

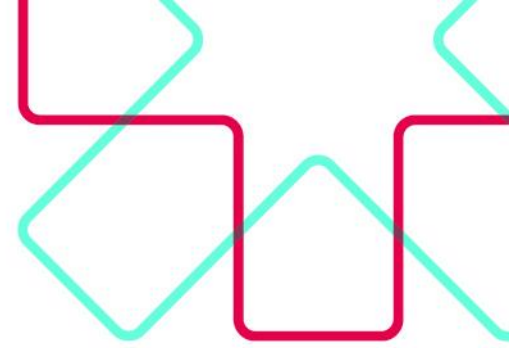
# REVITALISING THE GULF STAGE 2: ECONOMIC IMPACT ASSESSMENT OF THE MARINE PROTECTION PROPOSALS

Final Report

December 2022







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# PREFACE

This report has been prepared for the Department of Conservation by Roshen Kulwant and Nick Carlaw from MartinJenkins (Martin, Jenkins & Associates Limited).

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# EXECUTIVE SUMMARY

## “Revitalising the Gulf” proposes a package of marine protection areas in the Hauraki Gulf, using two new marine protection tools

“Revitalising the Gulf: Government action on the Sea Change Plan” is the Government’s strategy in response to the call for action made by the 2017 Sea Change – Tai Timu Tai Pari Hauraki Gulf Marine Spatial Plan.

It sets out an integrated package of marine conservation and fisheries management actions to improve the health and mauri of the Hauraki Gulf. This includes establishing new high protection areas and seafloor protection areas and extending the area of protection adjacent to two existing marine reserves in 2024.

### Protection area definitions

**High protection areas** will provide high level protection from the seafloor to the water’s surface. These are no take areas except for the provision of customary practices of mana whenua. Each area will be managed according to site-specific biodiversity objectives based on the biological values requiring protection at each site.

**Seafloor protection areas** protect seafloor habitats and communities susceptible to damage from activities such as fishing (particularly dredging, bottom trawling and Danish seining), sand extraction and mining. They will allow activities, such as commercial and recreational fishing, where they are compatible with the management objectives of each protected area.

**Marine reserves** established under the Marine Reserves Act 1971 offer the highest possible level of marine protection. Marine reserves are designated areas which are completely protected from the sea surface to the seafloor and shall be preserved as far as possible in their natural state.

## MartinJenkins was asked to carry out a staged economic assessment of the protected area proposals

MartinJenkins was commissioned by the Department of Conservation (DOC) to carry out an economic impact assessment of the marine protection proposals in the Revitalising the Gulf strategy.

We have done this by:

- investigating the level of commercial and recreational fishing activity that happens inside the proposed protected areas, and comparing this activity to that in the wider Hauraki Gulf and the relevant quota management areas
- analysing the distribution of potential impacts on commercial fishers



- estimating the macroeconomic impacts of the direct potential loss in commercial fishing to the rest of the economy, and
- expanding on our analysis of economic impacts by taking a wider wellbeing perspective using the Treasury's Living Standards Framework.

## **Commercial fishing activity varies across time, place, and operation**

We studied the commercial fishing activity that happened inside the proposed protected areas using the methods being restricted for the October 2019/20 and 2020/21 fishing years and the April 2020/21 and 2021/22 fishing years.<sup>1</sup>

Different fishing methods are restricted depending on whether the area is a high protection area or a seafloor protection area. Inside high protection areas, all commercial and recreational fishing is prohibited. Inside the seafloor protection areas all bottom trawling, Danish seining, and dredging is prohibited.

We compared this activity to the commercial fishing activity for all fish stocks with quota management areas that include the Hauraki Gulf, and relative to each permit holder's activity across all of Aotearoa New Zealand.

This gave us some key insights:

- Commercial fishing activity varies across locations and fishing years. Some permit holders fished in certain proposed protected areas using the methods being restricted in one fishing year and may have fished less, more, or not at all in the following or previous year.
- Around 12%–14% of the total number of permit holders who fished in quota management areas that include some or all the Hauraki Gulf, also fished in the proposed protected areas using the methods being restricted.
- The commercial fishing activity within the proposed protected areas using the methods being restricted represents approximately 1%– 3% of the total greenweight caught across all quota management areas that include the Hauraki Gulf.
- More commercial fishing activity using the methods being restricted happened inside certain proposed protected areas than others. Te Hauturu-o-Toi / Little Barrier Island High Protection Area and the Aldermen Islands / Te Ruamāhu (south) High Protection Area made up just under three-quarters of greenweight caught from the proposed protected areas using the methods being restricted.
- For most permit holders who fished inside the proposed protected areas using the methods being restricted, this activity contributed less than 10% of their total catch. This ranges from 0.05% to 53.8% of their individual total fishing revenue across Aotearoa New Zealand's exclusive economic zone.

<sup>1</sup> There are two main yearly management periods for New Zealand fisheries, April–March and October–September. Some fish stocks are managed using the April fishing year, while others are managed using the October fishing year.



- Fish stocks have different port prices and can make up smaller amounts of permit holders' total greenweight catch, but a higher proportion of their total revenue.

## **The proposals could affect the economy, the recreational fishing sector, and different aspects of the wealth of Aotearoa New Zealand**

### **The ability of permit holders to replace their effort or transfer it to other areas will vary. If they can't, this could have wider economic impacts**

Several factors influence a permit holder's ability to transfer their fishing effort to other areas. These include personal and financial circumstances, other government policy interventions, and ongoing fisheries management decisions.

If permit holders cannot transfer or replace this activity, the total loss of commercial fishing activity inside the proposed protected areas using the methods being restricted may result in flow-on impacts on the wider fishing industry and national economy.

We use this scenario to estimate the total impact on national Gross Domestic Product (GDP) from a direct impact to the gross output of the Fishing and Aquaculture Industry and Seafood Processing Industry.

The overall value of commercial fishing activity inside the proposed protected areas using the methods being restricted is approximately \$3.9 – \$4.6 million for the 2019/20 – 2020/21 October years and \$0.3 – \$0.6 million for the 202/21 – 2021/22 April years.

Assuming that this is all lost and not caught elsewhere, we can expect total impacts on national GDP of around \$4.2 – \$4.9m and \$0.4m – \$0.6m for the October and April fishing years respectively. This impact will be lower if this fishing activity is either transferred to other areas or replaced with non-restricted methods.

### **Recreational fishing activity could also be affected by the proposals**

Recreational fishers and amateur charter vessels also use the Hauraki Gulf. As we did for commercial fishing, we looked at how much recreational fishing happens in the Hauraki Gulf and how this activity is distributed across the proposed protected areas.

Recreational fishing was surveyed across the 2004/05, 2011/12, and 2017/18 October fishing years. These surveys show that the Hauraki Gulf is where more than half of snapper in SNA 1 was caught recreationally, at around 56% to 66% of the total SNA 1 snapper catch across the study periods.

The high protection area proposals are expected to impact the recreational fishing sector the most, as all recreational fishing activity will be prohibited inside them. However, inside the seafloor protection areas, recreational fishing methods that are not harmful to seafloor habitats, such as spear fishing and line fishing, are still allowed.

Around 9.58% of the recreational fishing vessels surveyed in the Hauraki Gulf were in areas that are being proposed as high protection areas. These vessels caught around 8.87% of the snapper (SNA 1) and 9.08% of the kahawai (KAH 1) catch in the Hauraki Gulf.



Although the number of amateur charter vessels that have operated inside the Hauraki Gulf has fluctuated across the 2011/12 to 2020/21 October fishing years, the total number of fishing events has steadily increased from 2,329 to 6,528 over the same period.

However, the vast majority of these events (around 89%) were outside the proposed protected areas. This suggests there is an opportunity to transfer fishing effort to other areas not included in the proposals.

Their ability to do so will ultimately depend on several factors such as the overall impact to individual operations and the financial capability for charter operators to absorb any additional costs that may be associated with shifting their effort into new areas or trialling new methods that aren't being restricted.

### **The proposals involve trade-offs between different aspects of the wealth of Aotearoa New Zealand**

The proposals aim to increase the health of the Hauraki Gulf marine environment by restricting people's use of certain areas and methods for their fishing activity. This trade-off is captured by the Treasury's Living Standards Framework in its third level, the wealth of Aotearoa New Zealand.

We carried out a desktop-based assessment of the potential impacts (both positive and negative) using available literature. We allocated the impacts across the five different aspects of wealth identified by the Living Standards Framework – natural environment, financial and physical capital, social cohesion, human capability, and culture.

The proposals intend to increase the wealth of the natural environment in the proposed protected areas, and in the wider Hauraki Gulf. However, this would mean that commercial and recreational fishers would now have a smaller total area to fish in the Hauraki Gulf, potentially leading to more competition in the remaining fishable areas.

The wider impacts on wellbeing are not clear-cut and are interdependent in various ways. Impacts can be either positive or negative, depending on how people interact with the marine environment and their personal values.

The size and extent of these impacts depend on the ability of the surrounding environment to absorb the displaced activity. Marine protection could also benefit fish stocks, which may increase the productivity of fishing effort and reduce the overall impact of the increased fishing pressure in the surrounding areas.

Marine protected areas can contribute to the physical and mental wellbeing of communities by preserving or restoring the natural environment and allowing the community to experience marine life around them. Some communities may also experience reduced access to locally sourced seafood if the proposed restrictions are put in place.

It is therefore important to monitor and evaluate the success of marine protection to help to mitigate any unintended consequences and make sure the wider benefits are achieved.



# ASSESSING THE ECONOMIC IMPACTS OF THE PROPOSALS IN TWO STAGES

## Our Stage 1 report assessed the current level of commercial fishing activity that could be affected

“Revitalising the Gulf: Government action on the Sea Change Plan” is the Government’s strategy in response to the call for action made by the 2017 Sea Change – Tai Timu Tai Pari Hauraki Gulf Marine Spatial Plan. It sets out an integrated package of marine conservation and fisheries management actions to improve the health and mauri of the Hauraki Gulf.

This includes establishing new high protection areas and seafloor protection areas and extending the area of protection adjacent to two existing marine reserves (see the next page for a list of the proposed protection areas).

MartinJenkins was commissioned to carry out a staged economic assessment of the protected area proposals. In Stage 1 of this assessment, we estimated the current level of commercial fishing activity within the proposed protected areas using the methods being restricted, as a proportion of overall commercial fishing activity.

This report presents Stage 2 of our assessment, covering the wider economic impacts that might result from the new and extended protected areas.

## We compared the commercial fishing activity inside the proposed protected areas to the activity in quota management areas that contain the Hauraki Gulf

Before we could assess the potential economic impacts of the proposals, we first needed to estimate the overall size of fishing activity in those areas and the size of the revenue generated from that activity.

In our Stage 1 report, we:

- identified the proposed protected areas, the methods being restricted, and the reference areas to be studied
- defined “commercial fishing activity” for this study by asking “who”, “what”, “how”, “where”, and “when”
- measured the levels of commercial fishing activity in the proposed protected areas using the methods being restricted and compared that activity with total landings for quota management areas that contain the Hauraki Gulf



- for permit holders who operated in the proposed protected areas using the methods being restricted, we also compared this activity with their total activity, anywhere within New Zealand and for any fish stock.

We defined “commercial fishing activity” in terms of greenweight<sup>2</sup> landings (kgs) and revenue by permit holders and fishing method across two October fishing years (2019/20 and 2020/21) and two April fishing years (2020/21 and 2021/22).

Table 1 and Figure 1 show the areas that are being proposed for protection as part of “Revitalising the Gulf: Government action on the Sea Change Plan.” Our assessment compared the commercial fishing activity in those areas using the methods being restricted to that across all methods within quota management areas that contain the Hauraki Gulf.

Different fishing methods are restricted depending on whether the area is a high protection area or a seafloor protection area. Inside high protection areas, all commercial and recreational fishing is prohibited. Inside the seafloor protection areas all bottom trawling, Danish seining, and dredging is prohibited.

A full description of our analysis and methods can be found in our Stage 1 report.<sup>3</sup>

**Table 1: Proposed new areas for protection in the Hauraki Gulf**

Map reference	Site	Type of protection proposed	Area km <sup>2</sup>
1	Te Hauturu-o-Toi / Little Barrier Island	High Protection Area	195.25
2	Slipper Island / Whakahau	High Protection Area	13.31
3	Motukawao Islands	High Protection Area	29.11
4	Rotoroa Island	High Protection Area	12.35
5	Rangitoto and Motutapu	High Protection Area	10.60
6	Craddock Channel	Seafloor Protection Area	151.99
7a	Cape Colville	High Protection Area	26.61
7b	Cape Colville	Seafloor Protection Area	68.03
8a	Mokohīnau Islands	High Protection Area	118.24
8b	Mokohīnau Islands	Seafloor Protection Area	325.99
9a	Aldermen Islands / Te Ruamāhu (north)	High Protection Area	133.75
9b	Aldermen Islands / Te Ruamāhu (south)	High Protection Area	154.85
10a	Kawau Bay	High Protection Area	40.93

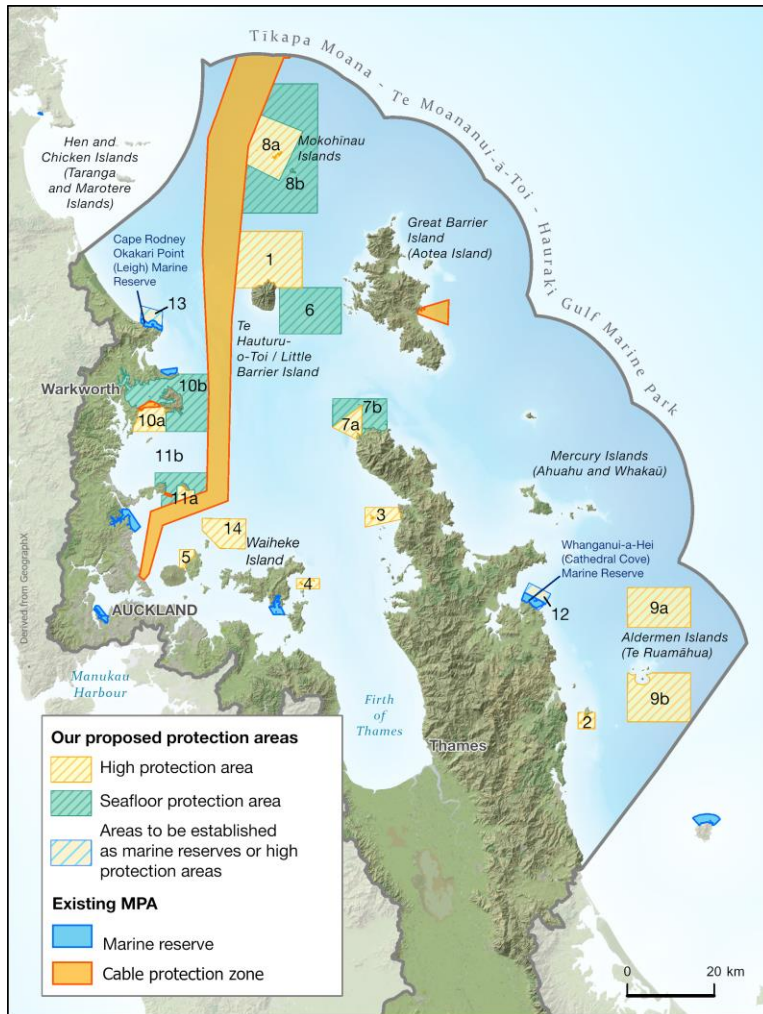
<sup>2</sup> Greenweight is the weight of fish before any processing has happened or before any part of the fish is removed.

<sup>3</sup> <https://www.doc.govt.nz/contentassets/6d2ec8fd81fb4c7bb3ba4ac9bb6d07ca/revitalise-gulf-commercial-fishers-report.pdf>.



Map reference	Site	Type of protection proposed	Area km <sup>2</sup>
10b	Kawau Bay	Seafloor Protection Area	158.38
11a	Tiritiri Matangi	High Protection Area	9.49
11b	Tiritiri Matangi	Seafloor Protection Area	53.68
12	Whanganui A Hei (Cathedral Cove) Marine Reserve	High Protection Area or Marine Reserve	14.61
13	Cape Rodney-Okakari Point (Leigh) Marine Reserve	High Protection Area or Marine Reserve	15.17
14	Ōtata / Noises Islands	High Protection Area	59.51

**Figure 1: Locations of the protected area proposals**



Source: Department of Conservation, 2022.



## In this Stage 2 report, we estimate the potential economic impacts, assess the recreational fishing activity in the Gulf, and consider the wider wellbeing impacts of the Revitalising the Gulf proposals

### We estimated the direct and indirect economic impacts of a total loss of commercial fishing activity from the proposed protected areas using the methods being restricted on output, GDP, and employment

In our analysis, we have assumed that the commercial fishing activity inside the proposed protected areas using the restricted methods no longer occurs and is not transferred elsewhere. In practice, it is likely that at least some of the impacted activity will still occur elsewhere.

Over time, we can expect the commercial fishing sector to adjust to the high and seafloor protection proposals. Impacted fishing activity may be either transferred to other areas or replaced with non-restricted methods. However, this is not included in our analysis as the timeframes for this to happen are unknown.

The loss of expenditure is what's known as "direct impacts" on an industry's output. Direct impacts are felt throughout the rest of the economy as "indirect" and "induced" impacts. If firms produce less, they will demand less from supporting industries (indirect impacts). In turn, this will reduce employment and the amount of income that households have to spend on goods and services (induced impacts). Together, the direct, indirect, and induced impacts are the "total impacts".

We then estimated the potential loss of commercial fishing activity using three measures:

- **Gross output** is the value of production, which is built up through the national accounts as a measure of gross sales or turnover. It is essentially the initial expenditure incurred by the activity.
- **Value added** is the increase in output generated along the production process minus any inputs. When aggregated, this is Gross Domestic Product (GDP).
- **Employment** is the number of full-time employees and working proprietors and is generally expressed in terms of "full-time-equivalent staff" (FTEs).

A description of the methodology is included in Appendix 1.

### We also assess the density of recreational fishing across the wider Hauraki Gulf and inside the proposed protected areas

The Hauraki Gulf is an important area for recreational fishing activity. Therefore, how much recreational fishing happens inside the proposed protected areas, relative to the wider Hauraki Gulf, is a significant consideration for the Revitalising the Gulf proposals.

The Ministry for Primary Industries (MPI) provided us with spatial information on estimated recreational fishing activity, including aerial survey data on stationary vessel density for line and rod fishing and amateur charter vessel reports across the Hauraki Gulf.





The locations of the proposed protected areas have been overlaid with these datasets to indicate where, and how much, recreational fishing activity happens.

To do this, we looked at:

- how much snapper in SNA 1 and kahawai in KAH 1 is taken inside the Hauraki Gulf, compared to elsewhere
- the surveyed vessel numbers inside the proposed protected areas compared to the Hauraki Gulf
- the number of fishing events by amateur charter vessels inside the proposed protected areas as a proportion of those events in the whole Hauraki Gulf, and
- the fish species most caught by amateur charter vessel activity across the proposed protected areas.

## **We used the Treasury’s Living Standards Framework to assess the wider impacts of the proposals on the wealth of Aotearoa New Zealand**

Our assessment of the wider impacts is aligned with the New Zealand Treasury’s Living Standards Framework.<sup>4</sup> The 2021 version of this Framework is shown in Figure 2.

The Living Standards Framework is split into three levels, with the first measuring individual and collective wellbeing, the second measuring our institutions and governance, and the third measuring the wealth of Aotearoa New Zealand. The level that should be used depends on the topic being analysed and the necessary considerations.

We focused our analysis on the wealth of Aotearoa. This level of the Framework captures the overall wealth of the country through five different aspects – the natural environment, human capability, social cohesion, financial and physical capital, and culture. Culture is typically considered to encompass the other four aspects of wealth, but we have included it as a fifth aspect to more easily demonstrate the potential impacts on this part within the framework.

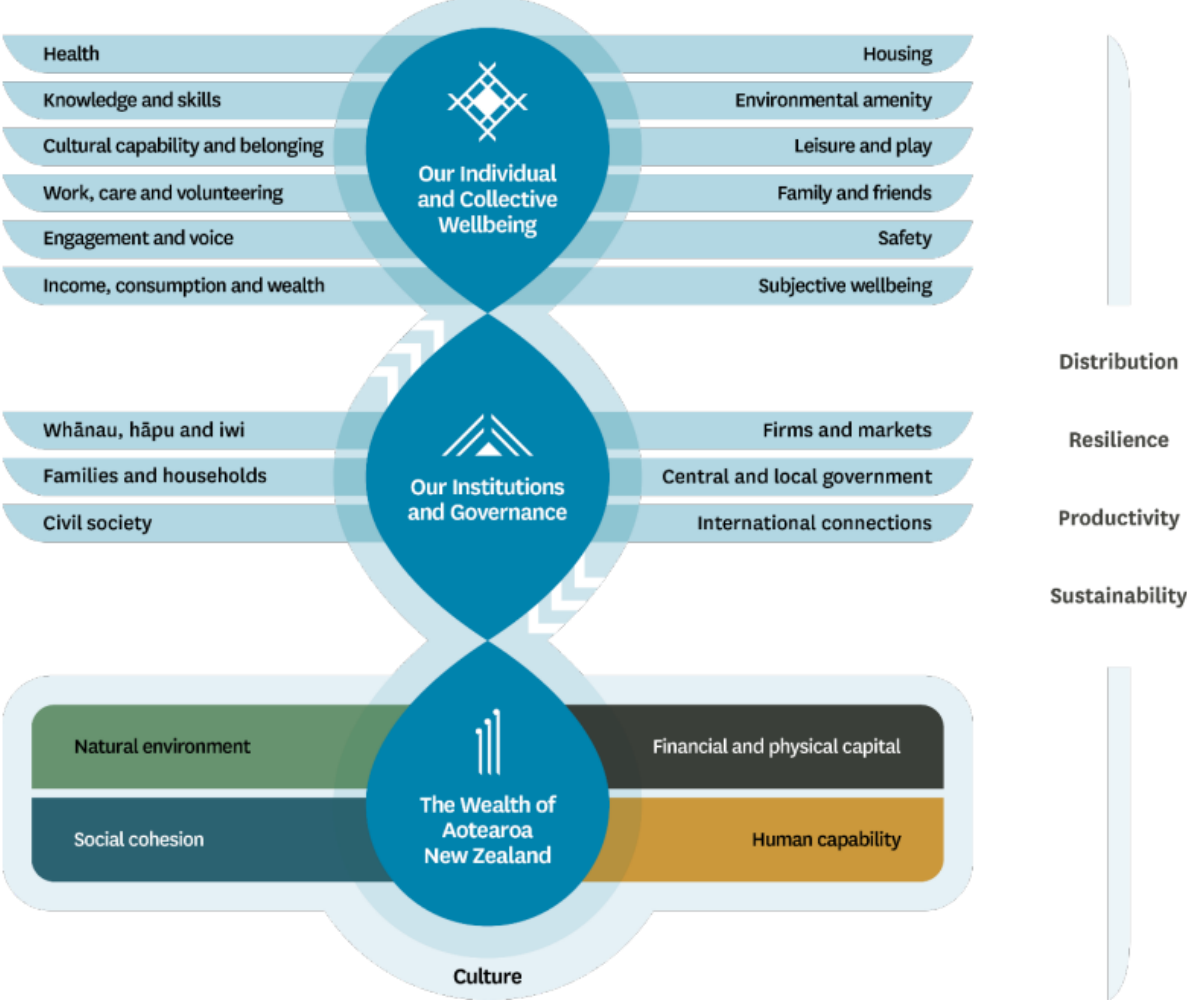
The proposals in the “Revitalising the Gulf” strategy focus mainly on rebuilding the natural environment related to the proposed areas, and our assessment so far has focused on measuring the financial and physical capital that could be affected. From here, we expand our assessment to also include social cohesion and human capability.

In our assessment, we do not quantify or monetise the wider wellbeing impacts. We carried out a desktop assessment using the available literature and present a description of the potential impacts on wellbeing, the aspect of wealth that those impacts relate to, and the indicative nature of the impact. However, the different aspects of wealth should not be thought of as separate – for example, economic outcomes also have important social impacts.

<sup>4</sup> <https://www.treasury.govt.nz/information-and-services/nz-economy/higher-living-standards/our-living-standards-framework>



**Figure 2: The Treasury’s 2021 Living Standards Framework**



Source: The New Zealand Treasury



# ESTIMATING THE POTENTIAL ECONOMIC IMPACTS OF THE MARINE PROTECTION PROPOSALS

## We compared the commercial fishing activity in the proposed protected areas to activity for Hauraki Gulf fish stocks

In this section, we use the results from the Stage 1 report to estimate the potential economic impacts on the wider economy if all the fishing activity inside the proposed protected areas using the restricted methods were to be lost.

As noted above, this analysis assumes that the impacted commercial fishing activity is not transferred to other areas or that the quantity of fish is not caught using allowed methods.

In our Stage 1 report, we assessed the level of commercial fishing activity and compared this to the overall commercial fishing activity across all fish stocks with quota management areas that contain the Hauraki Gulf.

MPI provided us with data for the 2019/20 – 2020/21 October and 2020/21 – 2021/22 April fishing years. The electronic reporting and global positioning reporting requirements for commercial fishers was rolled out in stages across all remaining commercial fisheries during 2019. Therefore, the most recent fishing years represent “best available” data for the study.

Table 2 below shows the level of commercial fishing activity in the proposed protected areas in relation to activity in all quota management areas that encompass the Hauraki Gulf.

The greenweight commercial fishing activity inside the proposed protected areas using the methods being restricted decreased between the two October years, but the generated revenue increased. This is because of a shift from lower-value fish stocks such as blue mackerel to those with higher values such as snapper.

The overall commercial fishing activity across all Hauraki Gulf fish stocks increased over the two years. This indicates a disproportionate increase in fishing activity outside the areas proposed for protection.

Between the two April fishing years, greenweight commercial fishing activity increased both for Hauraki Gulf stocks and for the proposed protected areas. However, a decrease in the port price for crayfish in CRA 2 resulted in a decrease in the overall port price revenue for the entire quota management area.



**Table 2: Commercial fishing activity in proposed protected areas vs Hauraki Gulf fish stocks**

October fishing years	Values	2019-2020	2020-2021
<b>Proposed protected areas</b>	Greenweight (tonnes)	906.07	530.23
	Port price revenue (\$m)	1.15	1.37
	Market price revenue (\$m)	3.91	4.59
<b>All Hauraki Gulf fish stocks</b>	Greenweight (tonnes)	32,716.85	37,979.49
	Port price revenue (\$m)	59.02	66.31
	Market price revenue (\$m)	165.12	183.34
April fishing years	Values	2020-2021	2021-2022
<b>Proposed protected areas</b>	Greenweight (tonnes)	2.96	4.47
	Port price revenue (\$m)	0.23	0.30
	Market price revenue (\$m)	0.34	0.59
<b>All Hauraki Gulf fish stocks</b>	Greenweight (tonnes)	124.00	128.56
	Port price revenue (\$m)	8.83	7.76
	Market price revenue (\$m)	14.08	16.90

**To estimate the potential economic impacts, we assume a complete loss in commercial fishing activity due to the proposals**

We cannot at this point know exactly how much of the commercial fishing catch would be lost because of the proposals. There are many factors that may influence a commercial fisher’s willingness or ability to continue fishing using methods that aren’t being restricted or move their effort to other areas. These include personal and financial circumstances, other government policy interventions, and ongoing fisheries management decisions.

To estimate how the potential impacts are felt across the economy from a reduction in commercial fishing activity, we take the scenario where all commercial fishing activity inside the proposed protected areas that used the restricted methods is not transferred to other areas or replaced with non-restricted methods.

In practice, at least some of the commercial fishing activity will be replaced by non-restricted fishing methods or displaced to other areas that can be fished. We discuss this later in this report.



## The impacts of a loss in commercial fishing revenue flow on to the national economy

### The fishing and aquaculture industry and the seafood processing industry primarily support the commercial fishing sector and will be directly affected

First, we allocated the reduction in commercial fishing revenue to relevant industries in the national-accounts tables. The fishing and aquaculture industry and the seafood processing industry are likely to experience some of the effects of a loss in commercial fishing activity.

We split the total market price revenue across the two industries to avoid double counting. Licensed fish receivers pay port prices to permit holders for the fish they land and on-sell the fish to their customers. We therefore allocated the amount equal to total port price revenue to the fishing and aquaculture industry and allocated the rest to seafood processing.

Table 3 shows how this revenue has been allocated for each fishing year. We have also included the revenue estimates for Hauraki Gulf fish stocks, to show the relative size of the potential impacts on the wider economic contributions of commercial fishing. These are included as reference points and not assumed to be lost commercial activity in our analysis.

**Table 3: Commercial fishing revenues allocated to the fishing and aquaculture industry and the seafood processing industry**

Expenditure inputs (\$m)	Industry	October fishing years		April fishing years	
		2019-2020	2020-2021	2020-2021	2021-2022
<b>Proposed protected areas</b>	Fishing and aquaculture	1.15	1.37	0.23	0.30
	Seafood processing	2.77	3.22	0.10	0.28
	<b>Total</b>	<b>3.91</b>	<b>4.59</b>	<b>0.34</b>	<b>0.59</b>
<b>All fishstocks that contain the Hauraki Gulf</b>	Fishing and aquaculture	59.02	66.31	8.83	7.76
	Seafood processing	106.10	117.03	5.25	9.13
	<b>Total</b>	<b>165.12</b>	<b>183.34</b>	<b>14.08</b>	<b>16.90</b>

### The direct impacts on these industries flow on to the rest of the economy through indirect and induced impacts and combine to form the total impacts

Our estimates of the direct and total impacts on the economy from the loss of commercial fishing revenue are shown in Table 4 across the two October and April fishing years.



### For the October years

- The fish stocks that contain the Hauraki Gulf contribute a direct gross output of around \$165.1m – \$183.3m which generates around \$176.4 – \$195.9m in total GDP.
- As a result of the proposals, direct gross output of the Fishing and Aquaculture Industry and the Seafood Processing Industry is expected to reduce by around \$3.9m – \$4.6m.
- GDP is estimated to reduce by around \$1.4m – \$1.6m. When flow-on effects to supporting industries and households are considered, GDP reduces by around \$4.2m – \$4.9m in total.

### For the April years

- The fish stocks that contain the Hauraki Gulf contribute a direct gross output of around \$14.1m – \$16.9m. This generates around \$14.7m – \$17.9m in total GDP.
- As a result of the proposals, direct gross output of the Fishing and Aquaculture Industry and the Seafood Processing Industry is expected to reduce by around \$0.3m – \$0.6m.
- GDP is estimated to reduce by around \$0.1m – \$0.2m and \$0.4m – \$0.6m when accounting for flow-on effects.

The reason for the differences between the October and April years is that different fish stocks are managed in each year. This is described further in our Stage 1 report.

**Table 4: Economic estimates of commercial fishing activity within the proposed protected areas and for all fish stocks that contain the Hauraki Gulf**

Proposed protected areas	October fishing years		April fishing years	
	Direct impact	Total impact	Direct impact	Total impact
Output \$m	3.9 – 4.6	9.9 – 11.6	0.3 – 0.6	0.8 – 1.5
GDP \$m	1.4 – 1.6	4.2 – 4.9	0.1 – 0.2	0.4 – 0.6
Employment (FTEs)	10 – 12	31 – 37	1 – 2	3 – 5

All fishstocks that contain the Hauraki Gulf	October fishing years		April fishing years	
	Direct impact	Total impact	Direct impact	Total impact
Output \$m	165.1 – 183.3	416.1 – 461.8	14.1 – 16.9	34.5 – 42.1
GDP \$m	58.2 – 64.6	176.4 – 195.9	5.0 – 6.0	14.7 – 17.9
Employment (FTEs)	441 – 490	1,307 – 1,451	37 – 45	109 – 132

Note: Total impact includes direct, indirect, and induced impacts.



## The ability for commercial operators to lessen the impacts on them depends on several factors

Commercial fishing in the Hauraki Gulf will be restricted to varying degrees inside the proposed high protection areas and seafloor protection areas. Our analysis assumes that any impacted catch will not be caught in other areas or by using non-restricted methods in the proposed areas, at least in the short term.

Over time, we expect resources that were previously used to fish in the protected areas will be redeployed to fish in other areas. For example, ACE can be used by other permit holders across the entire quota management area, and crew who no longer fish in protected areas may be employed on other fishing vessels.

The extent to which permit holders will transfer or replace their fishing activity is not known at this time and will depend on several factors.<sup>5</sup>

- **How much of each permit holder's total catch currently comes from inside the proposed protected areas.** Permit holders who rely on the proposed protected areas for a smaller amount of their overall fishing activity may find it easier to transfer their effort elsewhere (the next section summarises data about the level of fishing activity in protected areas).
- **Extra costs associated with fishing in new areas or adapting to new fishing methods.** Trialling new methods and exploring new fishing areas might require more fuel, labour, and ACE for different species. This reduces the overall profitability of this commercial fishing activity. However, these costs might reduce over time as permit holders figure out what works and what doesn't.
- **Space limitations and fish stocks in unrestricted areas.** The proposals may result in higher concentrations of fishing activity in unrestricted areas. This is because the same number of permit holders now compete in smaller amounts of fishable marine space. Increased concentration could give rise to environmental impacts, depending on the location of fishing activity and the current level of activity.<sup>6</sup>

## The proportion of each fisher's activity that comes from inside the proposed protected areas gives an idea of the size of individual impacts

In our Stage 1 report, we analysed the number of commercial fishers that operated inside the proposed protected areas using the methods being restricted.<sup>7</sup>

<sup>5</sup> Fisheries displacement effects related to closed areas: a literature review of relevant aspects Diana Slijkerman & Jacqueline Tamis IMARES report C170/15.

<sup>6</sup> Duncan Vaughan, Fishing effort displacement and the consequences of implementing Marine Protected Area management – An English perspective, Marine Policy, Volume 84, 2017.

<sup>7</sup> <https://www.doc.govt.nz/contentassets/6d2ec8fd81fb4c7bb3ba4ac9bb6d07ca/revitalise-gulf-commercial-fishers-report.pdf>.



Table 5 and Table 6 expand on this by showing the distribution of permit holders catch according to their total port price revenue. The tables provide some key insights:

- Permit holders of various revenue sizes fish inside the proposed protected areas using the methods being restricted. This activity is not over-represented by “smaller” or by “larger” permit holders.
- Around half of the permit holders identified used the methods being restricted inside the proposed protected areas to generate 5% or less of their total port price revenue. This suggests that most permit holders must either replace or transfer a relatively small, but not insignificant, proportion of their activity using non-restricted methods or to other areas
- Within each revenue band, the amount of revenue generated inside the proposed protected areas using the restricted methods varies across individual permit holders. Any financial impacts on commercial fishing operations therefore depend on individual circumstances.
- On average, permit holders in the higher revenue bands generate a smaller proportion of their total revenue inside the proposed protected areas using the restricted methods compared to other revenue bands. These permit holders may find it relatively easy to transfer their effort to other areas in each quota management area.

**Table 5: Grouped permit holders and average port price revenue by total revenue ranges, October fishing years**

2019-2020 (Oct) Fishing Year		Average port price revenue inside proposed protected areas	Average percentage of total revenue inside proposed protected areas
Total port price revenue	Permit holders		
< 200k	7	7,533	8.8%
200k - 400k	7	18,119	6.5%
400k - 600k	6	14,571	3.2%
600k - 800k	5	36,386	5.8%
800k - 1m	4	22,467	2.3%
1m +	11	55,498	1.8%
<b>Total</b>	<b>40</b>	<b>28,732</b>	<b>4.6%</b>
2020-2021 (Oct) Fishing Year		Average port price revenue inside proposed protected areas	Average percentage of total revenue inside proposed protected areas
Total port price revenue	Permit holders		
< 200k	6	2,285	12.9%
200k - 400k	8	19,337	7.3%
400k - 600k	6	27,688	5.6%
600k - 800k	1	103,977	15.4%
800k - 1m	4	40,826	4.7%
1m +	15	50,934	2.4%
<b>Total</b>	<b>40</b>	<b>34,146</b>	<b>6.0%</b>

Note: average port price revenue is only for the methods being restricted inside the proposed protected areas. This is then compared with the total revenue from all fishing methods for each permit holder across Aotearoa New Zealand's exclusive economic zone.





**Table 6: Grouped permit holders and average port price revenue by total revenue ranges, April fishing years**

2020-2021 (Apr) Fishing Year		Average port price revenue inside proposed protected areas	Average percentage of total revenue inside proposed protected areas
Total port price revenue	Permit holders		
< 200k	-	-	-
200k - 400k	2	73,376	20.9%
400k - 600k	1	72,401	17.9%
600k - 800k	-	-	-
800k - 1m	1	14,525	1.8%
1m +	-	-	-
<b>Total</b>	<b>4</b>	<b>58,419</b>	<b>15.4%</b>
2021-2022 (Apr) Fishing Year		Average port price revenue inside proposed protected areas	Average percentage of total revenue inside proposed protected areas
Total port price revenue	Permit holders		
< 200k	-	-	-
200k - 400k	4	72,008	23.9%
400k - 600k	1	16,694	3.0%
600k - 800k	-	-	-
800k - 1m	-	-	-
1m +	-	-	-
<b>Total</b>	<b>5</b>	<b>60,945</b>	<b>19.7%</b>

Note: average port price revenue is only for the methods being restricted inside the proposed protected areas. This is then compared with the total revenue from all fishing methods for each permit holder across Aotearoa New Zealand's exclusive economic zone.



# ASSESSING RECREATIONAL FISHING IN THE HAURAKI GULF

This section reports on the amount of recreational fishing in the Hauraki Gulf, and how this activity is distributed across the marine protection area proposals in the “Revitalising the Gulf” strategy.

We first look at the overall recreational fishing activity (stationary boat-based rod and line) in the Hauraki Gulf using harvest estimates based on the most recent research for snapper in SNA 1 and kahawai in KAH 1.

This research is carried out periodically, on behalf of Fisheries New Zealand by the National Institute of Water and Atmospheric Research (NIWA), with estimates generated for the 2004/05, 2011/12, and 2017/18 October fishing years. Information for other fish stocks was either unavailable or not provided to us.

We then look at the spatial density of fishing activity across the Hauraki Gulf for amateur charter vessels, as this sector could be financially impacted by the marine protection proposals through restricting access to established fishing grounds.

We do this by analysing the number of individual fishing events inside the proposed protected areas, and the wider Hauraki Gulf, across the previous ten October fishing years and for the top ten most caught fish species.

## The Hauraki Gulf is important to recreational fishers

### Aerial surveys show a snapshot of the proportion of recreational fishing activity that happens in the Hauraki Gulf and other areas

Aerial surveys performed in the 2004/05, 2011/12, and 2017/18 fishing years are used to inform estimates of recreational catch for snapper in SNA 1, kahawai in KAH 1, gurnard in GUR 1, trevally in TRE 1, and east coast tarakihi in TAR 1.<sup>8</sup>

For the individual fish stocks, only snapper (SNA 1) and kahawai (KAH 1) have geospatial locations provided for the proposed protected areas in the 2017/18 fishing year alongside the total estimates across the three fishing years.

Table 7 shows the distribution of the total estimated recreational catch for snapper and kahawai across East Northland, the Hauraki Gulf, and the Bay of Plenty. These estimates suggest that the Hauraki Gulf is where most snapper in SNA 1 is caught recreationally, at around 56% to 66% of total SNA 1 catch across the survey years.

<sup>8</sup> Hartill, B.; Bian, R.; Rush, N.; Armiger, H. (2019). Aerial-access recreational harvest estimates for snapper, kahawai, red gurnard, tarakihi and trevally in FMA 1 in 2017–18. New Zealand Fisheries Assessment Report 2019/23.



As shown in the table below, recreational catch of kahawai in KAH 1 is more spread out than the SNA 1 recreational catch. For two of the three survey years, the Hauraki Gulf provides the biggest KAH 1 catch out of the three different areas.

This shows a concentration of recreational fishing effort in the Hauraki Gulf. Therefore, access to the Hauraki Gulf for recreational fishing is important to local communities.

Recreational fishers are likely to be less able to transfer their effort to areas outside the Hauraki Gulf where there is a higher concentration of fishing effort, such as for snapper. It is also unknown if other areas like East Northland or Bay of Plenty can sustain the increase in fishing effort in the long term.

**Table 7: Recreational harvest estimates for snapper in SNA 1 and kahawai in KAH 1, tonnes**

Species	Location	2004/05	2011/12	2017/18
Snapper	East Northland	557	718	720
	Hauraki Gulf	1,345	2,490	2,068
	Bay of Plenty	517	546	680
	<b>SNA 1 Total</b>	<b>2,419</b>	<b>3,754</b>	<b>3,467</b>
Kahawai	East Northland	129	191	312
	Hauraki Gulf	98	483	517
	Bay of Plenty	303	268	390
	<b>KAH 1 Total</b>	<b>530</b>	<b>942</b>	<b>1,219</b>

### **This information was used to estimate the spread of Hauraki Gulf recreational fishing activity across the proposed protected areas**

Table 8 takes a closer look at the distribution of recreational fishing activity within the proposed protected areas. It shows the proportion of surveyed fishing vessels, kahawai catch, and snapper catch inside the proposed protected areas compared to the Hauraki Gulf.

It is important to note that recreational fishing is only proposed to be restricted in high protection areas. Recreational fishing without harmful bottom contact fishing methods can still happen in seafloor protection areas.<sup>9</sup>

Around 9.58% of the recreational fishing vessels surveyed in the Hauraki Gulf were in areas that are being proposed as high protection areas. This equals to around 8.87% of the snapper (SNA 1) and 9.08% of the kahawai (KAH 1) catch in the Hauraki Gulf.

To put this into perspective, high protection areas make up around 5.9% of the total area of the Hauraki Gulf and seafloor protection areas make up 5.4%.

<sup>9</sup> A full list of the activities that the proposals restrict and allow can be found in DOC's Revitalising the Gulf information document. <https://www.doc.govt.nz/contentassets/6d2ec8fd81fb4c7bb3ba4ac9bb6d07ca/revitalising-the-gulf-information-document.pdf>



Recreational fishers who currently fish in the high protected areas can transfer their fishing activity to either the seafloor protected areas or other areas inside the Hauraki Gulf that aren't being proposed for protection.

However, commercial and recreational fishers will have less overall space to fish in the Hauraki Gulf and this could lead to increased competition. The total size of this impact on the commercial and recreational fishing sectors is not currently known.

**Table 8: Percentage of estimated Hauraki Gulf recreational fishing activity that is inside the proposed protected areas – 2017/18 fishing year**

Proposed protected area	Stationary boats actively fishing (%)	Kahawai catch (%)	Snapper catch (%)
1 Te Hauturu-o-Toi / Little Barrier Island High Protection Area	0.38%	0.16%	0.38%
2 Slipper Island / Whakahau High Protection Area	0.44%	0.35%	0.20%
3 Motukawao Islands High Protection Area	0.40%	0.33%	0.47%
4 Rotoroa Island High Protection Area	1.12%	1.22%	1.03%
5 Rangitoto and Motutapu High Protection Area	0.30%	0.25%	0.24%
6 Craddock Channel Seafloor Protection Area	0.19%	0.19%	0.20%
7a Cape Colville High Protection Area	0.31%	0.42%	0.56%
7b Cape Colville Seafloor Protection Area	0.49%	0.63%	0.95%
8a Mokohīnau Islands High Protection Area	0.49%	0.49%	0.13%
8b Mokohīnau Islands Seafloor Protection Area	0.38%	0.41%	0.11%
9a Aldermen Islands / Te Ruamāhua (north) High Protection Area	0.00%	0.00%	0.00%
9b Aldermen Islands / Te Ruamāhua (south) High Protection Area	0.11%	0.04%	0.02%
10a Kawau Bay High Protection Area	1.85%	1.41%	1.52%
10b Kawau Bay Seafloor Protection Area	4.62%	3.23%	3.88%
11a Tiritiri Matangi High Protection Area	0.61%	0.54%	0.53%
11b Tiritiri Matangi Seafloor Protection Area	3.27%	2.77%	2.78%
12 Whanganui A Hei (Cathedral Cove) Marine Reserve	0.34%	0.40%	0.15%
13 Cape Rodney-Okakari Point (Leigh) Marine Reserve High Protection Area or Marine Reserve	0.07%	0.05%	0.06%
14 Ōtata / Noises Islands High Protection Area	3.16%	3.42%	3.58%
<b>Total seafloor protection areas</b>	<b>8.95%</b>	<b>7.23%</b>	<b>7.92%</b>
<b>Total high protection areas</b>	<b>9.58%</b>	<b>9.08%</b>	<b>8.87%</b>

Source: These tables and maps use data sourced from New Zealand Fisheries Assessment Report 2019/23 (FAR-2019-23-Aerial-access-survey-recreational-FMA1-3338), produced on behalf of Fisheries New Zealand by the National Institute of Water and Atmospheric Research (NIWA).

Note: Recreational fishing activity is only being restricted in high protection areas and can still happen in the seafloor protection areas without harmful bottom contact fishing methods.



This distribution of recreational fishing effort is shown spatially in the following maps. Here we can see how the recreational fishing effort is distributed across the Hauraki Gulf and the proposed protected areas.

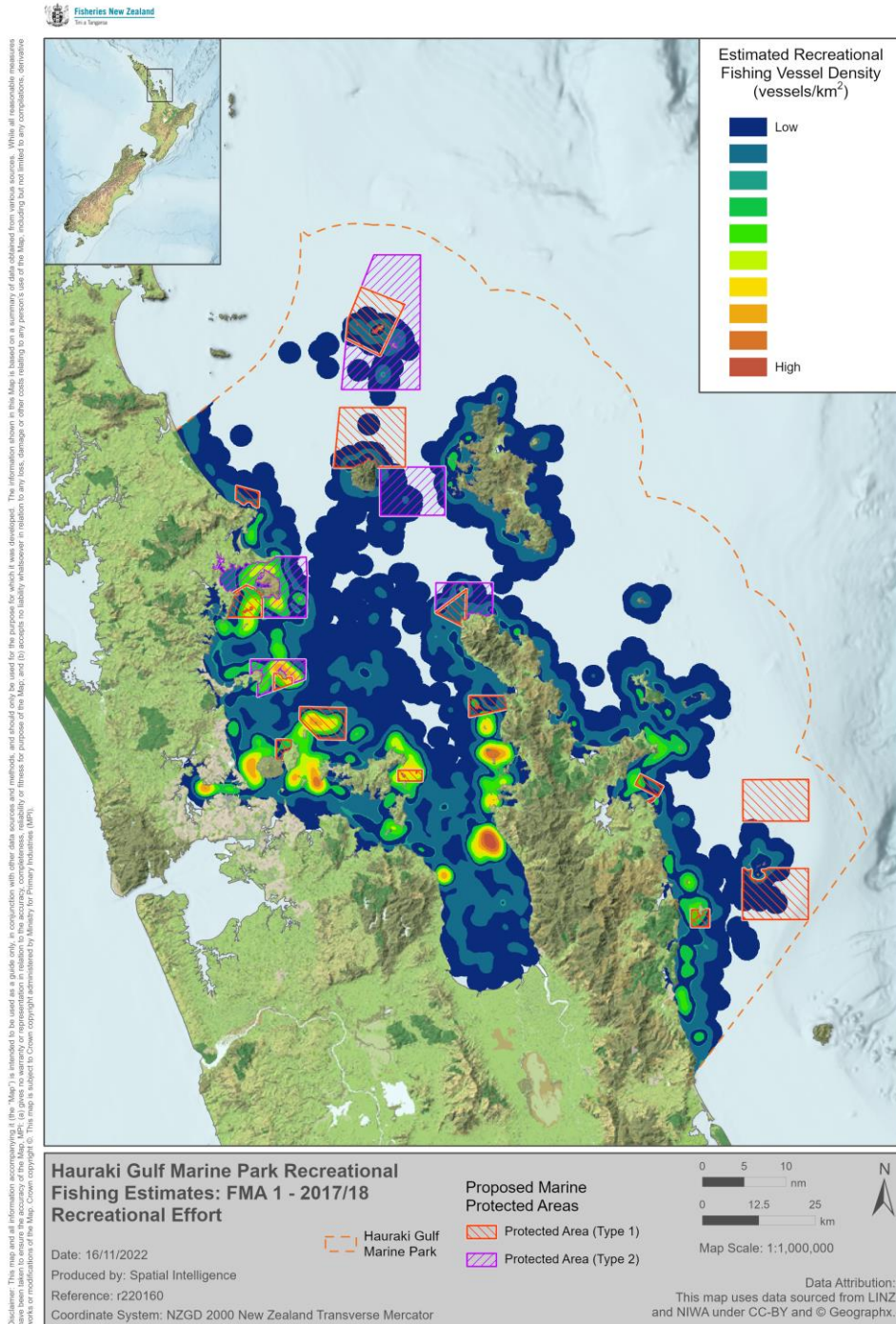
**The following maps are based on extrapolated data and are indicative only**

The maps and associated information were produced by MPI's Spatial Intelligence Team. All values of vessel and fishing effort density presented in these maps are indicative only, as all values represent estimates based on modelled outputs.

The maps present the estimated relative density of the analysed datasets based on extrapolated values from recorded fishing effort. The data is indicative only of wider fishing activity and provides a visual representation for where vessel activity (or estimated catch) is lower or higher (blue and red shades, respectively). These maps therefore do not present true records of total fishing effort. Areas with little to no recorded fishing activity are also excluded from the analysis.



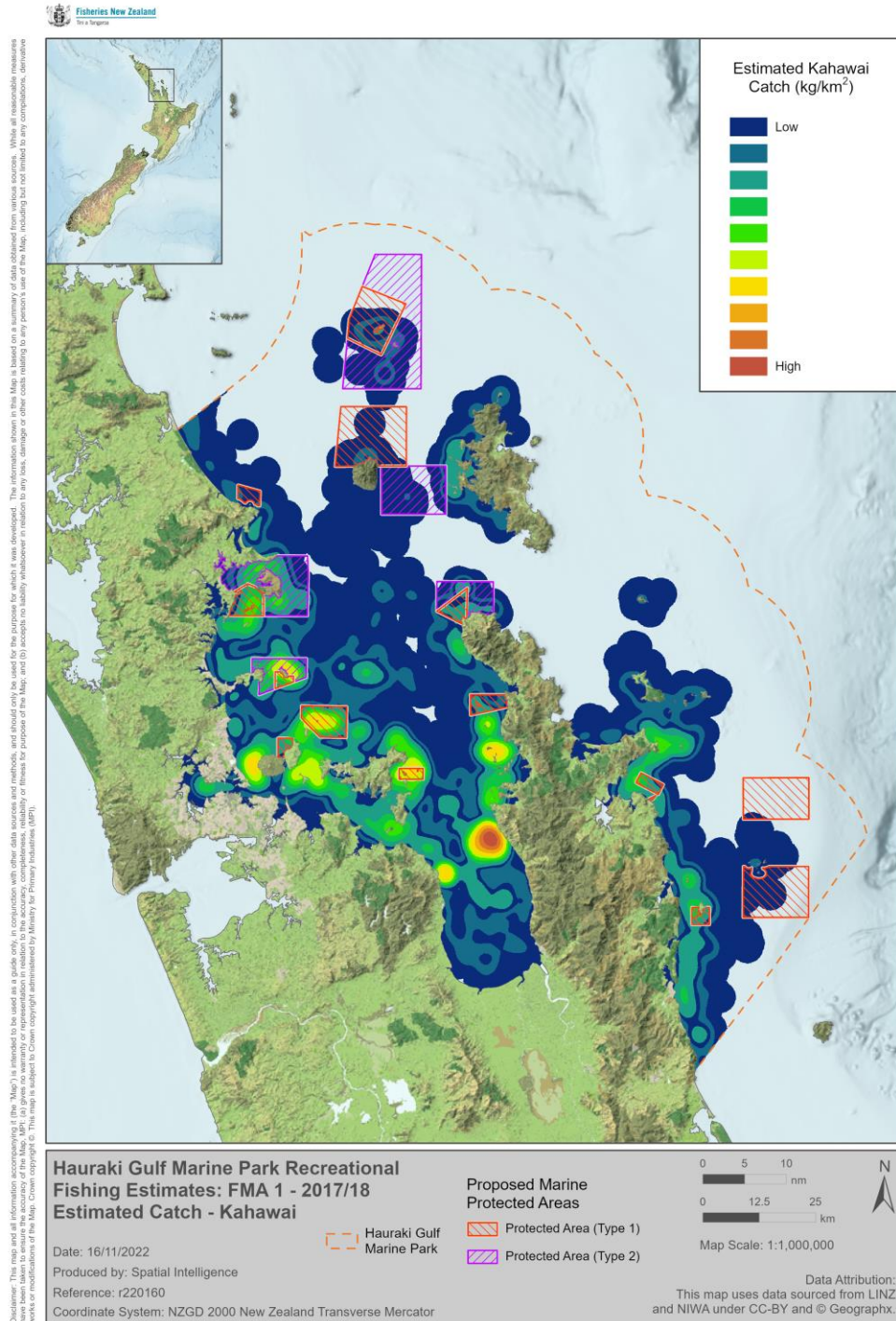
**Figure 3: Estimated recreational fishing density (vessels/km<sup>2</sup>) in the Hauraki Gulf – 2017/18 October fishing year**



Source: Ministry for Primary Industries



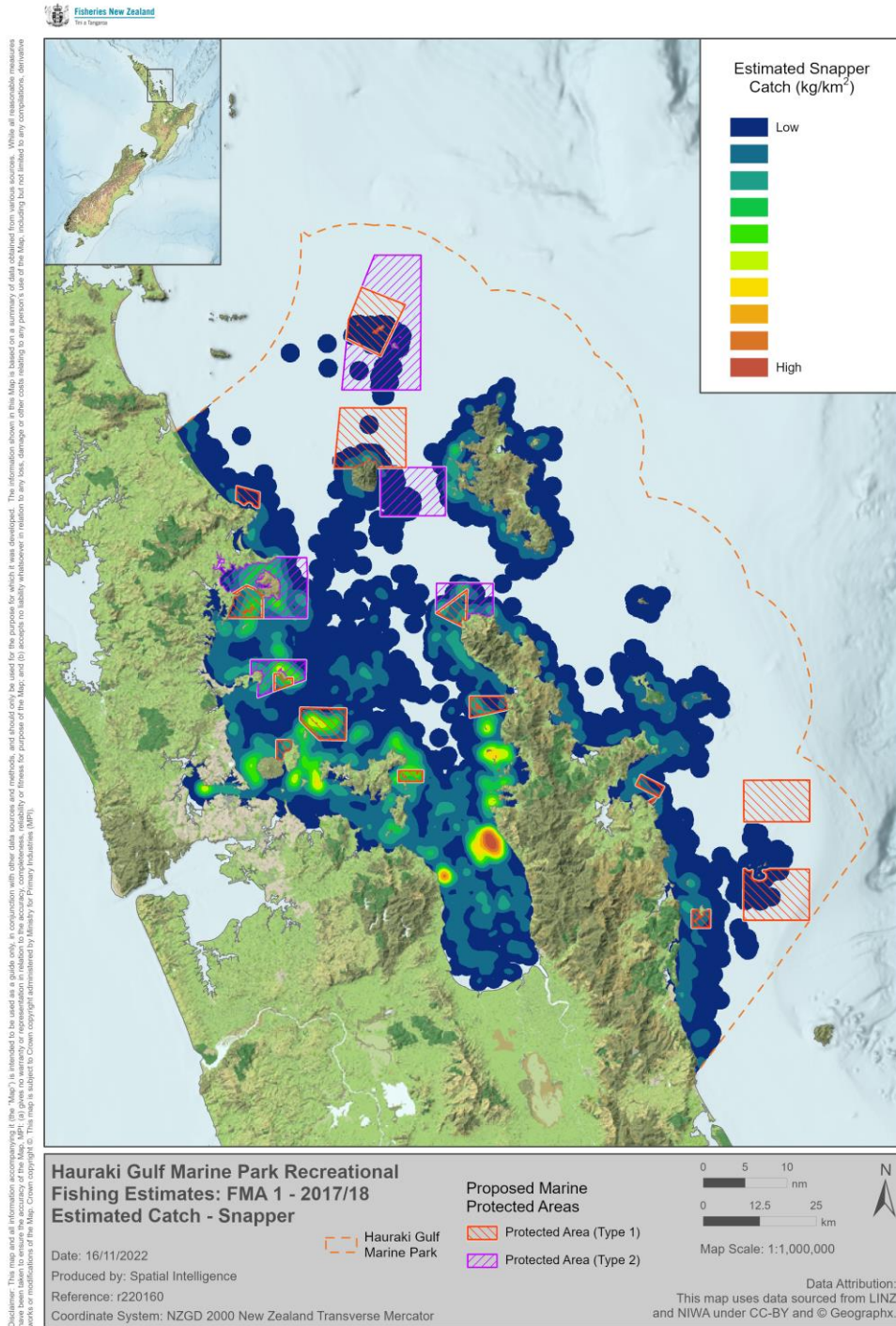
**Figure 4: Estimated recreational kahawai catch (kg/km<sup>2</sup>) in the Hauraki Gulf – 2017/18 October fishing year**



Source: Ministry for Primary Industries



**Figure 5: Estimated recreational snapper catch (kg/km<sup>2</sup>) in the Hauraki Gulf – 2017/18 October fishing year**



Source: Ministry for Primary Industries





## Amateur charter vessels rely on recreational fishing in the Hauraki Gulf for their business

The potential impacts of the marine protection proposals on the recreational fishing sector extend to amateur charter vessels. These are businesses where customers pay for guide services and the use of a boat to fish recreationally.<sup>10</sup> These impacts will differ between the high protection areas and seafloor protection areas, based on the fishing methods and activities being restricted.

Much like commercial fishers, amateur charter vessels rely on established fishing grounds for the success of their business. The impact of the marine protection proposals on individual operators will depend on several factors, including:

- their knowledge of and ability to transfer their fishing effort to other areas not being protected
- how much of their current activity is inside the proposed protected areas
- whether and how much competition for fishing space increases in the remaining unprotected parts of the Hauraki Gulf.<sup>11, 12</sup>

We have not assessed the financial impacts on individual amateur charter vessel businesses due to the lack of available information provided on sales income and business expenses.

### Reports from amateur charter vessels provide yearly estimates of recreational fishing in the Hauraki Gulf

Amateur charter vessels must register with the Ministry for Primary Industries to operate. They must also report on their fishing activity, providing information on specific fish species, the number of fishers, how much fish was caught and retained, and the locations where the vessel has been fishing.

MPI has used these reports to estimate the number of amateur charter vessels that have had at least one fishing event inside the proposed protected areas and the wider Hauraki Gulf, as shown in Table 9 below.

The areas have been aggregated to show a general area, as the quality of the spatial information made it difficult to determine the exact position of a vessel between adjacent seafloor protection areas and the high protection areas.

Therefore, it is important to note that the information in Table 9 only represents the amount of recreational fishing activity that happens in the Hauraki Gulf compared to the aggregated proposed protected areas.

<sup>10</sup> This activity is regulated by the Fisheries (Amateur Fishing) Regulations 2013.

<sup>11</sup> Fisheries displacement effects related to closed areas: a literature review of relevant aspects Diana Slijkerman & Jacqueline Tamis IMARES report C170/15.

<sup>12</sup> Duncan Vaughan, "Fishing effort displacement and the consequences of implementing Marine Protected Area management – An English perspective", *Marine policy*, Volume 84, 2017.



The information does not indicate or quantify the impacts on amateur charter vessel operators or recreational fishers who use their services. This is because recreational fishing without harmful bottom contact fishing methods can still happen in the seafloor protection area proposals. All recreational fishing will be restricted in the high protection areas.

Overall, 78 amateur charter vessels fished in the Hauraki Gulf in the 2020/21 October fishing year. These vessels fished across multiple areas and some of these vessels fished in multiple of the proposed protected areas. Therefore, some of these vessels are counted across more than one area.

Kawau Bay (high and seafloor protected areas), The Noises (high protection area), and Tiritiri (high and seafloor protection areas) had the highest numbers of individual vessels operate in their areas, with 28, 27, and 21 vessels respectively in the 2020/21 October fishing year.

The total number of amateur charter vessels that have operated in the Hauraki Gulf fluctuated between the 2011/12 and 2020/21 October fishing years. This peaked at 103 vessels in 2015/16 and dropped back down to 81 vessels in 2020/21. This is probably due to COVID-19 restrictions, but we have not determined if this is the true cause or if this is because of other reasons.



**Table 9: Number of distinct fishing vessels by proposed protected area, 2011/12 to 2020/21 October fishing year**

Aggregated proposed protected area	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Aldermen Islands / Te Ruamāhua (north) High Protection Area	2	4	4	5	5	6	8	7	5	6
Aldermen Islands / Te Ruamāhua (south) High Protection Area	3	4	4	1	1	3	2	1	4	3
Cape Colville High Protection Area and Seafloor Protection Area	8	6	3	9	8	10	10	8	8	13
Cape Rodney-Okakari Point (Leigh) Marine Reserve High Protection Area or Marine Reserve	2	1	2	1	1	1	1	1	-	-
Craddock Channel Seafloor Protection Area	6	11	14	8	8	8	11	11	10	12
Kawau Bay High Protection Area and Seafloor Protection Area	12	15	16	21	23	21	17	22	21	28
Mokohīnau Islands High Protection Area and Seafloor Protection Area	7	9	15	13	11	10	8	8	11	12
Motukawao Islands High Protection Area	2	2	1	1	3	5	5	3	5	3
Ōtata / Noises Islands High Protection Area	14	12	18	21	26	14	14	16	18	27
Rangitoto and Motutapu High Protection Area	4	4	3	2	3	5	4	2	2	3
Rotoroa Island High Protection Area	3	2	2	4	4	3	4	2	4	4
Slipper Island / Whakahau High Protection Area	5	3	2	1	3	4	3	2	2	3
Te Hauturu-o-Toi / Little Barrier Island High Protection Area	7	7	5	6	5	4	4	6	9	9
Tiritiri Matangi High Protection Area and Seafloor Protection Area	10	19	18	20	18	18	16	17	22	21
Whanganui A Hei (Cathedral Cove) Marine Reserve	-	4	4	3	3	4	5	5	6	4
All other areas	74	89	95	95	93	94	93	81	77	78
<b>Total Hauraki Gulf</b>	<b>78</b>	<b>93</b>	<b>101</b>	<b>98</b>	<b>103</b>	<b>98</b>	<b>100</b>	<b>85</b>	<b>80</b>	<b>81</b>



## **Fishing events by amateur charter vessels tell us where fishing activity has happened**

Another way that fishing activity by amateur charter vessels is recorded is through “fishing events”. In general, fishing activity is recorded as a separate fishing event each time there is a change in the target species, the fishing method, the location, or the number of people actively fishing.

Figure 6 shows the number of fishing events that have been recorded within the proposed protected areas and all other areas within the Hauraki Gulf. The total annual number of fishing events recorded by amateur charter vessels has been increasing over the period from the 2011/12 to the 2020/21 October fishing years.

This trend has largely followed that of the number of vessels, except for the most recent fishing year where the number of fishing events has increased by around 160% from the previous year.

A large majority of fishing events (around 89%) by amateur charter vessels occur outside the combined high and seafloor protection areas. As mentioned earlier, recreational fishing activity can still occur in the proposed seafloor protection areas without harmful bottom contact fishing methods.

Across all Hauraki Gulf locations, there were minimal reported events (fewer than 1% of events) using the bottom long line method and dredging method. The exact methods that will be restricted may differ across the seafloor protection areas when they are established.

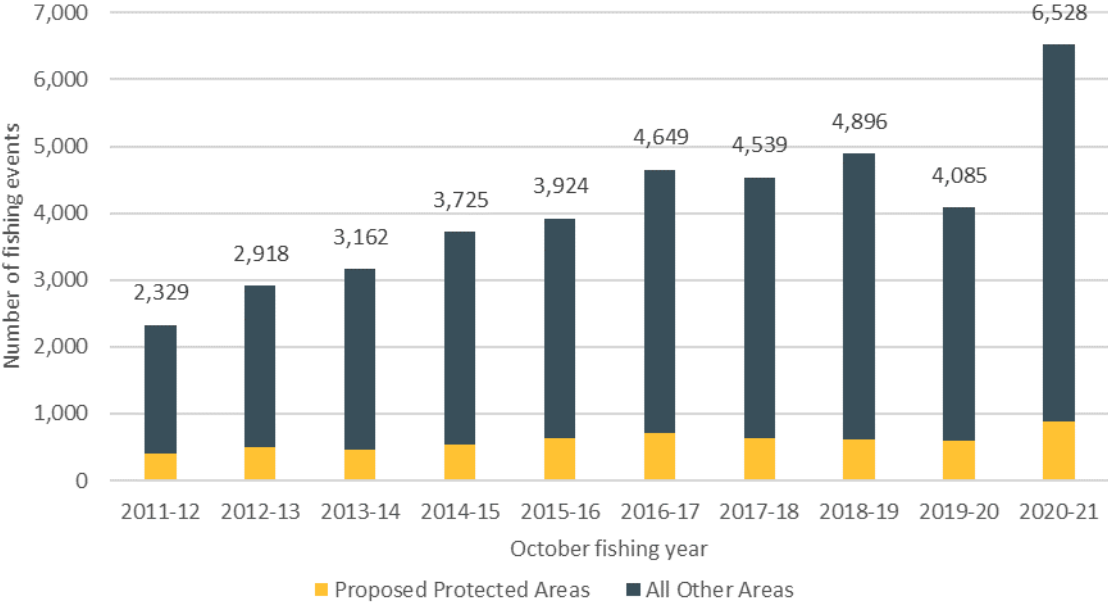
The vast majority, around 98%, of amateur charter vessel events report using the free diving and hand or rod and reel lining fishing methods. These methods are only being restricted in the high protection area proposals.

DOC have noted that scallop dredging across all recreational fishers is likely to be impacted by the protected area proposals, but we do not have the information to quantify the scale or extent of this impact.

Most of the increase in recreational fishing activity has occurred in other Hauraki Gulf areas. It is not known if this activity is new or supplementary to baseline levels of fishing activity, but this suggests that recreational use of other areas in the Hauraki Gulf to fish is increasingly viable.



**Figure 6: Number of individual fishing events in the proposed protected areas and the Hauraki Gulf, 2011/12 to 2020/21 October fishing years**



**Fishing events by amateur charter vessels also tell us which fish species were most often caught**

Across the proposed protected areas, snapper and kingfish are the most-caught fish species by amateur charter vessel fishing event. Table 10 shows the number of events that have recorded catch for each species for the top 10 species.

Over the October fishing years from 2011/12 to 2020/21, the number of fishing events that have caught snapper and kingfish have been relatively the same. However, in the most recent fishing year, the number of fishing events that have reported snapper catch has increased while kingfish has stayed consistent with previous years.

The high protection area proposals will restrict recreational fishers from catching snapper, kingfish, kahawai, and trevally and these proposals will probably have the largest impact. For example, out of 887 fishing events in the 2020/21 October fishing year, 711 events caught snapper. These species are therefore important for amateur charter vessels and their customers.



**Table 10: Top 10 species caught by the number of amateur charter vessels events inside the proposed protected areas, 2011/12 to 2020/21 October fishing years**

Species	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Snapper	162	260	230	282	359	462	343	366	338	711
Kingfish	248	221	236	271	331	358	378	339	332	361
Kahawai	67	97	117	118	219	209	212	172	98	159
Trevally	60	70	71	67	87	110	105	82	61	137
Gurnard	13	32	31	33	41	82	44	60	53	83
Crayfish	10	31	25	26	10	23	13	14	19	32
John dory	32	27	11	18	29	38	23	33	15	31
Blue cod	19	27	13	25	20	23	17	21	12	13
School shark	-	2	1	2	5	4	4	6	2	12
Sea perch	6	4	5	4	-	-	1	2	1	10
<b>Total all species</b>	<b>409</b>	<b>494</b>	<b>466</b>	<b>534</b>	<b>631</b>	<b>703</b>	<b>633</b>	<b>614</b>	<b>603</b>	<b>887</b>



# ASSESSING THE IMPACTS ON WELLBEING USING TREASURY'S LIVING STANDARDS FRAMEWORK

## The Revitalising the Gulf proposals involve adjusting the stocks and flows between different aspects of “wealth” of Aotearoa New Zealand

We have used the Treasury's Living Standards framework to identify the wider wellbeing impacts that could result from the Reviving the Gulf proposals at a conceptual level. Our analysis is based on a desktop assessment of the available literature on marine protection and socioeconomic wellbeing.

This is not meant to be exhaustive or representative of all impacts from the proposals, but rather a high-level assessment of what wider impacts could look like (positive and negative). This provides a broader perspective than that obtained by solely analysing financial or economic information.

The Living Standards Framework provides a foundation for considering the impacts of policies and interventions on New Zealanders' wellbeing. The Framework has three levels: our individual and collective wellbeing, our institutions and governance, and the wealth of Aotearoa New Zealand.

We focused our assessment on the third level – the wealth of Aotearoa. This level captures the overall wealth of the country through five different aspects – the natural environment, human capability, social cohesion, financial and physical capital, and culture. Culture is typically defined as encompassing the other four aspects, but we have included it as a fifth aspect of wealth to better show the possible impacts on cultural wellbeing. Each of these aspects is described in Table 11 below.

The proposals in the “Revitalising the Gulf” strategy focus mainly on rebuilding the natural environment related to the proposed areas through protecting and restoring ecologically important habitats and ecosystems.<sup>13</sup>

Our assessment so far has focused on measuring the financial and physical capital that could be affected, through assessing the potential impacts of the proposals on commercial fishing activity, such as greenweight catch and revenue. From here, we expand our assessment to include social cohesion and human capability.

<sup>13</sup> Department of Conservation: Revitalising the Gulf – Government action on the Sea Change Plan June 2021



**Table 11: Aspects of wealth used to assess wellbeing impacts**

Aspect of wealth	Definition
Natural environment	All aspects of the natural environment which support life and human activity, whether valued for spiritual, cultural, or economic reasons.
Human capability	People's knowledge, physical and mental health, including cultural capability.
Social cohesion	The willingness of diverse individuals and groups to trust and cooperate with each other in the interests of all, supported by shared intercultural norms and values.
Financial and physical capital	Tangible, human-made assets, such as buildings, machinery, and infrastructure, including physical taonga, such as marae. Intangible, knowledge-based assets, such as research and development, software and databases, and arts and literature. Financial assets minus liabilities, including currency, bank deposits, loans, and equity.
Culture	Our accumulated heritage from our ancestors, including knowledge systems, values and beliefs, and their manifestations in objects, practices, and concepts. Culture is present in all the other aspects of our wealth.

Source: The New Zealand Treasury

## The literature gives us insights on the impacts on and across the different wealth aspects

We carried out a desktop assessment on the potential impacts of the Revitalising the Gulf proposals using relevant and available literature. This assessment is indicative only – the real impacts will depend largely on how people interact with the Hauraki Gulf, on their personal and collective circumstances, and on the final design of the marine protection measures.

Assessing the wider wellbeing impacts proved difficult for the following reasons:

- **Most of the research we found was from overseas** – Much of the literature we found on marine protected areas focused on other countries. Papers ranged from the impacts on small fishing communities in developing countries, to the localised implications of marine protected areas such as in California.
- **Different countries define “marine protected areas” differently** – “Marine protected areas” is used as a general catch-all term for areas with various levels of protection.<sup>14</sup> This made it difficult to make any conclusive comparisons because the scope and level of protection varies from country to country.

<sup>14</sup> Gollan N, Barclay K (2020) 'It's not just about fish': Assessing the social impacts of marine protected areas on the wellbeing of coastal communities in New South Wales. PLOS ONE 15(12): e0244605. <https://doi.org/10.1371/journal.pone.0244605>





- **“Wellbeing” is a general term and there is no established method for assessing these impacts** – The term “wellbeing” means different things according to the particular subject matter, and so the interpretation of “wellbeing impacts” can vary greatly. Examples range from ex-ante evaluations (evaluations based on forecasts) of the socioeconomic costs and benefits of marine protected areas,<sup>15</sup> to attempts to quantify people’s willingness to pay for marine protection.<sup>16</sup>

Figure 7 presents a high-level description of the impacts that could be applicable to the Revitalising the Gulf proposals. A detailed description is included in Appendix 2 of this report.

Those impacts include the wider wellbeing impacts that are involved in making trade-offs between the different aspects of wealth in the Living Standards Framework. Those wider impacts go beyond the economic impacts discussed in the earlier sections of this report.

The overall wealth of Aotearoa New Zealand is determined by the trade-offs being made between the different wealth aspects. The Revitalising the Gulf proposals aim to increase the wealth of the natural environment by reducing the resource flows from the proposed protected areas to the other aspects such as financial and physical capital.

The impacts on peoples’ wellbeing will depend on their values and how they interact with the marine environment. People who intrinsically value healthy, more natural marine environments are likely to experience greater wellbeing from greater protection measures.

From the literature, we can see that the trade-offs may also have unintended consequences. Marine protection increases the health of the natural environment, but can result in increased fishing pressure in adjacent, unprotected areas. If additional measures aren’t applied to release this pressure this could then result in overall poorer environmental outcomes.<sup>17</sup>

People with close cultural or community ties to the marine environment may also benefit from increased protection, as they intrinsically value an abundant and healthy natural environment. However, this may come at the cost of losing access to established fishing grounds within the areas.

The size and extent of these impacts, both positive and negative, will depend on how the protected areas are designed and maintained, including efforts to mitigate negative impacts or promote positive impacts. For example, if the adjacent unprotected areas can absorb the increased competition within the limits of their environmental health, then the unintended consequences are likely to be small or even negligible.

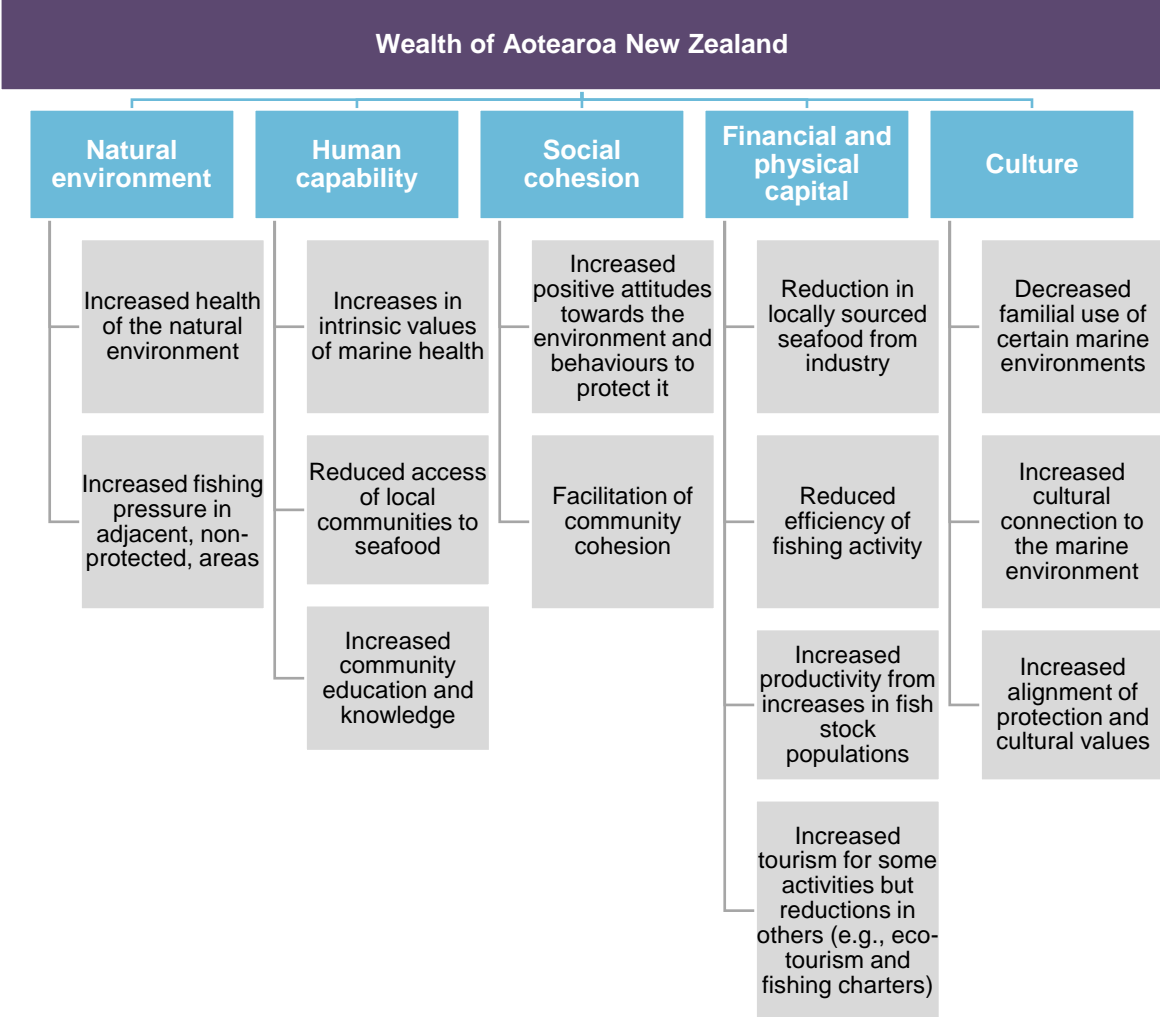
<sup>15</sup> Perruso, L., Johnson, J. C., Baertlein, P., & Johnson, D. H. (2015). A Socioeconomic Evaluation of a Network of Deepwater Marine Protected Areas. *Marine Fisheries Review*, 77(3), 73–83. <https://doi.org/10.7755/MFR.77.3.6>

<sup>16</sup> Togridou, A., Hovardas, T., & Pantis, J. D. (2006). Determinants of Visitors’ Willingness to Pay for the National Marine Park of Zakynthos, Greece. *Ecological Economics*, 60(1), 308–319.

<sup>17</sup> Charles, A., & Wilson, L. (2008). Human dimensions of Marine Protected Areas. *ICES Journal of Marine Science*, 66(1), 6–15. <https://doi.org/10.1093/icesjms/fsn182>



**Figure 7: Wellbeing impact assessment of proposed protected areas**



**Marine protected areas should be monitored and evaluated to ensure their long-term success**

Understanding the trade-offs between marine protection and economic activity is key to ensuring that protection measures work well and that the benefits outweigh the costs.

If marine protection is too restrictive, then communities may face social and economic difficulties that are detrimental to their overall wellbeing. On the other hand, if marine protection is not strong enough, then use of the environment’s resource stocks for social and economic activity will continue to add to environmental degradation to some degree.

Our use of the Treasury’s Living Standards Framework provides a starting point for developing a set of measures for monitoring and evaluating the overall performance of the Revitalising the Gulf proposals in safeguarding the various aspects of the wealth of Aotearoa New Zealand.



# APPENDIX 1: DATA AND TECHNICAL DETAILS

## Commercial fishing activity in the proposed protected areas

A full breakdown and description of the commercial fishing activity across the proposed protected areas and Hauraki Gulf fish stocks are provided in our stage 1 report.<sup>18</sup>

**Table 12: Commercial fishing activity in proposed protected areas vs Hauraki Gulf fish stocks**

October years	Values	2019-2020 (Oct) Fishing Year	2020-2021 (Oct) Fishing Year
<b>Proposed protected areas</b>	Greenweight (tonnes)	906.07	530.23
	Port price revenue (\$m)	1.15	1.37
	Market price revenue (\$m)	3.91	4.59
<b>All Hauraki Gulf fish stocks</b>	Greenweight (tonnes)	32,716.85	37,979.49
	Port price revenue (\$m)	59.02	66.31
	Market price revenue (\$m)	165.12	183.34
April years	Values	2020-2021 (Apr) Fishing Year	2021-2022 (Apr) Fishing Year
<b>Proposed protected areas</b>	Greenweight (tonnes)	2.96	4.47
	Port price revenue (\$m)	0.23	0.30
	Market price revenue (\$m)	0.34	0.59
<b>All Hauraki Gulf fish stocks</b>	Greenweight (tonnes)	124.00	128.56
	Port price revenue (\$m)	8.83	7.76
	Market price revenue (\$m)	14.08	16.90

<sup>18</sup> <https://www.doc.govt.nz/contentassets/6d2ec8fd81fb4c7bb3ba4ac9bb6d07ca/revitalise-gulf-commercial-fishers-report.pdf>



**Table 13: Market price revenue and proportion of total quota management area greenweight from within proposed protected areas, October years**

Species name	Fish stock	Market price revenue (\$)		Proportion of total greenweight landed (capped at total available annual catch entitlement)	
		2019-2020 (Oct) Fishing Year	2020-2021 (Oct) Fishing Year	2019-2020 (Oct) Fishing Year	2020-2021 (Oct) Fishing Year
Barracouta	BAR1	335	672	0.0%	0.0%
Blue Cod	BCO1	-	2,989	-	1.4%
Blue Mackerel	EMA1	1,014,234	466,699	7.2%	2.7%
Frostfish	FRO1	321	62	1.0%	0.3%
Grey Mullet	GMU1	15,767	31,879	0.2%	0.4%
Ghost Shark	GSH1	595	215	1.0%	0.5%
Gurnard	GUR1	25,817	47,148	0.3%	0.5%
Hāpuku & Bass	HPB1	2,234	5,041	0.2%	0.3%
John Dory	JDO1	125,683	166,109	3.7%	4.5%
Jack Mackerel	JMA1	330,238	51,573	2.6%	0.4%
Kahawai	KAH1	47,674	34,653	2.9%	2.4%
Kingfish	KIN1	10,625	13,340	1.9%	2.0%
Leatherjacket	LEA1	2,877	3,896	1.0%	2.5%
Ling	LIN1	1,383	-	0.04%	-
Parore	PAR1	1,886	765	1.5%	0.6%
Pilchard	PIL1	14,395	-	8.0%	-
Pōrae	POR1	-	2,756	-	1.7%
Rough Skate	RSK1	744	-	0.2%	-
Red Snapper	RSN1	7,013	29,607	2.9%	12.1%
School Shark	SCH1	39,056	49,686	0.6%	0.8%
Gemfish	SKI1	424	395	0.1%	0.1%
Snapper	SNA1	1,257,131	1,682,150	2.6%	3.4%
Sea Perch	SPE1	-	500	-	0.6%
Rig	SPO1	35,973	28,915	2.3%	1.6%
Kina	SUR1B	829,080	1,780,881	9.1%	16.7%
Tarakihi	TAR1	42,728	28,819	0.8%	0.6%
Trevally	TRE1	108,635	161,452	1.9%	2.6%



**Table 14: Market price revenue and proportion of total quota management area greenweight from within proposed protected areas, April years**

Species name	Fish stock	Market price revenue (\$)		Proportion of total greenweight landed confined to total available ACE	
		2020-2021 (Apr) Fishing Year	2021-2022 (Apr) Fishing Year	2019-2020 (Oct) Fishing Year	2020-2021 (Oct) Fishing Year
Rock Lobster	CRA2	323,252	586,910	3.4%	5.6%
Packhorse Rock Lobster	PHC1	13,139	-	0.3%	-

## Input-Output multiplier analysis

### Underlying logic of multiplier analysis

The underlying logic of economic impact analysis is that enterprises create flows of expenditure (direct impacts) that are magnified or “multiplied as they flow-on to the wider economy. This happens in two ways:

- 1 indirect impacts - the enterprise purchases materials and services from supplier firms, who in turn make further purchases from their suppliers and so forth
- 2 induced impacts - employees in the enterprises and in firms supplying services are paid a wage and the enterprises generate profits, which is then spent on consumption.

Total impact is then the sum of the direct, indirect, and induced impacts.

The size of the multiplier depends upon the degree of economic self-sufficiency. The more self-sufficient a region or nation is, the higher the multiplier is likely to be. Initial expenditure is assigned to the industry where it occurs. Each industry has a different multiplier based on the average pattern of purchases of goods and services, capital formation, profits, wages, and salaries.

### Measures of economic activity

We estimate three measures of economic activity – gross output, value added and employment.

Gross output is the value of production, which is built up through the national accounts as a measure of gross sales or turnover. It is essentially the initial expenditure incurred by the activity.

However, not all revenue (or expenditure) adds value to the economy. Intermediate inputs are used in the process of producing gross outputs. Gross output less intermediate inputs equals the value added to the economy.



Value added is therefore increase in output generated along the production process, which when aggregated totals Gross Domestic Product (GDP). This is the sum of:

- compensation of employees (salaries and wages),
- income from self-employment,
- depreciation,
- profits, and
- indirect taxes less subsidies.

Employment, generally expressed as FTEs to allow for comparison. FTEs is the number of full-time employees and working proprietors. FTEs provide a measure of total labour demand associated with gross output for one year. For example, four full-time jobs running for three months would be shown as one FTE.

## **Limitations**

### **Additionality**

It is assumed that the activity or event being analysed does not displace existing activity. This suggests that there is no second alternative that will attract a level of investment and therefore economic activity.

### **Impact**

It is assumed that an activity will not have an impact on relative prices. The larger the activity, or the more concentrated it is in a single industry or region, the more likely it is that relative prices would change.

### **Aggregation**

Each industry has its own unique inputs and outputs and thus multipliers. The more aggregated the level of analysis, the less accurate these inputs and outputs become. It is therefore important to apportion the initial expenditure to the industry where it occurs.

### **Regions and boundaries**

The smaller or less defined a region and its boundaries, the less accurate the multiplier analysis will be. Similarly, the easier it is to move across boundaries, the less accurate the analysis will be.



# APPENDIX 2: WELLBEING IMPACT ASSESSMENT

References used in this assessment are included below the following table.

Impact	Description
<b>Natural environment</b>	
Increased health of the natural environment	<p>Marine protected areas are a tool to manage and reduce localised threats to the marine environment in the context of degrading global environmental health.</p> <p>Residents of coastal communities near marine protected areas have reported increased biodiversity through protection of threatened and protected species.</p> <p>This increases the natural capital stock of the environment and maintains a buffer for the other resource flows that rely on the marine environment.</p>
Increased fishing pressure in adjacent, non-protected, areas	<p>There is a perception that marine protected areas concentrate fishing effort into adjacent areas, therefore increasing localised fishing pressure.</p> <p>This has the potential to result in overfishing in areas where effort becomes concentrated without any further management or protection in those areas. Greater concentration in the remaining fishable areas may also result in increased conflict between various fishing sectors, as the likelihood of fishing activity overlap increases.</p> <p>Increased fishing pressure and concentration can also negatively impact non-protected species by shifting effort into the areas that these species are usually found.</p>
<b>Human capability</b>	
Increases in intrinsic values of marine health	<p>Increases in marine life have been reported to increase peoples' intrinsic benefits of the marine environment.</p> <p>Marine protected areas contribute to their physical and mental health by preserving the natural environment and allowing for the enjoyment of seeing marine life around them.</p> <p>People have reported increased physical activity in the marine environment after protection, which has led to improvements in spiritual, emotional, and mental health</p>
Increased community education and knowledge	<p>Marine protection is commonly seen as a tool for creating community awareness of environmental issues. Having marine protection in their local area meant that people sought out information about marine protection which increased education within local communities.</p> <p>Education and knowledge are also seen as pivotal to ensure buy-in for increased environmental protection.</p> <p>However, a lack of access to research and information leads to assertions that locations for marine protected areas are arbitrary, rather than based on scientific information. This can be resolved through communication of scientific outputs and establishing a monitoring and evaluation framework on the success of the protection measures.</p>



Impact	Description
Reduced access of local communities to seafood	<p>The restriction of established fishing grounds and methods can have negative impacts on people’s access to seafood, as established fishing grounds or known fishing methods are restricted.</p> <p>Shifting effort to areas not being protected does not guarantee catch of the same species or quantity. This can impact people’s diets where they previously relied on fishing for their subsistence, at least in the short term.</p> <p>This can also negatively impact people’s social interactions where they would fish in groups and share information amongst other fishers. Conflict may arise if fishing pressure is seen as too great for the competition in the remaining fishable areas.</p> <p>The extent of this impact depends on the reliance of local communities on fish that is caught using the restricted methods inside the proposed protected areas.</p>
<b>Social cohesion</b>	
Increased positive attitudes towards the environment and behaviours to protect it	<p>The process on putting in place marine protection should involve stakeholders at all levels. This makes environmental protection a “hot topic” for those of the local community and may foster a sense of community cohesion through socialising with like-minded individuals.</p> <p>Marine protection also presents an opportunity for people who are part of environmental conservation groups or take an active interest in environmental conservation to discuss the benefits of protection and the reasons why this is needed. Greater awareness of environmental issues tends to lead to more positive attitudes towards the environment and protection.</p>
Facilitation of community cohesion	<p>Marine protected areas give communities the ability to collaborate around the protection of their local environment. This is most evident where local community groups have taken an active role in developing protection measures.</p> <p>However, not providing for input and participation from stakeholders can have the opposite effect and can lead to distrust between communities and the government.</p> <p>Marine protection is also seen as an opportunity for users to discuss and negotiate their access rights to marine areas, therefore, somewhat representing an avenue for conflict resolution from competing interests.</p>
<b>Financial and physical capital</b>	
Reduction in locally sourced seafood from industry	<p>When certain fisheries are heavily tied to certain areas, protection of established fishing grounds could lead to a loss in the ability to maintain catch levels. This is compounded by potential increases in competition in other fishable areas and the ability for commercial fishers to stay in business.</p> <p>This can result in lower supply of locally sourced seafood to domestic markets, especially if there is a strong localised supply chain through fishmongers and regular open-space markets.</p> <p>Access or supply to international markets may also be negatively impacted as throughput levels decrease if commercial operators are unable to effectively transfer their effort elsewhere.</p>





Impact	Description
Reduced efficiency of fishing activity	<p>Fishers may also have to travel further out to unknown areas which can impact their profitability and pose health and safety concerns.</p> <p>Negative impacts on fisher profits include extra costs from travelling further in search of new fishing grounds, less time for fishing activity because of greater travel times, and increased competition in areas outside the marine protected areas.</p>
Increased productivity from increases in fish stock populations	<p>Reduced fishing pressure in marine protected areas allow for localised fish stocks to recover and provides safe breeding grounds for fish.</p> <p>This may increase the fish population in other areas adjacent to the protection areas depending on the characteristics of local fish species. For example, some fish travel great distances in line with seasonal cycles, but others stay in certain locations and form residential populations.</p> <p>Increasing fish populations increases the productivity of fishers as they are able to catch more fish per unit of fishing effort than previously experienced.</p>
Increased tourism for some activities but reductions in others	<p>Marine tourism and recreational activities that aren't extractive have the potential to increase as the quality of the marine environment improves. Some of these activities include snorkelling and dolphin or whale watching excursions.</p> <p>However, recreational fishing tourism also forms a part of the tourism sector in marine environments protection measures may reduce this activity as restrictions are set.</p>
Culture	
Decreased familial use of certain marine environments	<p>Families who have fished certain areas that are being protected tend to hold historical ties to those areas and their use of the marine environment for their livelihoods.</p> <p>Protection in areas with historical ties can be seen as disregarding the cultural importance of their family history and lead to emotional and financial strains.</p> <p>This is especially relevant when certain areas that are being protected are the only apparent viable option for the operation of a particular fishery and transfer of effort is uncertain or unviable.</p>
Increased cultural connection to the marine environment	<p>Marine protection that incorporates and builds on customary fishing rights can maintain or increase the cultural connection to the marine environment and enhance the legitimacy of protection measures across various groups that use these resources.</p> <p>Traditional cultural practices include passing on information of different areas to younger generations and ensuring continuation of stories and traditional practices. Maintaining access to traditional fishing grounds is important to enable people to continue to live these traditional practices.</p>
Increased alignment of protection and cultural values	<p>Customary groups have described a sense of cultural responsibility to protect and preserve the marine environment in line with their values. This is to ensure that traditions are passed down to future generations and relies on sustainable use of marine resources.</p>



## References

- Ban, N. C., Gurney, G. G., Marshall, N. A., Whitney, C. K., Mills, M., Gelcich, S., Bennett, N. J., Meehan, M. C., Butler, C., Ban, S., Tran, T. C., Cox, M. E., & Breslow, S. J. (2019). Well-being outcomes of marine protected areas. *Nature Sustainability*, 2(6), 524–532. <https://doi.org/10.1038/s41893-019-0306-2>
- Charles, A., & Wilson, L. (2008). Human dimensions of Marine Protected Areas. *ICES Journal of Marine Science*, 66(1), 6–15. <https://doi.org/10.1093/icesjms/fsn182>
- Gill, D. A., Cheng, S. H., Glew, L., Aigner, E., Bennett, N. J., & Mascia, M. B. (2019). Social Synergies, Tradeoffs, and Equity in Marine Conservation Impacts. *Annual Review of Environment and Resources*, 44(1), 347–372. <https://doi.org/10.1146/annurev-environ-110718-032344>
- Gollan, N. (2020). “It’s not just about fish”: Assessing the social impacts of marine protected areas on the wellbeing of coastal communities in New South Wales. *PLOS ONE*. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0244605>
- Pendred, S., Fischer, A., & Fischer, S. (2016). Improved Management Effectiveness of a Marine Protected Area through Prioritizing Performance Indicators. *Coastal Management*, 44(2), 93–115. <https://doi.org/10.1080/08920753.2016.1135272>
- Perruso, L., Johnson, J. C., Baertlein, P., & Johnson, D. H. (2015). A Socioeconomic Evaluation of a Network of Deepwater Marine Protected Areas. *Marine Fisheries Review*, 77(3), 73–83. <https://doi.org/10.7755/MFR.77.3.6>
- Mascia, M (2004). Social Dimensions of Marine Reserves. In J.A. Sobel & C. P. Dahlgren (Eds.), *Marine Reserves: A Guide to Science, Design, and Use* (2nd ed.). (pp. 164-186). Island Press.

