August 2013

Report on the "Review of sustainability and other management controls for snapper 1 (SNA 1)"

Prepared by Rob Greenaway for the New Zealand Sport Fishing Council Inc

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Cover photo: Morning snapper catch in Pilot Bay, Tauranga Harbour, 1967

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1 Introduction

I have been asked by the New Zealand Sport Fishing Council (the Council) to consider the *Review of sustainability and other management controls for snapper 1 (SNA 1)* (the Ministry for Primary Industry's 'initial position paper' (IPP) (MPI, 2013)) from a recreation planning perspective.

The Council has directed me to the Fisheries Act 1996 where the Act refers to its dual purpose of providing for the *utilisation* of the fisheries resource while ensuring *sustainability*. My review is most strongly focused on *utilisation*, which the Act defines as meaning:

> *conserving, using, enhancing, and developing fisheries resources to enable people to provide for their social, economic, and cultural well-being.* (s8(2)(b))

Section 21 of the Act requires allowance for recreational interests when setting or varying any total allowable commercial catch (TACC) (21(1)(a)(ii)). I take this to mean that managing recreational access to a fishery is a key method by which the Minister enables "people to provide for their social, economic, and cultural well-being".

Section 10 of the Act sets out the *information principles* which guide decision-making when allocating access to a fishery resource:

> *All persons exercising or performing functions, duties, or powers under this Act, in relation to the utilisation of fisheries resources or ensuring sustainability, shall take into account the following information principles:*
>
> *(a) decisions should be based on the best available information:*
>
> *(b) decision makers should consider any uncertainty in the information available in any case:*
>
> *(c) decision makers should be cautious when information is uncertain, unreliable, or inadequate:*
>
> *(d) the absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of this Act.*

With this in mind, my analysis considers the degree to which the IPP:

- Takes into account the available information about recreational interests in the SNA 1 fishery,
- Recognises the value of the SNA 1 fishery to recreation interests,
- Uses the correct data in allowing for recreational interests when setting the TACC.

A brief CV detailing my background as a recreation and tourism planner is attached as Appendix 1.

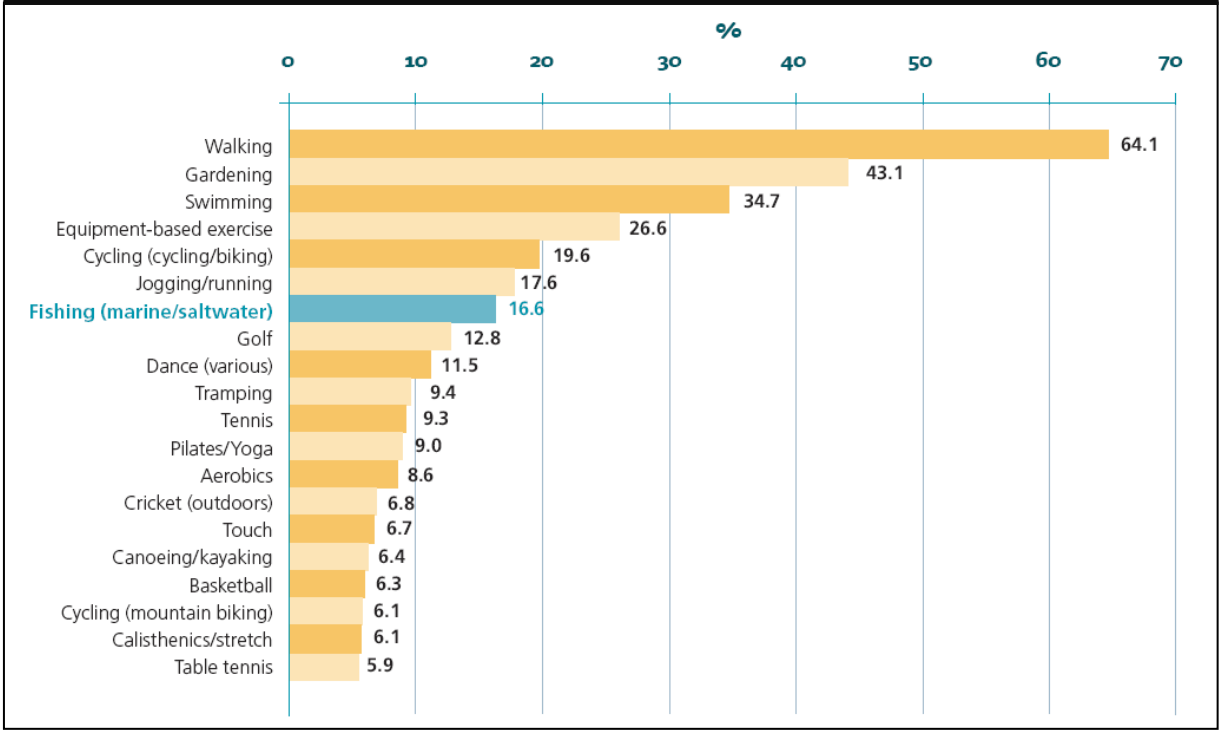
2 The importance of recreational marine fishing in New Zealand

2.1 Participation levels

Various estimates are available for the number of marine fishers in New Zealand. Kearney (2002) reviews various studies which have given a wide range of estimates for the level of participation. These include estimates based on surveys carried out between 1996 and 2000 ranging from 9.7% to 39% of the population (Reilly 2002 in Kearney 2002). Several studies post-date these reviews or were not referenced.

At the national level, reliable relative data (if not absolute)[1] are provided by the Active NZ Surveys carried out by Sport NZ (previously SPARC – Sport and Recreation NZ) (SPARC 2008). The data from the most recent (2007/08) study is based on a stratified (by time and location) national respondent set of 4,443 adults aged over 16, of whom 809 reported fishing at least once in the 12 months preceding an interview. Scaling these data indicate that 19.5%[2] of all New Zealand adults aged 16 years and over (633,768 people) had participated in fishing at least once; 16.6%[3] had participated in marine fishing (539,515 adults aged over 16) and 5.7%[4] had participated in freshwater fishing. This made marine fishing the 7th most popular form of active recreation in NZ (Figure 1), while freshwater fishing was ranked 21st equal (with rugby union) (SPARC 2009).

Figure 1: Sport and recreation activities with the highest participation levels (SPARC 2009)



[1] SPARC (2008) notes: "The Active NZ Survey is a nationally representative survey of all New Zealand adults. The findings in this profile are not directly comparable with other sources of information about fishing. This is because methodological differences (e.g. the way data is collected, the definitions used) contribute to differences in findings between different data sources."
[2] (95% CI: 17.7–21.2)
[3] (95% CI: 15.0–18.3)
[4] (95% CI: 4.6–6.8)

At the sub-regional and regional levels[5], participation rates ranged from 23.5% in the Bay of Plenty (the 5th most popular outdoor recreation activity) to 10.9% for central Auckland (10th most popular). The participation rates for North Harbour were 19.8% (5th) and for Counties Manakau 20.6% (5th). Future participation rates are difficult to estimate, but population growth in the Bay of Plenty and Auckland – the highest growth areas in New Zealand[6] – will increase absolute participation levels. Changes in economic status and ethnicity will alter participation rates, most likely driving more growth in demand.

Sport NZ (2012a) report that over a 12 month period ending in spring 2011, 48.8% of New Zealand boys aged 5 to 18 went fishing, as well as 33.9% of girls in the same age group – the 10th and 18th most popular sport and recreation activities respectively for that age bracket. The study relied on more than 17,000 young people (5 to 18-year-olds) from over 500 primary, intermediate and secondary schools throughout NZ, but did not report separate figures for marine and freshwater fishing.

Walshe & Akroyd (2000) in their survey of 2,773 randomly selected New Zealanders indicated that:

- 61% of Kiwis aged over 16 had fished NZ seawaters from a boat
- 59% had fished from land
- 27% had fished at a river mouth for seagoing species
- 13% had fished underwater
- 44% had hand-collected or trapped
- 22% had not fished at all

This equates to 1.9 million New Zealanders aged over 16, as at 2000, having experienced recreational fishing. Nineteen percent of those respondents who had never fished (22%) stated an interest in doing so in the future.

Horizon Research (2013), relying on an internet-based panel of 2,508 self-selected respondents aged 18 years and over, weighted to represent the national population[7], gave a past participation rate of 49% in marine recreational fishing, and 74% for Maori – a total of 1,650,000 New Zealanders aged over 18.

Forty-five percent of respondents in Walshe & Akroyd (2000) had been fishing in the previous 12 months, equating to 1.09 million active marine fishers aged over 16.

Walshe & Akroyd (2000) suggest a far higher level of marine fishing participation than SPARC (2009). However, 48% of Walshe & Akroyd's respondents only 'tagged along' with a fishing expedition, while 30% 'consciously chose' seawater fishing as a recreation. Those who 'tagged along' might not have considered themselves as active participants in fishing in SPARC (2009), and the two datasets might therefore be compatible.

Kerr et al (2003) questioned 836 respondents self-selected from a random selection of 2000 voters nationally. Women and people aged over 40 were over-represented and 269 considered themselves to be active marine fishers (32%).

[5] The SPARC data are reported at the national level and for the areas managed by Regional Sports Trusts. The latter do not always match territorial local government boundaries.

[6] http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/SubnationalPopulationProjections_HOTP0631UpdateOct12.aspx – retrieved 22 August 2013

[7] By age, gender, ethnicity, education, personal income, employment and Party Vote at the 2011 general election. See also, Horizon Research (no date).

These data offer a range in active participation levels in marine fishing from 16.6% (SPARC 2009) to 30% (Walshe & Akroyd 2000) fishing over a 12 month period, and 49% (Horizon Research 2013) to 78% (Walshe & Akroyd 2000) for past participation generally . My preference is to rely most heavily on the estimate provided by SPARC (2009) as this research was focused on participation in all forms of active recreation and had no primary focus on targeting marine anglers, and gives an estimate of active participation. This research also provides estimates for participation levels in other forms of sport and recreation which, to my knowledge, have not been challenged. However, the SPARC estimate is at the lowest end of the participation estimates discussed here and may be conservative.

The SPARC data provided additional analysis for all anglers (aggregated for freshwater and marine):

- During any one month, 7.5 percent[8] of all New Zealand adults (242,534 people) participated in fishing at least once.
- During any one week, 2.5 percent[9] of all New Zealand adults (81,054 people) participated in fishing at least once.
- On average, anglers participated in fishing on two days out of seven, for an average of 198 minutes on any one day.
- The average time spent fishing per week was 323 minutes.
- Participation levels on weekdays did not differ significantly to the weekend participation level.

The latter finding differs from that of quite robust on-site surveys such as Hartill et al (2011) who reported far more marine angling activity during weekends and public holidays than during mid-week days (91%).

These data indicate that we still have only a coarse understanding of the level of participation in marine recreational fishing, that there is little agreement amongst researchers due to different study methods and foci, and that by comparing aspects of different studies, weaknesses can be found. However, there is clearly a relatively high level of participation at the national level in recreational marine fishing – and high participation (and growth) rates in much of Auckland and the Bay of Plenty – and it is one of New Zealand's most important forms of outdoor recreation.

2.2 The benefits of recreation participation

Recreation and sport are generally considered forms of social good, based on benefits which are personal and those which accrue to society in general. Booth & Lynch (2010), in a stock-take of research into outdoor recreation in New Zealand, identified:

- 37 publications on the economic benefits of outdoor recreation
- 27 on the health benefits
- 53 on the social benefits
- 58 on the learning (educational) benefits
- 6 on the environmental benefits, and
- 7 on general benefits.

[8] (95% CI: 6.2–8.7)
[9] (95% CI: 1.8–3.2)

Research using, for example, contingent valuation methods (willingness to pay) are based on a personal response to an option to change the perceived value of a resource or opportunity – via changing resource attributes or access to the resource. This implies that respondents have a clear understanding of the net benefit of their, and others', participation in an activity. Booth et al (2002) identified more than 100 individual forms of benefit that an individual and/or society may gain from recreation participation. Considering a sample of the list of benefits identified, this would require the personal ability to quantify, for example, the following researched benefits of outdoor recreation:

- Nurturance of others
- Understanding and tolerance of others
- Environmental awareness, sensitivity
- Enhanced world view
- Socialization/acculturation
- Cultural identity
- Cultural continuity
- Prevention of social problems by at-risk youth
- Developmental benefits of children
- Reduced health costs
- Increased work productivity
- Less work absenteeism
- Reduced on-the-job accidents
- Decreased job turn-over
- International balance of payments (from tourism)
- Local and regional economic growth
- Employment opportunities
- Contributions to net national economic development

This requires a resource manager to look beyond a personal response to a change in resource status, as identified via a contingent valuation method, to the true net effect of a resource allocation decision on people's social, economic and cultural well-being. That is, while there is clear benefit in estimating the effect of a resource allocation decision on the individual, those data are only part of the picture.

2.3 Importance for SNA 1 review

Fishing is the most popular form of outdoor recreation in New Zealand which requires access to natural environments and to which codified management controls apply. Thus, the Ministry is the single most significant recreation resource manager in New Zealand, if participation rates are the basis of analysis. Decisions made about access to the fishing resource have the potential to affect almost twice as many New Zealanders compared with decisions made by the Department of Conservation (DOC) in relation to tramping – and that comparison only holds if we assume that all tramping occurs on the DOC estate. All recreational marine fishing occurs in the setting administered by the Ministry and the activity directly depends on the resource the Ministry controls (the fish).

The Ministry's role as administrator of our most significant national recreation resource suggests that a detailed understanding of the effect of resource allocation decisions on recreation is required.

The Ministry's IPP does not appear to recognise the social value of recreational marine fishing to the New Zealand population. For example, Dalziel (2011) identified the direct benefits enjoyed by participants in sport in recreation in New Zealand to be $5.9 billion, plus social benefits of $1 billion due to increased work productivity and health benefits (an extra 17% in value).

The Ministry has relied on contingent valuation methods in the IPP to quantify the value of the SNA 1 fishery to the recreation marine fishing community (MPI, 2013, paras 71 to 74). This analysis does not consider the more broad benefits of recreation to society. As the single-most significant recreation resource manager in New Zealand, the Ministry needs to have a more clear understanding of the benefits that will accrue to society via the allocation of access to marine fishing. These benefits will be greater than the current contingent valuation methods indicate, which are largely confined to concepts of individual benefit.

3 Estimates of economic value for recreational marine fishing

I accept that contingent valuations methods are a widely-accepted means of assigning a price to a preference for gaining some non-market value, although there are significant issues which mean that any non-market valuation needs to be treated with caution. Hanemann's (1994) conclusions about the efficacy of contingent valuation methods put them into context:

> *Faced with the assertion that contingent valuation surveys can never be a reliable source of information either for benefit cost analysis or for damage assessment, the NOAA [National Oceanic and Atmospheric Administration] Panel rejected this as unwarranted. Two years later, there is now even more evidence from recent studies and literature analyses to support the Panel's conclusion. However, it would be misleading for me to suggest that contingent valuation surveys can be made to work well in all circumstances. I am sure situations could exist where a contingent valuation researcher might be unable to devise a plausible scenario for the item of interest. Nor would I wish to argue that all contingent valuation surveys are of high quality. The method, though simple in its directness, is in fact difficult to implement without falling into various types of design problems that require effort, skill and imagination to resolve. Each particular study needs to be scrutinized carefully. But the same is true of any empirical study.*
>
> *While I believe in the feasibility of using contingent valuation to measure people's value for the environment, I do not mean to advocate a narrow benefit-cost analysis for all environmental policy decisions, nor to suggest that everything can or should be quantified. There will be cases where the information is inadequate, the uncertainties too great, or the consequences too profound or too complex to be reduced to a single number. I am well aware of the fallacy of misplaced precision. But this cuts both ways. It also applies to those who suggest that it is better not to measure nonuse values at all than to measure them through contingent valuation. I reply to such critics by quoting Douglass North: "The price you pay for precision is an inability to deal with real-world issues" (Wall Street Journal, 7/29/94).*

The final quote matches the expectations of section 10(d) of the Fisheries Act: "the absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of this Act". That is, a lack of precision does not remove the need to deal with real-world issues. The general conclusions also match that of the Ministry in relation to the South Australian Centre for Economic Studies (SACES) report on the value of recreational fishing in New Zealand (Lindsay et al 1999):

> *... there is considerable uncertainty in this information arising from the assumptions used to generate the economic measure* (MPI, 2013, para 72).

Nevertheless, the SACES estimate is used in the Ministry's decision-making process to conclude that the values of commercial and recreational marine fishing are "roughly similar", while noting that the estimates of recreation value are "highly uncertain" (MPI, 2013, para 178).

I note that Lindsay & Damania (2000) describe the Lindsay et al (1999) results as "both reliable and intuitively plausible", which I challenge in the following sections.

While I recognise that some uncertainty in economic valuations are inevitable, several points relating to the assessments used by the Ministry to compare recreation and commercial value require consideration.

Kerr & Latham (2011) reviewed research into consumer surplus from marine recreational fishing and identified only three relevant studies in New Zealand: Lindsay et al (1999), discussed above, Kerr et al (2003) and Schischka & Marsh (2008). The latter identified mean expenditure per trip and estimated consumer surplus for a sample of anglers operating out of Whangamata. Kerr et al (2003) considered WTP for fish licensing.

Other studies consider the value of recreation generally. For example, Kaval & Yeo (2007) estimate the non-market benefit of outdoor recreation in New Zealand to be over $5 billion and with market benefits of approximately $4 billion. Dalziel (2011) identified the value-added contribution of the sport and recreation sector to be $3.8 billion in 2008/09 with direct benefits enjoyed by participants to be $5.9 billion, plus social benefits of $1 billion due to increased work productivity and health benefits. The full contribution of sport and recreation to GDP in 2008/09 was more than $5.2 billion, or 2.8 per cent (Dalziel, 2011) (as large as the dairy sector). Dalziel (2011) also identified the sport and recreation sector to be the 5th largest provider of employment in NZ (using 2006 data) – above house construction and dairying – with 36,831 workers, almost 4000 of whom were in the boatbuilding and repair sector.

3.1 Value-added

Value-added for market values is not assessed in the IPP for either recreational or commercial fishing and is not used to compare net benefit (economic and/or social). The question is, is it different for each activity and how different is it for each fish landed? There is quite likely to be a difference considering the relative levels of effort taken to land each fish and the different scales of efficiency relevant to each. Commercial fishing is more likely to be far more efficient per fish than recreational fishing – although it generally includes a paid labour component – and the value-added by recreational anglers per fish is likely to be greater. The relative contribution to GDP or GRP of recreational snapper fishing in SNA 1, considering the similar scales of take, might well be significantly larger than commercial fishing, and also have a different pattern of benefit, supporting many small-scale retailers and service providers rather than large-scale and centralised providers.

Kerr & Latham (2011) state, in reference to the findings of Lindsay et al (1999), that, “Consumer surplus is two to four times expenditure, indicating that value-added from recreation fishing is likely to be relatively small in comparison to consumers’ surplus.” However, no attempt has been made to identify what value-added amounts to in absolute terms. Consider here Kaval & Yeo’s (2007) estimate that the non-market benefit of outdoor recreation in New Zealand was more than $5 billion while the market benefits were approximately $4 billion (80% of non-market values and not ‘relatively small’ as Kerr & Latham (2011) propose).

3.2 Willingness to pay – average versus marginal

The Ministry applies the marginal willingness to pay (MWTP) for snapper as estimated by Lindsay et al (1999) to develop a value estimate for the recreational snapper fishery (MPI, 2013, para 73). In my view average willingness to pay (AWTP) gives a better estimation of consumer surplus and value, but more work is needed to identify the true value of fishing on a per-species and catch-rate bases.

Lindsay et al (1999) suggest that MWTP is the “best illustration of how much recreational fish are worth to New Zealand recreational fishers” (p(ii) and p89 (footnote 74)). Barbera (2012) applies both AWTP and MWTP in valuing the recreational fishery in the Hauraki Gulf, but states that, “in order to assess the value of recreational fishing the average willingness to pay (AWTP) is commonly considered the most accurate value” (p104). Barbera concludes that the

total recreational AWTP for snapper and kahawai is four times bigger than total commercial value. However, this assumes a degree of accuracy in the Lindsay et al (1999) data which I suspect is lacking.

The non-market values for kahawai, as identified by Lindsay et al (1999) are unusually high when compared with snapper, and considering the assumptions about the motivations for catching these different fish, are inconsistent for kingfish, rock lobster and blue cod.

For example, the ratio between MWTP and AWTP for kingfish in Lindsay et al (1999) is 9.2 (the AWTP is 9.2 times greater than MWTP). The same ratio for kahawai is 17.2, for blue cod 15.2, for rock lobster 7.4, and for snapper the ratio is 5.4. There is no consistency in the ratio between the AWTP and MWTP, and this applies to both sport fish (kahawai and kingfish) and eating or table fish (snapper and blue cod). One would expect some consistency if the motivation for landing each species was similar. The AWTP for kahawai is 91% greater than for snapper and 22% greater than for rock lobster, although the MWTP for kahawai is less than that for snapper and almost half that for rock lobster. Kahawai has very low commercial value as a table fish, while snapper has the reverse, and the recreational eating values of each species is commonly stated to be the same. I fail to understand how Lindsay & Damania (2000) describe these data as "intuitively plausible" when quite the reverse appears to be the case.

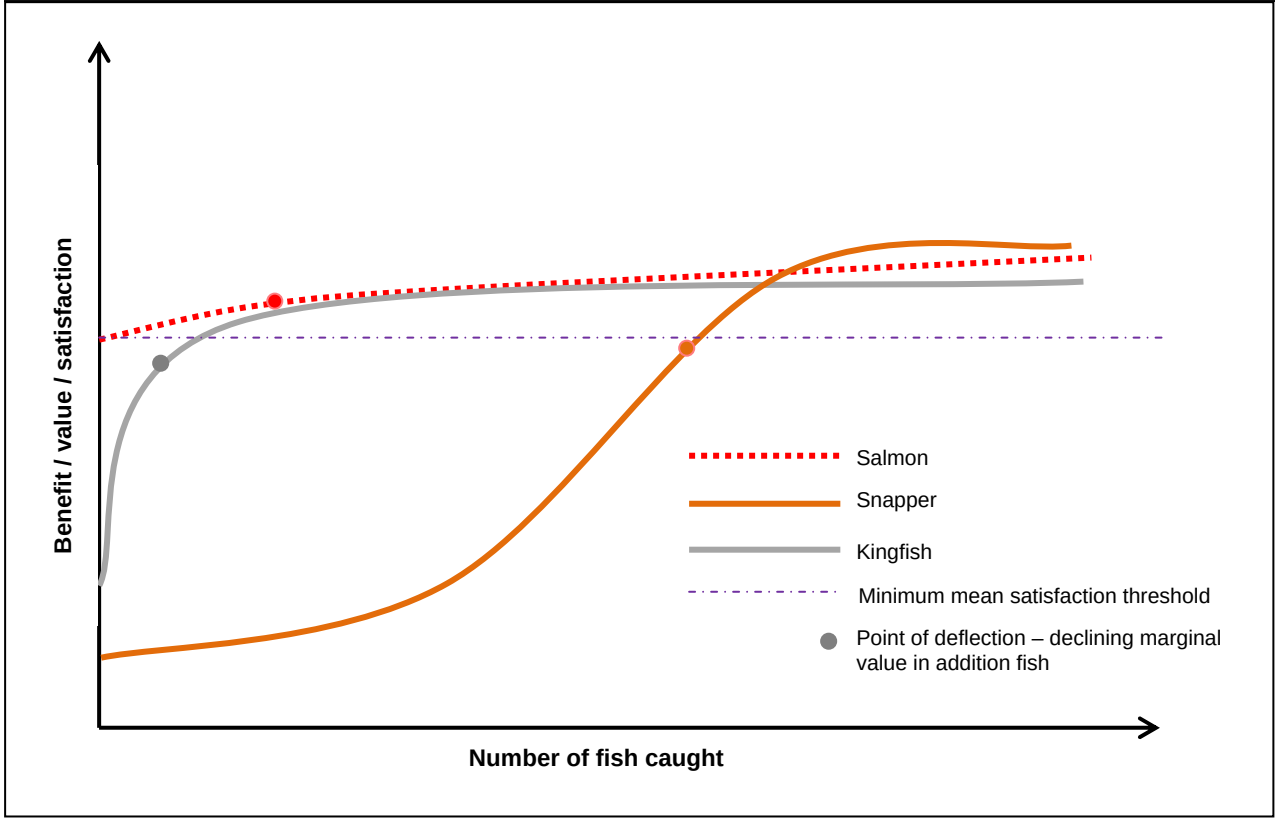
MWTP fails to recognise the change in marginal value of catching one or more fish. A relatively high willingness to pay is likely to apply to the first sports fish caught (a kingfish or marlin), but the second and subsequent fish caught will be of lesser value. For eating fish, there is likely to be a focus on catching 'enough for a feed' (see Walshe & Akroyd 2000). The demand curve for each species will differ, with an early point of deflection (where marginal benefits of catching an additional fish begin to decline) for a large sports fish species and a later deflection point for a table fish species (particularly for a relatively small one).

Figure 2 represents this as a modelled demand / supply curve. I have included salmon as a example of a sports fish which anglers might not catch for many seasons and yet still gain a sufficiently high level of satisfaction to continue participating. At some point, an expected catch rate (indicated by where the dotted line intersects with the demand curve for each species) will influence satisfaction and persistence in participation, although this will differ from person to person depending on their motivations, inputs and skill level.[10]

I expect that MWTP is most likely to reflect the value of a fish at the point of deflection, where marginal benefits begin to decline. However, applying this marginal value to the value of the total catch does not recognise the true scale of consumer surplus (see Kerr & Latham 2011) generated by the number of fish caught previously (MWTP assumes a straight line demand profile and could better be described as 'mean marginal willingness to pay'). Accordingly, it appears that the value (consumer surplus) derived from recreational snapper fishing is likely to be greater (possibly much greater) that the estimate used by the Ministry, but is one which will rely on achieving a minimum catch level that has not been identified.

[10] McConnell et al (1995) touches on this issue in relation to angler responses to changes in bag limits.

Figure 2: Stylised demand / supply curve for recreational fishing by species – Value versus number of fish caught



3.3 Importance for SNA 1 review

The Ministry, while recognising the uncertainties in the contingent valuation method applied to recreation fishing values, remains largely in the dark as to the true scale of consumer surplus generated by recreational marine fishing, and has no estimation of the value-added to the NZ economy by the activity (in absolute terms or relative to commercial fishing). The ability to make an informed decision about the most efficient allocation of resources is limited. The quantitative effects of changing bag limits on recreation values (social benefit, consumer surplus, value added) for each species is unknown. While this lack of precision does not preclude the Ministry from making a decision (section 10(d) of the Fisheries Act), the Ministry appears to be relying on data that is largely incapable of supporting sound decision-making, which risks significant non-compliance with the other requirements of section 10 of the Act.

4 Recreation responses – coping mechanisms and rationalisation

In 2007 I led an exploratory research project for the Department of Conservation into the scale and causes of recreation displacement in New Zealand (Greenaway et al 2007). The study was a response to anecdotal accounts that social impacts from increasing participation rates in recreation (crowding) were forcing traditional recreationists to change their activity patterns. The term 'recreation displacement' generally describes the response behaviours of outdoor recreationists who are repeat users of a place, but who change their use of that place over time due to some negative evaluation of changed local conditions.

Our findings were based on 2271 responses to an open public mail-back and on-line questionnaire. We found that reasons for doing recreation activities less were generally life-cycle issues (such as work pressure, changes in interest, cost and family issues). However, reduced use of preferred recreation settings by hunters, fresh water anglers and salt water anglers was most related to less fish, game or kai.

The study identified that, anecdotally, the 'problem' attributed to displacement was that existing users, in a setting that is subject to growing use pressures, are forced out of those areas, sometimes spreading pressures to other places, or withdrawing from their preferred activities. Maintaining participation in the face of changing resource attributes requires the participant to adopt some form of coping strategy, with 'rationalisation' being key. Rationalisation is a personal coping strategy that outdoor recreationists may employ when faced with adverse social, environmental, or managerial conditions. It is a process whereby outdoor recreationists re-evaluate an undesirable situation in a favourable way, minimising the sense of personal loss that could result from a compromised experience (Hall and Cole 2006). This could be represented by, for example, rationalising that, 'although more people are using my favourite place, it is positive to see so many children enjoying the setting'; or, 'although my access to a resource has been limited, this is a fair management decision and better for the resource quality in general'.

We did not analyse other responses to adverse changes in resource settings, but Kerr et al (2003) identified a high level of potential poaching of fishing resources should a fishing licence requirement be implemented. Breaking the rules is also a coping strategy, by which participants maintain their original levels of satisfaction in an activity when access has been restricted. This coping strategy would, of course, impact upon the integrity of the fisheries management system and the long-term sustainability of SNA 1. For example, Horizon Research (2013) indicated that, for those who fish in the SNA 1 area, if the snapper bag limit was dropped to three or four per person as a result of options proposed by the Ministry:

- 18% said they would ignore the new limit,
- 38% would fish for other species,
- 4% would stop fishing for snapper, and
- 5% would stop fishing in the sea altogether (consider the 'minimum mean satisfaction threshold' in Figure 2).

My 2007 study (Greenaway et al 2007) suggested that New Zealanders were quite adept at rationalising adverse change and maintaining participation levels, but that specific instances of potential displacement need assessment on a case-by-case basis. The SNA 1 fishery appears to be one of these cases.

4.1 Importance for SNA 1 review

The Ministry's analysis in the IPP currently has no indication of the potential effects of changing the level of access to the SNA 1 recreational fishing resource. This is surprising given that the importance of SNA 1 to recreational interests, and the Ministry being the single most significant recreation resource manager in New Zealand. Displacement effects may result in the targeting of alternative fish species with adverse stock effects. Where participants are not able to rationalise their loss of access to a resource – which may result if an allocation decision is considered inequitable – then there may be a loss of participation (and a loss of social and economic value to New Zealand), or personal decisions may be made to ignore the restrictions (poaching). Without a more complete review of likely recreation participation responses to an allocation decision, the net benefit of the decision is unclear and the potential unintended consequences are unknown, or at least unquantified.

5 Conclusion

Section 10 of the Fisheries Act requires the Ministry to "take into account the following information principles":

(a) decisions should be based on the best available information:

(b) decision makers should consider any uncertainty in the information available in any case:

(c) decision makers should be cautious when information is uncertain, unreliable, or inadequate:

The IPP does not evaluate the effect of bag reductions on the values enjoyed by recreational interests, nor does it quantify the values of recreational marine fishing (absolutely or relative to commercial fishing) in any reliable manner. The Ministry recognises the low confidence in the data used to assess recreation value (para 72 of the IPP) but then does not consider how the "considerable uncertainty" in that data might affect resource allocation decisions.

Given the likelihood that the data used to estimate recreational value is flawed and underestimates value, relying on a proportional allocation regime in SNA 1 may result in significant inequalities and inefficiencies in resource allocation, as well as the denigration of the social and recreational value of one of the nation's prime forms of outdoor recreation.

Section 21 of the Fisheries Act requires the Ministry to 'allow for' or 'take into account' recreational interests, as well as Maori non-commercial fishing interests, when setting or varying the TACC for any quota management stock. A paradigm shift may be required whereby the Ministry better recognises its role as administrator of the nation's single most important outdoor recreation resource (all other outdoor recreation resources with higher levels of participation are managed by diverse agencies).

This will require a more considered resource allocation regime, which is likely to include a review of the proportional allocation model as described in the IPP. The regime will need to maximise benefit at the national level, and must therefore take into account the full spectrum of values obtained from recreational marine fishing.

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Appendix 1: Summary CV

My full name is Robert James Greenaway.

I am in practice as a consultant leisure and open space planner. I operate a private Nelson-based consultancy trading as Rob Greenaway & Associates (R&R Consulting (NZ) Limited) and I am a Director of the Pacific-based leisure planning consortium, the Global Leisure Group Limited. I was raised in the Bay of Plenty.

I graduated from Lincoln University in 1987 with a three-year Diploma in Parks and Recreation Management with Distinction, and then completed 18 months of postgraduate study. Between 1990 and 1995 I worked with an international tourism and recreation development consultancy – Tourism Resource Consultants – on a range of large and small development and advisory projects, including ecotourism development planning in Samoa and Malaysia, and for potential World Heritage Sites in the Solomon Islands for the Ministry of Foreign Affairs and Trade, as well as domestic event management and reserve, tourism and recreation management planning.

Between 1995 and 1997 I worked for Boffa Miskell Limited, focusing on recreation planning for local authorities and tourism development planning for private agencies. Since 1997 I have worked independently. The majority of my work is for local and central government, private companies, and environmental and community agencies. I am regularly called as an expert witness in Environment Court consent hearings and have completed many primary research projects.

I have been a member of New Zealand's leading professional leisure management association – the New Zealand Recreation Association (NZRA) – since 1990 and was a member of the Association's National Executive from 2000 to 2006. In 2004 I was awarded the Ian Galloway Memorial Cup by the NZRA, 'to recognise excellence and outstanding personal contribution to the wider parks industry'. I was Chair of the Association's Board of Accreditation to assess candidates for the status of Accredited Recreation Professional (ARPro) up to 2012, and also hold that status (and remain a member of the accreditation board). I am also a member of the New Zealand Association for Impact Assessment (NZAIA) and the Australia and New Zealand Association for Leisure Studies (ANZALS). In 2009 I was appointed to the inaugural Sir Edmund Hillary Outdoor Recreation Council, an advisory panel tasked with assisting Sport NZ in the implementation of the National Outdoor Recreation Strategy, and I served on the Council until it was dissolved in 2013.

In the recent past, as an example, I have worked as either lead, co-lead or sole consultant on recreation, park and sport development strategies, assessment of effects and research programmes for: Meridian Energy Limited (Waitaki, (Aqua, North Bank Tunnel Concept), Manapouri, Mokihinui, Hayes, Waiau (Canterbury), Hurunui wind, Central wind), Contact Energy Limited (Clutha), TrustPower Limited (Arnold, Wairau, Patea, Matahina), King Country Energy Limited (Mokau), Bay of Plenty Energy Limited (Kaituna), Fish and Game New Zealand (Hurunui), MainPower New Zealand Limited (Mount Cass wind), Pioneer Generation Limited (Nevis), Genesis Energy Limited (Castle Hill wind), Mighty River Power Limited (Puketoi wind), the Department of Conservation, Christchurch City Council, Sport NZ, the Royal Forest and Bird Protection Society, Summit Road Society, LandCo, Fiordland Link Experience, Central Plains Water Trust, Christchurch Estuary Association, Port Levy Coastal and Marine Protection Society, Far North District Council, Nelson City Council, Tasman District Council, Infinity Investment Group, Darby Partners, Nelson Cycle Trails Trust, the Canterbury West Coast Sports Trust, Environment Canterbury, and the Whakatane District Council, amongst others.

In the marine environment I am currently assessing recreation and tourism values for the management of the wreck of the Rena (for the insurers), the effects of iron sand mining in the South Taranaki Bight (for Trans-Tasman Resources Ltd) and the reconsenting of the Whareroa marine outfall (for Fonterra Ltd and the South Taranaki District Council).

Recreationally, my main activity is sailing. I was raised by a furniture manufacturer and boat builder (his photo is on the cover of this report) and I have a 31ft keeler based in Nelson.