in 2009 by 88 percent, in 2011 by 21 percent, in 2012 by 30 percent and in 2013 by 14 percent.[31]

Despite the stock continuing to rebuild, the demand for recreational fishing has grown at a faster rate. Recreational landings are three-to-four times higher now than in 2007. Red snapper are being landed faster, and each one landed is larger, on average weighing twice what it did a few years ago. Furthermore, greater quantities of red snapper are being landed in state waters that remain open while the recreational season in federal waters has been progressively shortened.[32]

28. Section 2.3 in the New Zealand Initiative's 2016 report *What's the Catch?: The state of recreational fisheries management in New Zealand* states that, depending on the species, New Zealand's quota aggregation limits are 10, 20, 35 or 45 percent of the fish stock (https://nzinitiative.org.nz/insights/reports/whats-the-catch-the-state-of-recreational-fisheries-management-in-new-zealand/).

29. Cullis-Suzuki, S., McAllister, M., Baker, P., Carruthers, T., and Tate, T.J. (2012). Red snapper discards in the Gulf of Mexico: Fishermen's perceptions following the implementation of Individual Fishing Quotas. *Marine Policy*, 36, 583–591.

30. Gulf of Mexico Fishery Management Council (2014). *Reef Fish Amendment 28 Red Snapper Allocation and Recreational Accountability Measures*. Gulf of Mexico Fishery Management Council: Tampa, Florida (http://sero.nmfs.noaa.gov/ sustainable_fisheries/gulf_fisheries/reef_fish/2013/am28/documents/pdfs/allocation_accountability_guide.pdf).

31. *Guindon et al vs Pritzker et al* (http://cases.justia.com/federal/district-courts/district-of-columbia/dcdce/1:2013cv00988/160778/61/0.pdf?ts=1411527224).

32. Ibid.

In 2013, commercial fishing interests filed legal action in the federal court challenging the 2013 red snapper TAC allocations and fishing season. This included the failure to hold the recreational fishing sector to its TAC allocation, which, it was argued, hindered the red snapper stock rebuild. In 2014, the court found that NMFS had failed to require adequate accountability measures to prevent the retention of fish after the recreational TAC allocation had been caught.[33]

The Gulf of Mexico Council requested an emergency rule to revise accountability measures. These measures included a 20 percent buffer on the recreational TAC allocation to constrain landings to below the TAC allocation and, therefore, reduce the likelihood of overages.[34]

The Gulf of Mexico Council also revised the 51/49 split in the TAC allocation by shifting 2.5 percent of the commercial sector's allocation to the recreational sector, making it a 48.5/51.5 split favouring the recreational sector. This revision was based on a recalibration of data for estimating catches since 2015. The Council has requested information on several proposed alternative splits in the TAC allocation between the commercial and recreational sectors. Beginning in 2016, projections regarding stock assessment were to assume alternative allocative splits: 45/55, 40/60, 35/65 and 30/70.[35]

However, the federal court has recently cancelled (vacated) an amendment to the Magnuson-Stevens Act that proposed reallocation of red snapper from the commercial to the recreational sector. The judge found that reallocation based on past overages of the recreational sector TAC allocation would violate the Act's national standard for fair and equitable allocation.[36] It is worth highlighting the court did not consider the use of compensation in any reallocation.

1.5 Recreational sector separation

In 2014, the Gulf of Mexico Council began a series of actions directed at better ensuring the recreational sector does not exceed its TAC allocation, although, as noted, it is unclear what the future allocative split might be. These actions include changes to the sector itself and include various programmes not yet fully developed.

The changes are fundamentally about developing an IFQ programme for the for-hire sector, in line with NOAA's Catch Share Policy supporting

33. *Guindon et al vs Pritzker et al* (http://law.justia.com/cases/federal/district-courts/district-of-columbia/dcdce/1:2013cv00988/160778/61/).

34. Gulf of Mexico Fishery Management Council and National Oceanic and Atmospheric Administration (2010). *Gulf of Mexico Regional Summary*. United States. See also Doerpinghaus, J., Hentrich, K., Troup, M., Stavrinaky, A. and Anderson, S. (2014). An assessment of sector separation on the Gulf of Mexico recreational red snapper fishery. Marine Policy, 50, 309–317.

35. Gulf of Mexico Fishery Management Council (2015). *Red Snapper Allocation: Final Amendment 28 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico*. Gulf of Mexico Fishery Management Council: Tampa, Florida (http://gulfcouncil.org/docs/amendments/Final%20Red%20Snapper%20Allocation%20-RF%20Amendment%2028.pdf).

36. Order Granting Plaintiffs' Motion for Summary Judgment in Part, Guindon v. Ross, No. 1:15-cv-02256, Dkt. # 30 (D.D.C. Mar. 3, 2017).

ABOVE: *Snapper hanging in a row*
Source: Bubba Cook

catch share programmes for headboats and charter boats.[37] The changes pertain to accounting for red snapper catches, along with the prospect of IFQ traded between fishing sectors, both of which remain controversial, especially because none of the changes would increase the number of fishing days for private boat anglers.

The Council first approved the establishment of two components within the recreational sector: private boat angling and federally permitted for-hire boats.[38] The latter includes all for-hire boats with a valid or renewable federal reef fish for-hire permit. The former includes anglers fishing from private boats and all other for-hire boats (for example, state licenced).

The Gulf of Mexico Council also separated the red snapper recreational TAC allocation between the two components, with 42.3 percent allocated to federal for-hire permits and 57.7 percent allocated to private boat angling. These allocations were based on average proportional landings by each component, minus the 20 percent buffer that has been in place since 2014. Preliminary data show that in the first two years of the recreational sector separation, the federal for-hire landings have been under its allocation, while the private boat angling landings have exceeded its allocation, and by at least 150 percent.[39]

37. National Oceanic and Atmospheric Administration (2009). *Catch Share Policy*. Department of Commerce: Washington, DC (www.nmfs.noaa.gov/sfa/management/catch_shares/about/documents/noaa_cs_policy.pdf).

38. Gulf of Mexico Fishery Management Council (2014). *Recreational Red Snapper Sector Separation: Final Amendment 40 to the Fishery Management Plan to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico*. Gulf of Mexico Fishery Management Council: Tampa, Florida (https://gulfcouncil.org/docs/amendments/RF%2040%20-%20Final%2012-17-2014.pdf).

39. Refer to the 31 January 2017 Reef Fish Management Committee (TAB B) titled, Preliminary 2016 Red Snapper For-Hire Landings Relative to ACL (TAB B, No. 11) – Diaz https://gulfcouncil.org/council_meetings/BriefingMaterials/BB-01-2017/Jan2017Index%20(Conflicted%20copy%20from%2080KF842-PC%200n%202017-01-13).php

"Some dually permitted (commercial and charter) boat operators in the Gulf of Mexico are operating under existing regulation that allows them to fish year-round for red snapper using IFQs."

Starting in 2015, the Gulf of Mexico Council established red snapper fishing seasons and closures for each component, with the season length based on each component's TAC allocation. All other management regulations remain the same for both components, including the 16 inch (40.6 centimetre) minimum legal size, the two fish daily bag limit and a 1 June season start.

Next, the Council intends further separating the federal for-hire permit component into the 67 headboats that participated in the Southeast Region Headboat Survey, and therefore have associated catch histories, and the 1,247 charter boats not invited to participate in the Survey. The Council is considering an IFQ programme for the headboats, with quota distributed to each permit holder based on vessel landing history. The Council is also considering various options for the charter boats, including a programme whereby percentage shares of collective landing histories would be distributed to each permit holder, and the shares would be tied to the permit.[40]

Perspectives differ on the changes the Gulf of Mexico Council has proposed for the for-hire fleet. For example, Johnny Williams, owner of Williams Party Boats in Galveston, Texas, considers an IFQ programme based on catch histories is a superior way of operating his business, compared with fishing under a short, defined season (pers. comm., Johnny Williams, 10 October 2016).

Mike Nuggent, owner of Wrecklamation Charters in Port Aransas, Texas, and spokesperson for the Port Aransas Boatmen Inc, is critical of the use of catch shares for charter boats, despite being well placed to benefit from any quota allocations based on catch history. Nuggent reiterated concern that "IFQs would eventually become consolidated within the hands of a few, as occurred in the commercial fishery" (pers. comm., Mike Nuggent, 15 October 2016).

> If the aim is to improve the recreational fishing information, then NMFS should have implemented E-reporting, which the charter fleet operators have requested for several years. My advice is not to listen to outsiders who attempt to buy people. We should have our own state management of the red snapper fishery, because Texas has been successful at managing other fisheries (pers. comm., Mike Nuggent, 15 October 2016).

1.5.1 Charter boat use of individual fishing quotas

Some dually permitted (commercial and charter) boat operators in the Gulf of Mexico are operating under existing regulation that allows them to fish year-round for red snapper using IFQs. This type of operation is referred to as the "catch share experience".

While IFQs applied to charter boats is not a new idea, that they are operating just like commercial fishing operations is novel. None of the recreational rules apply, and the fishers on board do not pay for charter services. Because the red snapper caught during the catch share experience

40. Gulf of Mexico Fishery Management Council (2016). *Red Snapper Management for Federally Permitted Charter Vessels: Draft Amendment 41 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico*. Gulf of Mexico Fishery Management Council: Tampa, Florida.

ABOVE: *Snapper catch*
Source: Environmental Defense Fund

is counted against IFQs, it does not count against nor diminish the recreational TAC allocation.

The arrangement works by the fishers simply placing their orders with the fish processor that receives their catch. The fishers then participate in the commercial harvest to fill their orders. When their catch is delivered to the fish processor, the fishers pay the pre-set price for filleted red snapper. No exchange occurs between the fishers and the boat captain, beyond agreement to be on board and fish for free as "riders", so long as maritime safety rules are met.

I went on one of these catch share experience fishing trips, leaving from the Port of Galveston in Texas. The boat went about 26 miles (42 kilometres) offshore. The captain, Scott Hickman, also owns the IFQs that we fished against on board his dually permitted boat. Hickman had positive statements regarding this arrangement, particularly about these fast boats operating with lower costs (per pound of red snapper caught), so long as a minimum level of orders was filled.

In addition, because it was a commercial fishing trip, Hickman was subject to all Gulf of Mexico IFQ requirements. These include using a vessel monitoring system that allows NMFS to track movements, giving hail-out and hail-in notices to NMFS, along with estimates of landings on board (these must be unloaded at an authorised fish processor that is required to account for each pound of fish unloaded and to report landings information to NMFS).

During the fishing trip, we each caught around 30 to 40 red snapper, making it a thoroughly enjoyable experience. The red snapper were so abundant we caught one within seconds of the hooks descending a few metres. We had three undersized snapper discards for the entire fishing trip. The 13 inch (33.0 centimetre) commercial minimum legal size applied, not the 16 inch (40.6 centimetre) recreational size limit.

With other dually permitted boats operating in Louisiana, Florida and Alabama setting up catch share experience fishing trips, there is little doubt they will generate ongoing interest and debate. They provide recreational fishers with opportunities to access red snapper fishing all year round, which many will likely find appealing. It is an intriguing example of an unconventional solution that benefits both sectors in the Gulf of Mexico context.

Ted Venker, Coastal Conservation Association (CCA) Conservation Director and Editor of *TIDE* magazine, objects to catch share experiences because these trips are the first step towards "privatising" the recreational snapper TAC allocation. Venker states "It's the ultimate blurring of the line between recreational and commercial. Under this scenario, that distinction doesn't exist as it all just deteriorates down to who owns the fish, and it isn't the public anymore".[41]

1.6 Proposed management changes

In 2015, the directors of the marine fisheries agencies in the Gulf states proposed that the Gulf states coordinate all management of red snapper by way of a new independent body that includes the Gulf states' principle marine fisheries managers.

This proposal led to the US House of Representative's Committee on Natural Resources having ordered a bill (H.R. 3094), the Gulf States Red Snapper Management Authority Act, in mid-2016 to be reported (amended) to the House. This bill would remove authority for managing the red snapper fishery from federal management under the Magnuson-Stevens Act, and, therefore, the Gulf of Mexico Council and NMFS, including the Reef Fish Fishery FMP. The bill would shift the red snapper fishery to a new authority comprising the principal fisheries manager in each Gulf state.[42]

This bill is strongly opposed by red snapper commercial fishing interests. For example, Buddy Guindon, founding member and Executive Director of the Gulf of Mexico Reef Fish Shareholders' Alliance in Galveston, Texas, opposes the bill because it would set a precedent to roll back federal regulations of regional US fisheries. Guindon considers the plan to have red snapper managed by the Gulf states could eliminate the IFQ programme in place since 2007.[43]

The Gulf of Mexico Reef Fish Shareholders' Alliance, along with the Gulf Fishermen's Association (Clearwater, Florida), the Charter Fishermen's Association (Corpus Christi, Texas) and the Seafood Harvesters of America (Washington, DC) have joined forces to oppose H.R. 3094, which they consider poses an imminent threat to their jobs, fishing communities and the red snapper resource.[44]

41. See Raines, B. (7 April 2016). *Texas charter captains use loophole to get around federal red snapper limits* (www.al.com/news/index.ssf/2016/04/post_111.html).

42. Gulf States Red Snapper Management Authority Act (www.congress.gov/bill/114th-congress/house-bill/3094).

43. Gulf of Mexico Reef Fish Shareholders' Alliance (27 June 2016). *Gulf Fishermen Applaud Louisiana's Leadership and Responsibility* (http://shareholdersalliance.org/documents/2016-06-27.pdf).

44. Joint letter to the Committee on Natural Resources Subcommittee on Water, Power, and Oceans (20 October 2015) (www.seafoodharvesters.org/wp-content/uploads/Fishermen-oppose-H.R.-30941.pdf).

1.7 Marine recreational fishing advocacy

It is beyond the scope of this report to outline the various recreational fishing advocacy organisations that support the estimated 11 million Americans who participate in marine fisheries each year. Brief explanations are provided regarding the CCA, as noted above, and a recently formed coalition of leading advocacy organisations for marine recreational fishing and boating, the Center for Sportfishing Policy (CSP) (former Center for Coastal Conservation).

1.7.1 Coastal Conservation Association

The CCA is a non-profit marine conservation organisation founded in Texas in 1977 and now has over 50,000 members. The CCA's purpose is to advise and educate the public on the conservation of marine resources, and to conserve, promote and enhance their present and future availability for the benefit and enjoyment of the public.[45] Many CCA members are volunteers and make financial contributions for various coastal marine conservation and management initiatives.[46] The CCA also receives funds from financial sponsors.[47]

Since 1984, the CCA, with its headquarters in Houston, Texas, has been active in every national fisheries debate.[48] The CCA has a legal defence fund to increase its advocacy, and this has been used to defend net bans and bycatch reduction devices, support pro-fisheries legislation and "battle arbitrary, federal no-fishing zones".[49] The CCA headquarters and state chapters are engaged in hundreds of different programmes and projects, including scientific, contaminate and hydrology studies, scholarship funding, artificial reefs, hatcheries, freshwater inflows and support of local enforcement agencies.[50]

The Texas chapter, referred to as CCA Texas, has taken up various initiatives. It also has a history of supporting and taking part in habitat restoration, referred to as Habitat Today for Fish Tomorrow projects.[51] It partners in these projects with the US Fish and Wildlife Service, Harte Research Institute at Texas A&M University-Corpus Christi, Texas Parks and Wildlife Department and the Galveston Bay Foundation. CCA Texas conservation contributions totalled more than US$500,000 in 2015.[52]

45. Coastal Conservation Association Texas (www.ccatexas.org/conservation/).

46. Standard CCA membership is US$30 for one year. Several options are available, including lifetime membership for US$1,000, Heritage membership for US$5,000 and Legacy membership for US$10,000, which includes member decals and limited edition display pieces. All include a subscription to the bimonthly magazine *TIDE* (https://membership.joincca.org/WEB/Online/Membership/Membership_Levels.aspx).

47. Coastal Conservation Association Texas (www.ccatexas.org/how-to-help/advocacy/).

48. Ibid.

49. Coastal Conservation Association Texas (see www.ccatexas.org/how-to-help/advocacy/ and www.ccatexas.org/cca-faq/).

50. Coastal Conservation Association Texas (www.ccatexas.org/conservation/).

51. Coastal Conservation Association Texas (www.ccatexas.org/conservation/habitat-projects/).

52. Coastal Conservation Association Texas (www.ccatexas.org/conservation/).

"Recently, the CSP outlined what it considers to be 21st-century solutions on recreational fishing issues that the new federal government administration and US Congress should consider. These solutions include guidance for federal policy makers that calls for an end to 'antiquated' federal policies"

1.7.2 The Coastal Conservation Association's positions

The CCA opposed the 2014 separation of the recreational sector into the private boat angler and federally permitted for-hire components on the basis that the private boat anglers have watched their season continue to diminish, while the commercial sector has had its season lengthen over time. The CCA took legal action against the sector separation in the federal district court, which was overturned. The CCA appealed to the US Court of Appeal and lost.

The CCA is also supporting H.R. 3094 introduced in the US House of Representatives to grant all management of red snapper in the Gulf to the Gulf states.[53] The CCA is critical of the federal government's primary focus on managing the commercial sector. It holds the view that the federal government has had decades to improve the red snapper management, and it is timely to pass this responsibility to the Gulf states.[54]

1.7.3 Center for Sportfishing Policy

The CSP is a non-partisan organisation that focuses on having an impact in the national political arena, particularly the US Congress and federal regulatory agencies. Its mission is to maximise opportunities for saltwater recreational anglers by organising, focusing and engaging them to speak with one voice to shape federal marine fisheries management policy.[55]

Recently, the CSP outlined what it considers to be 21st-century solutions on recreational fishing issues that the new federal government administration and US Congress should consider. These solutions include guidance for federal policy makers that calls for an end to "antiquated" federal policies.[56]

The CSP highlights the Gulf of Mexico red snapper fishery as having several contributing factors to the federal fisheries management system "failing" to recognise the distinctions between recreational and commercial fishing. These factors include overly rigid statutory requirements, inadequate stock assessments, inaccurate angler harvest estimates, a refusal by managers to legitimately re-examine allocations and the heavy influence of commercial fishing and environmental organisations within the Gulf of Mexico Council.[57]

Finally, the CSP supports the creation of a new federal advisory committee to advise the Secretary of Commerce on saltwater fishing matters. This committee should be like the Interior Secretary's Federal Advisory Committee regarding freshwater fisheries, but with membership that includes representatives of state marine fisheries management agencies, recreational fishing organisations, marine recreational industries and related organisations.[58]

53. Ibid.
54. Coastal Conservation Association (www.joincca.org/articles/769).
55. Center for Sportfishing Policy (www.sportfishingpolicy.com/who-we-are).
56. Center for Coastal Conservation (2016). *A Vision for Marine Fisheries Management in the 21st Century: Priorities for a new administration*. Center for Coastal Conservation: Baton Rouge, Louisiana (www.coastalconservation.us/docs/AVisionForMarineFisheriesManagement21stCentury.pdf).
57. Ibid.
58. Ibid.

1.8 Concluding remarks

The Gulf of Mexico red snapper fishery exemplifies what is possible when rebuild measures are initiated. The red snapper TAC needed a 45 percent reduction to bring about a substantial increase in biomass, which has nearly tripled during the past decade. However, the rebuild is not complete, because a disproportionate number of young red snapper have not yet reached their peak productive years, requiring the rebuild programme to continue.

The red snapper fishery also shows how controversial a fishery can become when one sector is plagued by failed management. Many private boat anglers feel animosity towards the federal government for what they perceive to be ongoing partiality for commercial fishers. Many of the commercial fishers, however, consider the private boat anglers and their representatives are blaming others for problems they have caused with respect to exceeding the recreational TAC allocation and the risk that poses for the red snapper rebuild.

The management problems in the red snapper fishery cannot be blamed on commercial overfishing. The commercial sector has consistently stayed within its TAC allocation since the IFQ programme was implemented in 2007. The blame has been redirected towards the federal government's apparent mismanagement of the fishery and it having failed the private boat anglers. Failure is commonly defined as the inability to increase the available days to fish.

Intersectoral tensions have led to a concerted effort amongst the Gulf states to take up individual and collective responsibility for the management of the red snapper fishery. If passed, the proposed federal bill would remove the longstanding arrangement for federal management of the red snapper fishery. Such a shift in responsibility could potentially destabilise the federal government-supported IFQ programme in the Gulf and elsewhere, including the separation of the recreational fishing sector in the Gulf.

The prospect of changes to the TAC allocative split appears less likely, given the recent court determination on reallocation. But, if the Gulf states gain management responsibility for the fishery, a split more favourable to recreational fishing would likely be inevitable.

A high degree of uncertainty exists in the red snapper fishery, including the timeframe for decisions to be made about its future management. This uncertainty may well increase, given the new federal government administration and legislature.

CHAPTER 02

Northern California red abalone fishery

Source: Jack Likins

Northern California shows us how collaborative efforts can help to improve the management of a fishery in crisis. Warm water conditions and a spike in purple urchin numbers have created an unprecedented collapse of the kelp forests that abalone depend on as a food source. When things looked bleak, volunteers and government and non-governmental organisations collaborated to better ensure the red abalone fishery remains sustainable. This meant improving the management capacity for adapting to adverse natural conditions.

North of San Francisco Bay has never been open to commercial abalone harvest. The only species that supports a recreational fishery along the northern California coastline is the red abalone (*Haliotis refescens*).[59] This fishery has had up to 40,000 divers landing 200 to 310 metric tonnes annually, making it the world's largest recreational abalone fishery.[60] According to Jack Likins, a long-standing abalone diver in northern California, the number of red abalone landed has declined from 300,000 in 2007 to 154,000 in 2015, excluding illegal take, and the number of divers has declined, reaching 25,000 in 2016 (pers. comm., Jack Likins, 20 January 2017).

In contrast, the abalone populations along the southern coastline have declined dramatically, nearing extinction for some species, due to both human and natural causes.[61] Abalone once supported important commercial and recreational fisheries in southern California. Since 1997, a moratorium has been in place on harvesting abalone south of San Francisco Bay.

Consequently, the California coastline presents a unique opportunity to compare the same abalone species in quite different circumstances. In southern California, serial depletion (sequential decline in landings by species or area) remains a problem for red and other abalone species. In the north, serial depletion has not been a problem to date. The health of the red abalone population is mainly because of the rugged northern coastline being exposed to harsh weather conditions, making it inaccessible except for a few small areas. The northern and southern coastlines are separated by the central sea otter zone. This is an area where abalone survive but cannot support a fishery, because of the predatory nature of the otters.

Since 2014, The Nature Conservancy[62] has been working with the California Department of Fish and Wildlife (Department of Fish and Wildlife), scientists and a group of volunteer local divers (referred to as

59. Six species live along the southern California coastline: red abalone (*Haliotis refescens*), pink abalone (*H. corrugata*), green abalone (*H. fulgens*), black abalone (*H. cracherodii*), white abalone (*H. sorenseni*), pinto abalone (*H. kamtschatkana*). The three species along the northern California coastline are: red abalone (*H. refescens*), pinto abalone (*H. kamtschatkana*) and flat abalone (H. walallenis).

60. Kashiwada, J.V. and Taniguchi, I.K. (2007). Application of recent red abalone *Haliotis rufescens* surveys to management decisions outlined in the California abalone recovery and management plan. *Journal of Shellfish Research*, 26, 713–717.

61. Karpov, K.A., Haaker, P.L., Taniguchi, I.K. and Rogers-Bennett, L. (2000). Serial depletion and the collapse of the California abalone (*Haliotis* spp.) fishery. *Workshop on Rebuilding Abalone Stocks in British Columbia*, 11–24. NRC Research Press: Ottawa, Canada.

62. The Nature Conservancy is a charitable environmental organisation headquartered in Arlington, Virginia, and its mission is to "conserve the lands and waters on which all life depends." Its vision "is a world where the diversity of life thrives, and people act to conserve nature for its own sake and its ability to fulfil our needs and enrich our lives" (www.nature.org/).

the Abalone Working Group). The collaboration aims to find better ways to ensure the red abalone fishery remains sustainable, which includes improving capacity for adaptive management.

Frank Hurd, The Nature Conservancy's Coastal Fisheries Project Director, states that these efforts focus on improving data collection capacity and integrating that data into efficient, science-based management decision making.

> To build up existing capacity, The Nature Conservancy relies on those who are closest to the resource. In this case, it is the local abalone divers who understand the science behind abalone management, but may typically lack the scientific backgrounds that most marine data collectors have (pers. comm., Frank Hurd, 28 September 2016).

Reliance on local and regional volunteers is an increasingly acceptable and cost-effective way of improving data collection over greater spatial and temporal scales.[63] A complementary incentive is that volunteers are given opportunities to address management and environmental issues of importance to them.[64] In these circumstances, research can become a participatory or collaborative venture. The red abalone fishery is an example of this. One of the most compelling challenges, however, is overcoming the Department of Fish and Wildlife's reluctance to accept volunteers' contributions to both data collection and development of management strategies for the red abalone fishery (pers. comm., Jack Likins, 20 January 2017).

2.1 Red abalone characteristics

Red abalone is the largest of the species, and so is prized for its size. The recreational minimum legal size is 7 inches (178 millimetres). Most divers go their entire lifetime without finding a red abalone around 10 or 11 inches (254 to 279 millimetres) in length. Those measuring 10 inches or more are considered a trophy. The world record is 12.32 inches (313 millimetres).[65]

Like other abalone species, red abalone are slow growing and long lived. They can reach 30 to 40 years of age. On average, it takes 12 years for red abalone to reach the 7 inch (178 millimetres) minimum legal size, and five-to-six years to grow another inch (25 millimetres). The growth rate depends on several factors, including available habitats, shifts in water temperature, fluctuations in food supply and spawning cycles.[66]

Abalone are broadcast spawners, which means successful fertilisation must occur through synchronistic release of eggs and sperm. A minimum

63. Fairclough, D.V., Brown, J.I., Carlish, B.J., Crisafulli, B.M., and Keay, I.S. (2014). Breathing life into fisheries stock assessments with citizen science. *Scientific Reports*, 4(7249) (www.nature.com/articles/srep07249).

64. Cigliano, J.A., Meyer, R., Ballard, H.L., Freitag, A., Phillips, T.B. and Wasser, A. (2015). Making marine and coastal citizen science matter. *Ocean & Costal Management*, 115, 77–87.

65. Dr Abalone *The Hunt for Monster Red Abalone* (7 September 2014) (https://briantissot.com/2014/09/07/the-hunt-for-monster-red-abalone/).

66. California Department of Fish and Game (2005). *Abalone Recovery and Management Plan Adopted by the California Fish and Game Commission*. California Department of Fish and Game, Marine Region: Sacramento, California.

RIGHT: *Jack Likins with an 11-incher (279mm)*
Source: Jack Likins

density of spawners is essential for successful broadcast spawning. When the population drops below a minimum density, the fishery is in danger of collapse, especially if subject to fishing mortality.[67]

2.1.1 Predators

Sea otters are the main natural predator of abalone and cause significant reductions in their number and size. Sea otters were exploited during the Russian expansion in the late 1700s and early 1800s. In their efforts to continue hunting sea otters for the lucrative fur trade in China, Russians moved south from Russian Alaska to California. Sea otter populations were hunted to extinction along most of the California coastline, although some populations remain in central California and San Nicholas Island.[68]

In these areas, sea otters keep the population densities well below 0.20 abalone per square metre, which the Department of Fish and Wildlife uses as the density below which a fishery is at risk of collapse (pers. comm., Jack Likins, 20 January 2017). It is likely that sea otters will eventually expand northward, which will pose a serious threat to the red abalone fishery.

Other threats to the red abalone fishery include the recent decline in kelp forests. The northern California coastal waters have two major

67. Ibid.

68. Marine Science (19 March 2009). *Abalone History and Future* (www.marinebio.net/marinescience/06future/abhist.htm).

canopy-forming species of kelp, the giant kelp (*Macrosystis pyrifera*) and bull kelp (*Nereocystis luetkeana*), which provide habitat for a diverse mix of species.[69] Aerial surveys show the canopy-forming kelp has declined by 93 percent during the past few years, which is attributed to two natural causes.[70]

"'The warmer water and "urchin barrens" are to blame for an unprecedented collapse of the kelp forests along hundreds of miles from San Francisco to Oregon'. The lack of food (kelp) has hindered red abalone recruitment since the warm water conditions began in 2014"

First, during 2014 and 2015, water temperatures were above normal. A patch of warm water off the west coast, referred to as the "warm blob", was 1 degree to 4 degrees Celsius above normal. The warm blob's origins were associated with a persistent high-pressure ridge that caused calm ocean conditions, so less heat was lost to cold air currents during the past two winters. These conditions have led to fish sightings in unusual places and food webs disrupted by warm, less nutrient-rich water.[71]

Second, the warm water conditions stressed the kelp forests, making them more vulnerable to sea urchin grazing. Small, purple urchins have devoured large tracts of kelp forests. Starfish species are the primary predators of purple urchins. However, a disease along the west coast in 2013 eliminated vast quantities, and without starfish keeping purple urchin populations in check, their density increased more than 60 times.[72]

The spike in purple urchin numbers and the decline in kelp forests have led to a radically transformed near-shore environment. Cynthia Catton, a marine scientist for the Department of Fish and Wildlife at Bodega Bay, concludes "the warmer water and 'urchin barrens' are to blame for an unprecedented collapse of the kelp forests along hundreds of miles from San Francisco to Oregon".[73] The lack of food (kelp) has hindered red abalone recruitment since the warm water conditions began in 2014.[74]

2.2 Decline in abalone fisheries

The commercial abalone fishery in southern California (Mexican border to Point Conception) and to a lesser extent in central California (Point Conception to San Francisco Bay) used to be lucrative. However, those managing the fishery failed to adapt to changes in the abalone stocks and fishing effort over time.

Beginning in the 1940s, landings in southern California increased significantly, peaking at 2,500 metric tonnes in 1957. Around 2,000 metric

69. Pacific Fishery Management Council (2013). *Pacific Coast Fishery Ecosystem Plan for the U.S. Portion of the California Current Large Marine Ecosystem: Public review draft.* Pacific Fishery Management Council: Portland, Oregon.

70. Callahan, M. (2016). Collapse of kelp forest imperils North Coast ocean ecosystem. *The Press Democrat*, 16 April (www.pressdemocrat.com/news/5487602-181/collapse-of-kelp-forest-imperils?artslide=0).

71. Hickey, H. (2015). 'Warm blob' in Pacific Ocean linked to weird weather across the U.S. *UW Today*, 9 April (www.washington.edu/news/2015/04/09/warm-blob-in-pacific-ocean-linked-to-weird-weather-across-the-u-s/).

72. Callahan, M. (2016). Collapse of kelp forest imperils North Coast ocean ecosystem. *The Press Democrat*, 16 April (www.pressdemocrat.com/news/5487602-181/collapse-of-kelp-forest-imperils?artslide=0).

73. Ibid.

74. Rogers-Bennett, L., Dondanville, R.F., Catton, C.A., Juhasz, C.I., Horii, T., and Hamaguchi, M. (2016). Tracking larval, newly settled, and juvenile red abalone (*Haliotis rufescens*) recruitment in northern California. *Journal of Shellfish Research*, 35(3), 601–609.

tonnes were harvested annually until 1969, and then harvest levels steadily declined, reaching only 118 metric tonnes in 1995.[75]

Regulations were used to control harvest and effort, including minimum legal sizes, daily bag limits and seasonal TACs. However, they were ineffective in avoiding serial depletion by species and area and eventual collapse of the fishery. The depletion went unnoticed, initially, because the abalone stocks were managed as a multi-species fishery where landings of individual species were not tracked.

This management approach allowed commercial harvest to shift from one species to the next and one area to the next, giving the appearance of constant catch, while the catch of individual species continued to decline. As the availability of abalone decreased, effort shifted to the sea urchin fishery. Divers searching for sea urchins continued to harvest abalone while populations went to extremely low levels.[76] Despite evidence of this decline, the abalone fishery remained opened as the market value for abalone continued to rise.[77]

A further factor in the decline of the abalone fishery was the growth in the scuba recreational fishery. This remained unmonitored, along with a growing number of shore-pickers, private boat divers and commercial passenger diving boats that harvested mainly around the Channel Islands west of Los Angeles.[78] The recreational landings were also not tracked in terms of species, numbers or weight.

Natural causes also contributed, such as severe El Ninos during the 1980s and 1990s that created warm water conditions, causing nutrient levels to decrease as kelp forests declined. These conditions had a devastating effect on southern California abalone stocks. In addition, abalone are susceptible to withering foot syndrome, which spread amongst the southern California abalone stocks in the 1990s. This syndrome is an infectious disease that causes abalone to become progressively smaller though the shell remains the same size. Eventually, the abalone cannot hold onto the substrate and becomes easy prey.[79]

A moratorium was implemented in 1997 to commercial and recreational abalone harvesting south of a line drawn due west magnetic from the centre of the mouth of San Francisco Bay. Commercial harvesting had never occurred north of that line. Since the moratorium, the northern California recreational abalone fishery has been based solely on red abalone.[80]

75. California Department of Fish and Game (2005). *Abalone Recovery and Management Plan Adopted by the California Fish and Game Commission*. California Department of Fish and Game, Marine Region: Sacramento, California.

76. Ibid.

77. Karpov, K.A., Haaker, P.L., Taniguchi, I.K. and Rogers-Bennett, L. (2000). Serial depletion and the collapse of the California abalone (*Haliotis* spp.) fishery. *Workshop on Rebuilding Abalone Stocks in British Columbia*, 11–24. NRC Research Press: Ottawa, Canada.

78. California Department of Fish and Game (2005). *Abalone Recovery and Management Plan Adopted by the California Fish and Game Commission*. California Department of Fish and Game, Marine Region: Sacramento, California.

79. Marine Science (19 March 2009). *Abalone History and Future* (www.marinebio.net/marinescience/06future/abhist.htm).

80. California Department of Fish and Game (2005). *Abalone Recovery and Management Plan Adopted by the California Fish and Game Commission*. California Department of Fish and Game, Marine Region: Sacramento, California.

2.3 Fisheries management

"A resident who is 16 years of age and older must have a licence to take any kind of fish, mollusc, invertebrate, amphibian or crustacean in California, except for people angling from a public pier in ocean or bay waters. The licence is also required to take reptiles, except for rattlesnakes"

The Pacific Fishery Management Council is authorised under the Magnuson-Stevens Act to manage fisheries along the coasts of California, Oregon and Washington. Numerous Native American tribes co-manage a variety of fish species and marine areas with state and federal government agencies and participate in the Council management processes.[81] The various tribes and federal government agencies also participate in state-level fisheries management.

The California Constitution established the forerunner of the Fish and Game Commission in 1870, which was the first wildlife conservation agency in the United States. The Commission has a variety of powers, including tracking commercial landings and recreational catch and publicising regulations to manage sport fishing and hunting.

The Department of Fish and Wildlife is responsible for implementing and enforcing the regulations set by the Commission, as well as providing biological data and expertise to inform the Commission's decision-making processes.[82] The Department of Fish and Wildlife's jurisdiction extends 3 miles (4.8 kilometres) from shore.

The Marine Life Management Act was enacted in the California legislature in 1999 with the overall goal of ensuring conservation, sustainable use and restoration of living marine resources. Through the Act, the California Legislature delegated greater authority to the Commission and the Department of Fish and Wildlife.[83]

2.3.1 Sport fishing licence

The Department of Fish and Wildlife administers the marine recreational fishing licensing system for California residents and non-residents. A resident who is 16 years of age and older must have a licence to take any kind of fish, mollusc, invertebrate, amphibian or crustacean in California, except for people angling from a public pier in ocean or bay waters. The licence is also required to take reptiles, except for rattlesnakes.[84] Anglers must provide their telephone number when purchasing a licence, as part of a federal requirement to establish a national saltwater angler registry. The licence must be on the angler while engaged in fishing.[85]

An annual California resident sport fishing licence can be bought for US$47.01 and an annual non-resident licence for US$126.36. California

81. Pacific Fishery Management Council (2013). *Pacific Coast Fishery Ecosystem Plan for the U.S. Portion of the California Current Large Marine Ecosystem: Public Review Draft*. Pacific Fishery Management Council: Portland, Oregon.

82. California Fish and Game Commission (2016). *About the Fish and Game Commission* (www.fgc.ca.gov/public/information/).

83. Pacific Fishery Management Council (2013). *Pacific Coast Fishery Ecosystem Plan for the U.S. Portion of the California Current Large Marine Ecosystem: Public Review Draft*. Pacific Fishery Management Council: Portland, Oregon.

84. A sport fishing licence is not required for the sport take of any rattlesnake, although bag and possession limits do apply. See California Natural Resources Agency, Department of Fish and Wildlife *Native Reptile Captive Propagation Laws and Regulations* (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=35207).

85. California Department of Fish and Wildlife, *California Ocean Sport Fishing Regulations 2016–2017 Effective March 1, 2016 through February 28, 2017* (www.wildlife.ca.gov/fishing/ocean/regulations/sport-fishing).

residents and non-residents can also buy one-day licences for US$15.12, two-day licences for US$23.50 and 10-day licences for US$47.01. Annual reduced-fee sport fishing licences can be bought for US$6.95 by those who qualify as honourably discharged veterans, recovering service members or resident low-income seniors. Lifetime licences can be bought for US$517.00 to US$844.50, depending on age categories. Marine recreational anglers must also purchase a Sport Ocean Enhancement Validation for US$5.14 for fishing in southern California waters.

2.4 Red abalone fishery management

For several decades, the Department of Fish and Wildlife has continued to implement and enforce various requirements for red abalone harvesting, summarised as follows:

- all red abalone must be 7 inches (178 millimetres) or greater measured along the longest shell diameter, and all legal-sized abalone must be retained
- abalone can only be taken during April to June and August to November, inclusive
- abalone may be taken only from 8am to one-half hour after sunset
- three red abalone may be taken per day, and no more than three may be possessed at any time
- no person can take more than 18 abalone during a calendar year, with no more than nine taken south of the boundary between Sonoma and Mendocino counties
- abalone irons for removal from the substrate have strict specifications, along with a calliper-type measuring gauge, which are required to reduce disturbance and injury
- scuba gear and surface-supplied air cannot be used to harvest red abalone.[86]

In 2002, an abalone report card was implemented. Only one abalone report card can be issued per person, at a cost of US$22.42. The card requires entry of the month, day, time of catch and fishing location, which must be legible and in indelible ink. The card must be reported online or returned to the Department of Fish and Wildlife between 1 December and 31 January. Anyone failing to report or return the card by the deadline may be restricted from obtaining the card in a subsequent licence year or may be subject to an additional fee.[87]

In 2010, a tagging system was added to the card. The card includes numbered detachable tags that must be attached to the abalone shell immediately upon return to the shore. The tagging of each abalone was

86. California Department of Fish and Wildlife, *California Ocean Sport Fishing Regulations 2016–2017 Effective March 1, 2016 through February 28, 2017* (www.wildlife.ca.gov/fishing/ocean/regulations/sport-fishing).

87. Ibid.

ABOVE: *Diver leaving the water*
Source: Jack Likins

added to help reduce illegal take and ensure compliance with the daily bag and annual limits.[88]

2.4.1 Management planning

Since 2014, the Department of Fish and Wildlife has been developing the Northern California Red Abalone Fishery Management Plan (Red Abalone Plan). A fisheries management plan developed under the Marine Life Management Act sets out the priorities and information for managing the harvest sustainably. The purpose of developing the Red Abalone Plan is to further refine and implement the long-term management objectives set out in the Abalone Recovery and Management Plan (ARMP).

The Department of Fish and Wildlife's efforts to restore abalone populations, other than those species listed under the federal Endangered Species Act of 1973,[89] are guided by the ARMP. The ARMP was adopted by the Fish and Game Commission in 2005 to address the shortcomings of the past management failures. The ARMP aims to improve the red abalone fishery in northern California with interim management and planning with a highly precautionary basis. This includes continued use of historical management tools (for example, daily and annual bag limits), long-term monitoring of abalone densities and two sources of fishery-dependent data, creel surveys and the abalone report cards.

The intent is to move the red abalone fishery towards long-term planning, where management is locally based, more responsive and adaptive, and with less need for a precautionary basis. It is also intended this planning approach will be applied to the recovery of abalone populations in southern and central California outside the range of the sea otters.[90]

88. California Cooperative Oceanic Fisheries Investigations (2010). *California Cooperative Oceanic Fisheries Investigations Reports, Vol 51, January 1 to December 31, 2010*. California Cooperative Oceanic Fisheries Investigations: La Jolla, California.

89. White abalone (*H. sorenseni*) and black abalone (*H. cracherodii*) are listed under the Endangered Species Act of 1973. Pink abalone (*H. corrugata*), green abalone (*H. fulgens*) and pinto abalone (*H. kamtschatkana*) are part of the Species of Concern Program, which supports proactive conservation and research (www.westcoast.fisheries.noaa.gov/protected_species/species_of_concern/species_of_concern.html).

90. California Department of Fish and Game (2005). *Abalone Recovery and Management Plan Adopted by the California Fish and Game Commission*. California Department of Fish and Game, Marine Region: Sacramento, California.

2.4.2 Abalone monitoring

The ARMP sets guidelines for TAC adjustments, closing and reopening the fishery, and maintaining abalone densities. Measures of density have been considered important because higher density equates to a greater reproductive population and because of risk of collapse should the density become too low.

The overall average density of abalone is determined from Department of Fish and Wildlife surveys conducted historically at eight fishery index sites that are surveyed on a rotating three-year basis. Four index sites are in Mendocino County and four are in Sonoma County.[91] Map 2 shows the eight index sites, sites for creel surveys and top 10 sites for abalone report cards.

Map 2: Locations of the fishery index, creel survey and top 10 abalone report card sites

Source: California Department of Fish and Wildlife

Ninety-six percent of the annual red abalone harvest is taken in waters off these two counties, and around 40 percent is taken at the eight sites. The purpose of monitoring is to determine if average density is statistically

91. The Department of Fish and Wildlife has added two more index sites, the Sea Ranch in Sonoma County and Russian Gulch in Mendocino County and the Fort Ross site was closed in 2012.

significantly different over time and to what extent.[92] For example, the density was determined to have declined in 2013, leading to the reduction in the annual limit (from 24 to 18 per person) and the fishing start time being moved back to 8am. In December 2016, the Fish and Game Commission closed the season in April and November and reduced the annual take from 18 to 12 per person.

Index site monitoring can be an effective, though expensive and time consuming, means of managing abalone populations, but it is equivalent to "a canary in a coal mine". In other words, the drawback is the Department of Fish and Wildlife is informed of the population status at the monitored index sites and not the overall fishery.[93]

This situation may be cause for concern, given that abalone population dynamics occur at a very small scale, around 10 to 100 metres, which means each species consists of numerous "micro-stocks". An important part of long-term management under the Red Abalone Plan is to tailor management to the biology and ecology of each "micro-stock".[94]

2.5 Collaborative efforts

As noted, The Nature Conservancy has been working since 2014 with the Abalone Working Group. The goal of this collaborative project is to establish how community-based methodology and assessments of spawning potential ratio (SPR) could be used cost effectively to augment the density estimates the Department of Fish and Wildlife uses to determine the red abalone stock status.[95]

SPR compares the spawning ability of a stock in the fished condition with its spawning ability in the unfished condition.[96] Methods for assessing SPR have shown to be effective for assessing and managing spatially complex and data-limited fisheries, such as abalone.[97] This is because of the simplicity of the models and size composition being easier to estimate than density. The collaborative project was tasked with trialling a new approach to estimating SPR using length-based data.[98]

The project began with the Abalone Working Group developing scientific protocols, identifying additional monitoring sites and designing

92. Presentation to the Fish and Game Commission by Taniguchi, I. and Rogers-Bennett, L. California Department of Fish and Game, 7 November 2012, Sacramento, California.

93. Prince, J. (2003). The barefoot ecologist goes fishing. *Fish and Fisheries*, 4(4), 359–371.

94. Ibid.

95. Prince, J. (Draft). *Citizen Science and the Assessment of Red Abalone (Haliotis rufescens) in Northern California*.

96. National Oceanic and Atmospheric Administration (No date). *Historical Overview (1800s-present): How has the red snapper fishery changed over time?* (http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/red_snapper/ overview/index.html).

97. The paua stock assessment methodology used in New Zealand does not include estimates of SPR as a reference for maximum sustainable yield. Instead, it relies on commercial catch-per-unit-effort data reported at the statistical area level, and other data sets, including length-at-maturity data. Refer to Fu, D. (2016). *The 2015 stock assessment of paua (Haliotis iris) for PAU 7. New Zealand Fisheries Assessment Report 2016/35*. Ministry for Primary Industries: Wellington.

98. Prince, J. (Draft). *Citizen Science and the Assessment of Red Abalone (Haliotis rufescens) in Northern California*.

ABOVE: *Abalone Working Group*
Source: Jack Likins

a small-scale data collection programme for these sites. Because it is illegal to detach abalone from the substrate, unless of legal size and taken as part of a daily bag limit, the Abalone Working Group developed underwater callipers to facilitate the collection of length frequency data. The callipers work by punching a hole into waterproof paper that corresponds to the length of each abalone measured.[99] Frank Hurd also explains that The Nature Conservancy continues to seek improvements in the way length frequency data can be collected, including trialling the use of image recognition technology on photos of red abalone (pers. comm., Frank Hurd, 28 September 2016).

In addition, The Nature Conservancy has contracted a third-party scientist to compare alternative management strategies under different scenarios to determine the best one in meeting the fishery objectives. "In other words, we're hitting the management problem from all sides by partnering with experts in their field" (pers. comm., Frank Hurd, 27 January 2017).

In 2015, the Abalone Working Group began collecting length frequency data. The data-gathering methodology used by the group varied greatly from the rigorous methodology used to monitor the eight index sites. Each diver swam relatively haphazard search paths at each site on multiple occasions to measure abalone. They consciously avoided doubling back on their dive path to lessen the probability of double measuring any abalone within each dive.[100]

The divers also mapped each swim onto aerial photographs and planned successive dives in new ground. They measured all the abalone they could

99. Ibid.
100. Ibid.

find, excluding those in crevices that could not be measured with the callipers. Around 50 to 100 abalone were measured per diver during each swim, lasting 60 to 120 minutes. The divers collectively measured 5,285 abalone at 10 sites.[101]

"The results of the data collected by the Abalone Working Group were almost identical to those provided by the Department of Fish and Wildlife database"

The Abalone Working Group's efforts were complemented by another group of voluntary divers who, with the use of scuba gear, also collected length frequency data. The divers were members of Reef Check California, which volunteers its efforts in monitoring rocky reefs inside and outside of California's marine protected areas.[102]

The results of the data collected by the Abalone Working Group were almost identical to those provided by the Department of Fish and Wildlife database. The project's estimates of SPR show that the abalone stock is being managed to conserve high levels of reproductive capacity, at levels generally above internationally accepted reference points for maximum sustainable yield (30 to 40 percent) and consistent with reference points used internationally for rebuilding stocks (SPR greater than 50 percent).[103]

2.6 Concluding remarks

Southern California's abalone stocks highlight what can happen when ineffective management persists. The management approach failed because it could not adapt to changes in the abalone stocks and fishing effort over time. It also failed to respond to a series of natural conditions that contributed to the abalone populations declining dramatically and nearing extinction for some species. More drastic measures taken sooner were hampered by pressure to keep the abalone fishery open as the market value for abalone continued to rise. The southern California abalone populations remain depleted and unable to support any fishery.

Only red abalone along the northern California coastline has sufficient abundance to support a fishery. The health of the red abalone population is attributed largely to the remoteness of the coastline and the harsh weather conditions that constrain the level of recreational harvest, with only a few easily accessible areas being the exception. However, it, too, has been subject to adverse natural conditions during the past few years that have affected red abalone populations.

Fortunately, collaborative efforts in northern California are focusing on finding better ways to ensure the fishery remains sustainable, which includes improving capacity for adapting to adverse natural conditions. These efforts include The Nature Conservancy, scientists and a group of dedicated local and regional divers.

The Nature Conservancy sees this as an opportunity to show how a fishery can become highly adaptive when leveraging strong science, technological solutions and the capacity and knowledge of local abalone

101. Ibid.

102. See Reef Check California (2017) http://reefcheck.org/california/ca-overview.

103. Prince, J. (Draft). *Citizen Science and the Assessment of Red Abalone* (Haliotis rufescens) *in Northern California*.

divers to improve both data collection and decision making (pers. comm., Frank Hurd, 27 January 2017). The challenge, however, remains for the Department of Fish and Wildlife to fully accept the extent to which others are prepared to collaborate.

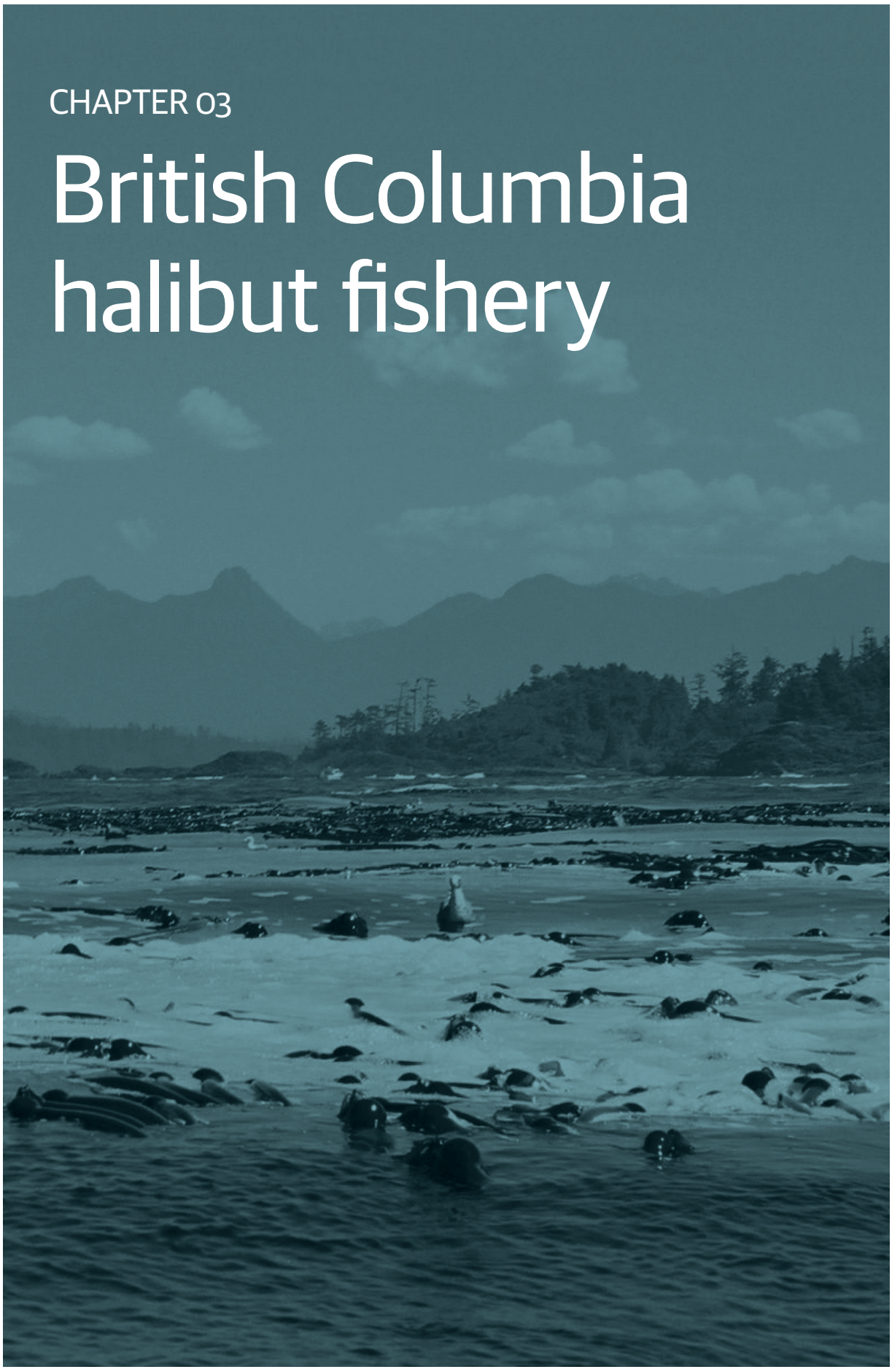
Nonetheless, the collaborative project has potentially widespread benefits for strengthening both management and community capacity. Their dedication shows how it is possible for those with recreational interests to take up a stewardship role in the fullest sense. This fishery, and others like it, demonstrate that stewardship is not limited to just those with interests in commercial quota.

> Involving those with recreational interests in the management of their fisheries is one of the most important, innovative aspects of fisheries management that can be proposed for improvement (pers. comm., Jack Likins, 28 September 2016).

It also illustrates the potential benefits for government organisations when willing to work with non-governmental organisations and volunteers and when valuing what they provide to scientific research and monitoring and management decision making.

CHAPTER 03

British Columbia halibut fishery



Source: The Sport Fishing Institute of British Columbia

Since the quota management system (QMS) was implemented in New Zealand in 1986, fisheries economists have suggested the solution to problems in managing recreational fisheries is to integrate them into the QMS.[104, 105, 106] The theoretical appeal of this type of integration is it would allow markets to determine whether the value of the next fish caught was greater for recreational or commercial fishers (for example, quota transfers between sectors). In theory, this is something of a Holy Grail, but how feasible is it in practice?

British Columbia, Canada, has the best example of market-based quota transfers between commercial and recreational fishers. Since 2011, quota transfers have been available for private anglers and other recreational fishing interests, making it a novel example of management integration. The integration applies to the halibut fishery.

The British Columbia recreational fishing sector is allocated 15 percent of the halibut TAC, which is subject to several annual management measures designed to keep catch levels within the allocation. The recreational fishing licence currently restricts fishing to a one halibut daily bag limit, two halibut possession limit, a six halibut annual limit, a maximum legal size of 133 centimetres and a season that generally lasts 10 months (1 February to 31 December).

If a private angler, fishing guide, or operator of a charter boat, fishing lodge or marina wants to fish for halibut beyond the limits and time available under the normal recreational fishing licence, they must first acquire an experimental licence. With such a licence, quota can be acquired at market rates, and the transaction is easily done online with a credit card. But, it is controversial.

The two recreational representative organisations, the Sport Fishing Institute of British Columbia and the Sport Fishing Advisory Board, object to the experimental licence in principle, along with the quota-based system for managing the commercial fishery. The Sport Fishing Institute strongly prefers that the recreational sector gains access to a greater proportion of the halibut TAC. The commercial halibut fishers object to any TAC reallocation without full compensation.

The Minister of Fisheries and Oceans Canada has confirmed the experimental licence will move forward with regulatory changes that make this market-based mechanism available for the long term.[107] If recreational quota acquisitions prove successful, the political fight over who gets how much halibut might well get resolved by letting people trade.

This chapter describes the management of British Columbia's halibut fishery and the role of the experimental licence in recreational fishing.

104. Pearce, P.H. (1991). *Building on Progress, Fisheries Policy Development in New Zealand. A report prepared for the Minister of Fisheries*. Ministry of Fisheries: Wellington.

105. Sutinen, J.G. (1996). *Recreational Entitlements: Integrating Recreational Fisheries into New Zealand's Quota Management System. A report to the Minister of Fisheries*. Ministry of Fisheries: Wellington.

106. Sharp, B.M.H. (1998). Integrating Recreational Fisheries into Rights Based Management Systems. Paper presented at the First World Congress of Environmental and Resource Economists: Venice, Italy, 25–27.

107. Fisheries and Oceans Canada (7 February 2012). *Greater Certainty in the Pacific Halibut Fishery*. News release. Fisheries and Oceans Canada: Vancouver, British Columbia.

"As salmon stocks have declined, halibut has become an increasingly important target species for British Columbia residents, non-residents and foreign visitors"

Source: Langara Fishing Adventures

3.1 Fisheries management

In 2010, 5 percent of British Columbia residents (237,000) participated in freshwater fishing, and 3.5 percent (167,000) participated in marine fisheries. A further 49,500 Canadians residing in other provinces and territories and foreign visitors participated in British Columbia's freshwater fisheries, while 61,300 participated in marine fisheries.[108]

The main marine species caught are chinook salmon, coho salmon and sockeye salmon.[109] Historically, recreational anglers targeted groundfish species, including Pacific halibut (*Hippoglossus stenolepis*), when the salmon season was finished. As salmon stocks have declined, halibut has become an increasingly important target species for British Columbia residents, non-residents and foreign visitors. In 2010, 42 percent of anglers surveyed identified halibut as one of their top three preferred species, and nearly 16 percent of the days fished included time fishing for halibut.[110] Around

108. Fisheries and Oceans Canada (2012). *Survey of Recreational Fishing in Canada 2010*. Economic Analysis and Statistics. Strategic Policy. Fisheries and Oceans Canada: Ottawa, Ontario.

109. Ibid.

110. This survey result is attributed to the Canadian Government's document, Fisheries and Oceans Canada (2012). Survey of Recreational Fishing in Canada 2010. Fisheries and Oceans Canada: Ottawa, Ontario. The survey result is cited in section 7.2.1 (page 9) of another Canadian Government document, Fisheries and Oceans Canada (2016). *Pacific Region Integrated Fisheries Management Plan: Groundfish – Summary effective February 21, 2016*. Vancouver: Fisheries and Oceans Canada: Vancouver, British Columbia.

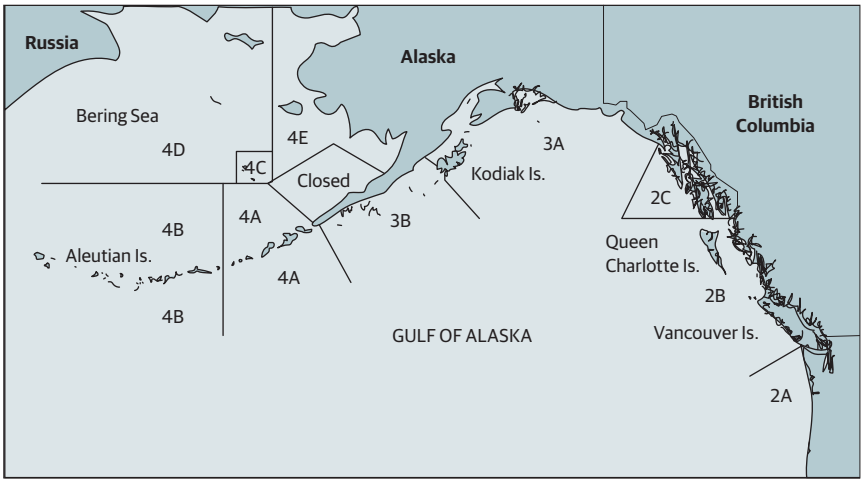
60 percent of the total recreational halibut catch is taken by business operations, such as charter boats and fishing lodges.[111]

Halibut are mostly caught in depths ranging from 90 to 900 feet (27 to 274 metres). Halibut have flat, diamond-shaped bodies. The top of the body varies from olive to dark brown or black with lighter irregular blotches, like the colour of the seabed. The bottom side of the body is white. Both eyes are located on the top side of the head.[112] Halibut are the largest Pacific flatfish. The females can reach weights of 470 pounds (213 kilograms), can be 9 feet (3 metres) in length and live up to 45 years. The males usually do not exceed 40 pounds (18 kilograms) in weight and 55 inches (140 centimetres) in length. They can live up to 25 years.[113]

The north Pacific halibut stocks are jointly managed by Canada and the United States through the International Pacific Halibut Commission (IPHC). The IPHC was founded in 1923 as a bilateral commission with the governments of Canada and the United States. Its mandate is to research and manage halibut stocks within the waters of these two nations.[114]

Each year, the IPHC recommends the total catch limit for halibut and other regulations to the governments of Canada and the United States to approve, implement and enforce.[115] The total catch limit applies to the two nations' territorial waters and exclusive economic zones (EEZs), the Bering Sea and in relation to 10 management areas: 2A, 2B, 2C, 3A, 3B, 4A, 4B, 4C, 4D and 4E (refer map 3).

Map 3: International Pacific Halibut Commission halibut management areas



Source: IPHC

111. Fisheries and Oceans Canada (February 2011). *Pacific Recreational Halibut Fishery*. News release. Fisheries and Oceans Canada: Vancouver, British Columbia.

112. International Pacific Halibut Commission (2014). *The Pacific Halibut: Biology, Fishery, and Management. Technical Report 59*. International Pacific Halibut Commission: Seattle, Washington (www.iphc.int/library/techrep.html).

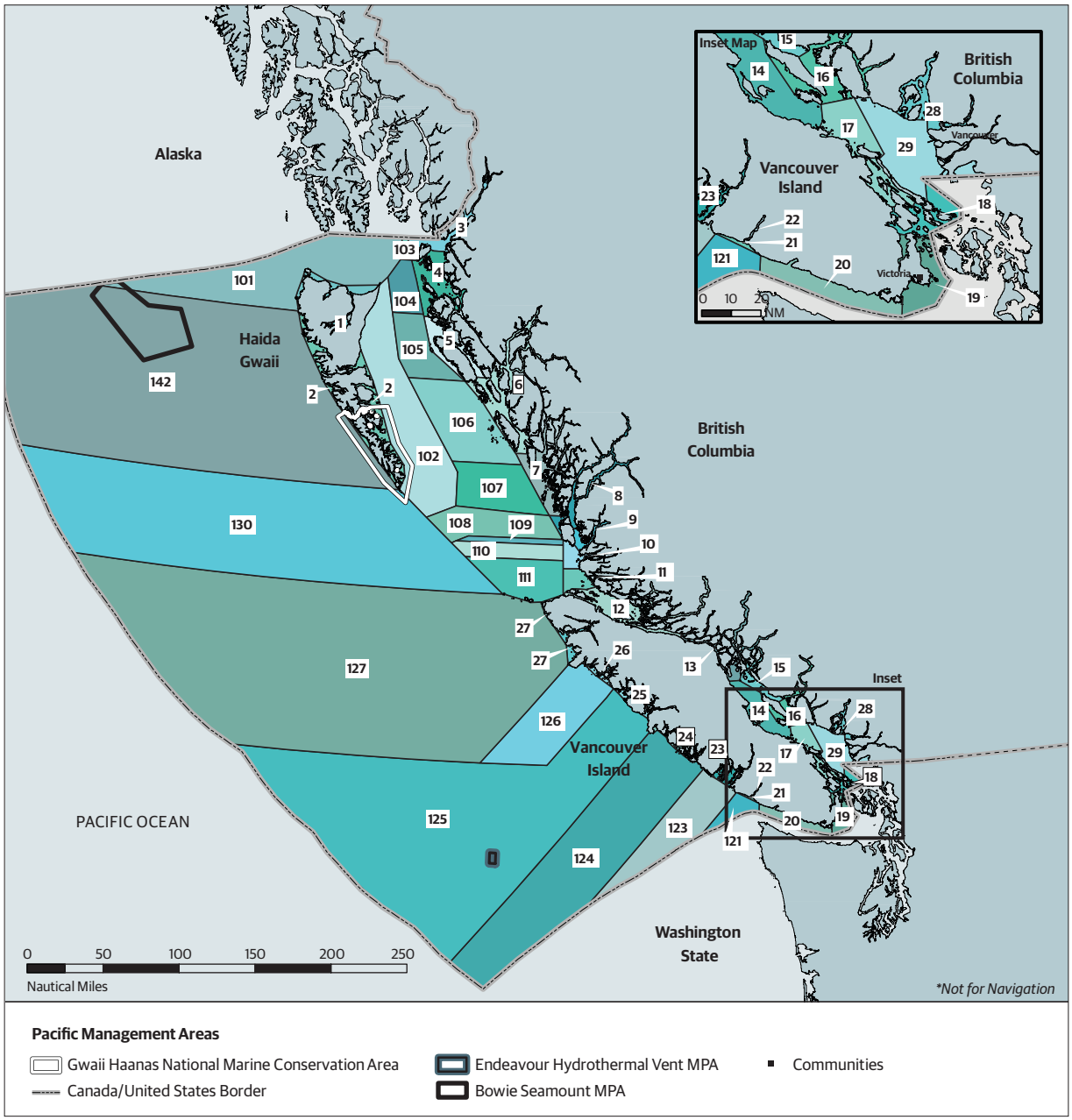
113. The International Game Fish Association (2015). Pacific halibut (*Hippoglossus stenolepis*) (www.igfa.org/species/144-halibut-pacific.aspx?CommonName=144-halibut-pacific.aspx).

114. International Pacific Halibut Commission (No date). *About IPHC* (www.iphc.int/about-iphc.html).

115. Ibid.

In 2016, the IPHC recommended a total catch limit of 29.89 million pounds (13,608 tonnes).[116] Most was allocated to Alaskan waters, with 1.14 million pounds (517 tonnes) allocated to California, Oregon and Washington state waters (Area 2A), and 7.3 million pounds (3,311 tonnes) allocated to British Columbia waters (Area 2B) (see map 4).[117]

Map 4: British Columbia waters and management areas



Source: Fisheries and Oceans Canada

116. Pounds refer to net weight, dressed, head off, which equates to around 75 percent of undressed weight. In other words, a 100 pound halibut equates to 75 pounds dressed, head off. Quota is counted in net weight.

117. International Pacific Halibut Commission (No date) *International Pacific Halibut Commission announces 2016 catch limits and seasons* (www.iphc.int/news-releases/news-releases-2016/443-nr20160129.html).

The management of Canada's recreational fisheries also includes federal and provincial or territorial governments. Fisheries legislation sets out the requirements for managing all fisheries. It also outlines the responsibilities of the Minister and the Department of Fisheries and Oceans (DFO).

As in New Zealand, the Minister has sole discretion in the allocation of fisheries resources between fishing sectors. The 2016 Area 2B commercial allocation was around 6.1 million pounds (2,784 tonnes), and the recreational allocation was 1.1 million pounds (499 tonnes).[118]

3.1.1 Aboriginal fishing rights

The Aboriginal people of Canada south of the Arctic are referred to as First Nations (similar to the tribal groups of indigenous people in the United States). The DFO provides British Columbia's 204 First Nations with priority access to Canada's portion of the IPHC total catch limit (referred to as the halibut TAC). This allocation policy is aligned with the 1990 Supreme Court determination that where an Aboriginal group has a right to fish for food, social and ceremonial purposes, it has priority, after conservation, over other resource uses.[119] First Nations harvest halibut and other groundfish for food, social and ceremonial purposes under the Aboriginal Communal Fishing Licences Regulations or Treaty Harvest Agreements that are negotiated at the same time as a treaty with the Crown. The estimated food, social and ceremonial halibut catch in Area 2B is 405,000 pounds (183.7 tonnes).[120]

First Nations also have access to commercial opportunities through communal commercial licences that are acquired through the Allocation Transfer Program and Pacific Integrated Commercial Fisheries Initiative. These federal programmes buy fishing access (for example, licences and/or quota) via markets and distribute them to First Nations. The programmes have acquired and distributed around 16 percent of the total halibut quota.[121]

The Supreme Court determination also referred to the importance of consulting with Aboriginal groups when their fishing rights could be affected. DFO developed its Aboriginal Fisheries Strategy in response to this court determination. The strategy applies where DFO manages a fishery and where land claims have not put in place a fisheries access and management programme.[122]

This type of management programme was implemented in 1994 by the Haida Nation from Haida Gwaii (formerly known as the Queen Charlotte Islands in northern British Columbia) (see map 4). The Haida Nation

118. Fisheries and Oceans Canada (2016). *Pacific Region Integrated Fisheries Management Plan: Groundfish – Summary effective February 21, 2016*. Department of Fisheries and Oceans: Vancouver, British Columbia.

119. Fisheries and Oceans Canada (No date). *Aboriginal Fisheries Strategy* (www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/afs-srapa-eng.htm).

120. Fisheries and Oceans Canada (2016). *Fisheries and Oceans Canada 2015 IPHC Annual Report*. Fisheries and Oceans Canada: Vancouver, British Columbia.

121. Fisheries and Oceans Canada (2016). *Pacific Region Integrated Fisheries Management Plan: Groundfish – Summary effective February 21, 2016*. Fisheries and Oceans Canada: Vancouver, British Columbia.

122. Ibid.

has its own management programme that includes catch recording and cooperative management with DFO.[123]

3.1.2 Licencing

All recreational fishers over the age of 16 are required to hold a Tidal Waters Sport Fishing Licence when fishing in tidal waters (saltwater). The licence is issued by the Province of British Columbia and its cost varies, depending on age and duration of the licence. A salmon conservation stamp must be affixed to the licence of anyone wishing to catch and retain any species of salmon. No conservation stamp is needed for catching halibut (see table 1).

Table 1: Tidal Waters Sport Fishing Licence fees 2016/17

Category	Resident (CAN$)	Non-resident (CAN$)
Adult (16–64 years)	22.05	106.05
Seniors (65+)	11.55	106.05
5 day	16.80	32.55
3 day	11.55	19.95
1 day	5.51	7.35
Salmon conservation stamp	6.30	6.30

"All recreational fishers over the age of 16 are required to hold a Tidal Waters Sport Fishing Licence when fishing in tidal waters (saltwater)"

The Tidal Waters Sport Fishing Licence holder must carry the Licence when fishing and must record on it the catch of chinook salmon and halibut. Lingcod must also be recorded when caught in certain management areas. Since 2008, around 300,000 Licences have been issued each year.[124]

Requirements are also in place for packaging catch so the species, number and, if applicable, size and weight of the fish can be readily determined if checked by fishery enforcement officers. If a maximum size limit applies, the head and tail must remain attached.[125]

At the time of writing, the maximum head-on length for halibut is 133 centimetres (nearly 101 centimetres head off) but has fluctuated since the management measure was implemented in 2013. The size limit is determined based on the size frequency of halibut and estimates of how quickly the recreational TAC allocation will be caught in a season (pers. comm., Owen Bird, 18 January 2017).

The intent of the maximum size limit is to increase the number of halibut available for recreational fishing and slow down the harvest level rate, which effectively extends the season. The Sport Fishing Advisory Board considers it is better to harvest halibut for the longest season possible and as available catch will allow. The two halibut possession limit, which

123. Food and Agriculture Organization (May 2000). *Information on fisheries management in Canada* (www.fao.org/fi/oldsite/FCP/en/CAN/body.htm).

124. Fisheries and Oceans Canada (No date). *Fishing Licences – Pacific Region* (www.pac.dfo-mpo.gc.ca/fm-gp/rec/licence-permis/stat-eng.htm).

125. Fisheries and Oceans Canada (2017). *Halibut Fishing in BC* (www.pac.dfo-mpo.gc.ca/fm-gp/rec/species-especes/halibut-fletan-eng.html).

Source: The Sport Fishing Institute of British Columbia

has changed over time, can slow the rate of recreational harvest, though the rate depends on the number of fishers.

The daily bag limit is one fish, and the possession limit is two fish, with only one longer than 83 centimetres head on (around 63 centimetres head off). The annual limit is six fish per licence. The area from which each halibut is caught and the length must be recorded immediately in ink on the licence.

DFO considers that fishing licences, both recreational and commercial, are privileges that are granted annually. The right to issue, suspend, cancel and refuse issuance or reissuance of any licence is at the discretion of the Minister.[126]

3.1.3 Recreational fishing sector representatives

The Sport Fishing Advisory Board has been the official advisory body to DFO since it was constituted in 1964. It advises DFO on various recreational fishery-related issues, including stock assessment and monitoring, regulations and enforcement, policy development and advice on enhancing the recreational fishing experience.[127]

The Sport Fishing Institute is a non-profit society. Its 350 members comprise a wide range of committed stakeholders, including fishing lodges, resorts, hotels, certified tidal angling guides, charter boat operators, manufacturers, distributors, tackle shops, marine boat manufacturers and dealers, regional airlines, private anglers and insurance industry organisations. Since 1980, the Sport Fishing Institute's shared and stated goals are to ensure sustainability of natural resources and that angling opportunities are maintained and promoted.

126. Gislason, G. (2006). *Commercial vs recreational fisheries allocation in Canada: Pacific herring, salmon and halibut*. Paper presented at the Sharing the Fish 06 Conference, Fremantle, Western Australia, 26 February to 2 March 2006.

127. Sport Fishing Advisory Board (2015). *About SAFB* (http://sfab.ca/about/).

The Sport Fishing Institute addresses issues such as allocation disputes, licencing and transport, and what it considers to be a chronic lack of government understanding of the social and economic benefits generated by recreational fishing. Various categories of membership are available to the Sport Fishing Institute. All members are offered access to medical and dental benefits, liability insurance and manufacturer and service provider discounts related to recreational fishing.[128]

3.2 Historical developments

The commercial halibut fishery began in the late 1880s. As the fishing fleet grew and overfishing became apparent, the governments of Canada and the United States signed a convention that led to the development of the IPHC.[129]

Before 1979, the halibut fishery was open access with fewer than 100 vessels. Regulated limited-entry licensing was introduced in 1979, and 435 limited-entry commercial halibut licences were eventually issued by DFO.[130] During the 1980s, the capacity of the commercial fleet to catch halibut and other groundfish increased dramatically. In every year, the commercial halibut allocation was exceeded, while the race to fish resulted in ever shorter fishing seasons. In 1990, it took just six days for the fleet to catch the 8.5 million pound (3,855 tonnes) commercial allocation. This equated to only one-tenth of the time needed to catch almost 50 percent more halibut than was caught a decade earlier.[131]

In 1991, the halibut fishery transitioned from a limited-entry fishery to an individual vessel quota (IVQ) system. The system began with IVQ because of restrictions on transferability. This meant that a fishing licence and quota initially allocated to that licence were "married" to a vessel and had to be transferred together. The IVQ system was initially implemented on a two-year trial basis. It was formalised in 1999, because it proved successful in meeting conservation objectives and improving the fleet's economic viability.[132]

128. Associate membership costs CAN$50, which is designated for certified tidal angling guides and individual supporters. The sockeye membership costs CAN$250, which is designated for single boat charter operators, small tackle shops and manufacturing representatives. The coho membership costs CAN$750, which is designated for small lodges, multiple boat charter operators, charter operators, large tackle shops, small manufacturers or distributor guide industry and other associations, media and so on. The chinook membership costs CAN$1,250, and is designated for large hotels, lodges or resort operations, national distributors, large manufacturers, mass merchants and industry supporters (http://sportfishing.bc.ca/sfibc/memberships.htm).

129. Sporer, C. (2001). Initial allocation of transferable fishing quotas in Canada's Pacific marine fisheries. In Shotton, R. (ed) *Case Studies on the Allocation of Transferable Quota Rights in Fisheries. FAO Fisheries Technical Paper. No. 411.* Food and Agriculture Organization of the United Nations, Rome, Italy, 266–303.

130. Pearse, P.H. (1982). *Turning the Tide: A New Policy for Canada's Pacific Fisheries: Final Report.* Commission on Pacific Fisheries Policy: Vancouver, British Columbia.

131. Sporer, C. (2001). Initial allocation of transferable fishing quotas in Canada's Pacific marine fisheries. In Shotton, R. (ed) *Case Studies on the Allocation of Transferable Quota Rights in Fisheries. FAO Fisheries Technical Paper. No. 411.* Food and Agriculture Organization of the United Nations, Rome, Italy, 266–303.

132. Ibid.

In 1999, quota became transferable on a per pound basis, changing the management system from IVQ to ITQ, although no one vessel could hold more than 1 percent of the commercial allocation (unless it had fished more than this amount from 1993 to 1998).[133]

"Given the need to develop a recreational sector TAC allocation and control and account for recreational catches, in 2000, the Minister committed to developing an equitable and sustainable halibut allocation framework for the commercial and recreational sectors"

Given the need to develop a recreational sector TAC allocation and control and account for recreational catches, in 2000, the Minister committed to developing an equitable and sustainable halibut allocation framework for the commercial and recreational sectors.

3.2.1 Halibut allocation framework

DFO appointed an independent facilitator to negotiate a halibut TAC allocation agreement between the recreational and commercial fishing sectors. The sectors agreed on several important operational principles, but were unable to reach consensus on initial allocations or a mechanism to transfer allocations between sectors over time. As a result, the facilitator recommended that DFO resolve these two issues through the use of an independent arbitration process.[134]

In 2002, a respected arbitrator was retained as an independent advisor to provide advice on the two issues. After an extensive review and meetings with both sectors, the advisor recommended TAC allocations comprising 91 percent to the commercial sector and 9 percent to the recreational sector. The advisor also suggested both sectors should discuss developing a method for exchanging their quota allocations.[135]

In 2003, the Minister announced the halibut allocation framework, which has a 12 percent recreational allocation "ceiling", a 33 percent increase over the independent advisor's recommendation. The increase was granted to allow for growth in the recreational sector. The framework also called for both sectors to develop an acceptable mechanism for adjusting the recreational allocation through acquisition of quota. Furthermore, DFO would "focus on improving recreational catch estimates and allow time for both sectors to develop a suitable market-based mechanism for future allocation adjustments..."[136]

The halibut allocation framework allocated more quota to the recreational sector than it could catch in 2004 and 2005. Consequently, DFO allowed the Pacific Halibut Management Association of British Columbia, a non-profit organisation that has represented 80 percent of the commercial halibut fishers since 1997, to lease the surplus recreational allocation to its members.

According to Chris Sporer, Executive Manager of the Pacific Halibut Management Association, the funds generated from leasing the surplus recreational allocation in 2004 and 2005 totalled around CAN$1.7 million. The funds were put into an escrow account that the Sport Fishing Advisory Board could use to lease quota and pay a service provider for a study on

133. Ibid.

134. Blewett, E. (2000). *Facilitation Report: Allocation of Halibut between the Commercial and Recreational sectors.*

135. Kelleher QC, S. (2002). *Allocation of Halibut for the Canadian and Recreational Fishing Sectors in the Pacific Region* (www.dfo-mpo.gc.ca/Library/318586.pdf).

136. Fisheries and Oceans Canada (27 October 2003). *Minister Thibault Announces Pacific Halibut Allocation Framework.* News release. Fisheries and Oceans Canada: Vancouver, British Columbia.

"In 2007, the Pacific Halibut Market Based Adjustment Mechanism Committee, led by an independent chair, was formed to make recommendations on a market-based mechanism for transferring quota to the recreational sector"

Source: Langara Fishing Adventures

catch estimates. The recreational sector, through the Sport fishing Advisory Board, also leased quota in 2008, 2009 and 2010 (pers. comm., Chris Sporer, 7 February 2017).

In 2012, the Minister increased the recreational halibut allocation from 12 percent to 15 percent, changing the TAC split from 88/12 to 85/15.[137] The Minister also announced that the experimental licence introduced in 2011 (discussed later) would be made available for the long term (the Minister made a separate announcement in 2011 about trialling the experimental licence programme for the 2011 season only).[138]

The commercial fishing sector legally challenged the Minister's decision to increase the recreational allocation. The essence of the challenge was that the Minister had abused his discretion in deciding to reallocate 3 percent of the TAC without using a market-based mechanism or another form of compensation. The courts rejected this argument and upheld the decision of the Minister. The courts concluded the Minister's decision fell within a range of reasonable outcomes.[139]

3.2.2 Market-based mechanism

In 2007, the Pacific Halibut Market Based Adjustment Mechanism Committee, led by an independent chair, was formed to make recommendations on a market-based mechanism for transferring quota to the recreational sector. The Committee was tasked with following a consensus-based process, and could only reach agreement on the federal government providing initial funds (that is, around CAN$25 million) to purchase quota and the government then recouping these funds through

137. Fisheries and Oceans Canada (7 February 2012). *Greater Certainty in the Pacific Halibut Fishery*. News release. Fisheries and Oceans Canada: Vancouver, British Columbia.

138. Fisheries and Oceans Canada (15 February 2011). *Statement by Gail Shea, Minister of Fisheries and Oceans – Pacific Halibut*. News release. Fisheries and Oceans Canada: Vancouver, British Columbia.

139. *Malcolm v. Canada (Minister of Fisheries) 2014 FCA 130.*

increased licence fees or use of a halibut stamp. It was noted, however, that it would take decades for a halibut stamp programme to recoup the initial funds, based on the CAN$6.30 cost for a salmon conservation stamp.[140]

After reviewing the recommendation, DFO responded that it did not have the legal authority to charge a fee to support reallocation of quota between sectors nor to move funds collected from the recreational sector to the commercial sector. Even if DFO had authority to charge a fee to support reallocation, the recommendation to generate revenue through raising the cost of fishing licences or the use of a halibut stamp was not supported by the purpose and intent of the User Fees Act 2004 (a clear connection between the fee paid and the service provided).[141]

Consequently, the process recommenced in 2010, with a new independent chair. The purpose of this non-consensus process was for the working group to evaluate four DFO options, as well as any that the fishing sectors proposed. The four options were:

1. maintain the existing percentage allocations and manage both sectors to within their respective percentages
2. enable quota transfers through licensing of the commercial guiding, charter boat and fishing lodge operations
3. have a flexible 88/12 TAC split that is met over the long term, not annually
4. have a fixed recreational number (pounds) rather than a percentage of the TAC.[142]

The working group reviewed and evaluated the options, but with option 2 revised to include private anglers. The group reached different conclusions on the evaluation of each option. DFO subsequently considered these evaluations and, in 2011, the Minister announced his decision in favour of the experimental licence programme, which is the revised option 2.[143]

3.3 Experimental recreational licence

Halibut is the primary recreational fishery subject to the ITQ system and the only species subject to a DFO pilot project that began in 2011. At the Minister's instruction, DFO piloted an experimental recreational licence programme that allows interested recreational fishers (such as private anglers, fishing lodges, charter boat operators, fishing guides or marinas) to request the licence that lets them lease or purchase halibut quota from commercial licence holders.

140. Gordon, H. (2008). *Pacific Halibut Market Based Adjustment Mechanism Committee: Progress to Date. Report to the Minister of Fisheries and Oceans.*

141. Fisheries and Oceans Canada (2010). Pacific Halibut Transfer Mechanism: Background and Options Paper. Fisheries and Oceans Canada: Vancouver, British Columbia.

142. Ibid.

143. Fisheries and Oceans Canada (15 February 2011). *Statement by Gail Shea, Minister of Fisheries and Oceans – Pacific Halibut.* News release. Fisheries and Oceans Canada: Vancouver, British Columbia.

The no-fee experimental licence was designed to let licence holders fish for halibut beyond the limits and time available under the Tidal Waters Sport Fishing Licence. It is legal for an angler to catch within the limits of the Licence and then catch more than that Licence's limits and count the excess against the experimental licence, so long as all catch from both licences is accurately reported. The experimental licence programme had three main objectives:

- conservation of the resource through enhanced monitoring of the recreational fishery, keeping all fishing sectors accountable for maintaining catches within the TAC
- economic prosperity through predictable access for all resource users
- flexibility through an effective mechanism for transfers between the fishing sectors.[144]

"The no-fee experimental licence was designed to let licence holders fish for halibut beyond the limits and time available under the Tidal Waters Sport Fishing Licence"

More predictable access to the halibut resource was considered important for allowing businesses dependent on recreational fishing to plan and advertise for the fishing season. Increases in recreational fishing could translate into direct benefits for supporting businesses, such as those providing accommodation, fuel and bait.[145]

Only Canadian citizens and permanent residents are eligible for the experimental licence, though foreigners may fish under the authority of another's licence (for example, clients of a fishing lodge or charter boat operation). To participate in the experimental licence programme, an interested party must complete an expression of interest form. They then fill out a formal application for the experimental licence. The recreational halibut fishing season generally begins 1 February, although the experimental recreational fishery begins 1 April and closes 31 December.

Adam Keizer, Halibut and Sablefish Coordinator for DFO, explains that a requirement of the experimental licence is to acquire at least 20 pounds (9 kilograms) of quota before being able to fish under it, which reflects the average weight of a recreationally caught halibut under 133 centimetres. Any catch greater than the acquired quota must be reconciled after returning to the dock and no later than 31 December. The acquired quota can be leased or purchased (pers. comm., Adam Keizer, 10 February 2017).

DFO does not help with quota acquisition other than by providing experimental licence holders with a list of commercial licence holders. Many quota leases are completed through a third-party contractor, the Integrated Quota Management Inc (IQMI).[146] Transfers can occur between commercial and experimental licence holders, experimental licence holders and back to commercial licence holders. While all quota originated from the commercial sector when the experimental licence programme began in

144. Morrison, W.E., and Scott, T.L. (2014). *Review of Laws, Guidance, Technical Memorandums and Case Studies Related to Fisheries Allocation Decisions.* NOAA Technical Memorandum NMFS-F/SPO-148. United States Department of Commerce, National Oceanic and Atmospheric Administration: Silver Spring, Maryland.

145. Ibid.

146. See Integrated Quota Management Inc (www.iqmi.ca/accessQ.aspx).

2011, it now moves between the sectors and within the recreational sector (pers. comm., Adam Keizer, 10 February 2017).

Any uncaught quota on an experimental licence can be reallocated back to an individual licence holder or to another experimental licence holder or carried forward into the next fishing year. Up to 10 percent, or 200 pounds (91 kilograms), whichever is greater, can be carried forward, so long as the experimental licence holder reapplies and obtains a licence in the next fishing year.

Adam Keizer clarifies that the intent of the Minister's 2012 announcement regarding moving forward with regulatory changes is to create a licence for the long term that operates in the same manner as the experimental licence. With this change in place, recreational fishers could acquire a "quota licence" to lease and purchase quota (pers. comms., Adam Keizer, 10 February 2017).

3.3.1 Estimating recreational catches

Marine creel surveys have been used since the 1980s to estimate the recreational catch (from boats) of chinook and coho salmon. The surveys were expanded to estimate the catch of most recreationally caught finfish, including halibut. Creel surveys are implemented in peak fishing times and areas.

DFO undertakes an annual online survey that collects the catch records written on the Tidal Waters Sport Fishing Licence of 20,000 randomly selected fishers. Using these responses, DFO estimates the recreational catch of halibut, lingcod and chinook salmon, and average weights of halibut by month and management area. These catch estimates are compared to those from previous surveys and creel surveys. DFO continues to work with the Sport Fishing Advisory Board to improve internet-based surveys, which have been piloted for four years.[147] Although they remain voluntary, and the reported catch is unverified.

In addition, fishing lodges provide census data to DFO through a logbook programme, manifest data or the electronic (elog) pilot programme. These data are combined with angler survey data, including the Haida Gwaii Creel Survey, to produce monthly estimates of catch by management area (see map 4).[148]

3.3.2 Monitoring recreational and commercial catches

The experimental licence programme relies on self-reporting. The 2016 monitoring requirements for the licence included immediate recording of catch in a recreational logbook, recording the length and weight of each fish retained, and electronic submission of logbook data to DFO within seven days of returning home or to the fisher's regular place of work (pers. comm., Adam Keizer, 10 February 2017).

The electronic submission of a logbook must occur via a software package provided by DFO. All hardcopy logbooks must be submitted to

147. Fisheries and Oceans Canada (30 March 2016). *Internet Annual Recreational Catch (iARC) Survey* (www.pac.dfo-mpo.gc.ca/fm-gp/rec/irec/iarc-eng.html).

148. Fisheries and Oceans Canada (2016). *2015 Canadian Recreational Fishery Halibut Catch Report.* Report Prepared for the International Pacific Halibut Commission (IPHC). Fisheries and Oceans Canada: Vancouver, Canada.

Source: Howard McElderry

DFO at the end of the fishing season. Opportunities may be available to test additional monitoring, such as hail in–hail out (check in–check out) systems (electronic or phone), random dockside monitoring or on-the-water monitoring.[149]

In comparison, the commercial groundfish fishery has had a comprehensive catch monitoring programme since 2006. The programme consists of two parts: 100 percent at-sea monitoring and dockside monitoring. The 100 percent at-sea monitoring is accomplished either through on-board observer coverage to verify and record the species caught (retained and released) or an electronic monitoring system on board, which captures sensor data and video footage. The electronic monitoring system, designed by Archipelago Marine Research Ltd in Victoria, Canada, consists of multiple cameras and sensory devices. A global positioning system measures boat speed, location and behaviour, and a hydraulic pressure transducer and drum rotation sensor monitors the use of fishing gear.[150]

The monitoring programme includes a hail in–hail out system overseen by Archipelago Marine Research. Archipelago Marine Research then monitors the offload to verify the retained catch and collects the at-sea monitoring data, the observer logbook (if an observer was on board) or the electronic monitoring system hard drive. Archipelago also collects the vessel operator's logbook.

The catch monitoring programme includes reviewing 10 percent of the at-sea monitoring data and all data from the dockside monitoring to audit the vessel operator's logbook. If the logbook does not meet standards or is found

149. Fisheries and Oceans Canada (January 2016). *Pacific Region Halibut Experimental Recreational Fishery Program Details Presentation* (www.pac.dfo-mpo.gc.ca/fm-gp/commercial/ground-fond/halibut-fletan/2015/presentation-en.html).

150. Fisheries and Oceans Canada (No date). *The Commercial Groundfish Integration Program: Catch Monitoring* (www.pac.dfo-mpo.gc.ca/publications/pdfs/cgip_monitoring-pip-cpf_surveillance-eng.pdf).

not to represent actual catch, the audit is forwarded to DFO, which may conduct a full review of the monitoring data at the vessel operator's expense. While cost reductions are an ongoing consideration, the audit approach has shown that it meets operational requirements for accuracy and timeliness.[151]

The Sport Fishing Institute is considering developing an Archipelago-type monitoring programme that is capable of "handing over" better recreational catch data to DFO and that supports an increase in the recreational halibut allocation. It is urging its membership that it is their responsibility to report recreational catches (pers. comm., Owen Bird, 4 October 2016).

3.3.3 Ongoing controversy

According to the Sport Fishing Institute, the recreational sector has been loath to accept a market-based mechanism, because it means "condoning the de-facto ownership of a public property resource and the ITQ system" (pers. comm., Owen Bird, 4 October 2016). Furthermore, this type of "gifting" guaranteed access to halibut does not fit well with the recreational sector, which is seeking predictable and consistent access to the public resource. (pers. comm., Owen Bird, 18 January 2017).

In response, the Pacific Halibut Management Association questions who has been "gifted" with access to the halibut resource. It states that:

> … based on DFO data, since 1999 76.3 percent of quota has been permanently transferred. Commercial fishers and First Nations (outside of the Allocation Transfer Program and Pacific Integrated Commercial Fisheries Initiative) have continued to purchase quota. This percentage does not include permanent transfers of licences or vessels with licence and quota attached that have been bought and sold. In addition, commercial halibut fishers pay significant costs for the monitoring of the fishery, fund a rockfish survey program conducted in collaboration with DFO and pay licence fees to the federal government. No one has been 'gifted' anything (pers. comm., Chris Sporer, 7 February 2017).

Furthermore, while private anglers pay an annual Tidal Water Recreational Licence fee (CAN$22.05 for residents) this allows for the harvest of a large number of species (for example, halibut, rockfish, groundfish, crab and prawn) for the entire year.

> It seems that recreational anglers get off quite cheaply when considering the cost of camping one night in a British Columbia provincial park (CAN$10–35), playing one round of golf in a municipal golf course (CAN$12–45), or buying halibut fillets at the retail price (CAN$59.90/kilogram). Besides, fishing guides, fishing lodges and charter boat operations do not pay licence fees for accessing fisheries resources; they do not pay anything to the people of Canada for it. Is this not being 'gifted' access to the resource? (pers. comm., Chris Sporer, 7 February 2017).

151. Stanley, R.D., McElderry, H., Mawani, T., and Koolman, J. (2011). The advantages of an audit over a census approach to the review of video imagery in fishery monitoring. *ICES Journal of Marine Science*, 68(8), 1621–1627 (http://icesjms.oxfordjournals.org/content/68/8/1621.full.pdf+html).

"There is merit in highlighting that all management systems face challenges regarding illegal fishing; the experimental licence programme is no exception. It is also worth highlighting possible incentives to under-report or avoid reporting halibut catches"

The Sport Fishing Institute also considers the experimental licence programme a failure, with few participants, low levels of halibut catch recorded and with DFO acknowledging it lacks the staff and resources to enforce or effectively monitor the programme.[152] The Sport Fishing Institute refers to the programme as:

> … diluting the ability to accurately record recreational catch while presenting opportunities to take advantage of a shortfall in enforcement and administration, thereby presenting ample opportunities for recreational fishers to underreport or simply avoid reporting their catch (pers. comm., Owen Bird, 18 January 2017).

There is merit in highlighting that all management systems face challenges regarding illegal fishing; the experimental licence programme is no exception. It is also worth highlighting possible incentives to under-report or avoid reporting halibut catches. If only a few DFO fishery officers are monitoring recreational fishing activities, those fishers may not expect to be caught if they fail to report their catches, whether in ink on a licence or hardcopy log book, or on an electronic device. If fishers who then fail to report are not subject to strong penalties if caught, it might reasonably be expected that compliance is low – although many fishers will be motivated by a sense of duty and will report faithfully. Also, non-compliance by some can erode compliance norms overall.

The Pacific Halibut Management Association considers the Sport Fishing Institute's argument, that somehow the experimental licence programme is worse than the Tidal Waters Sport Fishing Licence, is simply a vested interest assertion. Significant shortcomings are involved in the monitoring of recreational fishery catches, and this is widely acknowledged (pers. comm., Chris Sporer, 7 February 2017).

The experimental licence programme was designed to use DFO's existing information technology for the ITQ system and to be simple for interested parties to use. Its biggest weakness, however, is the amount of administrative resources (for example, DFO officials' time) needed to support interested parties through the steps to acquire the licence and the quota (pers. comm., Adam Keizer, 3 October 2016).

Adam Keizer acknowledges the amount of administrative resources needed is high, when compared with the low number of experimental licences issued and quota pounds leased (pers. comm., Adam Keizer, 3 October 2016). However, high administrative costs are expected when a programme runs on a small-scale trial basis. Should the experimental licence programme catch on, the fixed costs of running the programme would be spread across more licences, reducing the average per-licence cost.

In 2013, 7,616 pounds of quota were leased through the experimental licence system.[153] In 2016, around 8,100 pounds of quota were leased,

152. Sport Fishing Institute of British Columbia (2017). *Halibut Experimental Licence* (http://sportfishing.bc.ca/news/HalibutExperimentalLicence.htm?CategoryID=31583&Include=1&SortType=3&SortDirection=1).

153. Fisheries and Oceans Canada (2013). *2012 Canadian Recreational Fishery Halibut Catch Report*. Report prepared for the International Pacific Halibut Commission January 2013. Fisheries and Oceans Canada: Vancouver, British Columbia.

Source: Langara Fishing Adventures

showing an increasing trend since 2011 (pers. comm., Chris Sporer, 7 February 2017). In 2013, 61 experimental licences were issued. In 2016, the number increased to 97, with 75 issued to private anglers and the remainder to fishing lodges. Most of the 75 private anglers were from the land-locked provinces or British Columbia residents who live inland, who then can catch beyond the limits of the Tidal Waters Sport Fishing Licence during the few days they spend marine fishing. According to Adam Keizer, the experimental licence "appears to be considered as an insurance policy that allows them to catch sufficient pounds of halibut before returning home" (pers. comm., Adam Keizer, 3 October 2016).

The commercial fishing sector is highly supportive of the experimental licence programme. The Pacific Halibut Management Association facilitates making quota available for IQMI to access, when requests are received from an interested recreational sector stakeholder (pers. comm., Chris Sporer, 7 February 2017).

3.3.4 Enhancing recreational fisheries management

The Sport Fishing Institute considers the goal is to return to the two fish daily bag limit and three fish possession limit in place until 2009, along with an increase in the recreational TAC allocation. It is open to how this can be achieved (pers. comm., Owen Bird, 4 October 2016).

For example, some recreational fishers prefer the use of a halibut stamp added to the Tidal Waters Sport Fishing Licence or increasing the Licence fees to raise funds to purchase halibut quota, thereby increasing the 15 percent TAC recreational allocation. As noted, the User Fees Act 2004 has been interpreted as legally, if not also politically, impractical for these purposes.

Also worth noting is that, where proceeds from selling halibut stamps would be used to purchase halibut quota for recreational fishers, the stamps would effectively accomplish the same purpose as the experimental licence programme. There is a one-way potential transfer of quota from the commercial sector to the recreational sector funded by those recreational

fishers who opt to catch in excess of the limits set out in the Tidal Waters Sport Fishing Licence.

The recreational fishing sector has been seeking approval for a vision implementation programme. This would follow on from the efforts of a broad group of stakeholders and government organisations in 2009, referred to as the Recreational Vision. It details a vision of what would constitute a sustainable and vibrant future for recreational fisheries.[154]

The Vision Implementation Program has taken elements of the Recreational Vision to develop a plan for making management improvements and addressing budgetary shortfalls for catch monitoring and other recreational fishing-related issues, and at a cost of around CAN$2 million to CAN$3 million annually. The Program is not a substitute for the experimental licence, nor does it provide an alternative basis for TAC allocations. It is intended as a general approach towards enhancing recreational fisheries management by addressing the recreational sector's expectations and opportunities for future success (pers. comm., Owen Bird, 18 January 2017).

According to the Sport Fishing Institute, if approved, the Vision Implementation Program will require some form of cost recovery by the government. This could result in raising the Tidal Waters Sport Fishing Licence fee, which has not been adjusted since 1996. A fee increase is supported, provided evidence of improvements to recreational fisheries management can be seen (pers. comm., Owen Bird, 18 January 2017).

3.3.5 Alaskan arrangement for quota leasing

In line with NOAA's 2010 Catch Share Policy supporting catch share programmes for charter and headboat sectors, a programme similar to the experimental licence in British Columbia has been set up for charter boats in Alaska's Areas 2C and 3A (see map 3). The programme pertains to qualified charter boats and their clients, "guided" anglers, but not to any other providers of fishing services or private boat "unguided" anglers.[155]

154. Fisheries and Oceans Canada (2010). *A Vision for Recreational Fisheries in British Columbia 2009–2013*. Approved January 2010 by the Government of Canada, Sport Fishing Advisory Board and the Government of British Columbia (www.pac.dfo-mpo.gc.ca/consultation/smon/sfab-ccps/docs/rec-vision-eng.pdf).

155. The quota leasing programme for charter boats arose from the North Pacific Fishery Management Council implementing the Catch Sharing Plan (CSP) for the charter boat and commercial setline sectors. The CSP established a formulaic process for allocating the TAC, referred to as the annual Combined Catch Limit (CCL), between these two sectors. A fixed percentage of the CCL is allocated to each sector, although it varies with changes in halibut abundance. For example, the charter boat sector's percentage of the CCL is higher when halibut abundance is lower, and then its percentage is lower when the CCL is higher. These percentages are multiplied by the CCL to calculate the commercial and charter sector allocations in net pounds. At intermediate abundance levels, the charter boat sector receives a fixed poundage allocation, as shown below for Area 2C.

Area 2C CCL	Charter boat CSP allocation	Commercial CSP allocation
0 to 4,999,999 lbs	18.3 percent	81.7 percent
5,000,000 to 5,755,000 lbs	915,000 lbs	Area 2C CCL minus 915,000 lbs
5,755,001 lbs	15.9 percent	84.1 percent

Source: North Pacific Fishery Management Council

"This project explored ways to increase the availability of the halibut resource for the charter boat guided anglers by establishing a recreational quota entity"

Since 2014, this voluntary programme has allowed Alaskan charter boat operators to lease halibut quota from commercial licence holders. By leasing quota, charter boat operators provide guided anglers the opportunity to retain halibut up to the limits for an unguided angler, if management measures restrict a guided angler's catch more than an unguided angler's catch.[156]

A review after two years of operation found the quota leasing programme has faced opposition from charter boat operators, who generally hold a negative view towards the Catch Share Policy and quota leasing arrangement. A minority view the programme favourably, with support tending to come from commercial fishing operators, while most recreational operators oppose it.[157]

The North Pacific Fishery Management Council began considering a project, initially referred to as the CATCH (Catch Accountability Through Compensated Halibut) project. This project explored ways to increase the availability of the halibut resource for the charter boat guided anglers by establishing a recreational quota entity (RQE). The RQE would act on behalf of the charter boats and guided anglers by purchasing halibut quota and holding it in a common pool. The goal would be to use the quota pool to maintain the historical daily bag limits.[158]

The North Pacific Fishery Management Council is developing the RQE concept. The intent is to establish a market-based approach that supports the halibut IFQ programme and avoids any adverse effects (that is, TAC reallocations with compensation). Specifically, the aim is to combine the quota purchased and held by the RQE with the TAC allocation for the guided component of the recreational sector to determine the annually adjusted total guided halibut allocation. This total allocation would form the basis for setting management measures (for example, daily bag and size limits), which may be less restrictive when halibut abundance is low and TAC allocations decrease accordingly. The analysis shows that even small percentages of quota held by the RQE could have led to less restrictive guided angler measures in 2015.[159]

3.4 Concluding remarks

The first New Zealand Initiative report, *What's the Catch?*, states that, as interest has grown in quota-based management systems, debates about

156. National Oceanic and Atmospheric Administration (24 March 2016). *New 2016 Regulations for Charter Halibut Anglers* (https://alaskafisheries.noaa.gov/sites/default/files/chfactsheet2016.pdf).

157. Kroetz, K., Lew, D.K., and Sanchirico, J.N. (2016). *Recreational Leasing of Alaska Commercial Halibut Quota: The first two years of the guided angler fish provision.* Resources for the Future: Washington, DC (www.rff.org/files/document/file/RFF-DP-16-39.pdf).

158. Yamada, R. and Flumerfelt, S. (2014). *Integrating a Recreational Fishery into a Catch Share Program: Case study of Alaska's guided halibut sport fishery.* Report prepared for the Catch Accountability through Compensated Halibut (CATCH) Project (www.alaskacharter.org/docs/Catch%20Alaska%20Report%20Final%202014.pdf).

159. North Pacific Fishery Management Council (2016). *Regulatory Impact Review/Initial Regulatory Flexibility Analysis/Environmental Assessment for a Proposed Regulatory Amendment to allow a recreational quota entity to hold commercial halibut quota share for use by halibut charter anglers.* C3 Halibut Charter RQE December 2016. North Pacific Fishery Management Council: Anchorage, Alaska (http://npfmc.legistar.com/gateway.aspx?M=F&ID=19ad857e-4427-4fb6-90ae-2cd031cd9f3c.pdf).

resolving intersectoral competition have included the integration of recreational fisheries into those systems.[160] The British Columbia halibut fishery stands out in its efforts to integrate in this way (for example, two-way market transfers of quota).

Chapter 1 outlines how charter boats in the United States' Gulf of Mexico use red snapper quota. While this is not an example of management system integration, it shows how charter boats can operate as commercial boats, so long as they meet relevant maritime and reporting requirements.

This chapter describes the British Columbia experimental licence programme, the best example of market-based transfers of quota for private anglers and others. If the programme catches on, the political fight over who gets how much halibut would be resolved by letting people trade.

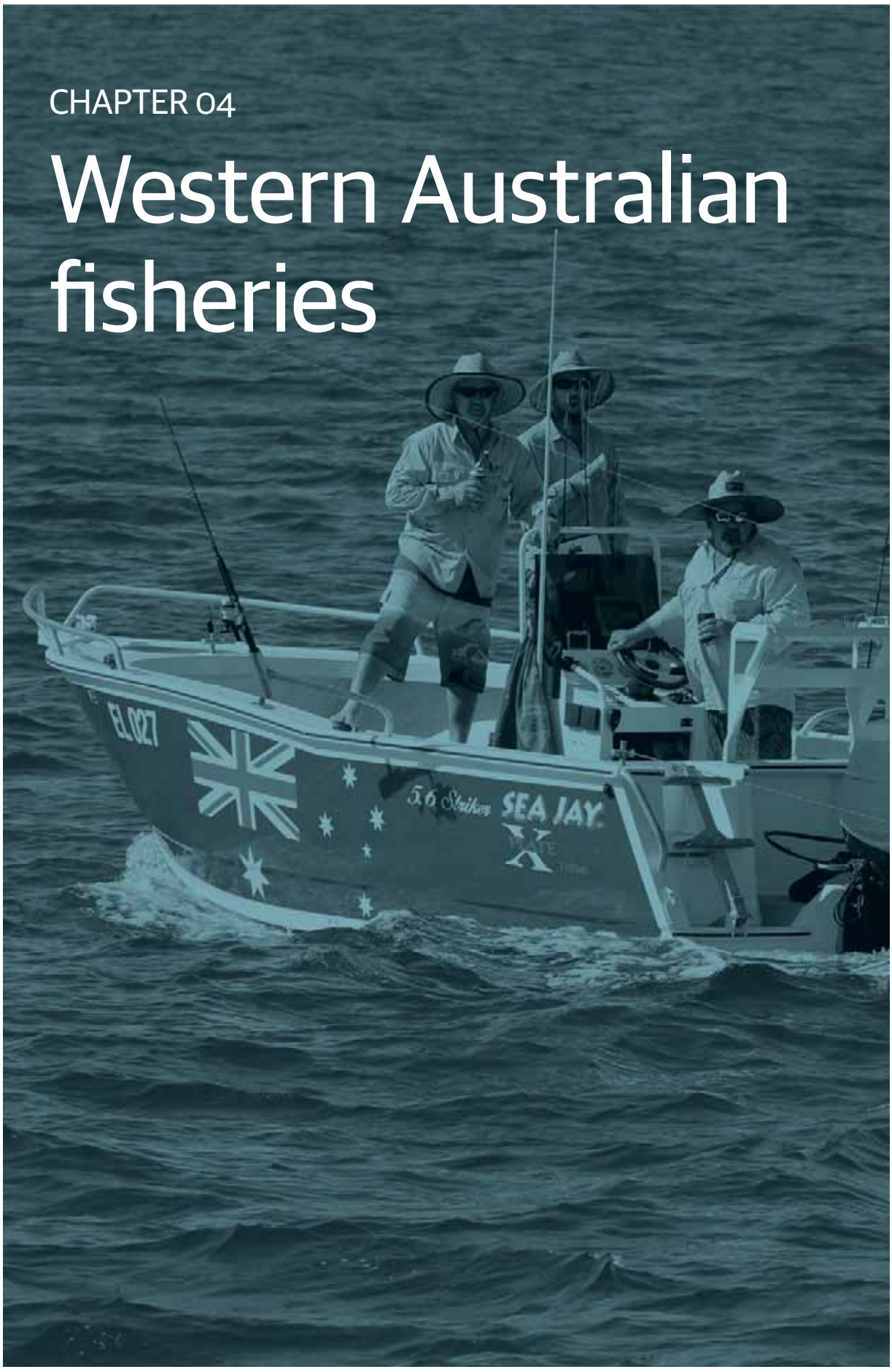
However, the experimental licence programme has not been well received, if not outright opposed, by much of the recreational fishing sector. Instead, some have considered the use of halibut stamp fees to purchase quota, which ironically would provide the same outcome as the experimental licence. That aside, the recreational fishing sector is pursuing ways to enhance the management of recreational fisheries, which will likely lead to some form of funding recovery by the government. Similarly, NMFS is considering ways to enhance its market-based mechanism to provide better opportunities for charter boat anglers.

A common theme in British Columbia and Alaska, as well as elsewhere, is that recreational fishing interests hold the view that their fishing for business or pleasure should come at no cost, or no more than the cost of fishing licences. This view raises important questions regarding the extent, if any, that others should be expected to subsidise their fishing.

160. Kearney, R.E. (2001). Fisheries Property Rights and Recreational/commercial Conflict: Implications of policy developments in Australia and New Zealand. *Marine Policy*, 25, 49–59.

CHAPTER 04

Western Australian fisheries



Source: Reefishwest

"Western Australia's reputation for well-managed recreational fisheries can be attributed to its Department of Fisheries preparing for increasing competition for limited fisheries resources due to population growth and coastal development"

Western Australia and New Zealand are more similar with respect to marine fisheries, lifestyles and cultures than the other locations described in previous chapters. But where New Zealand is well known for pioneering the QMS for commercial fisheries, Western Australia's recreational fisheries management draws increasing attention.

Western Australia's reputation for well-managed recreational fisheries can be attributed to its Department of Fisheries preparing for increasing competition for limited fisheries resources due to population growth and coastal development. This also included preparing for the ensuing conflicts that can adversely affect the management of fisheries.

This preparation is most apparent when considering that, for more than a decade, the Department has emphasised the need to resolve intersectoral allocation issues, including development of a reallocation mechanism to shift TAC allocations between fishing sectors. The Department continues to assert that allocations between sectors can, and should, change over time to reflect changes in social values.

Since 2010, the Department has had service level agreements with one commercial and one recreational representative organisation, thereby making them the central points of contact and referral for sectoral issues. These agreements alter organisational roles and intersectoral dynamics by providing incentives to collaborate in finding workable solutions to their differences.

The Department and its ministers have invested in human and financial resources to improve the management of recreational fisheries, openly stating that AUS$17.9 million was spent managing recreational fisheries in 2015/16.[161] The trust and confidence Western Australians have in the Department achieving its aquatic resource management objectives is reflected in an 86 percent public satisfaction rating.[162] While Western Australia has ongoing challenges in managing competing fishing sectors, the evidence shows the Department and broad sector-level representation are doing some things well.

This chapter outlines what is working well in Western Australia and the challenges it faces.

4.1 Fisheries management

The Western Australia marine environment provides a high level of diversity, over 3,000 fish species, but has a low level of productivity.[163] The low productivity is due mainly to the absence of major river systems enriching the continental shelf, a lack of major upwelling and the warm Leeuwin current that lacks the nutrients needed to support major fish stocks.[164]

161. In total, AUS$76 million was spent on managing commercial fishing and aquaculture. Refer to Department of Fisheries (2016). *Department of Fisheries Annual Report to Parliament 2015/16*. Department of Fisheries: Perth, Western Australia.

162. Ibid.

163. Crowe, F.M., Longson, I.G. and Joll, L.M. (2013). Development and implementation of allocation arrangements for recreational and commercial fishing sectors in Western Australia. *Fisheries Management and Ecology*, 20, 201–210.

164. Millington, P. and Cranley, M. (2006). *A case study on the use of fisheries adjustment schemes to achieve shifts in resource allocations in estuaries and embayments in Western Australia*. Paper presented at the Sharing the Fish 06 Conference, Fremantle, Western Australia, 26 February to 2 March 2006.

The natural features of the Western Australian marine environment have led to conservative measures for managing commercial fisheries.[165] Nonetheless, fisheries resources are an important economic asset for Western Australia. More than 2,000 commercial fishing licences have been issued, and the total gross value of commercial production is around AUS$490 million, comprising AUS$417 million in wild-capture fisheries production and AUS$73 million in aquaculture production. Pearling makes up 80 percent of aquaculture production, and the remaining 20 percent of "edible" production comprises barramundi, marron, mussels and abalone.[166]

Western Australia's AUS$490 million in fisheries production equates to 20 percent of Australia's total production, valued at AUS$2.5 billion in 2013/14. Production in Western Australia is second only to Tasmania's (30 percent), valued at AUS$735 million.[167]

Recreational fishing is an important part of the lifestyle and culture of Western Australians. Over 80 percent of Western Australians live within 30 kilometres (18 miles) of the coastline, predominately in the southwest part of the state.[168] Around 740,000 recreational fishers, or one-third of the population, fish annually.[169] The expenditure attributed to recreational fishing is around AUS$338 million, making it a highly valued activity.[170] Western Australia has the fastest population growth rate of all the states, and it is projected to double over the next 50 years. Population growth will bring increased demand for outdoor recreation, particularly recreational fishing.[171]

The Department is responsible for the conservation and management of fisheries resources in state waters and offshore, under the Aquatic Resources Management Act 2016 and the Offshore Constitutional Settlement 1995 between the state Government of Western Australia and the Commonwealth Government of Australia.[172]

The Department manages the commercial, recreational and indigenous customary fishing sectors, along with leases for coastal waters used for pearling and other aquaculture activities. The powers to manage fisheries resources are set out in the Fish Resources Management Act 1994, the Pearling Act 1990 and the Aquatic Resources Management Act 2016, which

165. Ibid.

166. Australian Bureau of Agricultural and Resource Economics and Sciences (2015). *Australian Fisheries and Aquaculture Statistics 2014*. Australian Bureau of Agricultural and Resource Economics and Sciences: Canberra, ACT.

167. Ibid.

168. Millington, P. and Cranley, M. (2006). *A case study on the use of fisheries adjustment schemes to achieve shifts in resource allocations in estuaries and embayments in Western Australia*. Paper presented at the Sharing the Fish 06 Conference, Fremantle, Western Australia, 26 February to 2 March 2006.

169. Campbell, D. and Murphy, J.J. (2005). *The 2000–01 National Recreational Fishing Survey economic report: A Fisheries Action Program, FRDC project no. 99/158*. Natural Heritage Trust, Department of Agriculture, Fisheries and Forestry: Canberra, ACT.

170. Ryan, K.L., Trinnie, F.I., Jones, R., Hart, A.M. and Wise, B.S. (2016). Recreational fisheries data requirements for monitoring catch shares. *Fisheries Management Ecology*, 23, 218–233.

171. Department of Fisheries (2012). *A Resource-based Management Approach for Recreational Fishing in Western Australia 2012–2017: State-wide management proposals for finfish, crustaceans, molluscs and other invertebrates*. Fisheries Management Paper No. 252. Department of Fisheries: Perth, Western Australia.

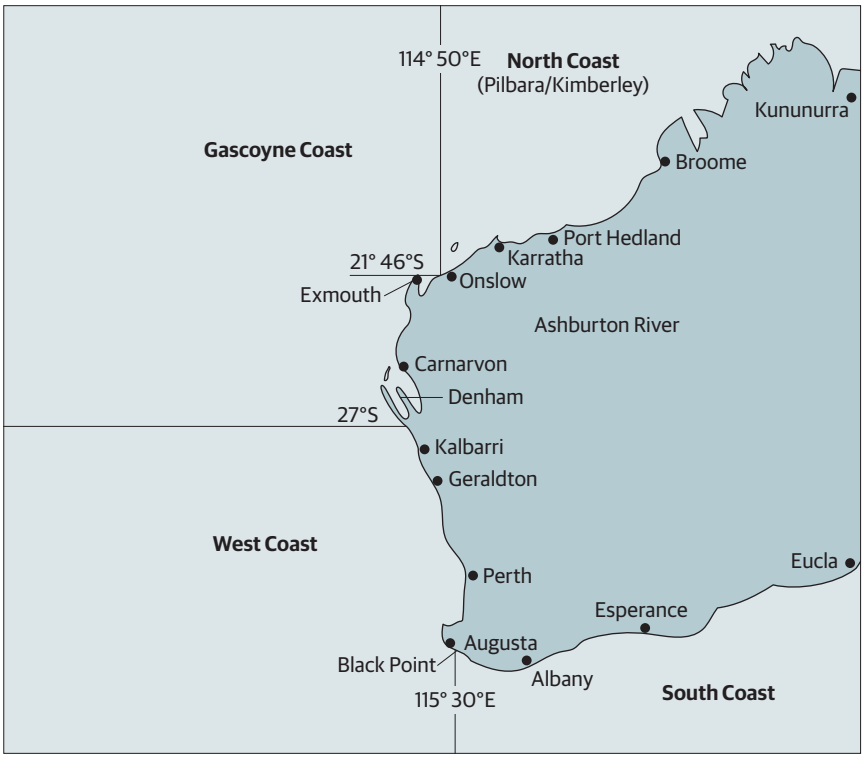
172. Department of Fisheries (1995). *Offshore Constitutional Settlement. Fisheries Management Paper No. 77*. Department of Fisheries: Perth, Western Australia.

will replace these two Acts once proclaimed.[173] Fisheries are managed through a combination of measures, including IFQs, effort controls, size limits, catch limits and area closures, along with provisions for special access for indigenous customary rights.[174]

For management purposes, the Western Australian marine environment is divided into four administrative "bioregions": North Coast, South Coast, West Coast and Gascoyne Coast (see map 5). Each bioregion is subdivided into estuarine and nearshore, demersal (on or near the bottom) from 20 to 250 metres (65 to 820 feet) in depth, offshore demersal from 250 metres (820 feet) (to the edge of the EEZ) and pelagic, including pelagic species in the water column above the inshore and offshore demersal species groups.[175]

Because of the diversity of species in each bioregion, the Department closely monitors certain species. For other ecological species groups, a small number of indicator species are monitored at the subdivision level. Also, some management measures are bioregion specific, while others are state wide.[176]

Map 5: Four bioregions for fisheries management in Western Australia



Source: Western Australia Department of Fisheries

173. This Act was passed on 20 November 2016 and is due to come into force on 1 January 2018.

174. Kailis, G. (2006). Integrated Fisheries Management: Implementation and allocation of rights. In: *Rebuilding Fisheries in an Uncertain Environment*. Proceedings of the 13th biennial conference of the International Institute of Fisheries Economics and Trade: Portsmouth, United Kingdom.

175. Department of Fisheries (2012). *A Resource-based Management Approach for Recreational Fishing in Western Australia 2012–2017: State-wide management proposals for finfish, crustaceans, molluscs and other invertebrates*. Fisheries Management Paper No. 252. Department of Fisheries: Perth, Western Australia.

176. Ibid.

4.2 Early management improvements

Before the late 1980s, a limited set of measures was used to manage recreational fishing. Daily bag and size limits were in place, but there was no effective cap on the growth in recreational fishing effort.[177] However, the Department acknowledged demand for fishing was increasing. This was due to population growth, increases in discretionary time and boat ownership, and improved access to the marine environment, particularly with increased use of four-wheel drive vehicles and the development of boat ramps and marinas.[178] It was also acknowledged that Western Australia's population was expanding regionally and in places that previously had low levels of recreational fishing effort.[179]

Between 1989 and 1991, the Department undertook its first comprehensive recreational fisheries review and developed a new management framework. This included a state-wide review of daily bag and size limits for all fish species.[180] As competition increased during the 1990s for fisheries resources, various fisheries management issues arose, leading the Department to explore ways to modify measures for certain species and areas.[181]

Andrew Cribb, Principal Policy Officer for the Department, clarifies an important measure at that time was a series of voluntary fisheries adjustment schemes. These aimed to control the exponential expansion of commercial fishing effort by reducing the number of licences and commercial boats operating, while recognising the commercial fishing access rights inherent in these fisheries. The offer of compensation payments to commercial operators who participated in the schemes removed the grounds for and reduced the likelihood of legal action by disgruntled commercial operators (pers. comm., Andrew Cribb, 9 January 2017). The schemes focused on estuarine and embayment fisheries in areas where productivity was considered both variable and limited, and population growth and coastal development were driving intense competition between commercial and recreational fishers.[182]

Where these schemes occurred, significant reductions followed in commercial fishing licences, with corresponding reductions in latent

177. Millington, P. and Cranley, M. (2006). *A case study on the use of fisheries adjustment schemes to achieve shifts in resource allocations in estuaries and embayments in Western Australia*. Paper presented at the Sharing the Fish 06 Conference, Fremantle, Western Australia, 26 February to 2 March 2006.

178. Department of Fisheries (2012). *A Resource-based Management Approach for Recreational Fishing in Western Australia 2012–2017: State-wide management proposals for finfish, crustaceans, molluscs and other invertebrates*. Fisheries Management Paper No. 252. Department of Fisheries: Perth, Western Australia.

179. Ibid.

180. Department of Fisheries (1990). *The Future for Recreational Fishing, Issues for Community Discussion: Recreational Fishing Advisory Committee*. Department of Fisheries: Perth, Western Australia.

181. Brayford, H. (2013). *An Overview of Reform in Fisheries and Aquatic Resource Management in WA (2008–2012).* Department of Fisheries: Perth, Western Australia.

182. Millington, P. and Cranley, M. (2006). *A Case Study on the Use of Fisheries Adjustment Schemes to Achieve Shifts in Resource Allocations in Estuaries and Embayments in Western Australia.* Paper presented at the Sharing the Fish 06 Conference, Fremantle, Western Australia, 26 February to 2 March 2006.

fishing effort. Containment of the commercial fishing effort also helped in preserving the fragile catch balance between commercial and recreational fishing. In the late 1990s, some schemes were also applied to solving regional political issues by removing commercial fishing in particular estuaries, making them de facto recreational-only fishing areas (pers. comm., Andrew Cribb, 9 January 2017).

"The Act also included forward-looking objectives that recognised the need for resource allocation between fishing sectors and their reallocation from time to time"

Enactment of the Fish Resources Management Act 1994 signalled a shift in the Department's statutory obligations. The Act increased the focus on resource sustainability objectives and sharing and conserving resources and their habitats for the benefit of current and future generations. The Department's function changed under the Act to managing the total effect that fishing has on fisheries resources, while taking account of broader ecosystem considerations and all fishing sectors. The Act also included forward-looking objectives that recognised the need for resource allocation between fishing sectors and their reallocation from time to time. It did not, however, contain specific enabling powers to achieve this because of the absence of clear policy development in this emerging area at the time.[183]

4.3 Integrated fisheries management policy

In 2000, the Department established the Integrated Fisheries Management Review Committee. Its aim was to develop an integrated approach for sustainable resource use and management for fisheries and areas shared between commercial, recreational and indigenous fishers and aquaculture.

The Review Committee's 2002 report referred to integrated fisheries management as a shift from managing individual fishing sectors to more holistic management of the aquatic ecosystem. The report identified issues that supported more integrated management, including competition for limited fisheries resources intensifying and ensuing conflicts that could adversely affect fisheries management. It also noted the increasing resistance by the commercial and recreational sectors to accept changes to sector-level management without supporting scientific data on the effect that management changes would have on their respective allocations of fisheries resources or "catch shares".[184]

In Western Australia, the term "catch shares" is synonymous with sector allocations of a TAC or some other type of total allowable harvest level. This meaning is at a broader level than that used in the United States, where catch shares refer to IFQs and other means of allocating proportional shares of TACs to individuals, groups and other entities (see chapter 1).

In 2003, while the Review Committee's report was being considered, the pink snapper (*Pagrus auratus*) fishery in the southern part of Shark Bay was in decline, requiring a drastic reduction in catch levels. The reduction

183. Brayford, H. (2013). *An Overview of Reform in Fisheries and Aquatic Resource Management in WA (2008–2012)*. Department of Fisheries: Perth, Western Australia.

184. Kailis, G. (2006). Integrated Fisheries Management: Implementation and allocation of rights. In: *Rebuilding Fisheries in an Uncertain Environment*. Proceedings of the 13th biennial conference of the International Institute of Fisheries Economics and Trade. Portsmouth, United Kingdom.

was needed to address the increasing numbers of recreational fishers camping nearby, and their combined fishing effort, which was depleting the pink snapper population in the lower part of the bay.

To avoid closing Shark Bay to all pink snapper fishing, the Department trialled a lottery-based harvest tag system to severely restrict the total catch. The lottery allowed some fishers the right to purchase harvest tags for AUS$10 each. In total, 1,500 tags was available annually: 1,200 tags for recreational fishers and 300 tags for commercial fishers.

The Department's intervention with this extreme management measure was a timely reminder for the fishing sectors, demonstrating the potential consequences of a fishery becoming depleted. Nathan Harrison, the Department's Director Policy and Strategic Services, commented that "Fishers accepted the need to do something rather drastically to improve the fishery. Even environmental groups got involved, with one representative arriving at a public meeting wearing a harvest tag necklace" (pers. comm., Nathan Harrison, 5 December 2016).

The harvest tag system was abolished after 12 years, once the stock assessment showed the fishery had recovered. The daily bag limit is two pink snapper per person in all of Shark Bay, and possession limits are in place in the lower part for filleted snapper.

In 2004, the Government of Western Australia adopted a formal policy on integrated fisheries management. The policy states that, amongst other things, integrated fisheries management must include allocations and reallocations, highlighting the importance of developing a mechanism to reallocate catch shares between sectors in the future. The policy advises that allocation decisions should aim to achieve the optimal benefit to Western Australia from the use of fisheries resources by taking account of economic, social, cultural and environmental factors.[185, 186]

In 2009, the policy was amended. The revised policy notes any reallocation of resources from one sector to another could warrant consideration of compensation for financial losses to licenced commercial fishers or aquaculture operators. It also refers to the Government of Western Australia potentially seeking contributions from all sectors regarding the cost of managing the resources and providing access for each sector.[187]

4.4 Fisheries with integrated management

The Department is phasing in the integrated fisheries management approach, and it is anticipated it will take 10 years to implement for most

185. Crowe, F.M., Longson, I.G. and Joll, L.M. (2013). Development and implementation of allocation arrangements for recreational and commercial fishing sectors in Western Australia. *Fisheries Management and Ecology*, 20, 201–210.

186. Kailis, G. (2006). Integrated Fisheries Management: Implementation and allocation of rights. In: *Rebuilding Fisheries in an Uncertain Environment*. Proceedings of the 13th biennial conference of the International Institute of Fisheries Economics and Trade. Portsmouth, United Kingdom.

187. Department of Fisheries (2009). *Integrated Fisheries Management: Government Policy*. Department of Fisheries: Perth, Western Australia.

shared fisheries.[188] To date, the integrated fisheries management approach has been applied to three fisheries: the western rock lobster, Roe's abalone and demersal scalefish fisheries. Catch shares (allocations) of the TAC, or other types of total allowable harvest levels, have been made for each fishery, although none have so far been reallocated.[189] At the time of writing, the integrated management approach is being applied to the Cockburn Sound and Peel-Harvey Estuary blue swimmer crab (*Portunus armatus*) fishery.[190]

4.4.1 Aboriginal customary rights

An ongoing challenge for integrating the management of fisheries is giving expression to Aboriginal customary fishing access rights. These rights generally refer to "fishing in accordance with relevant Indigenous laws and customs for the purpose of satisfying personal, domestic or non-commercial communal needs".[191]

The Department has developed a Customary Fishing Policy that is consistent with the Native Title Act 1993 and international laws acknowledging Aboriginal people having rights to fish and hunt in accordance with ongoing tradition and culture.[192] The Policy also removes some legal uncertainty about fishing rules that apply to Aboriginal people in Western Australia. It does not include any explicit allocation of fisheries resources for customary fishing purposes.[193] However, under the Aquatic Resources Management Act 2016, allowances for customary take will be set before allocating a TAC between the commercial and recreational fishing sectors (pers. comm., Andrew Cribb, 9 January 2017).

4.4.2 Western rock lobster fishery

In 2008, the Minister allocated 95 percent of the western rock lobster (*Panulirus cygnus*) TAC to the commercial sector, 5 percent to the recreational sector and 1 tonne for customary fishing. Nathan Harrison clarified that, when the recreational sector was allocated 5 percent of the TAC, the annual recreational catch level was estimated to be near 3 percent "providing a buffer for growth in recreational demand" (pers. comm., Nathan Harrison, 5 December 2016).

188. Department of Fisheries (2016). *Department of Fisheries Annual Report to Parliament 2015/16*. Department of Fisheries: Perth, Western Australia.

189. Crowe, F.M., Longson, I.G. and Joll, L.M. (2013). Development and implementation of allocation arrangements for recreational and commercial fishing sectors in Western Australia. *Fisheries Management and Ecology*, 20, 201–210.

190. Department of Fisheries (2015). *Blue Swimmer Crab Resource of the Peel-Harvey Estuary Harvest Strategy 2015–2020. Version 1.0. West Coast Estuarine Managed Fishery (Area 2) and the Peel-Harvey Estuary Blue Swimmer Crab Recreational Fishery. Fisheries Management Paper No. 273*. Department of Fisheries: Perth, Western Australia.

191. National Native Title Tribunal (2004). *Fishing Principles to Guide Indigenous Involvement in Marine Management: The Principles Communiqué on Indigenous Fishing* (www.nntt.gov.au/News-and-Publications/latest-news/Pages/Fishing_principles_to_guide_Indigenous_i.aspx).

192. Department of Fisheries (2009). *Customary Fishing Policy*. Department of Fisheries: Perth, Western Australia.

193. Department of Fisheries (30 September 2015). *Customary fishing – frequently asked questions* (www.fish.wa.gov.au/Fishing-and-Aquaculture/Customary-Fishing/Pages/Customary-Fishing-FAQ.aspx).

ABOVE: *Crayfishing*
Source: Recfishwest

The western rock lobster fishery is Western Australia's largest, totalling 77 percent of the wild-capture fisheries production and valued at AUS$321 million in 2014.[194] According to Andrew Cribb, almost all commercial catch is exported live to China (pers. comm., Andrew Cribb, 7 December 2016). In 2010, the fishery began transitioning from a limited-entry system with input controls to an IFQ system.[195] The commercial fishery is also managed by areas (to avoid concentration of fishing effort), area closures and size limits, protection of females in breeding condition and limiting the type of gear used.[196]

A rock lobster-specific recreational licence is required to fish for any species of rock lobster. The licence provides access to western rock lobster and three other species: southern rock lobster (*Jasus edwardsii*) and the tropical lobsters *Panulirus ornatus* and *Panulirus versicolour*. According to Leyland Campbell, Operations Manager for the Western Australian Recreational and Sport Fishing Council (Recfishwest) (discussed later), between 2012/13 and 2015/16 a 46 percent increase occurred in the number of recreational rock lobster licences issued. "This sort of growth demonstrates the importance of the recreational fishery and the need to ensure there is opportunity for growth in recreational allocations" (pers. comm., Leyland Campbell, 28 January 2017).

The recreational fishery is managed with gear restrictions, size limits, protection of reproductive females, seasonal closures, and daily bag, boat and possession limits, depending on the species and area fished. Most recreational fishing occurs in waters off Perth and Geraldton to the north.[197]

194. Australian Bureau of Agricultural and Resource Economics and Sciences (2015). *Australian Fisheries and Aquaculture Statistics 2014*. Australian Bureau of Agricultural and Resource Economics and Sciences: Canberra, ACT.

195. Department of Fisheries (2014). *Department of Fisheries Annual Report to Parliament 2013/14*. Department of Fisheries: Perth, Western Australia.

196. Department of Fisheries (15 December 2016). *Lobster management* (www.fish.wa.gov.au/Species/Rock-Lobster/Lobster-Management/Pages/default.aspx).

197. Ryan, K.L., Trinnie, F.I., Jones, R., Hart, A.M. and Wise, B.S. (2016). Recreational fisheries data requirements for monitoring catch shares. *Fisheries Management Ecology*, 23, 218–233.

"In the metropolitan area (West Coast Zone 1), the current Roe's abalone season occurs for just five hours in total: on the first Sunday of each month from November 2016 to March 2017 (inclusive) and between 7am to 8am only"

The commercial and recreational fisheries for rock lobster are separated by seasons, with the start of the recreational season moved back from 15 November to 15 October. Recreational fishing occurs during the summer months when rock lobster are not in prime market condition, being a whiter colour that attracts a lower price. The IFQ system provides flexibility for the commercial sector to fish year round, although fishing occurs mainly in the winter months when rock lobster are red in colour and, therefore, attract premium prices (pers. comm., Nathan Harrison, 5 December 2016).

Commercial fishers are, however, increasingly fishing year round. They provide rock lobster for the Chinese New Year,[198] and a trial project is in place to fill local demand during the holiday season.[199] With this increased year-round fishing, Recfishwest, the sole representative organisation for Western Australia recreational fishers (discussed later), is working to have the time restrictions for recreational rock lobster fishing removed (pers. comm., Leyland Campbell, 28 January 2017).

4.4.3 Abalone fishery

Western Australian waters have 11 species of abalone, although only three are harvested. These are Roe's abalone (*Haliotis roei*), greenlip abalone (*Haliotis laevigata*) and brownlip abalone (*Haliotis conicopora*).

Roe's abalone is the smallest of the three species and is found in shallow, temperate waters, making it easily accessible to the public. They are found from Shark Bay to Victoria in the south. The larger greenlip and brownlip abalone are found in deeper waters along the southern coastline of Western Australia.[200]

In 2012, the greenlip and brownlip abalone recreational catch totalled 8 tonnes, and the Roe's abalone catch was 32.6 tonnes (18.6 tonnes in the Perth metropolitan area, with the remaining 14 tonnes in other regions). The Roe's abalone allocation for the recreational fishing sector is 40 tonnes, and the commercial sector allocation is 36 tonnes.[201]

An abalone-specific recreational licence is required to fish for any species. The recreational fishery is managed by effort restrictions, size limits, seasonal closures and daily bag and possession limits. The use of scuba gear and surface-supplied air is prohibited. Abalone is also farmed and not subject to size or total catch restrictions.[202]

While recreational abalone fishing occurs across much of the southern part of the Western Australian coastline, it is concentrated in the Perth metropolitan area where Roe's abalone is primarily targeted along shallow

198. ABC Rural News (17 January 2017). *Western rock lobster fishery begins season with increased catch quota and hopes of price rise* (www.abc.net.au/news/2017-01-17/lobster-season-begins-western-australia/8188916).

199. Western Australian Fishing Industry Council (December 2016) *Rock lobster trial will sell crayfish fresh off fishers boats to WA public* (www.wafic.org.au/wp-content/uploads/2016/12/WAFIC-December-Newsletter.pdf?65f1d6).

200. Department of Fisheries (2005). *Integrated Fisheries Management Report Abalone Resources. Fisheries Management Paper No. 204*. Department of Fisheries: Perth, Western Australia.

201. Department of Fisheries (8 March 2016) *Abalone management* (www.fish.wa.gov.au/Species/Abalone/Pages/Abalone-Management.aspx).

202. Ibid.

ABOVE: *Abalone season*
Source: Recfishwest

reef platforms.[203] For this reason, the integrated management approach is being phased into the Perth metropolitan Roe's abalone fishery. The northern coastline (Zone 2) is closed to all abalone fishing.

In the metropolitan area (West Coast Zone 1), the current Roe's abalone season occurs for just five hours in total: on the first Sunday of each month from November 2016 to March 2017 (inclusive) and between 7am to 8am only. The bag limit is 15 abalone per person per day.

The current season for Roe's abalone in the area to the south (Zone 3) is between 1 October 2016 and 15 May 2017. The bag limit is 20 per person per day, and the combined greenlip–brownlip abalone limit is five per person per day.[204]

4.4.4 Demersal scalefish fishery

Over 200 species make up the Western Australian demersal scalefish fishery, including pink snapper (*Pagrus auratus*), dhufish (*Glaucosoma hebraicum*) and baldchin groper (*Choerodon rubescens*), which are highly valued by recreational fishers.

The Minister allocated 64 percent of the demersal scalefish TAC to the commercial sector and 36 percent to the recreational sector. However, subsequent stock assessments of key demersal finfish species indicated a need to rebuild the stocks, requiring a 50 percent reduction in total

203. Ryan, K.L., Trinnie, F.I., Jones, R., Hart, A.M. and Wise, B.S. (2016). Recreational fisheries data requirements for monitoring catch shares. *Fisheries Management Ecology*, 23, 218–233.

204. Department of Fisheries (2016). *Recreational Fishing for Abalone Guide 2016/17*. Department of Fisheries: Perth, Western Australia (www.fish.wa.gov.au/Documents/Recreational_fishing/Licences/rec_licence_abalone.pdf).

RIGHT: *Recfishwest CEO with Dhufish*
Source: Recfishwest

catch levels in 2005/06.[205] This was accomplished through a commercial licence buy-back scheme, even though the voluntary fisheries adjustment schemes had ceased in 1999. The recreational catch was reduced through the Department imposing a two-month closure at the peak of the season, along with reductions in daily bag limits and the introduction of measures to reduce post-release mortality (pers. comm., Leyland Campbell, 28 January 2017).

The recreational sector accepted the two-month closure and corresponding reduction in catch, in part, because of the measures the Department had taken to restrain or eliminate commercial catch. Public acceptance of this closure was also attributed to most of the waters off the Perth metropolitan area having been closed to commercial fishing over the years, along with 800 metres (2,624 feet) around Rottnest Island and within most estuaries and embayments due to the voluntary fisheries adjustment schemes (pers. comm., Andrew Cribb, 7 December 2016).

Concerns were also raised about the increasingly varied and complex recreational fishing management measures for the demersal scalefish fishery. A series of recreational fisheries management reviews was undertaken at the bioregional level, raising awareness of the existing conflicts between fishing sectors (pers. comm., Andrew Cribb, 7 December 2016).

The reviews focused on the effect that global positioning systems, colour sounders and improved fishing gear technology can have on recreational fishing. The Department identified ongoing improvements in fishing-related technology as a major contributor to overfishing in the West Coast Bioregion demersal scalefish fishery.[206]

205. Ryan, K.L., Trinnie, F.I., Jones, R., Hart, A.M. and Wise, B.S. (2016). Recreational fisheries data requirements for monitoring catch shares. *Fisheries Management Ecology*, 23, 218–233.

206. Department of Fisheries (2012). *A Resource-based Management Approach for Recreational Fishing in Western Australia 2012–2017: State-wide management proposals for finfish, crustaceans, molluscs and other invertebrates*. Fisheries Management Paper No. 252. Department of Fisheries: Perth, Western Australia.

These reviews also provided a new state-wide, individual and mixed species bag-limit structure, fish possession limit and a minimum fillet length for fish processed at sea. For example, in the West Coast Bioregion, demersal finfish have a total mixed bag limit of two fish, such as one pink snapper and one baldchin groper or two pink snapper. Individual species daily bag limits that may be taken within a total mixed species daily bag limit are also in place. In the case of dhufish, the limit is two fish per boat but one fish per person (for example, if three anglers are on board a boat, only two fish can be retained).[207]

The recreational sector includes charter boats, most of which target demersal species. Since 2001, charter boat-based fishing has been monitored in the West Coast Bioregion with mandatory Tour Operator Returns (for example, charter logbooks).[208] A limit is in place on the number of charter fishing licences granted state wide, and the current number of charter boat operations is around 250.[209] According to Andrew Rowlands, CEO of Recfishwest, there is latent effort with respect to the number not operating, and the number that could move from one bioregion to another, and, therefore, potentially have a greater effect on local fish populations (pers. comm., Andrew Rowlands, 7 December 2016).

4.5 Organisational changes

The integrated fisheries management approach prompted several changes in organisational structures and processes, starting with the Department. Its sector-specific fisheries programmes were merged to deliver cross-sectoral management, and the delivery of science (monitoring, fish stock assessment and targeted research), policy and compliance were better integrated. At that time, the Department was the only fully combined fisheries organisation in Australia.[210]

The Department was also restructured to have a direct public "interface" with its fisheries compliance, communications, education and licensing services. It improved regional infrastructure, enhanced its fleet of patrol vessels and introduced new mobile fisheries patrols. Internal processes were also improved to support project management and priority setting based on risk and outcomes and less on budgets and inputs.[211]

In 2015/16, the Department also overhauled its website to improve the delivery of recreational fishing rules. The rules cover nearly 180 species and

207. Department of Fisheries (2016). *Recreational Fishing Guide 2016*. Department of Fisheries: Perth, Western Australia.

208. Ryan, K.L., Trinnie, F.I., Jones, R., Hart, A.M. and Wise, B.S. (2016). Recreational fisheries data requirements for monitoring catch shares. *Fisheries Management Ecology*, 23, 218–233.

209. Department of Fisheries (2012). *A Resource-based Management Approach for Recreational Fishing in Western Australia 2012–2017: State-wide management proposals for finfish, crustaceans, molluscs and other invertebrates*. Fisheries Management Paper No. 252. Department of Fisheries: Perth, Western Australia.

210. Brayford, H. (2013). *An Overview of Reform in Fisheries and Aquatic Resource Management in WA (2008–2012)*. Department of Fisheries: Perth, Western Australia.

211. Ibid.

groups of species and contain an overview of each. The website includes a location search to find common species in each bioregion, and it highlights nearby marine protected areas.[212] These improvements are supported by Recfishwest's new mobile fish identification and rules app.[213]

The new approach led to changes in the Department's funding arrangements. Since 1995, it had operated a cost-recovery programme for commercial fisheries, like that in New Zealand, which is designed to recover a portion of the total costs of managing fisheries. In 2010, the Department outlined a new arrangement for commercial licence holders to pay an access fee based on a single, fixed proportion (5.75 percent) of the gross value of product for their respective fisheries.

The Department also put new funding arrangements in place for recreational fishing. Fishers had already contributed to management costs through five fishery-specific licence fees.[214] In addition to these fees, in 2010, the Department implemented the Recreational Fishing from Boat Licence.[215]

This Licence is required whenever a powered boat is used to fish or transport catch or fishing gear to or from a land-based fishing location. It, therefore, does not apply to fishing from non-powered boats.[216]

The Licence is not tied to a boat but is for individual fishers who fish from a powered boat. The annual fee is AUS$30. Some half-fee concessions are available if certain criteria are met, including being under the age of 16, holding a Seniors Card, receiving age or disability support, a social security allowance, certain types of pensions and so on. Also, the Licence does not apply to Aboriginal customary fishing.[217]

Table 2: Fishing licences issued from 2012/13 to 2015/16, total number of licences and percentage change since 2012/13

	Fishing from Boat	Rock lobster	Net fishing	Abalone	Marron	Freshwater	Total no. of licences
2012/13	134,116	35,560	15,222	15,658	10,797	9,721	221,074
2013/14	135,315	40,904	16,084	15,992	11,400	10,430	230,125
2014/15	138,191	46,895	16,618	16,429	12,053	10,835	241,021
2015/16	139,485	52,046	16,828	17,082	10,972	9,992	246,405
Change since 2012/13 (%)	4	46	10	9	1	2	10

Source: Recfishwest

212. Department of Fisheries (2016). *Department of Fisheries Annual Report to Parliament 2015/16.* Department of Fisheries: Perth, Western Australia.

213. Recfishwest (2014). *Fishing Rules Now Only 1 Touch Away* (http://recfishwest.org.au/fishing-rules-now-only-1-touch-away/).

214. Department of Fisheries (10 June 2016). *Recreational fishing licences* (www.fish.wa.gov.au/Fishing-and-Aquaculture/Recreational-Fishing/Pages/Recreational-Fishing-Licences.aspx).

215. Department of Fisheries (2016). *Department of Fisheries Annual Report to Parliament 2015/16.* Department of Fisheries: Perth, Western Australia.

216. Ibid.

217. Department of Fisheries (2016). *Recreational fishing licences 2016/17 Information and application form.* Department of Fisheries: Perth, Western Australia (www.fish.wa.gov.au/Fishing-and-Aquaculture/Recreational-Fishing/Pages/Recreational-Fishing-Licences.aspx).

"The Recreational Fishing from Boat Licence database has been used to develop more cost-effective approaches for data collection"

Table 2 shows the breakdown in the marine and freshwater licences issued from 2012/13 to 2015/16, the total number of licences and the percentage change in the number of licences since 2012/13. Rock lobster licences had the greatest percentage change (46 percent) between 2012/13 and 2015/16, followed by net fishing licences (10 percent), abalone licences (9 percent), Fishing from Boat Licences (4 percent), freshwater licences (2 percent) and marron licences (1 percent). During this period, a 10 percent increase occurred in the total number of licences issued.

The Recreational Fishing from Boat Licence database has been used to develop more cost-effective approaches for data collection. This, in conjunction with logbooks completed annually by a survey sample of licence holders, provides the most comprehensive survey conducted in Western Australia.[218] The Licence was established with broad public support.[219] According to Brent Wise, the Department's supervising scientist for stock assessment, the public support was for the data that would be generated by the Licences, not the revenue generated, which lessened the objections against its implementation (pers. comm., Brent Wise, 7 December 2016).

4.5.1 Sector representation

The integrated management approach also led to a substantial consolidation in the organisations that represent the commercial and recreational fishing sectors. The Fish Resources Management Act 1994 had led to the establishment of three statutory ministerial advisory committees for rock lobster, aquaculture and recreational fishing.[220]

The recreational advisory committee alone was supported by 12 regional advisory committees. Non-statutory advisory committees were also established for certain fisheries, along with other representative organisations and individuals. Given this broad spectrum, the advice the Minister and/or Department received was often conflicting, which led to protracted consultative and decision-making processes.[221]

Concerns about the costs of supporting these representative organisations and various consultative processes led to the Minister amending the Fish Resources Management Act 1994 in 2010. This amendment removed the three statutory advisory committees, while retaining discretion in establishing non-statutory committees.[222]

Beginning in 2011, the Western Australian Fishing Industry Council (WAFIC) and the Western Australian Recreational and Sport Fishing Council (Recfishwest) became the recognised peak bodies or main sources of coordinated advice for the commercial (including pearling and edible aquaculture) and recreational sectors, respectively.

218. Ryan, K.L., Hall, N.G., Lai, E.K., Smallwood, C.B., Taylor, S.M. and Wise, B.S. (2015). *State-wide survey of boat-based recreational fishing in Western Australia.* Fisheries Research Report No. 268. Department of Fisheries: Perth, Western Australia.

219. Department of Fisheries (2014). *Department of Fisheries Annual Report to Parliament 2013/14*. Department of Fisheries: Perth, Western Australia.

220. Brayford, H. (2013). *An Overview of Reform in Fisheries and Aquatic Resource Management in WA (2008–2012).* Department of Fisheries: Perth, Western Australia.

221. Ibid.

222. Ibid.

While both organisations had been part of consultation processes previously, under new service level agreements with the Department, WAFIC and Recfishwest established their own sector and regional consultation processes, including public meetings. Their agreements also include provisions for developing management plans and advising on the allocation of resources, thereby making them the central points of contact and referral for sectoral issues.

4.5.2 Funding sources

The Government of Western Australia funds WAFIC for commercial representation, with 0.5 percent of the 5.75 percent gross value of product collected in access fees. The remaining 5.25 percent is allocated as follows: 5 percent to the Department and 0.25 percent towards Western Australia's contribution to the Fisheries Research and Development Corporation (FRDC).

FRDC is a statutory body that has involved the fisheries and aquaculture sectors and Commonwealth Government of Australia since 1992. It does not undertake research on its own but partners with research organisations and researchers.

Early on, FRDC's primary focus was research on commercial wild-capture fisheries and less on aquaculture. Subsequently, the focus broadened to include economic, environmental and social considerations for shared fisheries, including commercial, recreational, indigenous customary and aquaculture sectors.[223]

Recfishwest is funded with 15 percent of the annual recreational fishing licence fees, which totalled around AUS$1.1 million in 2014/15. In addition, since 2012, the remaining recreational fishing licence fees are credited to the Recreational Fishing Account and reinvested in projects that directly benefit recreational fishing in Western Australia.[224]

In practice, the Recreational Fishing Account is used as an operating account that includes licence fees and a contribution from consolidated revenue. In 2015/16, the Account received AUS$7.7 million from recreational licence fees and AUS$9 million from consolidated revenue appropriations. In 2015/16, AUS$17.9 million was spent on recreational fisheries management, research, education, compliance and associated activities (pers. comm. Andrew Cribb, 3 February, 2017).

Twenty-five percent of the funds in the Recreational Fishing Account is allocated each year to the Recreational Fishing Initiative Fund. This fund invests in research and development projects aligned with the priorities of the recreational fishing sector that deliver long-term social and economic benefits to the "Western Australian fishing community". These projects include habitat restoration and fish restocking.

For example, the Recreational Fishing Initiative Fund was used to buy a trailer to transport snapper broodstock (adult) to a hatchery in Fremantle

223. Fisheries Research and Development Corporation (2015). *Annual Operational Plan 2015–16*. Fisheries Research and Development Corporation: Canberra, ACT (http://frdc.com.au/about_frdc/corporate-documents/Pages/annual_op_plan.aspx).

224. Department of Fisheries (2014). *Department of Fisheries Annual Report to Parliament 2013/14*. Department of Fisheries: Perth, Western Australia.

ABOVE: *Fish stocking trailer*
Source: Recfishwest

and juveniles to Cockburn Sound south of Perth as part of the Snapper Guardians project. Recfishwest initiated a public-fund appeal to raise the AUS$25,000 required for this project to initially grow and stock pink snapper. Around AUS$36,000 was raised in the first few hours of the appeal, resulting in a surplus of funds.[225] This surplus was used for further hatchery work that provided more juvenile snapper that will be released into the wild during 2017 (pers. comm., Leyland Campbell, 28 January 2017).

To date, more than 20 projects, valued at over AUS$6.5 million, have been funded through the Recreational Fishing Initiative Fund. The Minister has absolute discretion in the application of these funds, the Department administers the funds and Recfishwest provides the Minister with prioritised projects for consideration.

4.5.3 Recfishwest

Recfishwest is a non-profit organisation that describes itself as "community based" in its representation of 740,000 recreational fishers. It has over 63,000 signed-up subscribers and members.[226]

Recfishwest is committed to protecting, promoting and developing sustainable, accessible, enjoyable and safe fishing opportunities for the benefit of the broader "fishing community".[227] Recfishwest advocates that recreational fishing has far-reaching social, cultural and health benefits.

225. Recfishwest (2014). *Snapper Guardians see Fish Released Back into Cockburn Sound* (http://recfishwest.org.au/snapper-guardians-see-fish-released-back-into-cockburn-sound/).

226. The options for signing up with Recfishwest include: subscriber (free of charge) and receive the monthly enews; member (free of charge) and receive the monthly enews, weekly fishing reports via email and the ability to have a say in surveys; and premium member for AUS$25 annually (in addition to the monthly enews and weekly fishing reports, members receive a member T-shirt, fishing lure, member sticker and access to member-only events and voting rights at the annual general meeting).

227. Recfishwest (2016). *Recfishwest Annual Report 2015/2016*. Recfishwest: North Beach, Western Australia (http://recfishwest.org.au/about/recfishwest-structure-and-governance/).

ABOVE: *Kids learning to fish*
Source: Recfishwest

It places importance on equitable allocations of fisheries resources for current and future generations that recognise and allow for population growth, and that are vital to recreational fishers taking up a stewardship role for the aquatic environment.[228]

As part of its broad role in consultation, Recfishwest advises on conserving the aquatic environment, including improved environmental practices associated with recreational fishing and encouraging innovation in habitat restoration and enhancement. It supports the establishment of conservation areas with high value marine environments, while also promoting access to fisheries. These issues are important deliverables in its independent advice and recommendations to the Department and Minister.

The Recfishwest website provides "How to Catch" tips and a monthly "Broad Cast" with public updates on various topical fisheries management issues and educational events, including the first National Gone Fishing Day held on 16 October 2016. This day celebrated fishing and teaching the next generation of "fisher kids".[229] The website also has online safety checklists for each fishing activity.[230]

Recfishwest operates under a constitution and has strong governance arrangements in place. The Board of Directors comprises eight directors, and the Board elects a non-voting chairperson. Five directors are elected by the Recfishwest membership and three are appointed for specific skills sets

228. Recfishwest (2015). *Recfishwest Strategic Plan 2015–2017*. Recfishwest: North Beach, Western Australia (http://recfishwest.org.au/about/recfishwest-governance/).

229. Recfishwest (2014). *Recfishwest Celebrate Gone Fishing Day* (http://recfishwest.org.au/kids-celebrate-gone-fishing-day/).

230. Recfishwest (2014). *Fishing Safety* (http://recfishwest.org.au/rock-fishing-safety/).

(for example, legal; accounting; biological, environmental and marketing expertise). Directors are appointed for a two-year period with half voted in by the membership every year, reducing the loss of corporate knowledge that would occur with a complete turnover of directors every two years (pers. comm., Leyland Campbell, 28 January 2017).

The Finance, Audit and Risk Committee operates under a charter endorsed by the Board in 2014. A governance committee reviews the governance systems and maintains a compliance report that is included in the Recfishwest report to the annual general meeting.[231, 232]

Recfishwest considers that fostering strong partnerships with the Department and researchers is necessary to ensure appropriate management strategies are implemented for effective resource conservation. One way these partnerships are supported is through the formation of reference groups. Reference group members have a three-year term to provide Recfishwest with information on current issues and to have input into recreational fisheries management. At the time of writing, reference groups are in place for the western rock lobster and freshwater fisheries.

Partnerships are also supported through ongoing dialogue between Recfishwest, the Department and WAFIC. Although differences of opinions persist, the service level agreements in place alter organisational roles and intersectoral dynamics by providing incentives to collaborate. John Harrison, Chief Executive Officer for WAFIC, acknowledges "the pendulum of public and political opinions have shifted in favour of recreational fishing interests, and it is critical that both sectors work together to find workable solutions" (pers. comm., John Harrison, 8 December 2016). Accordingly, WAFIC aims to focus commercial fishing interests on areas of agreement rather than disagreement.[233]

4.6 Fisheries management reform

Western Australian fisheries management has continued to reform to meet the challenges facing the commercial and recreational fishing sectors. In 2012, the Government of Western Australia announced its commitment to support the pre-assessment process for the internationally recognised Marine Stewardship Council (MSC) certification. The government committed AUS$14.5 million to have all commercial fisheries undergo MSC pre-assessment.

To date, several species have MSC certification, and many more are progressing towards full MSC assessment.[234] The blue swimmer crab fishery is unique for MSC certification, because it is the first to be certified

231. ASX Corporate (2017). *Corporate Governance Council* (www.asx.com.au/regulation/corporate-governance-council.htm). These ASX principles were slightly modified to properly reflect that Recfishwest is an incorporated association rather than an ASX reporting entity.

232. Recfishwest Constitution (http://recfishwest.org.au/about/recfishwest-governance/).

233. Western Australia Fishing Industry Council (www.wafic.org.au/who-we-are/).

234. Department of Fisheries (2015). *Department of Fisheries Annual Report to Parliament 2015/16*. Department of Fisheries: Perth, Western Australia.

worldwide as both a commercial and recreational fishery.[235, 236] Overall, the Department considers that 95 percent of the Western Australian fish stocks are not at risk from overfishing.[237]

"The 'Send us your skeletons' programme has been running since 2000. It involves hundreds of recreational fishers donating the fish frames of dhufish, pink snapper, baldchin groper and other demersal and nearshore species to help determine their stock status"

In 2012, the Government of Western Australia, in association with WAFIC and Recfishwest, developed a new Fisheries Policy Statement that builds on the 2009 policy on integrated fisheries management. The 2012 Fisheries Policy Statement focuses, amongst other things, on fisheries access rights that provide certainty and confidence to each fishing sector, and sound processes for sharing and allocating fisheries resources.

In addition, the Policy Statement emphasises the need to resolve intersectoral allocation issues, which is considered fundamental to ensuring fisheries are managed sustainably. The Policy Statement explicitly states that "fisheries allocations can, and should, change over time reflecting changing social values".[238]

Furthermore, the Policy Statement sets out a commitment to develop an allocation policy that has regard to the "optimum social utilisation of fish stocks available to the recreational sector". Finally, with respect to marine planning, the Policy Statement provides assurance that compensation should be payable where commercial fishing and related industries have a case for any detrimental impact.[239]

The Department has also developed programmes that involve the public in fisheries management. For example, the "Send us your skeletons" programme has been running since 2000. It involves hundreds of recreational fishers donating the fish frames of dhufish, pink snapper, baldchin groper and other demersal and nearshore species to help determine their stock status. Biological data are extracted from the fish frames at the Department's laboratory. The high number of fishers involved in the programme helps to ensure the total sample size is representative of the entire stock of each species.

The Department provides bags and tags that fishers fill out, and, in so doing, enter draws for major and quarterly prizes donated by various recreational fishing-related companies. The drop-off locations provide opportunities for Department staff to listen to fishers' perspectives and experiences.[240]

235. Marine Stewardship Council (2017). *Peel Harvey Estuarine Fishery: Recreational and commercial blue swimmer and commercial sea mull* (https://fisheries.msc.org/en/fisheries/peel-harvey-estuarine-fishery-recreational-and-commercial-blue-swimmer-crab-and-commercial-sea-mull/about/).

236. One of the Recreational Fishing Initiative Fund projects in 2012/13 was for the Department to engage with the local crabbing community to develop ongoing, cost-effective programmes to deliver annual information on recreational crabbing and stock dynamics in the recreational blue swimmer crab fisheries of the Swan-Canning Estuary, the Leschenault Inlet and Geographe Bay (http://recfishwest.org.au/funding-projects/large-grants/).

237. Department of Fisheries (2016). *Department of Fisheries Annual Report to Parliament 2015/16*. Department of Fisheries: Perth, Western Australia.

238. Department of Fisheries (2012). Western Australian Government Fisheries Policy Statement. Department of Fisheries: Perth, Western Australia, p 7.

239. Ibid.

240. Department of Fisheries (2016). *Research Angler Program, No. 35, November 2016*. Department of Fisheries: Perth, Western Australia.

4.6.1 New fisheries legislation

In 2016, Parliament passed the new Aquatic Resources Management Act (the new Act), which has an enactment date of 1 January 2018. This Act replaces both the Fish Resources Management Act 1994 and the Pearling Act 1990 as the primary legislation for managing aquatic resources in Western Australia.

The new Act builds on the existing legislative framework for integrated resource management and the 2012 Fisheries Policy Statement. It does this by adopting key principles of ecologically sustainable development[241] and further shifting the legislative scope from fisheries management to aquatic resource management. In summary, the new Act provides for improvements in eight main policy areas:

- ensuring ecologically sustainable development by balancing conservation outcomes with sustainable use
- risk-based assessment and transparent, outcome-focused resource use planning
- integration of resource protection and use across all sectors, including allowances for indigenous customary fishing and public benefit harvesting, such as research
- security of resource access and allocation of secure proportional harvest entitlements for the fishing sectors
- management of aquatic farming activities
- protection from the negative impacts of aquatic disease and harmful organisms (biosecurity)
- devolution and delegation of decision making, and deregulation
- cooperative management arrangements with the non-governmental sector.

The provisions for risk-based assessment and planning for managing aquatic resources include aquatic resource management strategies (ARMS) and aquatic resource use plans (ARUPS). ARMS set out the targets and assessment criteria for the conservation and use of a managed resource, the methods for calculating the TAC, or some other type of total allowable harvest level, and commercial and recreational fishing allocations.

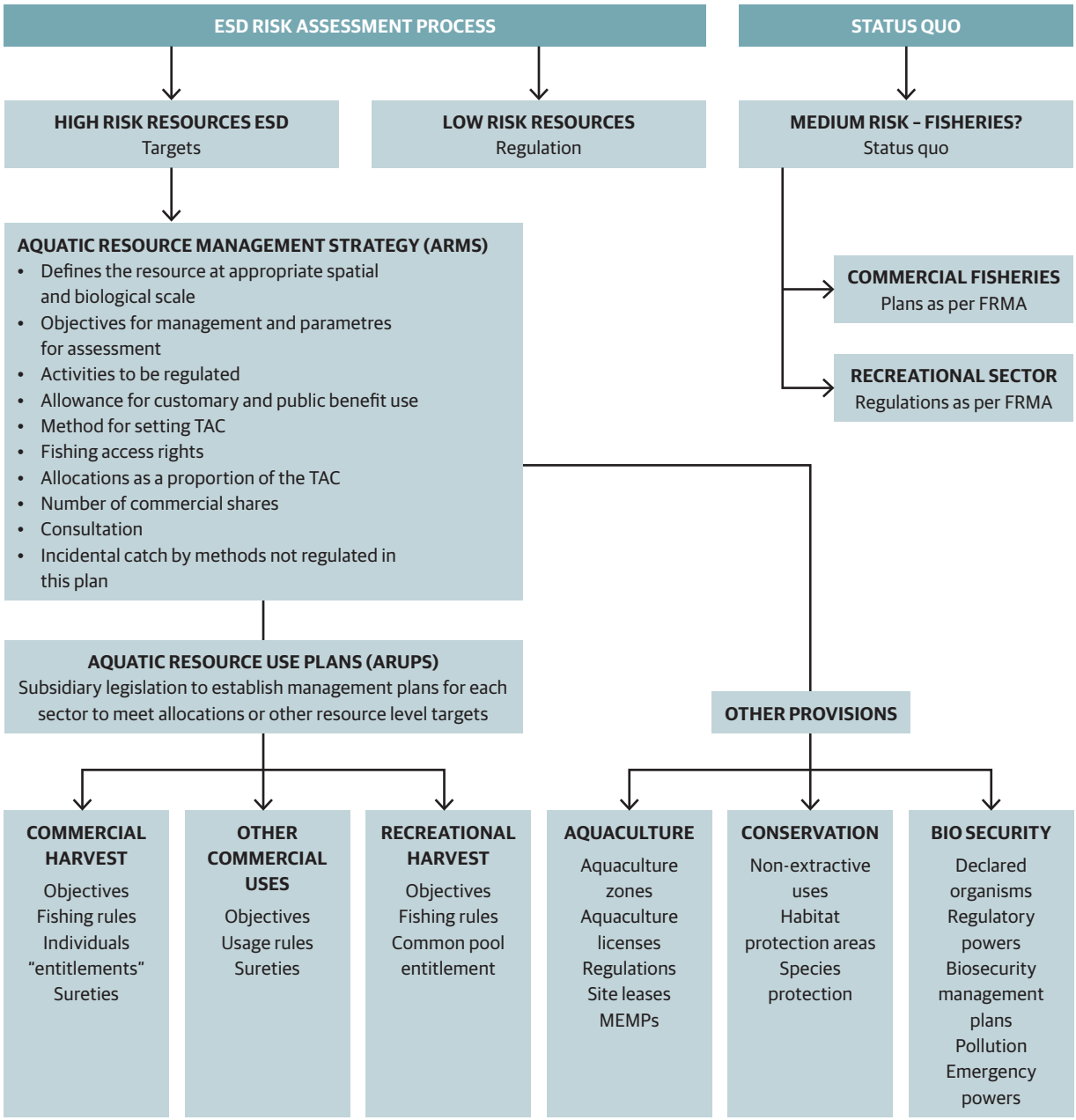
ARMS then link to ARUPS, which implement the objectives in the ARMS by establishing fishing rules and other measures that apply to each fishing sector. Some decision-making powers may be delegated to the Executive Director of the Department. Most ARMS will have at least two ARUPs – for commercial and recreational fishing. ARUPS will encourage greater stewardship through a system of financial "sureties" that will apply to those with a history of non-compliance.[242] The new Act also provides for the development of less formal management arrangements for

241. The principles of ecologically sustainable development are founded in the 1982 United Nations Convention on the Law of the Sea (UNCLOS), which sets out responsibilities for coastal nations to ensure the living resources within their EEZs are not endangered by over exploitation.

242. Department of Fisheries (No date). *Overview of the Aquatic Resources Management Bill 2015 and the Aquatic Resources Legislation Amendment Bill 2015*. Department of Fisheries: Perth, Western Australia.

medium- and low-risk aquatic resources through regulations, orders and licences (see figure 1).

Figure 1: Risk-based strategies and plans as set out in the Aquatic Resources Management Act 2016



Note: ESD = ecologically sustainable development; FRMA = Fish Resources Management Act 1994; MEMPs = management and environmental monitoring plans; TAC = total allowable catch.

4.6.2 Fishing access rights

A major feature of the new Act is the framework for fishing access rights, which draws on experiences with rights-based management in New Zealand, Canada, Norway, Iceland, the United Kingdom and the United States.

"The new Act includes provisions for reallocation between fishing sectors on temporary and long-term basis"

As in New Zealand, this framework separates the property-like elements of commercial fishing access rights from the administrative permission to fish. This separation includes resource shares that provide a tradable unit for the long-term, property-like element of the access rights, and annual catch entitlements that are a temporary tradable unit (quantity of catch or units of effort). Existing management arrangements and access rights will be preserved during the transition to the new framework.

4.6.3 Cross-sector allocation and reallocation

The establishment of proportional allocations of the TAC between fishing sectors will continue to be provided through an administrative policy decision by the Minister. This practice will continue because of the public access nature of recreational fishing access rights and the need to ensure a proper balance of economic and social outcomes, in accordance with the ecologically sustainable development principles.

The new Act includes provisions for reallocation between fishing sectors on temporary and long-term basis. A temporary reallocation may occur by an adjustment to the commercial or recreational allocations. This approach assumes buyers and sellers in each sector will be willing to negotiate the quantum and price of the exchange. In the case of a sale to the commercial sector, the transaction must be initiated by a recognised recreational fishing body and ratified by the Minister. For a purchase from the commercial sector, the Minster is required to adjust the recreational allocation by the amount of annual catch entitlements purchased.

A long-term reallocation can also occur by adjusting the proportions of the TAC between the recreational and commercial sectors, although this would require a public process and amendment to the ARMS.

That the new Act is moving into uncharted territory has been acknowledge by the Department, because no examples exist worldwide regarding how intersectoral reallocations might work in practice. The new Act's provisions are highly innovative and should be considered as a work in progress that will need refinement as more experience is gained (pers. comm., Andrew Cribb, 7 December 2016).

4.7 Concluding remarks

The Department has been preparing for increasing pressure on fisheries resources because of population growth and coastal development. Another consideration is the rapid advances in fish finding, fishing and communications technologies that cause fisheries resources to be more vulnerable to fishing.

Also acknowledged by the Department is that the regulatory measures for recreational fishing are largely based on social values that have had widespread support to date. These measures could, however, be less effective in constraining future recreational catches, as population growth increases demand for fishing. For several years, the Department has considered it inevitable that fisheries managers will need to seek ongoing public support for further measures that effectively constrain the fishing effort directed at certain species.

The Department anticipates that recreational fishers will play an increasingly active role in monitoring fisheries important to them. Rigorous assessments of the effects of fishing require large amounts of information that can be supplied by recreational and commercial fishers alike. In the future, participation in boat-ramp and online surveys, donating fish frames and maintaining daily logbooks will become an increasingly accepted part of the recreational fishing experience.[243]

Western Australians fish per capita more than New Zealanders. For many, fishing is more than just catching a fish; it is also a way to relax and unwind in the outdoors with family and friends. Western Australians have the added benefit of having been assured that their interests are considered in the long-term management of the fish stocks important to them.

It is no surprise, therefore, that Western Australians have trust and confidence in the Department, despite rather drastic measures being implemented that affect recreational access to fisheries. Overall, the public accepts these measures as necessary and in their long-term interests. People know that recreational opportunities will be pursued where possible through Recfishwest, the government-funded recreational representative organisation, and by investing licence fees in ways that align with the priorities of the recreational sector.

Another reason for public trust and confidence in management is knowing that the commercial representative organisation acknowledges that mutually beneficial solutions must be worked through. WAFIC's view is that if solutions are not worked through jointly then the likely outcome will be a loss for the commercial sector (pers. comm., John Harrison, 8 December 2016).

This situation raises the question, what can New Zealanders learn from Western Australians, particularly with respect to providing broad sector-level representation, eliciting intersectoral dialogue and pursuing distinctly bold efforts to address reallocation issues?

243. Department of Fisheries (2012). Western Australian Government Fisheries Policy Statement. Department of Fisheries: Perth, Western Australia.

Conclusion

Fisheries management can be approached in many ways, despite there being common challenges. Each of the fishing nations considered in this report offers important insights into what works well and not so well while grappling with the basics and ensuing problems.

New Zealand could head in the same direction as the Gulf of Mexico's red snapper fishery. During the past decade, the focus in the Gulf was on getting the red snapper IFQ system sorted before the various components of the recreational fishing sector were reformed. This type of prioritising ignores what we have known for some time, which is the importance of considering the rights and interests of all sectors when designing a quota-based system.

As in New Zealand, private boat anglers in the Gulf states are last in line for management reform. In the interim, emergency measures have left them with very few days to fish for red snapper each year, and the outlook is less than favourable. It is no surprise they feel animosity towards the federal government for its perceived partiality towards commercial fishing. While the commercial fishers have thrived under a simple IFQ system, they resent private boat anglers, who they believe are blaming others for problems they themselves have caused.

Ultimately, responsibility for any mismanagement of the Gulf's red snapper fishery rests with the federal government. Some attention is also being directed at possible reallocation of the red snapper TAC, which may provide a way out of this crisis. The recent effort among the Gulf states to assert responsibility for managing the fishery has, however, resulted in significant uncertainty about the future. New Zealand should decidedly avoid falling into a similar trap by leaving problems to worsen.

The collaborative efforts demonstrated in the northern California recreational-only red abalone fishery provide important lessons.

First, to avoid the management failures experienced in the southern California abalone fishery, the Abalone Working Group is collaborating to improve the capacity for adaptive management. The Group's efforts include responding to adverse natural conditions, while setting long-term management objectives and improving evidence-based decision making.

Second, potentially widespread benefits could be gained from strengthening both management and community capacity, demonstrating that stewardship is not just limited to those with interests in commercial quota.

Finally, we are reminded that government organisations responsible for managing fisheries can fall victim to reductions in capacity and capability, if not complacency. In these circumstances, reliance on volunteers is an increasingly acceptable and cost-effective way of improving an organisation's ability to meet its statutory requirements, while providing opportunities for volunteers to address management and environmental issues that are important to them.

"The concept of quota transfers might at first appear entirely impractical in New Zealand, when considering the lack of catch reporting requirements for the recreational sector and recent disclosures of problems in misreporting commercial catches and illegal discarding, particularly in inshore fisheries. The obstacle to solving these problems is management inattention"

These lessons are especially relevant to New Zealand, when considering reductions in the fisheries management function because of years of cutbacks in expenditure, restructurings and the merger to establish MPI.

The recreational halibut fishery in British Columbia is the best example of market transfers of quota to private anglers and others. This integrated management approach includes an experimental licence that allows recreational fishers to lease and purchase quota to top up their halibut catch beyond the catch limits and time available under the normal recreational licence.

This approach is not without controversy. While it provides greater access to halibut, the recreational fishing representative organisations object to it, but would support the use of Halibut Stamp fees to purchase quota, which ironically would provide the same outcome. However, their strong preference is to gain greater access to the resource through a higher proportion of the halibut TAC, with likely compensation for affected quota holders. The recreational fishing sector is also pursuing ways to enhance the management of recreational fisheries, which will likely lead to some form of funding recovery beyond the current recreational licence fees.

British Columbia's quota transfers between sectors and within the recreational fishing sector may improve over time with increased use. Efforts in Alaska might provide further insight into two-way quota transfers working in practice, at least for the commercial and charter boat sectors, which have stringent catch reporting requirements.

The concept of quota transfers might at first appear entirely impractical in New Zealand, when considering the lack of catch reporting requirements for the recreational sector and recent disclosures of problems in misreporting commercial catches and illegal discarding, particularly in inshore fisheries. The obstacle to solving these problems is management inattention. In comparison, since 2006, British Columbia has had 100 percent at-sea (observer or camera) and dockside monitoring in its commercial groundfish fisheries, which is operated by a private company independent of the commercial sector and government. Let us hope that MPI learns the lessons from British Columbia and elsewhere when designing its integrated electronic monitoring and reporting system.

Of the locations considered in this research, Western Australia clearly sets the benchmark when it comes to having management foresight. The Western Australia Department of Fisheries has consistently emphasised the need to prepare for increasing competition for limited fisheries resources. The Department recognises this increase will be due to population growth and coastal development, which will lead to conflicts that can adversely affect the management of fisheries.

Preparation for increasing competition is most apparent in the Department's approach to intersectoral allocation issues, especially the public assurance that TAC allocations between sectors can, and should, change over time to reflect changes in social values. The Department has recently put this policy position in legislation and will be developing a reallocation mechanism that includes the prospect of compensation. The new legislation also allows for short-term, two-way transfers of entitlements between sectors.

The use of service level agreements in Western Australia has the effect of shifting intersectoral dynamics and providing incentives for competing

sectors to work through their differences. The costs associated with maintaining these agreements are borne by the commercial and recreational fishing sectors, which instils a sense of everyone bearing their share of the burden. These shared costs help strengthen public trust and confidence in the way fisheries are managed.

As a next step in the New Zealand Initiative's fisheries project, I will travel to Western Australia with a group of New Zealanders to learn more about its successes and challenges. The visit will entail meeting with the Department, Recfishwest, WAFIC and local recreational and commercial fishers. It will also include site visits that demonstrate recreational licence fees used to fund research and projects that benefit recreational fisheries.

What we learn from Western Australia and elsewhere will help formulate the policy recommendations outlined in our third report. It is important these recommendations uphold the secure rights associated with quota holdings and the principles of the Treaty of Waitangi and related Treaty settlement obligations.

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With no rights comes no responsibility. It is an old saying that illustrates a fundamental truth – human beings act positively when they feel they have an important, stable and durable place in the scheme of things.

In both our nations, fish are a "common property" or "common pool resource" until caught – at which time they become personal property.

The other fishing sectors already have, or are moving towards, rights embedded in law that have form and substance – in other words "statutory rights". These rights assure them of a long-term share in the sustainable catch in exchange for science-based management programmes that aim to control catches within the limits of sustainability.

In this world of statutory fishing access rights, recreational fishing in both Australia and New Zealand seems to me to be drifting backwards up the proverbial creek, and is groping for the paddle.

How do we assure the future of our fisheries in the face of population growth, environmental change, competing demands and philosophies and increased fishing pressure? How do we change our management philosophies, authorities, systems and laws to be more inclusive, fair and balanced – and, ultimately, effective?

These are some of the questions for me that Randall, by implication, raises in this fascinating report.

They are questions that loom large in both Western Australia and New Zealand. We have recreational fisheries of a comparable scale, and I believe the search for better solutions can only be improved by working together and bringing our joint passion for fishing, our differing perspectives and our unique experiences to bear on the problem.

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PHOTO ABOVE: *Andrew Cribb with a Samson fish*

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