# The Economic Value of New Zealand Marine Recreational Fishing and its Use as a Policy Tool

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Abstract**.** This paper presents the results of a 1999 survey to determine the economic value of the recreational fishery in New Zealand for five species, snapper (*Chrysphrys autratus*), kingfish (*Seriola lalandi lalandi*), kahawai (*Arripis trutta*), blue cod (*Parapercis colias*) and rock lobster (*Jasus edwadsii* and *Jasus verreauxi*). Contingent valuation methods were used to establish estimates of the marginal willingness to pay and average willingness to pay per fish and per kilogram as well as the value of recurrent expenditure by recreational fishers. In addition, the legislative and historical context of this survey are discussed and initial views are presented on of the use of this type of survey in four areas of policy development where this type of information may be used. 1) The use economic value in the process of defining recreational fishing and management rights. 2) The characterisation of the recreational fishing sector. 3) Establishing costs and benefits when allocating commercial property rights for new species. 4) Allocations between stakeholders when setting a total allowable commercial catch. 5) Interpreting the legislative definition of utilisation in allowing for people to provide for their "*social, economic and cultural well being*".

## 1. INTRODUCTION

New Zealand is a country where it is said no one lives more that an a three hour drive from the nearest salt water, where the population destiny is low and a coastline is long and accessible. Because of this, most Kiwi's believe that the right to catch a fish is an undeniable part of being a New Zealander. Unfortunately, in spite of the relative importance of recreational fishing, there is very little structured information about recreational fishing compared to the other extractive users of our fisheries. The Ministry of Fisheries is striving to learn more about the recreational fishing sector and recently commissioned the first extensive study of the economic value of recreational marine fishing in New Zealand.

This paper has three separate sections. The first summarises the key economic results of the Value of New Zealand Recreational Fishing (SACE 1999); the second outlines the New Zealand legal and fisheries management context that the recreational value information will be used in; and the last postulates five specific policy issues where economic value of recreational fishing may be used. Because of how fisheries are managed in New Zealand and the focus by the Ministry of Fisheries on achieving sustainable fish stocks as the primary fisheries management objective, there has never before been the need to directly consider economic value of recreational fishing explicitly. Where there is plenty of fish for recreational fishers to catch, there is little necessity to make explicit trade offs. As such, neither the Ministry of Fisheries nor the author can authoritatively predict exactly how recreational economic value information will be used in New Zealand. Rathe, this paper postulates a limited number of situations where the author considers recreational economic data might prove useful in the New Zealand context.

## 2. SUMMARY OF THE RECREATIONAL VALUE STUDY

### 2.1 Overview

In 1998, through a competitive tender process, the Ministry of Fisheries contracted the South Australian Centre for Economic Studies (SACE) to determine the:

- total economic value including market and non-market values of marine recreational fishing; and
- specific contribution of recreational fishing for snapper, kahawai, kingfish, blue cod and rock lobster to the economy.

SACE utilised contingent valuation methodology based on international standards. The face to face surveys were undertaken between November 1998 to April 1999 (the southern hemisphere summer), the most active time for recreational fishing. "The Value of New Zealand Recreational Fishing" report was provided to the Ministry of Fisheries in November of 1999. The survey report provided a large amount of information characterising a variety of aspects of recreational fishing including:

- The enjoyment and importance of recreational fishing for each species;
- The number of fishing trips per year;
- The main reason for fishing (i.e. sport or eating purposes);
- The use of a boat, boat ownership, echo sounder use and type;
- Species targeted and numbers caught and kept;
- Indication of difficulties experienced fishing and perceived reasons for difficulties;
- Time spent fishing;
- Recurrent expenditure and willingness to pay;
- Age, sex, income range, general employment status; and
- Membership in a fishing club.

For the purposes of this paper, only a summary of total information is restricted to the estimates of marginal willingness to pay (MWTP), average willingness to pay (AWTP) and some descriptive statistics that may assist the reader in understanding the type of recreational fishery exists for each species.

### 2.2 Results Summary

#### 2.2.1 Overall Recreational Fishing

To allow for comparison with individual species and to put the results of the survey in to context it is worthwhile to consider the following over all results of the survey. Some of the relevant overall results are.

- The average recreational fishers spend $38.05 NZ ($17.88 US[1]) per fishing trip and an average of $941 NZ ($ 442.27 US) per fisher per year on recurrent expenditure.
- The average fisher made 25 trips per year and 45% fished for sport or eating purposes.
- Of all the interviewees, 88 % of fishers were male, 50% of fishers were between 30 and 50 years old and 28% earned less than $20,000 NZ ($9,400 US) per year. The vast majority (84%) owed boats but only 24% of those interviewed are members of a fishing club.

Table 1 provides a brief description of each species and summarises the estimated total recreational harvest by fish and by weight for each of the five target species considered by the recreational value survey.

[1] Based on an indicative conversion ratio of $0.47 US per dollar NZ.

| *Species* | *Description* | *Total Number of fish harvested by recreational fishers* | *Total weight (metric tonnes) harvested by recreational fishers* |
|---|---|---|---|
| Snapper (Chrysophrys auratus) | A sea bream. Probably the most popular fish in NZ for all stakeholders. Found in warmer shallow waters. | 4.3 million | 3229 |
| Kingfish (*Seriola lalandi lanandi)* | Sought after pelagic sport fish found primarily in warmer northern waters | 74,000 | 382 |
| Kahawai (*Arripis trutta)* | A popular schooling pelagic fish found both inshore and in deeper water primarily in warmer northern waters. | 1.1 million | 729 |
| Blue Cod (*Perapercic coias)* | Endemic to NZ. Bottom fish, found in primarily in cooler southern waters, near rocky inshore environments. | 1.2 million | 1518 |
| Rock lobster *(Jasus edwardsii* and *Jasus verreauxi)* | Popular crustacean found throughout the rocky shore environment in NZ. Taken by both pots and diving. | 534,000 | 313 |

**Table 1: Estimated catch (by numbers and weight) for the five target species considered in SACE 1999 study**

While more than 50 locations were surveyed over the course of the study, the vast majority of interviews took place in the North Island (82%) and in metropolitan areas (77%). The survey locations were designed to get a reasonable spread of interviews but also to focus on those areas with high intercept rates. Because of the need to provide a useful number of interviews, some survey locations were dropped following the summer holiday period. In total 3540 interviews were considered suitable for analysis

### 2.2.2 Snapper

Snapper were the most common target species in the survey, primarily due to the large percentage of surveys that were conducted North Island where this fish is the dominant target species. Its overwhelming popularity is as both a sport and eating fish. The marginal willingness to pay (MWTP) for an additional snapper and the average willingness to pay (AWTP) for all snapper kept[2] are outlined in table 2.

| | *Dollars per fish* | *Database used* |
|---|---|---|
| MWTP | $5.73 NZ ($ 2.70 US) | Kept |
| AWTP | $30.85 NZ ($14.50 US) | Kept |

**Table 2: MWTP and AWTP per fish for Snapper**

### 2.2.3 Kingfish

The results are as expected for a prized sport fishery as considerable effort and time is spent chasing these fish. Of the interviews where fishers were said they were targeting in kingfish, 99.8% were in the North Island. The MWTP for an additional kingfish caught (as opposed to kept[3]) and the AWTP for all kingfish kept are outlined in table 3.

| | *Dollars per fish* | *Database used* |
|---|---|---|
| MWTP | $19.76 NZ ($9.29 US) | Caught |
| AWTP | $181.10 NZ ($85.12 US) | Kept |

**Table 3: MWTP and AWTP per fish for Kingfish**

[2] For fish where fishers indicated that eating was at least as important as catching the fish, the kept database was used as returning an additional fish to the water was not considered to add to the MWTP.

[3] For fish where fishers indicated it was the catching, not the necessarily eating that was the dominant reason for fishing, the caught database was used as this more accurately represented the recreational MWTP.

### 2.2.4 Blue Cod

This fish species is relatively abundant in cooler southern waters and is generally caught easily and in large numbers. Of the interviews where fishers were said they were targeting blue cod, 70% were in the South Island. The MWTP for an additional blue cod kept and the AWTP for all blue cod kept are outlined in table 4.

| | *Dollars per fish* | *Database used* |
|---|---|---|
| MWTP | $1.61 NZ ($ 0.76 US) | Kept |
| AWTP | $24.46 NZ ($11.50 US) | Kept |

**Table 4: MWTP and AWTP per fish for Blue cod**

### 2.2.5 Kahawai

This species is considered an important and desirable sport fishery but of a lesser order than kingfish. The initial assumption that kahawai is generally fished for subsistence purposes was not born out by the survey. Results suggested a strong sport element to the reasons why this species is targeted by fishers. This may however have been biased by the predominance of boat ramp surveys in metropolitan areas.

Kahawai are often taken as an alternate target species when available or can be found. Of the interviews where fishers were said they were targeting in kahawai, 98% were conducted in the in the North Island. The MWTP for an additional kahawai caught (as opposed to kept) and the AWTP for all kahawai kept are outlined in table 5.

| | *Dollars per fish* | *Database used* |
|---|---|---|
| MWTP | $ 3.44 NZ ($1.62 US) | Caught |
| AWTP | $ 59.05 NZ ($ 27.75 US) | Kept |

**Table 5: MWTP and AWTP per fish for kahawai**

### 2.2.6 Rock lobster

Rock lobster are a very popular eating fish. Fishers targeting rock lobster undertook more fishing trips per year than any other fishery, had the highest annual spending on recurrent fishing expenses and because of the dispersed fishing patterns presented the most difficulty for the survey to achieve the required numbers of surveys. In addition, the bid values for the interviews were initially set too high and were revisited during the interview period. The MWTP for an additional rock

lobster caught (as opposed to kept) and the AWTP for all rock lobster kept are outlined in table 6.

| | *Dollars per fish* | *Database used* |
|---|---|---|
| MWTP | $ 6.54 NZ ($3.07 US) | Caught |
| AWTP | $48.29 NZ ($22.70 US) | Kept |

**Table 6: MWTP and AWTP per fish for Rock Lobster**

## 3. CONTEXT OF RECREATIONAL FISHING IN NEW ZEALAND

How any information is used must be considered in the context of the fisheries management practices and specifically the legislation that drives the system. This is what fisheries managers are primarily concerned with and to forget this can relegate potentially useful information to an academic exercise. This section presents an overview of the relevant legal framework provided by the fisheries legislation and the rights based management system used in New Zealand.

### 3.1 Legislation

The legal framework in New Zealand is in transition between two statutes, the Fisheries Act 1983 and the Fisheries Act 1996. The latter is intended to be fully in force in the next two years but until then elements of both are in force. The Fisheries Act 1996 provides the purpose and principles, which generally apply to any decision, made under either statute. The purpose of the Fisheries Act 1996 is to "*provide for utilisation of fisheries resources while ensuring sustainability*". Utilisation is further defined to mean "*conserving, using, enhancing and developing fisheries resources to enable people to provide for their social, cultural and economic well being*." Thus for the first time, the principle of making decisions that can take into account both economic and social issues has been introduced into New Zealand fisheries legislation.

To provide for the sustainability of the fish stock, the Minister is required to set a total allowable catch (TAC) which represents the total removals (including recreational) that can be sustained from that fish stock. Ensuring sustainability of fisheries resources is the overriding objective of the fisheries legislation and this has focused recreational fishing research funds on establishing estimates of harvest levels over information to support allocation decisions.

Once the TAC has been set, there are relatively few allocation principles explicitly provided in the legislation. Once a TAC is set, the explicit allocation is primarily though the mechanism for setting the total allowable commercial catches (TACC). The legislation requires that when the Minister makes the decision to set a TACC for a fishstock that they allow for both Maori customary non-commercial fishing interests and recreational fishing interests. There is considerable debate regarding the priority and definition of these "interests" but it is implied through other legislation that customary non -commercial interests may have to be provided for first. It interesting to note that there is no expectation or requirement in the legislation to allocate to maximise the economic or national benefit. This does limit the use of economic value data in terms of allocation decisions and is probably the reason why there has been relatively little work done in New Zealand to look at economic value of recreational fishing.

### 3.2 Rights Based Management Systems

The primary fisheries management tool in New Zealand is a system of property or management rights. Of the three extractive stakeholder groups, only recreational fishers have poorly defined rights. Environmental and option use rights are not considered here as this paper is looking at extractive uses only and other legislation provides for these uses. These rights are briefly described below.

#### 3.2.1 Commercial Fishing Rights

As has been described in a number of papers (Annala 1996, Batstone et al 1999), commercial fishing in New Zealand is managed primarily using property rights and a quota management system (QMS). Fishers are allocated proportional individual transferable quota (ITQ) by fishstock in perpetuity. Fishers are able to harvest to the proportion of the fishstocks' TACC that they hold. Other management measures (i.e. reporting, vessel monitoring and area restrictions) are implemented though regulation. These property rights are considered well defined.

#### 3.2.2 Customary Fishing Rights

In 1992, New Zealand resolved legal claims by indigenous Maori over the progressive alienation of fisheries rights guaranteed in 1840 under the Treaty of Waitangi. The customary fishing right recognised by the Crown and Maori was split into two streams to facilitate

the settlement process, commercial rights and customary non-commercial use and management rights.

**Commercial allocation**

Settlement of the commercial portion of the fishing right was through the inclusion of Maori in the commercial fishing industry. Maori were initially allocated 10% of the existing ITQ and will receive 20% of any ITQ that is allocated when new species are brought within the QMS. They were also provided with $150 million to purchase 50% of the largest fishing company in New Zealand. It is considered that Maori now own or control more that 50% ITQ (by weight) in New Zealand and are expected to be the dominant commercial participant in the future.

**Customary Non-commercial use and management rights**

To resolve the non-commercial use and management more creative mechanisms had to be employed. For most Maori, this stream of the settlement was probably more important than the commercial portion of the settlement. Over the last two years, Maori have been provided with mechanisms to recognise their non-commercial fishing and management practices. Customary non-commercial use has been provided for by processes for management of the fishing activity including, representation, self-authorisation and catch reporting. In addition, mechanisms to provide for Maori to manage all non-commercial fishing (including recreational fishing) in local areas and direct input and participation (as opposed to consultation) in all fisheries management processes were developed to recognise the management element of the customary non-commercial right.

Currently an unknown proportion of the customary non-commercial harvest is currently taken as recreational fishing as some Maori may chose to exercise their rights when they require more than the recreational harvest limit.

### 3.2.3 Recreational Fishing Rights

In contrast, to both commercial and customary fishing rights, recreational fishing rights are not defined in the fisheries legislation in New Zealand. This deficiency is recognised as in some instances the recreational fishers are marginalised by the better defined (and hence more measurable) use rights of the commercial or customary non-commercial fishers. To address this issue, the Ministry of Fisheries and recreational fishing representatives are currently developing a better definition of the recreational fishing right. The details of the specific proposals to better define the recreational fishing right are detailed in section 4.1 where the use of economic value information is discussed.

## 4. POTENTIAL POLICY USES OF RECREATIONAL ECONOMIC VALUE IN NEW ZEALAND

As is the case everywhere, the use of economic information (or any other information) is constrained and directed by the fisheries legislation and management systems used. Given the context of fisheries management in New Zealand and that this type of information has never been available, it is difficult to state exactly how the economic data will be used. Without limiting the potential uses of economic information, there are four areas of policy development identified where the economic value of recreation fishing information may prove useful to fisheries managers in New Zealand. They are:

- Definition of recreational rights.
- Characterisation of the recreational fishing sector.
- Establishing costs and benefits when bringing new species into the QMS allocating commercial rights.
- Allocation between stakeholders when setting TACC.
- Enabling people to provide for social economic and cultural well being.

### 4.1 Definition of Recreational Fishing Rights

The first area that the economic value of recreational fishing information may be used is in the definition of the recreational fishing right. As noted above, the Ministry of Fisheries and the recreational fishing representatives are beginning a public consultation process to develop a better definition of this right. There are three options being considered.

**Option 1 - Discretionary allocation**

This option is essentially status quo, (i.e. no explicit right) with Minister of Fisheries continuing to make a discretionary allocation decision when setting a TACCs for a fish stock. To facilitate better recreational access it is also proposed that increased use of local area management tools would be provided to reduce the interaction with other fishers in some high use areas. The government would continue to "manage" the recreational right.

**Option 2- Proportional Share**

This option proposes that the recreational fishing right be defined as an explicit proportional share of the fish stock that would represent the recreational right. The total take by recreational fishers would vary with changes to the TAC just like commercial ITQ. Management of the fishery (i.e. constraint of recreational catch) would continue to be by the government. The process for the initial allocation of the recreational share will require further analysis and negotiation. It is likely that economic value of a particular fishery (for all participants) would form part of the matrix of factors considered when setting the initial allocation and if the proportional share is subsequently adjusted.

**Option 3 - Recreational Management Right**

This option would require an explicit proportional allocation for recreational fishing (as for option 2) but processes would be established to permit recreational fishers to manage their own harvest levels. These self-management processes would be similar to the customary non-commercial rights discussed above. This is the most radical of the proposals and would require changes and development to the current accountability, funding and representation processes for recreational fishers.

### 4.1 Characterisation of the Recreational fishery

Fisheries managers in New Zealand generally face a paucity of information in respect of recreational fishing. To date the primary focus of any recreational research was harvest levels to input into sustainability processes. However, in conjunction with other studies (Akroyd et al 2000) the economic, demographic and fishing practice information that was extracted from this value survey allows both fisheries managers and the recreational fishers to build amore robust description of the recreational fishing sector. This information could be used to:

- Confirm recreational fisher's importance as a stakeholder group.
- Understand the people who fish and how they fish.
- Allow recreational fishers to organise and fund their own representation.
- Develop and enhance joint management processes and consultation.
- Understanding compliance and behavioural incentives.
- Understanding to a greater degree the impact of changes from general policy development and sustainability measures.

### 4.3 Allocation of Property Rights to New Species

Other then the definition of utilisation (see below), only the process for bringing new species in to the QMS is the use of economic value information proposed directly in the fisheries legislation. This statutory process requires that the Minister of Fisheries "have regard to the costs and benefits" before agreeing to bring a species into the QMS. Initially intended to account for administrative costs to commercial fishers, but the scope has expanded to a more general cost benefit analysis approach that is likely include the economic value of any fishstock important to recreational fishers. Notwithstanding, any economic value information will be secondary to the overall sustainability of the fishstock.

While the majority of major commercially fished species already have ITQ allocated, there are approximately 25 species fished commercially at significant levels (and up to 225 species in total) for which the ITQ could be allocated. As species that are important to recreational fishers are considered for entry into the QMS, it is certain that the economic value of the recreational fishery will part of the matrix of information used in the of the decision process. Interestingly the legislation provides no guidance to what costs and benefits are relevant, or does it require that the economic value (or any other issue) be maximised.

A good example how this information is being used is the developing debate regarding bringing kingfish into the QMS. This species is taken primarily as a by-catch of other commercial fishing operations, but is an important recreational fishery of considerable economic value. Already recreational fishers are suggesting that due to the economic value of the recreational kingfish fishery, it should remain outside the QMS. This is likely to be where fisheries managers in New Zealand consider the first direct use of the economic value of the recreational fishery.

### 4.4 Providing for Recreational Interests when Allocating TAC

It seems that the recreational economic value information is usual used by fisheries managers to allocate fish stocks between stakeholders to achieve some measure of economic efficiency. This is not an objective stipulated by the legislative framework in New Zealand. Rather,

once a TAC is established at the sustainable level for a fish stock, the Minister then decides on a TACC and allows for both customary non-commercial fishing and recreational fishing interests. Although there is no legislative definition of recreational interests, previous decisions have focused on historic harvest levels to guide the definition of the recreational interest. This is because this was the only information on recreational fishing relevant to allocation that was available to fisheries managers. It is clear that "interest" is not limited to historic harvest levels and therefore, it is reasonable suggest the Minister of Fisheries consider he economic value of recreational fisheries when allowing for recreational fishing interest. However, because there is no economic efficiency objective, allowing for the recreational interest based solely on the economic value information is not warranted.

### 4.5 Enabling Social Economic and Cultural Well being

Probably the most nebulas policy area that the Ministry of Fisheries is considering in respect economic value in the application the purpose and principles of the Fisheries Act 1996 which apply to any decision made under any of the legislation. The purpose of that Act is to "*provide for utilisation of fisheries resources while ensuring sustainability*". Utilisation is further defined to mean "*conserving, using, enhancing and developing fisheries resources to enable people to provide for their social, cultural and economic well being."* The Ministry of Fisheries does not consider that there this section implies any priority, but rather is a signal to decision makers to look beyond fish stock sustainability and recognise the social context that fisheries management takes place in. It implies that the role of this section, and the decisions made under the legislation is to establish a framework within which people can make their own decisions, constrained by sustainability measures and the rights held by other users of the resource. Because the fisheries legislation contains no further direct references or mechanisms to cultural, social or economic objectives, it is unlikely that it was intended for these issues to over-ride sustainable utilisation as the purpose of the fisheries legislation.

Already, recreational fishers are introducing information the economic value of recreational fishing into fisheries management decisions such aquaculture permits, commercial fishing mesh size reviews and compliance initiatives. Given the Ministry of Fisheries lack of experience in using economic value information and the ambiguity of the utilisation definition provided by the legislation, it is likely that an ad hoc process of considering the merit of economic value will develop in the short term.

## 5. CONCLUSION

On balance, establishing recreational economic values for five popular fish species has raised more policy questions than it answered. Over the next few years the Ministry of Fisheries will have to explicitly consider how this information can be used in respect of fisheries management decisions in New Zealand. While there are no policy issues that the recreational value estimates are likely to be used as the sole criteria for decision making, there are a number of other policy areas where recreational economic value information will form part of the matrix of information that used.

## 6. AKNOWLEDGMENTS

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