FIORDLAND (TE MOANA O ATAWHENUA) MARINE AREA USER STUDY 2010

VOLUME 1

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PREPARED BY
DR KAY BOOTH AND DR STEPHEN ESPINER
LINDIS CONSULTING

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lindis consulting

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Prepared by	Dr Kay Booth and Dr Stephen Espiner Lindis Consulting
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Research team	Esther van Neuren, Jude Wilson and Chrys Horn (surveyors and data entry/coding), Niamh Espiner and Eriko Viviers (data entry), and Helen Davies (postal survey administrator).
Peer review	A first draft report was reviewed by representatives of the client agencies and the Guardians. A second draft report was peer reviewed by Professor James Higham (University of Otago) and Rob Greenaway (Rob Greenaway & Associates).
Contact details	Lindis Consulting kay@lindis.co.nz

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Executive Summary

In 2007 the Fiordland Marine Guardians (FMG) and agencies associated with managing the Fiordland (Te Moana o Atawhenua) Marine Area (FMA)[1] developed and administered a user monitor for the FMA (Booth et al. 2007). The current report presents data from the second iteration of the user monitor and discusses trends in use patterns and user perceptions between 2007 and 2010. The primary purpose of the 2010 iteration was to inform a review of the Fiordland (Te Moana o Atawhenua) Marine Management Act 2005 (the Act). This report is organised in two volumes: Volume 1 presents and discusses study results, while Volume 2 presents all survey data.

The monitoring method uses a questionnaire survey, administered as a postal survey (February-May 2010) and on-site at Milford Sound/Piopiotahi and Doubtful Sound/Patea (March-April 2010). The user monitor encompasses the full range of FMA users. However, commercial boat passengers were excluded from the 2010 study because the FMG/agencies felt that their views would have changed little since 2007 and their responses was not the primary information required for the review of FMA management or the Act.

The same user monitoring method was implemented in 2010 as was applied in 2007. Minor adjustments were made to the questionnaire to accommodate recommendations from the 2007 study and to address recent management initiatives. Some minor adjustments to the sampling regime also took place. None of these changes alters the ability to compare data between the years.

Use and users

Respondents to the 2010 FMA survey were primarily from the southern regions of the South Island. Respondents were predominantly male and, while drawn from all age ranges, were concentrated in their middle years (35-59 years). This profile was consistent across the monitoring period (i.e. between 2007 and 2010), although sampling changes to the commercial fishers sub-group appeared to result in a greater proportion of 'local' fishers in the 2010 sample.

Use of the FMA was shown to vary geographically and by user group. This has an impact on people's perceptions of the FMA and its values (discussed in later sections). While users were categorised for analysis purposes by their *primary* FMA activity, it is clear that respondents undertook a range of activities in the FMA. Recreational fishing was a common activity across all user groups.

For all questions related to use characteristics, little change was apparent between monitoring years. The overall pattern of use remained reasonably constant. Where relevant, specific changes are noted in the following discussion.

The people who visited the FMA most frequently were the people who worked there (i.e. commercial fishers and tourism operators/employees). Many people had a long-

[1] Department of Conservation, Environment Southland, MAF Biosecurity New Zealand, Ministry for the Environment, Ministry of Fisheries.

term association with the area, especially commercial fishers. The transitory nature of some tourism employment was evident – tourism operators/employees exhibited a shorter period of association.

Many user groups stayed within the FMA for multiple days, with long visits particularly associated with the tourism user group. Most commercial and recreational fishers had spent up to a week in the FMA on their most recent visit.

Commercial fishers had spent varying amounts of the year within the FMA – typically 5-6 months. Commercial fishers primarily accessed the FMA by boat, while all other users were dependent upon the road access points at Milford Sound/Piopiotahi and Doubtful Sound/Patea.

Data suggest some shifts in the use of different geographical areas within the FMA between 2007 and 2010. However, sampling regime adjustments may have influenced these data and, therefore, results must be treated with caution. Across all sub-groups, use of the North Fiords (coastal and fiord areas south of Milford Sound/Piopiotahi and north of Thompson Sound) dropped and, with the exception of tourism operators/employees, use of the South Fiords (coastal and fiord areas south of Doubtful Sound/Patea) increased. Doubtful Sound/Patea's share of total visits remained static, while sub-groups' use of Milford Sound/Piopiotahi either remained static or increased.

Values and motivations

Motives for visiting the FMA were multiple and varied, as reported in 2007. Commercial fishers had the most narrowly focused reasons for being in the FMA ('to work' and 'to catch fish') but even this group rated experiencing Fiordland's 'special character' as relatively important. The other 'worker' category (tourism operators/employees) exhibited various reasons (beyond work rationale) for being in the FMA. Recreational fishers/boaties were visiting for a wide array of reasons, of which catching fish was relatively less important compared with some environmental and social reasons.

An important motivation for all sub-groups was to experience the special character of Fiordland. Dominant reasons for all sub-groups, with the exception of commercial fishers, were nature-based: 'To experience nature' and 'to view scenery'. The following reasons were rated highly (mean score >5) by at least two of the four sub-groups:

- To experience the special character of Fiordland
- To experience nature
- To view scenery
- To work
- To see a new place
- To see wildlife
- To catch fish/shellfish
- To experience wilderness
- To experience a quiet place
- To pursue recreational activities

As found in 2007, cultural and spiritual reasons did not appear to be a strong motivator for visiting the FMA in 2010.

Changes for all sub-groups between the monitoring periods were evident with respect to the relative importance of visit motives, but collectively they did not suggest any trends across all FMA users.

Overall, the values held for the FMA remained constant between 2007 and 2010, despite some changes within sub-groups. As found in 2007, almost all sub-groups rated 'beautiful scenery and views' as the most important value of the FMA. Other values that were very important to all user groups were:

- Presence of unique wildlife
- A wide variety of marine species
- Absence of marine pests and weeds
- High water quality
- Remote wilderness places
- Peace and quiet

Consistent with responses about motivations for visiting, people said Maori cultural values and spiritual values were less important to them. Low importance scores were attributed to the opportunity of having 'plentiful opportunities for tourism'.

Perceptions of change in FMA quality

Perceptions of changes in the quality of the FMA varied by user group. Commercial fishers and tourism users displayed a positive (optimistic) trend; a lower proportion in 2010 expressed the view that the quality of the FMA had worsened in the previous five years and, in the case of commercial fishers, a higher proportion indicated it had improved. Overall, recreational fishers/boaties were more pessimistic in 2010 than in 2007. The proportions of 'other' users reporting improved and worse FMA quality *both* increased between 2007 and 2010 (with a decrease in the proportion recording 'stayed the same'), suggesting a diverse set of opinions.

Perceived threats

Few activities were perceived to represent major current threats to the area. Marine pests and pollution were perceived as the greatest threats by all sub-groups. Tourism and commercial fishing were seen as potential threats by most user groups. The lowest perceived threats were associated with non-motorised recreational craft. These findings closely resemble the 2007 results, with perceptions of the most significant threats largely unchanged.

Most people reported that they had seen, read or heard information about marine pests. Between 2007 and 2010, the proportion of commercial fishers encountering information about pests increased, as did their self-reported ability to name marine pests. The other sub-groups remained static or decreased on these factors.

Between one- and two-thirds of each user group reported that they could name marine pests. Of the pests identified by respondents, three were most frequently mentioned (both in 2007 and 2010): didymo, undaria and sea squirt.

Owners/operators of marine vessels indicated that they were very willing to take action against marine pests, particularly: maintaining an active anti-fouling coating on the vessel, carrying out regular inspections of the vessel and equipment for the presence of fouling, and out-of-water cleaning and drying of the vessel's hull. The action that respondents were least willing to carry out was in-water cleaning of the vessel's hull. These preferences remained unchanged from 2007.

The ability to draw conclusions about respondents' preventive actions being taken against marine pest introduction, was restricted owing to small sample sizes for that question. But it appears that, although the willingness of the recreational fisher/boatie sub-group has remained stable over the monitoring period, there have been increases in willingness to carry out marine pest actions within all other sub-groups and most actions.

Marine reserves

Perceptions of marine reserves were stable between 2007 and 2010. The current level of marine reserve protection was considered to be adequate by respondents. Respondents tended to over-estimate the number of marine reserves (a change from 2007) and similarly the proportion of the FMA that is protected by marine reserves. The number and size of marine reserves remained the same between 2007 and 2010: ten marine reserves encompassing 1.1% of the FMA.

Respondents indicated that marine reserves have a positive influence upon enjoyment and use. The indicators used to gauge awareness (knowledge of numbers of reserves and areal extent) suggested many people lack knowledge of marine reserves. However, most people appeared to understand the rules surrounding marine reserves, with the exception of widespread confusion about feeding fish and, to a lesser extent, about anchoring.

FMA management

Most respondents had seen or heard information about the management of the FMA, mainly from the FMA User Guide, but also information brochures and signs at the water's edge. Some other information sources (such as newspapers) were used by particular user groups. Few differences between the monitoring periods were evident with respect to information sources.

Most people did not feel very well-informed about management of the FMA. While commercial fishers felt better informed in 2010 (c.f. 2007), some of the other sub-groups show the reverse trend. High proportions of users could not answer some questions as they said they did not know enough about FMA management or the FMG to do so.

The data suggest that the current management regime is not having any substantial positive or negative effect on people's use or experience of Fiordland. Current fishing regulations are having a slightly positive effect on recreational and commercial fishing activity in Fiordland and similarly upon enjoyment of recreational fishing.

Trends between monitoring periods were slight and positive, especially for the recreational fisher/boatie sub-group.

Most FMA users said they did not want to change any aspect of the current FMA management. Smaller proportions indicated they wanted changes in 2010 compared with 2007.

Awareness of the existence of the Guardians prior to participating in the survey was in the mid range (i.e. 45-64%), except for commercial fishers, with all of those respondents reporting that they knew of the FMG. Most respondents seemed reasonably knowledgeable about the role of the Guardians.

Conclusions

Overall, use patterns and users' perceptions of the FMA appear to have changed little between 2007 and 2010. The uniformity of findings is the primary conclusion of this study. Given the short 3-year period between iterations of the monitor, the relative stability in user perceptions is perhaps not surprising.

Some differences between 2007 and 2010 were found for specific sub-groups, although few trends were apparent across *all* user groups. In other words, the shifts in perceptions of the FMA do not represent a coherent or consistent (amongst users) set of changes in perception by all types of users.

Many questions in the survey provide for users to identify 'other' responses, thus any 'new' or emerging threats and issues may be captured. No emerging issues were apparent from the 2010 study.

Three methodological conclusions may be drawn. First, it would be wise to avoid overlap with other user surveys in the future, where 'competition' for survey respondents could occur. It is likely that the concurrent administration of the Milford Sound/Piopiotahi User Monitor and the FMA survey decreased the number of recreational fisher/boatie participants.

Second, the commercial fishers' contacts list remains problematic. In order to obtain a larger sample of commercial fishers (which would be very desirable), further action is required. A balance needs to be reached between contacting people who do not fish in the FMA (and potentially annoying them) and increasing this sub-sample. Indeed, any further refinements to maximise response rates for all sub-groups (and thus increase sample sizes) would be helpful.

Third, the value to the FMG/agencies from each information item (survey question/s) is worthy of reconsideration prior to the next administration of the survey. While monitoring requires consistency of application of the method to ensure any changes recorded relate to the phenomenon being measured, the monitor was designed to allow for some addition/deletion of questions. Over time, some issues may no longer be pertinent to management, while other factors may emerge and require inclusion.

The user monitor is valuable as it measures users' perceptions of the FMA: a critical element of management. Benefit gained from the monitor will increase over time as

time-series data build up with each iteration of the survey. Trends analysis will offer greater insight as the data time-series increases. It is suggested that the monitor is repeated every five years, or whenever the FMG/agencies detect changes associated with FMA use that demand attention. Commercial boat passengers should be monitored in future iterations.

1. Introduction

In 2007 the Fiordland Marine Guardians (FMG) and agencies associated with managing the Fiordland (Te Moana o Atawhenua) Marine Area (FMA)[2] developed and administered a user monitor for the FMA (Booth et al. 2007). This report presents data from the second iteration of the user monitor and discusses trends in use patterns and user perceptions between 2007 and 2010 pertaining to:

- Description of use and users
- Satisfaction measures
- Perception of FMA values and threats
- Knowledge of the marine environment and management measures
- Effectiveness of awareness campaigns

The monitor was implemented in 2010 to inform a review of the management of the FMA.

The user monitoring method developed and applied in 2007 was replicated in 2010, with some minor alterations (discussed in section 2). None of these changes alters the ability to compare data between the years.

The monitoring method uses a questionnaire survey, administered as a postal survey (February-May 2010) and on-site at Milford Sound/Piopiotahi and Doubtful Sound/Patea (March-April 2010). In 2007, in-depth interviews with selected key informants were conducted to assist with the interpretation of survey data. Because interviews do not form part of the monitoring method, they were not conducted in 2010.

The user monitor encompasses the full range of FMA users. However commercial boat passengers were excluded from the 2010 study because the FMG/agencies felt that their views would have changed little since 2007 and their responses was not the primary information required for the review of FMA management or the Act.

Because its primary focus was to identify trends in use and users' perceptions of the FMA, this report presents comparative analyses of the 2007 and 2010 data. Future iterations of the monitor will establish time series data and identify longer-term trends. In this way, its value will increase over time.

The study was undertaken by Lindis Consulting for the FMG and associated agencies. A draft of the report was peer reviewed by Professor James Higham (University of Otago) and Rob Greenaway (Rob Greenaway & Associates).

Volume 1 of this report presents and discusses study results. Volume 2 presents all survey data.

[2] Department of Conservation, Environment Southland, MAF Biosecurity New Zealand, Ministry for the Environment, Ministry of Fisheries.

2. Description of the monitoring method

2.1 Overview of the method

This section provides a brief outline of the monitoring method, which is described in detail in Booth et al. (2007).

The user monitor was conducted via a postal survey (February-May 2010) and on-site administration at Milford Sound/Piopiotahi and Doubtful Sound/Patea, the two main visitor access points to the FMA (March-April 2010). The full-length 'user' questionnaire, developed as one of two monitoring questionnaires, was used for all respondents. An abbreviated questionnaire suitable for commercial boat passengers (the 'visitor' questionnaire) was not used in 2010, as this sub-group was excluded from the 2010 study. All data were analysed by user sub-group: commercial fishers, recreational fishers/boaties, tourism operators/employees and 'other' users (a category which includes researchers, and non-commercial divers and kayakers).

The **postal survey** targeted FMA users known to the FMG/agencies. Lists of FMA users were provided by the FMG/agencies, all of whom were mailed a questionnaire and sent three reminders (and additional questionnaires/freepost envelopes). A cash prize incentive was used for the postal survey.

On-site surveyors approached FMA users at the boat ramps/jetties in Milford Sound/Piopiotahi and Doubtful Sound/Patea. All groups of users were approached and every member of the group was given a questionnaire, together with a freepost return envelope, irrespective of whether they were entering or exiting the FMA. These questionnaires were treated as part of the postal survey, since they were also posted back.

The on-site survey phase was also used to maximise representation of tourism employees who were not on the initial mailing list for the postal survey. Users who had already completed a questionnaire (via the postal survey) were ineligible for the on-site survey. No incentives for questionnaire completion were used for the on-site survey.

2.2 Survey sample

This section discusses sampling changes and makes observations about the sample design for the 2010 survey iteration compared with the 2007 survey.

The most significant variation in the sample design was the exclusion of commercial boat passengers (cruise, dive and kayak passengers on guided trips) in 2010. The FMG/agencies felt that their inclusion would not assist in the review of the Fiordland (Te Moana o Atawhenua) Marine Management Act 2005, which was the primary purpose of the 2010 monitor iteration. The rationale was that commercial boat passengers' views were unlikely to have changed much since 2007 and their responses was not the primary information required for the review of FMA management or the Act.

Another difference was that the on-site survey at Milford Sound/Piopiotahi was conducted at the same time as the Milford Sound/Piopiotahi User Monitor 2010 (undertaken as part of the Fiordland Integrated Coastal Management Project). Recreational fishers/boaties were given two questionnaires by surveyors (the FMA questionnaire and the Milford Sound/Piopiotahi user questionnaire). They were asked to return both questionnaires in the freepost envelopes provided. The increased burden of two concurrent surveys may have been responsible for the drop in the number of completed questionnaires obtained from recreational fishers/boaties in 2010 (n=65) compared with 2007 (n=93).

In contrast, the surveyor at Doubtful Sound/Patea distributed a greater number of questionnaires to recreational boaties in 2010 compared with 2007. The Deep Cove Hostel manager commented on the high numbers of recreational boaties during the 2010 survey period.

The number of completed questionnaires collected on-site from tourism operators/employees at both Milford Sound/Piopiotahi and Doubtful Sound/Patea increased in 2010 (the proportion of questionnaires returned increased). This most likely reflects greater rigour on the part of the surveyors (tenacity is required to get the questionnaires back). It is despite employees based at Milford Sound/Piopiotahi being asked to complete several surveys during February-April 2010 (the FMA survey, the Milford Sound/Piopiotahi User Monitor and tourism company surveys).

Due to a shortcoming identified in the 2007 postal survey, a change was made to the mail-out system for commercial fishers. In 2007, 48 commercial fishers (out of the 255 commercial fishers who were posted a questionnaire) returned their surveys stating they did not fish in the FMA. Therefore, care was taken to 'tidy' the mailing list in 2010. This comprised two actions. First, duplicates were removed (fishers who had multiple listings) which reduced the size of the mailing list. Second, only those commercial fishers known to be actively fishing in the FMA (using advice from the Ministry of Fisheries) were sent reminders. This resulted in a substantial drop in reminders mailed to this user group. Given that 87% of the reminders were sent to Southland-based fishers, this is likely to have contributed to the increase in the proportion of Southland resident commercial fishers in the sample (87% in 2010 compared with 45% in 2007). Both of these actions are likely to have contributed to the smaller number of questionnaires completed by commercial fishers in 2010 (n=39) compared with 2007 (n=71) because some eligible fishers would have received fewer questionnaires and reminders.

In summary, differences in the 2010 survey sample were:

- No commercial boat passenger sample
- Decreased commercial fisher sample and more 'locals'
- Decreased recreational fisher/boatie sample
- Greater proportion of recreational fishers/boaties contacted via Doubtful Sound/Patea compared with Milford Sound/Piopiotahi
- Increased tourism operator/employee sample
- Little change to 'other' FMA user numbers

Key aspects of the sample design for the 2007 and 2010 user surveys are recorded in Table 2.1, including sample sizes for all sub-groups.

Table 2.1: Sampling statistics for 2007 and 2010

	2007	2010
Total sample size		
Sample size (no. of completed questionnaires)	293	235
Postal survey		
Size of initial mail out	432	278
Number of 'returns to sender' / number addresses corrected	11 / 4 = 7	19 / 10 = 9
Known ineligible contacts (returned surveys - ticked 'do not use FMA')	48	10
On-site survey		
Number surveys distributed on-site	Milford = 186 Doubtful = 151	Milford = 245 Doubtful = 247
Survey period at Milford Sound/Piopiotahi	31 March - 15 April	28 March - 11 April
Survey period at Doubtful Sound/Patea	5-15 April	1-11 April
Easter and school holiday dates	Good Friday = 6 April School holidays = 6-22 April	Good Friday = 2 April School holidays = 1-18 April
Number of surveyors at Milford Sound/Piopiotahi	1	2 NB: 2010 survey conducted in tandem with the Milford Sound/Piopiotahi User Monitor 2010
Number of surveyors at Doubtful Sound/Patea	1	1
Response rate statistics		
Questionnaires posted	432	278
Questionnaires distributed on-site	328	492
Returned completed questionnaires	293 Mail-out (n=161) On-site distribution (n=132)	235 Mail-out (n=100) On-site distribution (n=135)
Gone, no address	7	9
Known ineligible contacts (returned surveys - ticked 'do not use FMA')	48	10
Overall survey response rate	42%[3]	31%[4]

Notes:

1. 2007 commercial boat passenger sample is excluded to facilitate comparison between years.
2. Questionnaires distributed on-site but returned by freepost are included in the postal survey sample statistics.
3. Reduction in the size of the postal survey initial mail out primarily resulted from the removal of duplicate listings for commercial fishers.
4. Increases in the number of surveys distributed on-site relates to both workers and recreational fishers/boaties (at both locations).

[3] Calculated as [293 / (328 + 432 - 7 - 48)] x 100 / 1.
[4] Calculated as [235 / (492 + 278 – 9 – 10)] x 100 / 1.

Many people did not return the questionnaires distributed by post and others (a small number) refused to take part in the on-site survey at Milford Sound/Piopiotahi and Doubtful Sound/Patea. No assumptions can be made about the nature of non-respondents (whether they are different from the people who did take part in the survey) because no information is available about their characteristics or use patterns.

2.3 Questionnaire

Minor revisions were made to the 2007 survey questionnaire for use in the 2010 survey. These included recommendations from the 2007 study (see Booth et al. 2007, page 81) and two changes suggested by the FMG/agencies. Revisions were:

1. Q13 'What activities are allowed in marine reserves?' reworded to overcome the problem that researchers may be permitted to do activities that are usually not allowed. Revised wording in highlighted in bold type:

   The list below contains a variety of marine activities. For <u>each</u> activity, please show whether you think, ***under normal circumstances, the activity*** *is allowed, sometimes allowed, or never allowed in marine reserves (etc).*

2. Q26 'What is the role of the Fiordland Marine Guardians?' reworded to avoid confusion about the FMG's role in the response item 'to help assess applications for commercial operations within the FMA'. This response item was deleted and a substitute item inserted:

   To audit commercial fishing operations

3. A new question added to ask about the activities users undertake in the FMA, in order to provide more information about the nature of FMA use. New Q1 inserted (and all question numbering revised):

   What activities have you <u>ever</u> undertaken in the Fiordland Marine Area?

   Owing to the addition of a new Q1, question numbers differ between the 2007 and 2010 questionnaires.

4. A new response item 'hunter' added to Q2 'Which of the following best described your use of the Fiordland Marine Area?' This was a suggestion from the FMG/agencies.

5. A new response item 'Fiordland Marine Area User Guide' added to Q22 'Where did you see or hear the information about the current management of the Fiordland Marine Area?' This was a suggestion from the FMG/agencies.

2.4 Analysis

Data were analysed using SPSS and Excel spreadsheets were used to format graphs and tables. All data are presented in Volume 2 of this report.

Data were analysed separately for each user sub-group. Sub-groups were identified from responses to Q2 ('which of the following best describes your use of the FMA?'). Membership of these groups is not mutually exclusive (people can belong to several sub-groups at one time or move between groups over time), and each sub-group represents a spectrum of use and user characteristics (individuals do not form a homogeneous collective with respect to their use of the FMA). Therefore, the classification of user sub-groups applied in this study should be considered a *guide*, used for survey design and discussion purposes.

In order for meaningful statistical analyses to be undertaken, it was necessary to amalgamate some sub-group categories that had small numbers of respondents. Table 2.2 describes the analytical categories used in this report.

All results are presented on the basis of these sub-groups. When comparing results across user sub-groups, comparisons are made in terms of proportions rather than raw figures because of the different sample sizes and sampling fractions for each group.

Error margins for the frequency data for all sub-groups are provided in Table 2.2. As the sample design was more complex than a simple random sample (on which these errors are calculated), these are estimates only.

Table 2.2: Sub-group analysis categories

Analytical user category	Number of respondents		Error Margin (+/-)		Composition of analytical user category	Number of respondents	
	2007	2010	2007	2010		2007	2010
Commercial fishers	71	39	11.6%	15.7%	Commercial fishers	71	39
Recreational fishers/boaties	93	65	10.2%	12.1%	Recreational fishers/boaties	93	65
Tourism operators/employees	75	86	11.3%	10.6%	Tourism operators/employees	64	81
					Charter vessel operators	11	5
Other	54	45	13.3%	14.6%	Kayakers (not commercial trip)	8	9
					Divers (not commercial trip)	20	11
					Hunters	NA	6
					Researchers	6	7
					Other FMA users	20	12
TOTAL	**293**	**235**				**293**	**235**

Notes:

1. Commercial boat passengers ('visitors') were surveyed in 2007 (n=509) but not in 2010. They are not represented in this table.
2. 'Other FMA users' comprised:
   2007: hunters (5), trampers (1), aviators/pilots (2), government employees (2), iwi (1), people sheltering from bad weather (2), student (1), hostel manager (1), Meridian Energy worker (1), no comment (4).
   2010: government employee (5), recreation/visitor (4), research boat skipper (2), paua diver (1), not specified (1).

3. User characteristics: Who are the users?

3.1 Summary

Respondents to the 2010 FMA survey were primarily from the southern regions of the South Island. Respondents were predominantly male and, while drawn from all age ranges, were concentrated in their middle years (35-59 years). This profile was consistent across the monitoring periods (i.e. between 2007 and 2010), although sampling changes to the commercial fishers sub-group appeared to result in a greater proportion of 'local' fishers in the 2010 sample.

3.2 Home location

Respondents were asked where they normally live (Q35). Most respondents (93%) indicated that they lived in New Zealand – 89% of recreational fishers/boaties, 100% of commercial fishers, 93% of tourism operators/employees and 89% of 'others'. A greater proportion of respondents were from overseas in 2010 (7%) compared with 2007 (3%); the highest proportions emanating from the recreational fishers/boaties and 'other' sub-groups. Statistical analysis of differences between 2010 and 2007 for this variable was inconclusive.[5]

Figure 3.1 presents results for all respondents who stated they lived in New Zealand and illustrates that FMA respondents in 2010 were primarily from the southern regions, as found in 2007. By far the largest proportion of people using the FMA normally lived in Southland. Otago was the next most common home region. Relatively few FMA users normally lived outside of these southern areas and few came from the North Island. The 2007 and 2010 results were similar across the total sample, although some sub-group differences were apparent. In this (and all other) analysis, the 2007 commercial boat passenger sample was not included.

Commercial fishers were heavily concentrated in Southland (87%), with 5% drawn from the North Island. This sub-group exhibited the most striking difference between the monitoring periods, which was an increased proportion of Southlanders, a statistically significantly change.[6] This finding is likely to relate to the focus upon *known* FMA commercial fishers in the 2010 postal survey (discussed in section 2.2) rather than a real shift in the origin of these users.

[5] Because data are treated as a set of sub-groups, the number of cases in each sample is often small, making it meaningless to test for statistical significance. Often there may be apparent differences in scores or percentages between monitoring years or within sub-groups. The inability to test for significance, or a test that reveals no statistically significant difference, does not mean that the observed difference is invalid or spurious. In the former case, such a result simply means that there are insufficient cases to determine the statistical significance. In the latter case, this means there is a greater than 5% chance that the findings could have occurred by chance (statistical significance is normally reported at two levels: 0.05 – there is only a 5% chance that the findings would occur by chance; and 0.01 – there is only a 1% chance that the findings would occur by chance).

[6] Chi square statistics: χ^2=19.1, df=2, p=.019.

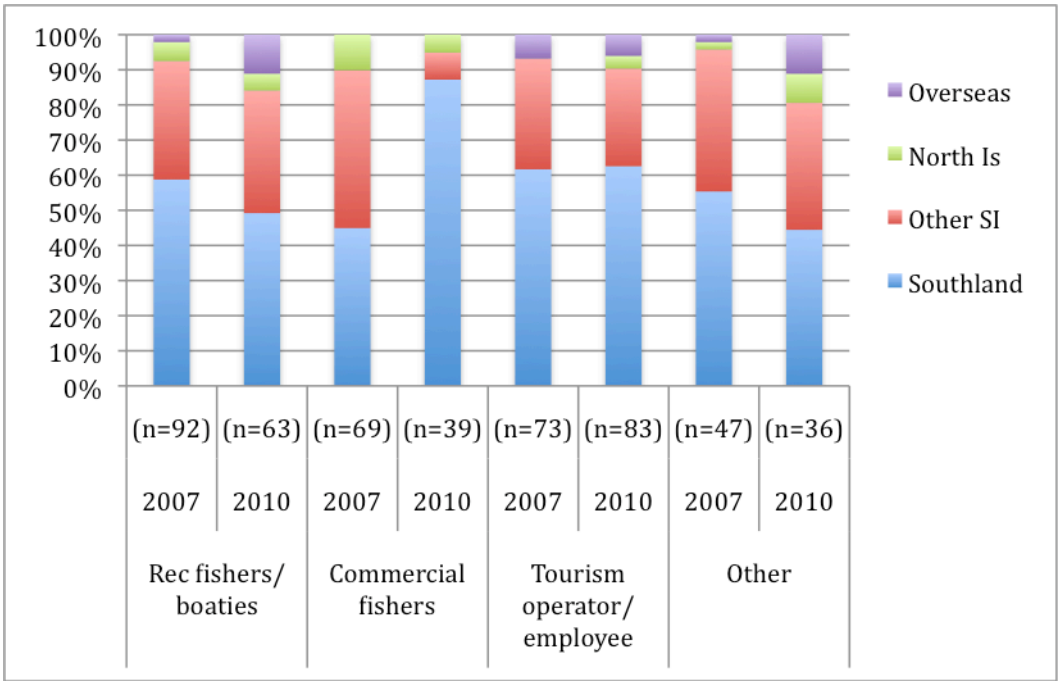


Figure 3.1: FMA users' normal place of residence - Q35

3.3 Gender

In both 2007 and 2010, most FMA survey respondents were male (Figure 3.2). This was particularly the case for commercial fishers (100%) and 'other' users (78%). Approximately two thirds of recreational fishers/boaties (66%) and tourism operators/employees (64%) were male.

A smaller proportion of 2010 respondents were women (c.f. 2007), except for recreational fishers/boaties (within that sub-group the percentage of women respondents increased from 24% to 34%). No statistically significant differences for any sub-group were apparent between the monitoring periods for gender.

3.4 Age

The FMA continues to be used by people from across all age brackets, with a large proportion of users in their middle years (35-59 years) (Figure 3.3). Respondents in the recreational fishers/boaties sub-group were the most diverse in terms of age and nearly one-quarter (24%) were over 60 years. Tourism employees had the youngest profile, with half (51%) of the respondents under the age of 30 years. Commercial fishers were particularly concentrated in the 35-59 years (87%), while over half (53%) of 'other' users were drawn from the 45-54 years age bracket.

The age distribution of FMA users does not appear to have altered between 2007 and 2010 - no statistical differences between 2007 and 2010 were evident for age (data were amalgamated into four categories to facilitate this analysis: <30 years; 30-44 years; 45-59 years; 60+ years).

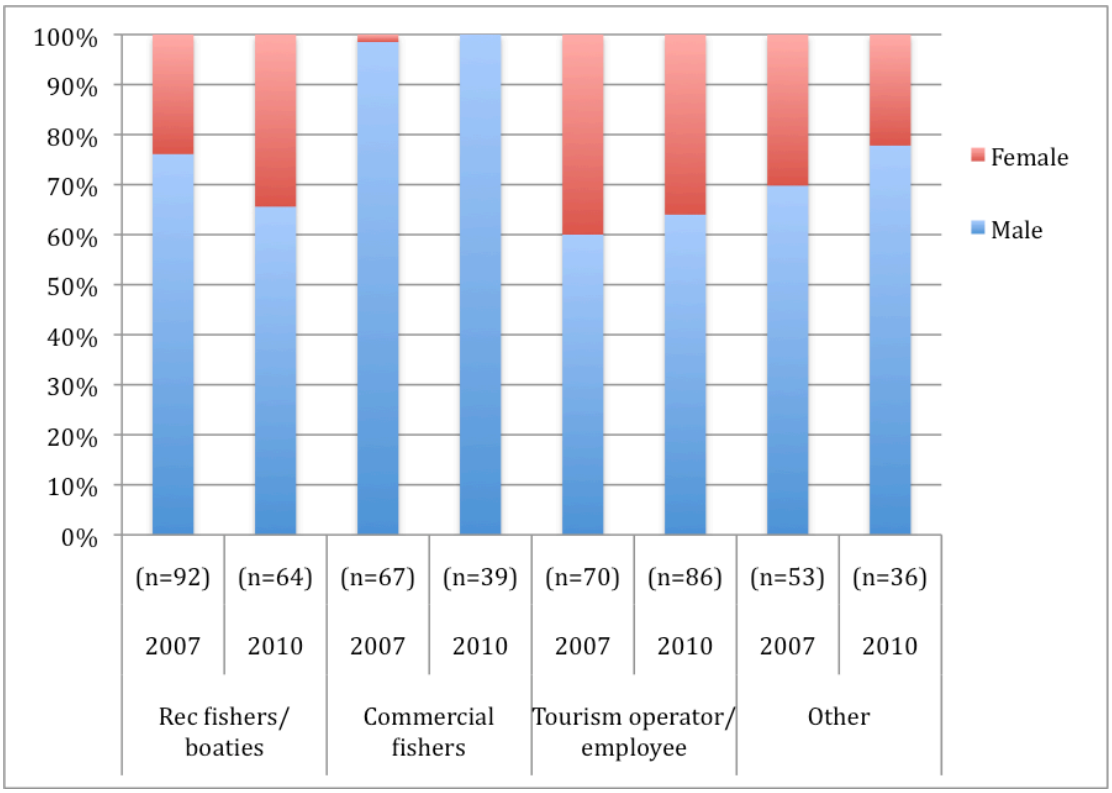


Figure 3.2: FMA users' gender – Q36

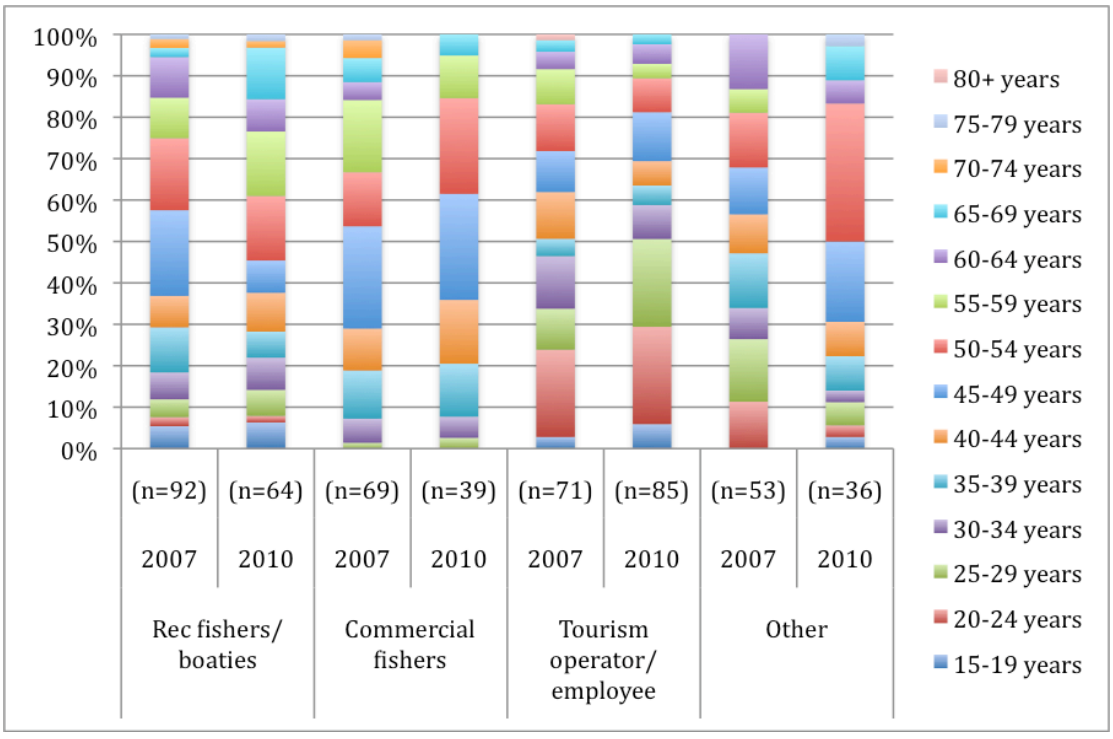


Figure 3.3: FMA users' age – Q37

4. Use characteristics and patterns

4.1 Summary

Use of the FMA was shown to vary geographically and by user group. This has an impact on people's perceptions of the FMA and its values (discussed in later sections). While users were categorised for analysis purposes by their *primary* FMA activity, it is clear from responses to additional questions that respondents undertook a range of activities in the FMA. Recreational fishing was a common activity across all user groups.

For all questions related to use characteristics, little change was apparent between monitoring years. The overall pattern of use remained reasonably constant. Where relevant, specific changes are noted in the following discussion.

The people who visited the FMA most frequently were the people who worked there (i.e. commercial fishers and tourism operators/employees). Many people had a long-term association with the area, especially commercial fishers. The transitory nature of some tourism employment was evident – tourism operators/employees exhibited a shorter period of association.

Many user groups stayed within the FMA for multiple days, with long visits particularly associated with the tourism user group. Most commercial and recreational fishers had spent up to a week in the FMA on their most recent visit.

Data suggest some shifts in the use of different geographical areas within the FMA between 2007 and 2010. However, sampling regime adjustments (particularly the increased proportion of recreational fishers/boaties from Doubtful Sound/Patea and Southland-based commercial fishers) may have influenced these data and, therefore, results must be treated with caution. Across all sub-groups, use of the North Fiords dropped and, with the exception of tourism operators/employees, use of the South Fiords increased. Doubtful Sound/Patea's share of total visits remained static, while sub-groups' use of Milford Sound/Piopiotahi either remained static or increased.

Commercial fishers had spent varying amounts of the year within the FMA – typically 5-6 months. Commercial fishers primarily accessed the FMA by boat, while all other users were dependent upon the road access points at Milford Sound/Piopiotahi and Doubtful Sound/Patea.

4.2 Activities undertaken

Survey analysis and reporting is predicated on a classification by sub-group. All analyses were based on responses to Q2 of the questionnaire: 'which of the following best describes your use of the FMA'. In other words, people were categorised based on their *primary* activity. However, some questions provide insight into the nature of FMA use more generally. Q1 enquired into all the activities respondents had ever undertaken in the FMA and so provides a picture of overall use. This was a new question in 2010 - it was not asked in 2007.

It is apparent that members of all user groups have undertaken a wide variety of activities in the FMA. Most prevalent is recreational fishing - a common activity for *all* sub-groups (Figure 4.1). Over half of respondents in all sub-groups said that they fished recreationally in the FMA. Some respondents (n=33, 15%) had undertaken activities in the FMA other than those listed in Q1 (Table 4.1).

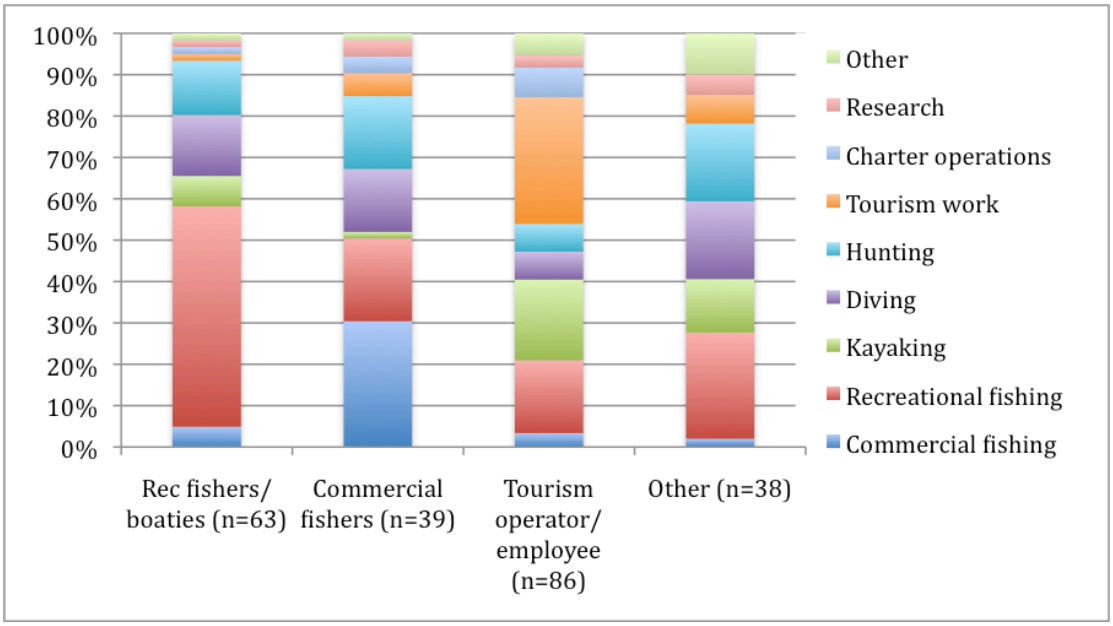


Figure 4.1: FMA activities ever undertaken (2010) – Q1

Table 4.1: Other activities undertaken in the FMA – Q1

n	Other activity
8	Walking, hiking, tramping
5	Work - government
4	Paua diving, snorkelling, swimming
3	Deer trapping, venison recovery
3	Visitor, sightseeing
2	Work - other
2	Helicopter operations
1	Conservation holiday clean up/seal counts
1	Documenting Maori caves and campsites
1	Kaitiakitanga/recreation
1	Tramping/flying
2	No answer given

Two survey questions enquired into fishing activity. Q31 asked whether respondents had fished for recreation in the FMA (Table 4.2). Not surprisingly, recreational fishers/boaties were most likely to answer 'yes' to this question. That 100% of these respondents are not recreational fishers can probably be attributed to the fact that some respondents (15%) are 'boaties' without participating in the activity of fishing.

The most evident change between the survey periods, relates to the proportion of commercial fishers who reported participation in recreational fishing – an increase of almost 50% (although this result was not found to be statistically significant).

Table 4.2: Percentage undertaking recreational fishing in the FMA – Q31

	Rec fishers/ boaties		Commercial fishers		Tourism operator/ employee		Other	
	2007 (n=87)	2010 (n=65)	2007 (n=58)	2010 (n=38)	2007 (n=72)	2010 (n=86)	2007 (n=52)	2010 (n=36)
Yes	92.0	86.2	55.2	73.7	52.8	53.0	59.6	66.7
No	8.0	13.8	44.8	26.3	47.2	47.0	40.4	33.3

A similar question (Q28) asked whether the respondent commercially fished in the FMA (Table 4.3). Results indicate that some people undertook commercial fishing as a secondary activity (it was not their main use of the FMA), but these numbers were very small.

Not surprisingly, 87% of 'commercial fishers' answered 'yes' to this question. It could be expected that 100% of the commercial fisher sub-group would state that they commercially fished in the FMA. The 13% difference may be explained by people completing the questionnaire because they owned or operated commercial fishing businesses using the FMA (but did not personally fish in the area). Only two people in any of the other user groups indicated that they currently fished commercially in Fiordland – 2% of recreational fishers/boaties, 1% of tourism operators/employees and none from the 'other' sub-group.

There was almost no change between 2007 and 2010 in the proportion of commercial fishers who reported commercial fishing in the FMA. Numbers for other sub-groups active in commercial fishing were too small for conclusions to be drawn.

Table 4.3: Percentage undertaking commercial fishing in the FMA – Q28

	Rec fishers/ boaties		Commercial fishers		Tourism operator/ employee		Other	
	2007 (n=89)	2010 (n=63)	2007 (n=62)	2010 (n=39)	2007 (n=70)	2010 (n=86)	2007 (n=52)	2010 (n=36)
Yes	3.4	1.6	85.5	87.2	1.4	1.2	1.9	0.0
No	96.6	98.4	14.5	12.8	98.6	98.8	98.1	100.0

4.3 Frequency of visit

Data on frequency of visit were classified into low, medium or high use levels, as follows:

- Low use level: Once per year or less
- Medium use level: Between 2 and 100 visits per year

- High use level: More than 100 visits per year

People who worked in the FMA used it the most frequently. Tourism operators/employees recorded the highest frequency of use, with 34% of respondents in this group using the area between 2-40 times per year, and 64% using the area more than 100 times per year. Commercial fishers also used the area relatively frequently, with almost 84% visiting between 2-40 times per year. Recreational fishers and respondents in the 'other' category recorded lower use frequencies. See Figure 4.2.

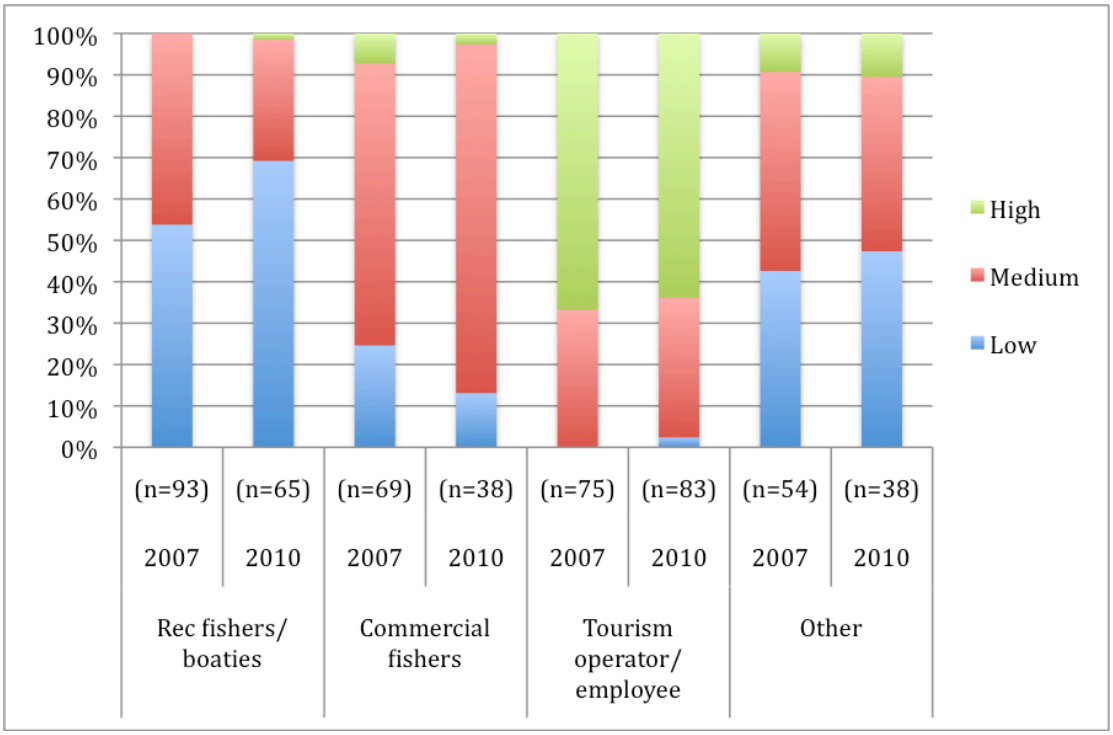


Figure 4.2: FMA users' frequency of use – Q3

Between the 2007 and 2010 monitoring periods, the relative levels of use frequency between sub-groups remained the same. However, within each sub-group, some changes have occurred. This includes a higher proportion of commercial fishers in the 'medium' category, and more recreational fishers/boaties in the low use category. The only statistically significant difference was for recreational fishers/boaties.[7]

4.4 Period of time respondents have used the FMA

Amongst survey respondents, commercial fishers have been using the FMA for the longest period of time (Figure 4.3), a finding that remained unchanged between monitoring periods. Just over two-thirds of this group have a 20 year (or more) history of use; a substantial, although not statistically significant, increase since 2007. Only 3% had been using Fiordland for less than five years.

[7] Chi square statistics: χ^2=5.77, df=2, p=.05.

In contrast, 'tourism operators and employees' had the shortest length of association of all sub-groups overall. Over half (59%) had been visiting the area for five years or less, and the proportion of this sub-group with an association less than one year increased between 2007 (16%) and 2010 (28%). This result could not be confirmed via tests of statistical significance. However, some tourism operators/employees (one-third) had been visiting the FMA for more than 11 years.

Compared with the first iteration of the monitor, the 2010 data show that 'other' FMA users appear to have increased their length of association and recreational fishers/boaties have decreased their length of association. These results were not statistically significant.

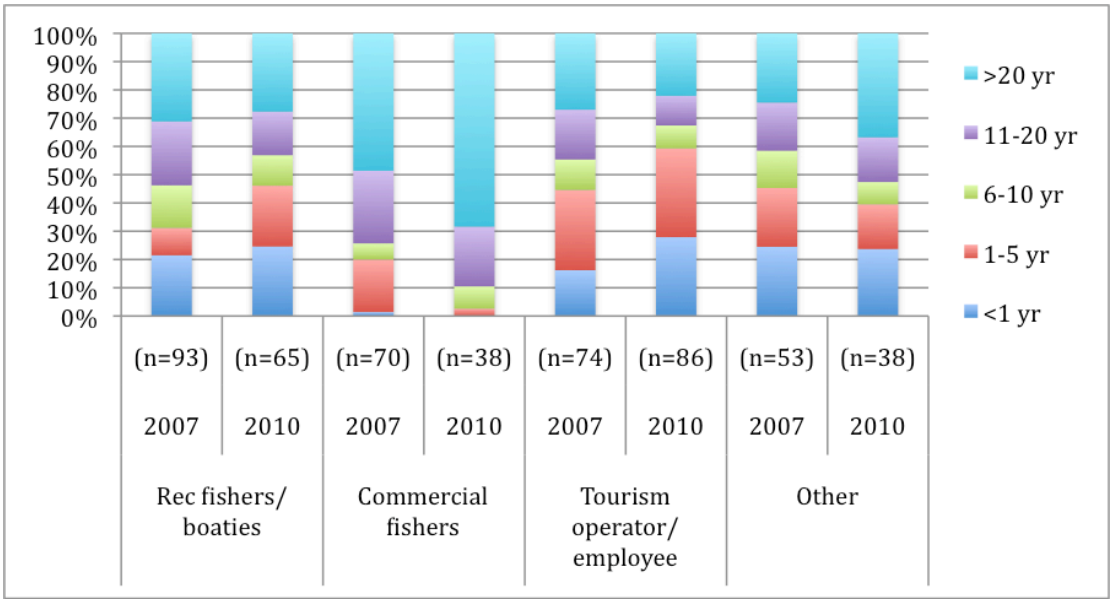


Figure 4.3: FMA users' length of time associated with the FMA – Q4

4.5 Length of stay

Tourism operators/employees reported spending the most time in the FMA; 54% stayed for more than seven days on their last visit. The majority of recreational fishers/boaties (79%) and commercial fishers (61%) spent between 2-7 days in the area on their last visit. See Figure 4.4.

Patterns of length of stay have not changed substantially between or within the sub-groups from 2007 to 2010. The most notable differences were that tourism operators/employees' visits had lengthened and 'others' had shifted from trips of one day or less, to trips of 2-7 days. Tests did not reveal any statistically significant differences.

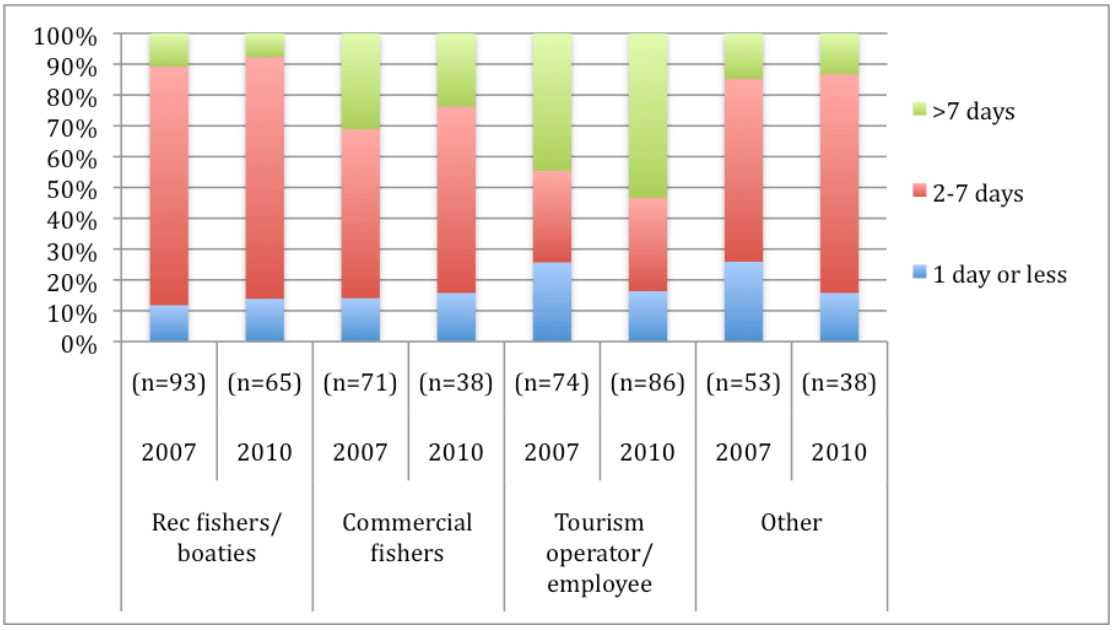


Figure 4.4: FMA users' length of visit to the FMA – Q6

4.6 Fishing activity

Figure 4.5 illustrates that the length of time spent *commercially* fishing in the FMA varied considerably between commercial fishers.

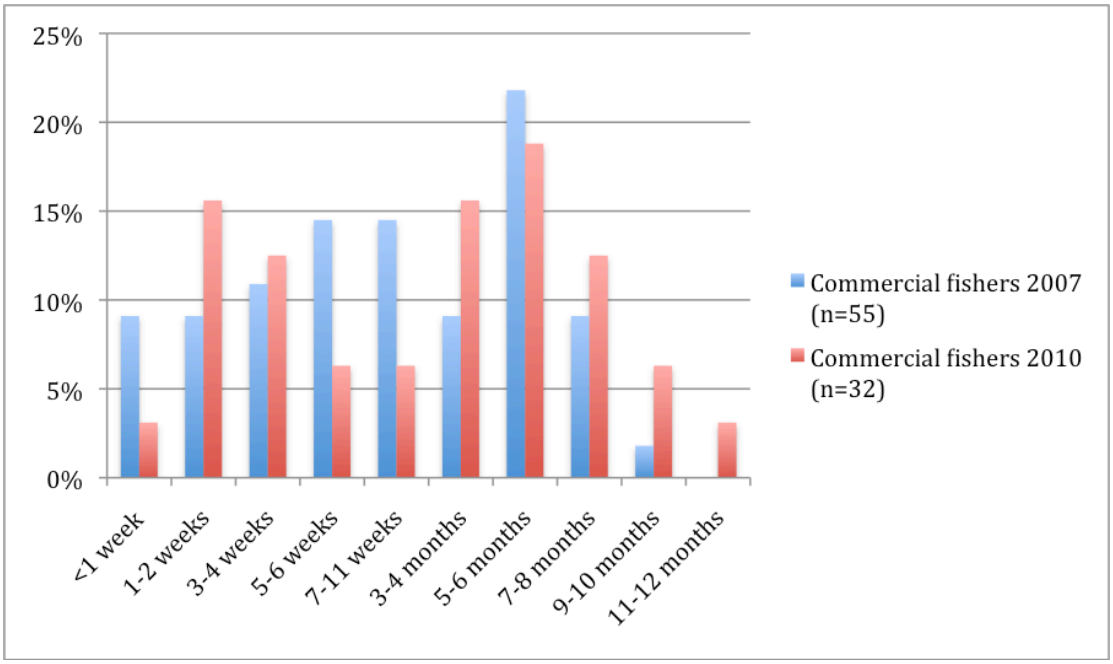


Figure 4.5: FMA commercial fishers' annual amount of time commercially fishing in the FMA - Q29

Almost half (47%) of fisher respondents said they spent 3-8 months of the year commercial fishing in the FMA, while less than one third (31%) spent less than a month. The proportion of fishers spending more (and less) than 3 months of the year commercially fishing in the FMA did not change significantly between monitoring periods.[8]

Figure 4.5 does not include data for the two respondents from outside the commercial fishers' sub-group who indicated that they commercially fished in the FMA, owing to their very small number.

The frequency with which respondents fished *recreationally* in Fiordland varied between user sub-groups. For ease of analysis and presentation, the reported frequencies for recreational fishing were reclassified into use levels representing low, medium and high frequencies as follows:

- Low frequency: Once a year or less
- Medium frequency: Once every 2-6 months
- High frequency: Once a month or more

Commercial fishers and tourism operators/employees most frequently undertook recreational fishing. Most recreational fishers/boaties were relatively low frequency fishers (61% fishing once a year or less in the FMA), as were 'other' FMA users (42%). See Figure 4.6.

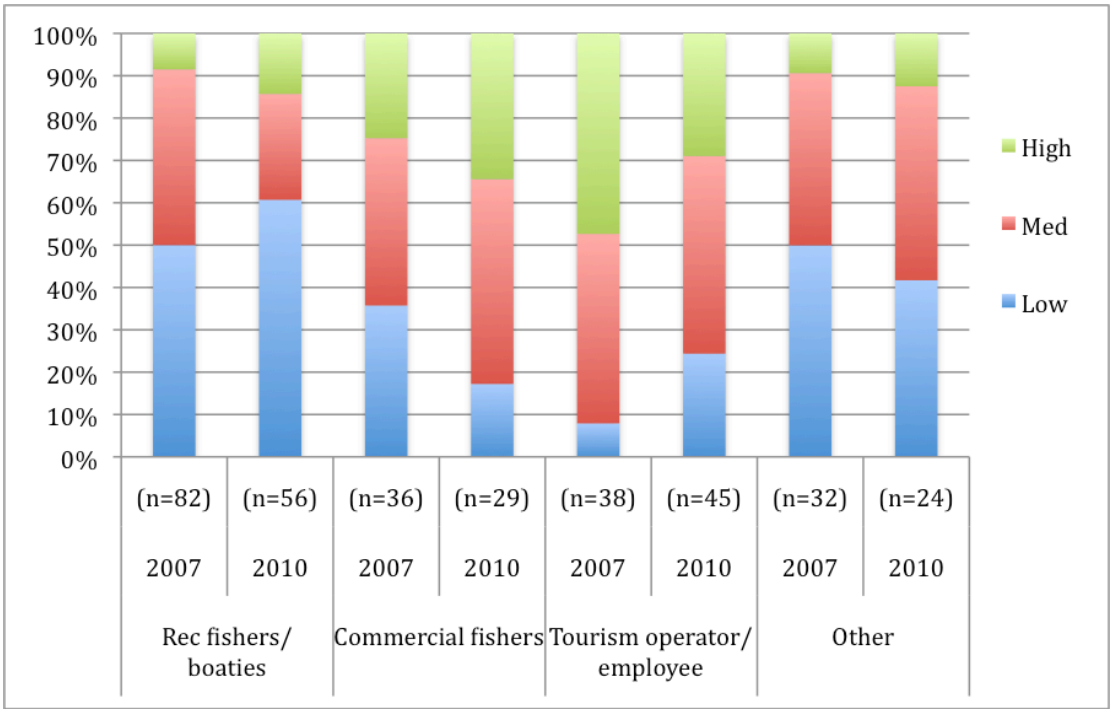


Figure 4.6: FMA users' frequency of recreational fishing in the FMA - Q32

[8] Chi square statistics: χ^2= 1.69, df=1, p=0.19.

Commercial fishers appeared to engage more frequently in recreational fishing than was the case in 2007, with higher proportions in both the medium and high categories. For tourism operators/employees, the opposite was apparent, with a decrease in the high recreational use category, and an increase in the lowest frequency band. This latter trend also applied to recreational fishers/boaties. None of these patterns were statistically significant.

4.7 Spatial characteristics of use

Respondents were asked to indicate on a map (Figure 4.7), each fiord or coastal section that made up part of their most recent trip to the FMA.

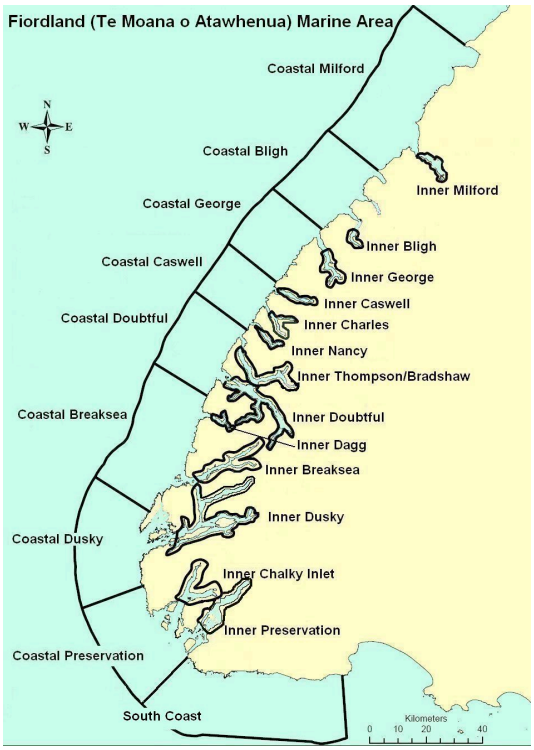


Figure 4.7: Map used in questionnaire to show fiord and coastal sections

Visits to the 22 specified locations within the FMA were aggregated into four zones (see Figure 4.8):

- Milford/Piopiotahi: coastal Milford, inner Milford
- Doubtful/Patea: coastal Doubtful, inner Doubtful, inner Thompson/Bradshaw
- North Fiords: coastal and fiord areas south of Milford Sound/Piopiotahi and north of Thompson Sound
- South Fiords: coastal and fiord areas south of Doubtful Sound/Patea

Across all sub-groups, use of the North Fiords dropped and, with the exception of tourism operators/employees, use of the South Fiords increased. Doubtful Sound/Patea's share of total visits remained static, while Milford Sound/Piopiotahi either remained static or increased.

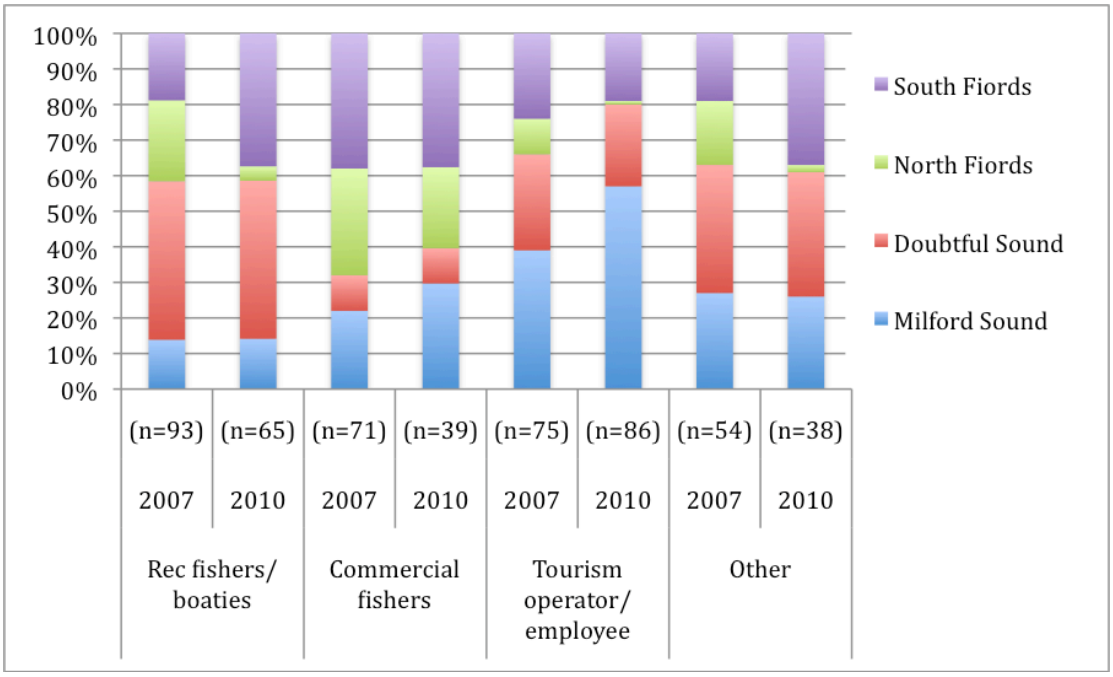


Figure 4.8: FMA users' places visited – Q7

Sampling may have influenced spatial use data and contributed to these findings. As discussed in section 2.2, Doubtful Sound/Patea was very busy during the 2010 survey period with recreational boating (a high number of boaties), fewer questionnaires (in 2010 c.f. 2007) were collected from Milford Sound/Piopiotahi recreational fishers/boaties, and a high proportion of 'local' commercial fishers were obtained in 2010.

For recreational fishers/boaties, Doubtful Sound/Patea remained the most visited location (44%) and the proportion of visits to Milford Sound/Piopiotahi remained unchanged. However, use altered from the North Fiords to the South Fiords. In 2007 a quarter of participants had visited the North Fiords, a few more than the South Fiords (19%). In 2010 over a third (37%) reported a visit to the South Fiords and only 4% said they had been to the North Fiords. These differences were all found to be statistically significant[9].

Among the tourism operator/employee sub-group, 57% of the total reported visits occurred within the Milford zone, which was a statistically significant increase from 2007 (39%)[10]. A drop in the use of the North Fiords was evident.

For respondents in the 'other' category, the South Fiords (37%) and Doubtful Sound/Patea (35%) were most commonly reported. As found for recreational fishers/boaties, a change in use from the North to the South Fiords was also evident for 'other' users.

[9] Chi square statistics: χ^2=7.62, df=1, p=.006; and χ^2=4.25, df=1, p=.039.
[10] Chi square statistics: χ^2=10.65, df=1, p<.001.

4.8 Mode of access to the FMA

No statistically significant differences were found between the monitoring periods with respect to modes of access, however some differences within the sub-groups were apparent.

As expected, commercial fishers continued to primarily use boats to access the FMA (Figure 4.9), although the proportion dropped from 71% (2007) to 56% (2010); with 59% percent of these originating at Bluff, and 25% at Riverton. A relative increase was recorded for road access into Milford (33% in 2010 and 23% in 2007).

Access across Lake Manapouri and the Wilmot Pass into Doubtful Sound/Patea remained the most popular route for recreational fishers/boaties (66% in 2010 c.f. 63% in 2007). Road access to Milford was used by 20% of this sub-group. Little change between 2007 and 2010 took place across modes of access for this sub-group.

For tourism operators/employees, the most common form of access was by road into Milford Sound/Piopiotahi (73%), with Lake Manapouri/Wilmot Pass also commonly reported (19%). The pattern of modes of access for this sub-group was similar between the monitoring years, with an increase in Milford respondents influencing results slightly (increasing the dominance of Milford road access).

'Other' users of the FMA showed an apparent increase in the use of Lake Manapouri/Wilmot Pass at the expense of road access into Milford.

Relatively few respondents accessed the FMA via helicopter. Some additional means of access were given by five respondents: helicopter from Knobs Flat (1), helicopter (1), floatplane (1), by car (1) and 'Milford' (1). Two respondents reported that they accessed the FMA by boat from ports of origin different from those listed in the question: Jacksons Bay (1) and Milford Sound (1).

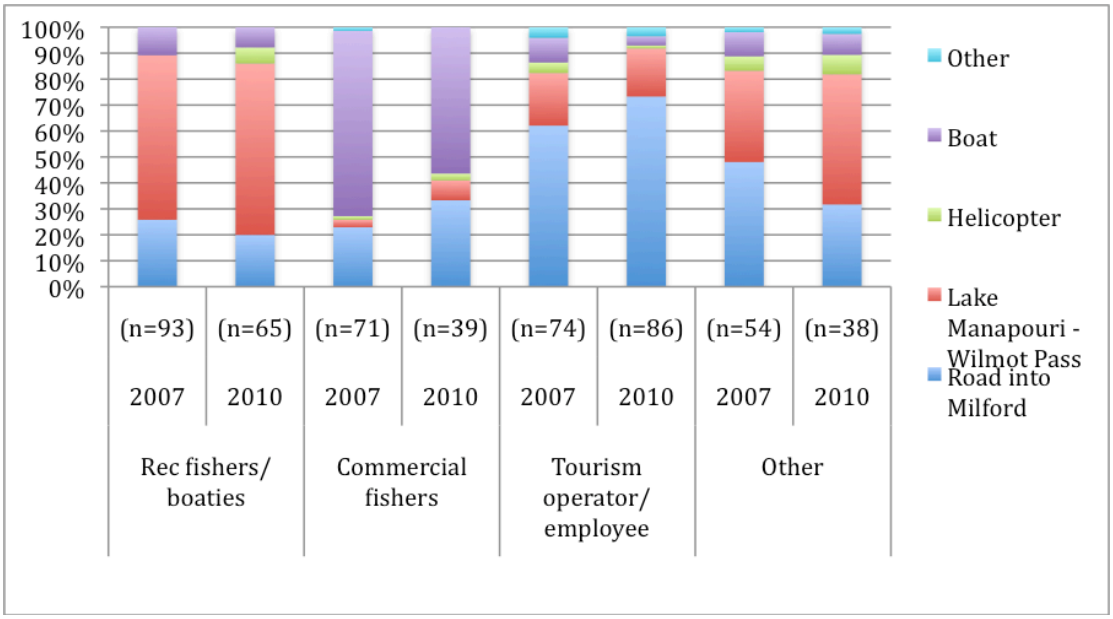


Figure 4.9: FMA users' mode of access to the FMA – Q5

4.9 Ownership/operation of marine vessels

Not surprisingly, commercial fishers were the sub-group with the highest ownership and operation of marine vessels in the FMA - 76% indicated they did so (Figure 4.10). Amongst the remaining sub-groups, a similar proportion owned or operated a vessel (29 or 30%).

While the pattern of vessel ownership and operation between 2007 and 2010 was similar for most sub-groups, one difference was obvious for employees and operators within the tourism industry. The ownership/operation rate fell from almost half (47%) in 2007 to under one third (30%) in 2010. This difference was found to be statistically significant.[11]

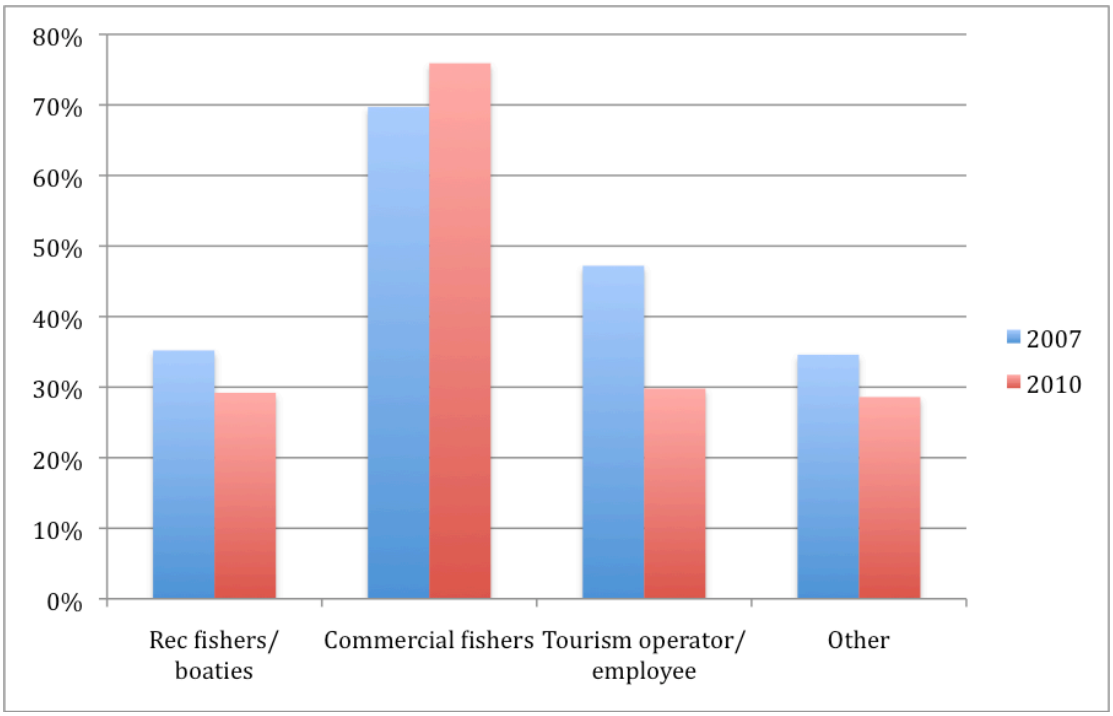


Figure 4.10: FMA users' ownership/operation of a marine vessel in the FMA - Q19

[11] Chi square statistics: χ^2=5.03, df=1, p=.025.

5. Values and motivations

5.1 Summary

Motives for visiting the FMA were multiple and varied, as reported in 2007. Commercial fishers had the most narrowly focused reasons for being in the FMA ('to work' and 'to catch fish') but even this group rated experiencing Fiordland's 'special character' as relatively important. The other 'worker' category (tourism operators/employees) exhibited various reasons (beyond work rationale) for being in the FMA. Recreational fishers/boaties were visiting for a wide array of reasons, of which catching fish was relatively less important compared with some environmental and social reasons.

An important motivation for all sub-groups was to experience the special character of Fiordland. Dominant reasons for all sub-groups, with the exception of commercial fishers, were nature-based: 'To experience nature' and 'to view scenery'. The following reasons were rated highly (mean score >5) by at least two of the four sub-groups:

- To experience the special character of Fiordland
- To experience nature
- To view scenery
- To work
- To see a new place
- To see wildlife
- To catch fish/shellfish
- To experience wilderness
- To experience a quiet place
- To pursue recreational activities.

As found in 2007, cultural and spiritual reasons did not appear to be a strong motivator for visiting the FMA in 2010.

Changes for all sub-groups between the monitoring periods were evident with respect to the relative importance of visit motives, but collectively they did not suggest any trends across all FMA users.

Overall, the values held for the FMA remained constant between 2007 and 2010, despite some changes within sub-groups. As found in 2007, almost all sub-groups rated 'beautiful scenery and views' as the most important value of the FMA. Other values that were very important to all user groups were:

- Presence of unique wildlife
- A wide variety of marine species
- Absence of marine pests and weeds
- High water quality
- Remote wilderness places
- Peace and quiet

Consistent with responses about motivations for visiting, people said Maori cultural values and spiritual values were less important to them. Low importance scores were attributed to the opportunity of having 'plentiful opportunities for tourism'.

5.2 Motivations

Respondents were provided with a list of possible reasons for visiting the FMA and were asked to indicate how well each one corresponded with their own reasons for visiting. A 7-point scale was used: respondents were asked to select a number between 1 and 7, where 1 = 'does not describe my reasons at all'; and 7 = 'describes my reasons exactly'. In Table 5.1, the mean score for each reason is presented by user sub-group. Mean scores of 5.0 or greater are emboldened to emphasise those reasons most closely representing the motivations of sub-group users.

As found in 2007, the reasons for visiting the FMA in 2010 varied considerably by user sub-group[12]. Commercial fishers and tourism operators/employees were in the area 'to work' and, for commercial fishers, 'to catch fish'. Both of these sub-groups also mentioned non-work related reasons, such as 'to experience the special character of Fiordland'.

Differences between the monitoring periods were evident for these two sub-groups. For tourism operators and employees, the only motive that showed a significant increase was 'to meet new people' (from 3.63 to 4.52)[13]. Two motives showed statistically significant decreases: 'to be with friends or family' (from 3.34 to 2.59), and 'to see a familiar place' (from 4.22 to 3.06).[14]

While commercial fishers' results displayed six reasons for which the mean score had shifted 0.5 or more, only one change was statistically significant - 'to be with friends or family'.[15]

Catching fish/shellfish was not the primary reason why recreational fishers/boaties visited the FMA; instead, they were motivated by a diverse set of reasons. The most frequently cited reasons were to view scenery, to experience the special character of Fiordland, and to be with friends and family. Three reasons showed a positive shift of 0.5 or more in the mean score between 2007 and 2010: 'to see a new place' (from 4.68 to 5.41), 'to learn about nature or history' (from 3.91 to 4.64), and 'to experience a quiet place' (from 4.76 to 5.41). A downward shift was found for the motives of 'to pursue recreation activities' (from 6.12 to 5.61), 'to meet new people' (from 3.25 to 2.46) and 'to catch fish/shellfish' (from 5.78 to 5.27). All changes were statistically significant.[16]

[12] Tests for significance (F-test) were undertaken for each reason, comparing mean scores across sub-groups.
[13] F-test statistics: F=5.80, df=1, p=.017.
[14] F-test statistics: F=4.09, df=1, p=.045 and F=9.52, df=1, p=.002, respectively.
[15] F-test statistics: F=4.02, df=1, p=.05.
[16] F-test statistics: F=3.91, df=1, p=.05; F=4.53, df=1, p=.035; F=3.72, df=1, p=.05; F=3.97, df=1, p=.048; F=5.01, df=1, p=.027; and F=3.39, df=1, p=.05 respectively.

Table 5.1: FMA users' reasons for visiting the FMA (mean scores) – Q8

	Rec fishers/ boaties			Commercial fishers			Tourism operator/ employee			Other		
	2007 (n=74)	2010 (n=65)	change	2007 (n=59)	2010 (n=38)	change	2007 (n=70)	2010 (n=86)	change	2007 (n=45)	2010 (n=38)	change
To work	1.15	1.49		**6.29**	**6.56**		**6.70**	**6.92**		3.91	3.70	
To see a new place	4.68	**5.41**	↑↑	3.41	2.79	↓	3.46	3.94		4.09	**5.17**	↑
To experience nature	**5.53**	**5.58**		4.11	4.26		**5.51**	**5.47**		**5.40**	**5.81**	
To meet new people	3.25	2.46	↓↓	1.85	1.67		3.63	4.52	↑↑	2.55	2.64	
To 'get away' from the town or city	**5.07**	4.78		3.86	3.48		**5.14**	4.73		**5.17**	**5.14**	
To see wildlife	**5.35**	**5.68**		4.29	4.58		**5.48**	4.99		**5.67**	**5.64**	
To view scenery	**6.08**	**6.10**		4.84	4.39		**5.77**	**5.45**		**5.50**	**6.06**	↑
To be with friends/family	**5.61**	**5.74**		2.38	3.48	↑↑	3.34	2.59	↓↓	4.09	4.43	
To learn about nature or history	3.91	4.64	↑↑	2.52	2.52		4.08	3.80		4.18	4.31	
To catch fish/shellfish	**5.78**	**5.27**	↓↓	**6.60**	**6.58**		2.89	3.10		3.65	4.11	
To experience wilderness	**5.38**	**5.53**		3.94	4.58	↑	**5.37**	4.93		**5.20**	**5.72**	↑
To get 'back to basics' for a while	4.52	4.35		2.58	2.87		3.63	3.64		4.04	4.77	↑
To get away from people	3.80	3.79		3.29	3.15		3.09	3.33		3.53	4.41	↑
To see a familiar place	3.19	3.13		3.26	4.33	↑	4.22	3.06	↓↓	3.59	3.29	
To experience a quiet place	4.76	**5.41**	↑↑	3.97	4.32		4.46	4.33		4.49	**5.15**	↑

	Rec fishers/ boaties			Commercial fishers			Tourism operator/ employee			Other		
	2007 (n=74)	2010 (n=65)	change	2007 (n=59)	2010 (n=38)	change	2007 (n=70)	2010 (n=86)	change	2007 (n=45)	2010 (n=38)	change
To pursue recreational activities	**6.12**	**5.61**	↓↓	3.33	4.33	↑	4.64	4.23		**5.38**	**5.53**	
For cultural reasons	1.62	1.88		1.27	1.79	↑	2.14	1.73		2.02	2.06	
For spiritual reasons	1.69	1.82		1.88	1.83		2.47	2.34		2.47	2.43	
To experience the special character of Fiordland	**6.34**	**5.97**		4.74	**5.08**		**5.49**	**5.35**		**5.80**	**6.25**	

Notes:

1. Arrows indicate a change in the mean of 0.5 or more and show the direction of change. A statistically significant change is denoted by a double arrow.
2. Mean scores of 5.0 or greater are emboldened.
3. Since the number of respondents (n) varies by question item, the n given here represents the number of respondents completing the first item. There was very little variation in n across items within the question.

People in the 'other' user category also visited the FMA for a wide variety of reasons, but particularly because of the special character of Fiordland and the scenery. While there were six apparent increases in the relative importance of motivations between 2007 and 2010 for this sub-group, none of these was found to be statistically significant.

The changes in the relative importance of visit motives do not suggest a pattern of change across all FMA users. Indeed, two reasons ('to meet new people' and 'to be with friends/family') show reverse trends between two sub-groups (i.e. upward in one case and downward in another).

An important motivation for visiting the FMA for all sub-groups was to experience the special character of Fiordland. Reasons highlighted by all sub-groups, with the exception of commercial fishers, were nature-based: 'To experience nature' and 'to view scenery'. The following reasons were rated highly (mean score >5) by at least two of the four sub-groups:

- To experience the special character of Fiordland
- To experience nature
- To view scenery
- To work
- To see a new place
- To see wildlife
- To catch fish/shellfish
- To experience wilderness
- To experience a quiet place
- To pursue recreational activities

As found in 2007, cultural and spiritual reasons did not appear to be a strong motivator for visiting the FMA in 2010.

Twenty respondents (9% of all respondents answering this question) noted 'other' reasons for visiting the FMA (additional to those listed). The most frequently listed reasons were various forms of employment (it was unclear whether they were voluntary or paid: n=6), hunting (n=5), history-related reasons (n=3), diving (n=3), social connections with Fiordland (n=3) and research (n=2).

5.3 Values

Using a similar approach, respondents rated the importance of the FMA values listed in Q9. The scale was anchored by 1 = 'not at all important' and 7 = 'very important'. Therefore, a high mean score represents a value perceived as important by respondents. Table 5.2 contains the mean scores by FMA user sub-group[17].

All user groups considered multiple values to be important (Table 5.2). Each sub-group gave a mean score of 5 or above to more than half of the listed values. There was also agreement about the most significant values of the FMA, all of which have maintained their high rating from 2007. As found in 2007, almost all sub-groups rated

[17] Tests for significance (F-test) were undertaken for each value, comparing mean scores across sub-groups.

the FMA's 'beautiful scenery and views' as the highest value (in 2010, the exception was commercial fishers who rated 'good fishing opportunities' higher). Other values that were very important to all user groups were:

- Presence of unique wildlife
- A wide variety of marine species
- Absence of marine pests and weeds
- High water quality
- Remote wilderness places
- Peace and quiet

The presence of unique wildlife was rated very highly by three of the sub-groups (relatively less important to commercial fishers compared with the other user groups). High water quality received high mean scores from three sub-groups (less so for tourism operators/employees). Maori culture and spiritual aspects of the FMA were consistently scored very low by all sub-groups, and 'plentiful tourism opportunities' also received low scores across all sub-groups.

Commercial and recreational fishers/boaties valued good fishing opportunities very highly, as may be expected, although this value had dropped in importance since 2007 for recreational fishers/boaties (from 5.97 to 5.29), a statistically significant change.[18]

'Peace and quiet' increased in value for two sub-groups: 'other' FMA users (from 5.54 to 6.24) and recreational fishers/boaties (from 5.57 to 6.08). In contrast, the value of the 'absence of other people' increased (from 4.51 to 5.59) for 'other' FMA users, but decreased for tourism operators/employees (from 4.99 to 4.06). All changes were statistically significant.[19]

Despite these shifts within sub-groups, results indicate that perceptions of FMA values have held steady between 2007 and 2010.

[18] F-test statistics: F=6.91, df=1, p=.009.

[19] F-test statistics: F= 3.94, df=1, p=.05; F=4.79, df=1, p=.03; F=6.31, df=1, p=.014 and F=8.87, df=1, p=.003 respectively.

Table 5.2: FMA users' values associated with the FMA (mean scores) – Q9

	Rec fishers/ boaties			Commercial fishers			Tourism operator/ employee			Other		
	2007 (n=91)	2010 (n=62)	change	2007 (n=62)	2010 (n=35)	change	2007 (n=72)	2010 (n=86)	change	2007 (n=50)	2010 (n=37)	change
A wide variety of marine species	**5.91**	**5.9**		**6.18**	**5.86**		**6.04**	**5.84**		**6.36**	**6.24**	
Absence of marine pests and weeds	**5.82**	**5.92**		**6.08**	**5.57**	↓	**6.10**	**5.72**		**6.18**	**5.92**	
High water quality	**5.93**	**6.30**		**6.02**	**5.92**		**6.26**	**5.82**		**6.74**	**6.30**	
Presence of unique wildlife	**6.13**	**6.26**		**5.41**	**5.17**		**6.35**	**6.24**		**6.40**	**6.41**	
Good fishing opportunities	**5.97**	**5.29**	↓↓	**6.39**	**6.74**		4.44	4.34		4.57	4.81	
Beautiful scenery/views	**6.58**	**6.67**		**6.25**	**6.35**		**6.68**	**6.49**		**6.69**	**6.51**	
Plentiful tourism opportunities	2.91	2.98		3.19	3.46		4.74	4.94		3.10	3.00	
Remote wilderness places	**5.90**	**6.21**		**5.25**	**5.81**	↑	**6.06**	**5.89**		**5.90**	**6.27**	
Peace and quiet	**5.57**	**6.08**	↑↑	**5.34**	**5.58**		**6.07**	**5.72**		**5.54**	**6.24**	↑↑
Absence of other people	4.81	**5.00**		4.12	4.57		4.99	4.06	↓↓	4.51	**5.59**	↑↑
Maori cultural values	1.66	2.16	↑↑	2.05	2.91	↑↑	3.84	3.22	↓	2.63	2.70	
Spiritual values	1.77	2.31	↑	2.36	2.68		3.49	2.98	↓	2.92	3.05	

Notes:

1. Arrows indicate a change in the mean of 0.5 or more and show the direction of change. A statistically significant change is denoted by a double arrow.
2. Mean scores of 5.0 or greater are emboldened.
3. Since the number of respondents (n) varies by question item, the n given here represents the number of respondents completing the first item. There was very little variation in n across items within the question.

6. Perceptions of change in FMA quality

6.1 Summary

Perceptions of change in the quality of the FMA varied by user group. Commercial fishers and tourism users displayed a positive (optimistic) trend; a lower proportion in 2010 expressed the view that the quality of the FMA had worsened in the previous five years and, in the case of commercial fishers, a higher proportion indicated it had improved. Overall, recreational fishers/boaties were more pessimistic in 2010 than in 2007. The proportions of 'other' users reporting improved and worse FMA quality *both* increased between 2007 and 2010 (with a decrease in the proportion recording 'stayed the same'), suggesting a diverse set of opinions.

6.2 Trends in quality

Respondents were asked their opinion on how the 'quality of the FMA' had changed over the last five years. This was a generic measure and specific dimensions of quality were not defined for respondents.

The majority of users in all sub-groups recorded either 'stayed the same' or 'don't know' (Figure 6.1). Sub-groups varied in terms of the strength of the perception that FMA quality had stayed the same. The relative balance between those who felt the FMA had improved (c.f. worsened) differed between sub-groups and showed some changes between 2007 and 2010.

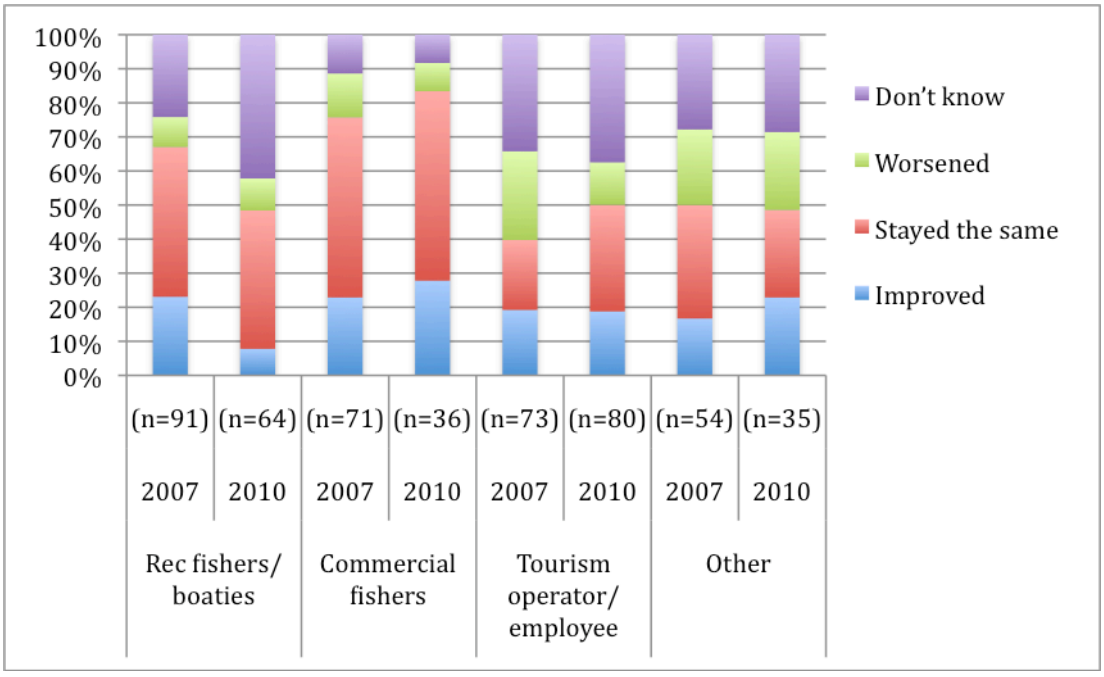


Figure 6.1: FMA users' assessment of trends in quality of FMA over the past 5 years - Q11

Patterns of opinion within the commercial fisher and the 'other' FMA sub-groups appeared to be reasonably static. For recreational fishers/boaties, however, there seemed to be a decrease in the proportion of those respondents believing that the FMA has 'improved' and a substantial increase in those who 'don't know'. For the tourism sub-group, the 2010 sample showed an increase in those who believed conditions had 'stayed the same' in the last five years, and a decrease in those who thought things were 'worse'.

The 'don't know' responses were removed from the analysis, to make the differences between survey periods more apparent. Commercial fishers appeared more optimistic in 2010 (c.f. 2007): (1) 15% of commercial fishers in 2007 felt that conditions had worsened, compared with 9% in 2010; and (2) 30% in 2010 (c.f. 25% in 2007) thought it had improved. Similarly, tourism respondents showed a substantial decrease in those reporting worse conditions (from 40% in 2007 to 20% in 2010). This latter finding was the only trend that was statistically significant.[20] In contrast, slightly greater proportions of recreational fishers/boaties and 'other' users thought that FMA quality had worsened (changes from 2007 to 2010 of 12% to 16%, and 27% to 32% respectively). A considerably lower proportion of recreational fishers/boaties felt the FMA had improved (from 30% in 2007 to 14% in 2010).

Many respondents made comments as part of their response to Q11, giving their opinion on changes in FMA quality over the past 5 years. The themes apparent in the comments were very similar to those in 2007.

People who elaborated on their comment that the FMA had improved in quality said that fish (cod and crayfish were frequently mentioned) numbers had increased and the fishing improved, there was less pollution/rubbish, and that people's awareness and attitudes had improved through information and education.

Comments that related to 'it has worsened' had a strong focus around increased numbers of people and boats (sometimes associated with tourism). Other respondents spoke of over-fishing and a decline in fish stocks (but far more made comments about increased fish numbers).

[20] Chi square statistics: χ^2= 4.25, df=1, p=.039.

7. Perceived threats

7.1 Summary

Few activities were perceived to represent major current threats to the area. Marine pests and pollution were perceived as the greatest threats by all sub-groups. Tourism and commercial fishing were seen as potential threats by most user groups. The lowest perceived threats were associated with non-motorised recreational craft. These findings closely resemble 2007 results, with perceptions of the most significant threats largely unchanged.

Most people reported that they had seen, read or heard information about marine pests. Between 2007 and 2010, the proportion of commercial fishers encountering information about pests increased, as did their self-reported ability to name marine pests. The other sub-groups remained static or decreased on these factors.

Between one- and two-thirds of each user group reported that they could name marine pests. Of the pests identified by respondents, three were most frequently mentioned (both in 2007 and 2010): didymo, undaria and sea squirt.

Owners/operators of marine vessels indicated that they were very willing to take action against marine pests, particularly: maintaining an active anti-fouling coating on the vessel, carrying out regular inspections of the vessel and equipment for the presence of fouling, and out-of-water cleaning and drying of the vessel's hull. The action that respondents were least willing to carry out was in-water cleaning of the vessel's hull. These preferences remained unchanged from 2007.

The ability to draw conclusions about respondents' preventive actions being taken against marine pest introduction, was restricted owing to small sample sizes for that question. But it appears that, although the willingness of the recreational fisher/boatie sub-group has remained stable over the monitoring period, there have been increases in willingness to carry out marine pest actions within all other sub-groups and most actions.

7.2 Activities

Respondents were asked to evaluate a list of activities in terms of the extent to which they threatened current FMA values. A 7-point scale was used in which 1 = 'no threat at all', and 7 = 'significant threat'. Survey participants were also given a 'don't know' option.

The perceptions of respondents are reported as mean scores in Table 7.1[21]. Scores of 5.0 or greater have been emboldened to emphasise the greatest perceived threats. Mean scores of greater than 4.0 represent the perception of a potential threat to values.

[21] Tests for significance (F-test) were undertaken for each threat, comparing mean scores across sub-groups.

Table 7.1: FMA users' perception of activities as a current threat to the FMA (mean scores) – Q10

	Rec fishers/ boaties			Commercial fishers			Tourism operator/ employee			Other		
	2007 (n=92)	2010 (n=63)	change	2007 (n=61)	2010 (n=35)	change	2007 (n=73)	2010 (n=74)	change	2007 (n=54)	2010 (n=37)	change
Commercial water craft	3.41	4.22	↑↑	2.60	2.00	↓	3.67	3.81		4.44	3.89	↓
Recreational fishing	2.64	3.41	↑↑	3.60	2.66	↓↓	3.50	3.24		3.68	3.49	
Commercial fishing	4.38	**5.08**	↑↑	2.25	1.77		4.02	4.01		4.94	4.50	
Aspects of current management	3.38	3.73		3.69	3.00	↓	4.46	3.95	↓	3.87	3.80	
Tourism	3.72	4.29	↑↑	4.01	3.29	↓	3.99	4.04		4.71	4.27	
Marine pests	**5.14**	**5.51**		**5.26**	**5.51**		**5.36**	**5.26**		**5.42**	**5.24**	
Pollution	4.90	**5.16**		**5.10**	4.94		4.94	**5.01**		**5.16**	**5.05**	
Diver damage to marine species	2.48	3.11	↑↑	2.80	2.32		3.01	3.57	↑	3.15	3.05	
Recreational kayaking	1.86	2.25		1.91	1.57		1.89	2.15		2.25	1.92	
Recreational power craft	2.49	3.2	↑↑	2.90	2.35	↓	3.47	3.52		3.37	2.94	
Recreational sailing craft	1.93	2.33		2.05	1.69		2.50	2.49		2.29	1.97	
Climate change	2.97	2.82		3.31	2.15	↓↓	4.50	3.61	↓↓	4.60	3.48	↓↓
Anchor damage to marine species	2.37	3.11	↑↑	2.15	2.09		3.50	3.85		4.21	3.63	↓

Notes:

1. Arrows indicate a change in the mean of 0.5 or more and show the direction of change. A statistically significant change is denoted by a double arrow.
2. Mean scores of 5.0 or greater are emboldened.
3. Since the number of respondents (n) varies by question item, the n given here represents the number of respondents completing the first item. There was very little variation in n across items within the question.

Table 7.1 illustrates that perceptions of threats to the FMA varied by user group, but few activities were perceived to represent *major* threats to the area. Each user group placed marine pests at the top of the list of significant threats; pollution followed closely behind. Tourism and commercial fishing were seen as a potential threat by most user groups. As found in 2007, the lowest perceived threats were associated with non-motorised recreational craft. These findings closely resemble 2007 results – perceptions of the most significant threats remain largely unchanged.

Within each sub-group, some changes between the monitoring periods were apparent. Recreational fishers/boaties appear to have increased their threat rating for each listed item, with the exception of 'climate change'. However, only half of these upward shifts were statistically significant: commercial watercraft, recreational fishing, commercial fishing, tourism, diver damage to marine species, recreational power craft, and anchor damage to marine species.[22]

For commercial fishers, the opposite trend was evident. Decreases were recorded for all threats, with the exception of a small increase in perception of the threat posed by marine pests. However, only two differences were statistically significant: the decrease in perceived threat of recreational fishing and climate change.[23]

Similarly, 'other' FMA users in 2010 seemed less concerned about potential threats, with small decreases in mean scores across the range of options. Statistically significant differences were found only for climate change.[24] Few obvious patterns were evident for the tourism sub-group. The only statistically significant change in perceived threat was for climate change.[25]

The proportion of respondents reporting that they did not know the extent of the threats posed to the FMA remained relatively consistent between 2007 and 2010. The most common items attracting the 'don't know' response continued to be 'aspects of current management' (between 14% and 37% across sub-groups), 'marine pests' (between 3% and 21%), 'climate change' (between 15% and 30%), and 'anchor damage to marine species' (between 1% and 22%). Amongst sub-groups, the main apparent differences were: an increase in the proportion of recreational fishers/boaties who did not know what threat might be posed by anchors (from 1% in 2007 to 22% in 2010); a smaller proportion of commercial fishers reporting that they did not know the level of threat associated with marine pests (from 12% in 2007 to 3% in 2010); an increase amongst tourism employees who did not know about the threat of marine pests (from 6% in 2007 to 16% in 2010); and a decrease amongst 'other' FMA users who reported that they did not know the threat associated with 'aspects of current management' (from 37% in 2007 to 14% in 2010).

[22] F-test statistics: 'commercial water craft' (F=8.73, df=1, p=.004), 'recreational fishing' (F=8.38, df=1, p=.004), 'commercial fishing' (F=4.79, df=1, p=.03), 'tourism' (F=3.99, df=1, p=.047), 'diver damage to marine species' (F=4.93, df=1, p=.028), 'recreational powercraft' (F=8.84, df=1, p=.003), 'anchor damage to marine species' (F=6.66, df=1, p=.011).

[23] F-test statistics: F=4.78, df=1, p=.031 and F=6.61, df=1, p=.012 respectively.

[24] F-test statistics: F=4.42, df=1, p=.039.

[25] F-test statistics: F=5.98, df=1, p=.061.

Twenty-eight respondents across all groups (13%) listed 'other' activities that they felt were threats. The most common activities were: cruise liners (n=5), recreational boats (n=4) including sewage and boaties who lack respect and skills, DOC (n=4), and animal pests (n=3) including seals, deer, stoats and possums.

7.3 Marine pests

Most respondents reported that they had seen, read or heard information about marine pests of threat to Fiordland (Figure 7.1). Commercial fishers were the most likely to have come across information about this subject (90%).

For recreational fishers/boaties and 'other' FMA users, the proportion of respondents reporting awareness of marine pests remained constant between 2007 and 2010. Analysis of commercial fishers revealed a statistically significant increase in marine pest awareness[26], contrasted by a decline in awareness amongst members of the tourism sub-group (a difference that was not statistically significant).

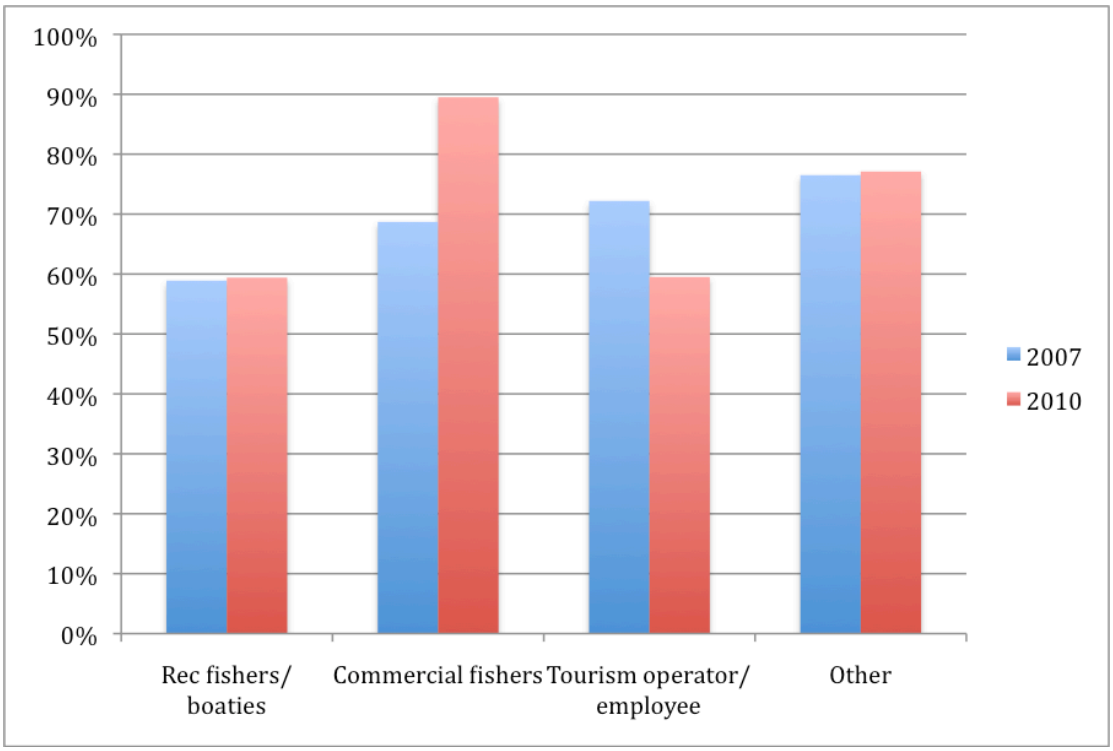


Figure 7.1: FMA users' awareness of information about marine pests of threat to Fiordland - Q17

Respondents' self-reported ability to name any marine pests that currently threaten the FMA (Figure 7.2) varied by user group. Commercial fishers and 'other' users were the *most* likely to be able to name pests (66% and 61% respectively), and commercial fishers displayed a significant increase in awareness of pest species (as measured by

[26] Chi square statistics: χ^2=5.79, df=1, p=.016.

this question) between 2007 and 2010.[27] This may be related to the increased proportion of 'local' fishers in the sample for this sub-group.

Tourism employees' reported knowledge of marine pests appeared to have declined since 2007 (from 53% to 36%), a difference confirmed by statistical tests.[28] The proportion of recreational fishers/boaties and 'other' FMA users who claimed the ability to name marine pests remained almost static across the three-year period.

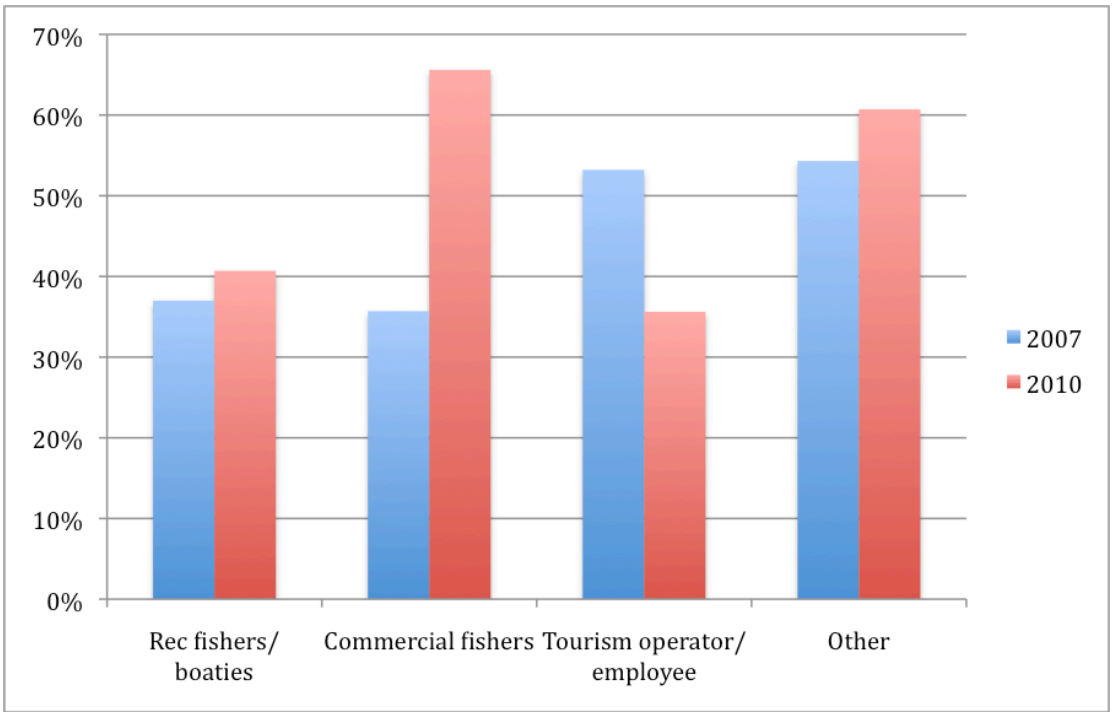


Figure 7.2: FMA users' self-reported ability to name marine pests that currently threaten the FMA - Q18

Users were asked to list any marine pests that they thought currently threatened the FMA (Q18) – 125 people (43% of all respondents) did so (compared with 132 people/56% of respondents in 2007). Table 7.2 provides the full list of all responses and the number of respondents who mentioned each 'pest'. Many respondents mentioned more than one pest. Pests most commonly mentioned were: undaria, sea squirt, didymo (the same pests most frequently mentioned by 2007 respondents). Some new pests were identified in 2010, especially marine invertebrates.

Table 7.2: Marine pests that users perceive to be threatening the FMA – Q18

Reported marine pest	2007	2010
	n	n
Marine algae (seaweed)		
Undaria, undaria pinnatifida, pinnat fida, Japanese seaweed	44	55

[27] Chi square statistics: χ^2=7.32, df=1, p=.007.
[28] Chi square statistics: χ^2=4.32, df=1, p=.04.

Reported marine pest	2007	2010
Sea squirt, styela clava	34	34
Weeds on boats, weed	3	5
Wanganella weed	1	0
Algae, red algae, algal bloom, red tide	6	1
Seaweed, types of seaweed, imported or overseas seaweed	18	4
'Plants'	2	0
Kelp	0	2
Caulerphtaxiforia	0	1
Freshwater algae		
Didymo, rock snot	44	32
Aquarium weed	0	2
Marine invertebrates		
Starfish, imported starfish	11	7
Five finger starfish	1	0
Eleven finger starfish	1	0
Japanese starfish	0	2
Pacific starfish	0	1
Northern starfish	0	1
Sea star, Northern Pacific sea star, Pacific sea star	1	6
Shellfish, types of shellfish, Asian mussels	1	2
Asian clam	0	5
Sea urchin, kina	2	3
Brittle star	1	
Crab	1	3
Mitten crab, Asian mitten crab, Chinese mitten crab	0	5
European shore crab	0	4
Jellyfish	0	1
Worm, tube worm, fanworm, Mediterranean fanworm	0	12
Red and black coral	0	1
Asterias amurensis	0	1
Carsinus maenas	0	1
Eroicheir sinensis	0	1
Subella spallanzanii	0	1
Potomo corbula amnurensis	0	1
Didemnum vexillum, Didendum, Diademnum	0	3
Marine mammals and fish		
Seals, fur seals	13	4
Leopard seal	1	0
Sea lion	1	0
Killer whales	1	0
Sharks (mako, white)	1	0
Predatory fish	0	1
Terrestrial animals		
Shags	1	1
Possums	2	8
Stoats, ferrets, weasels	2	10

Reported marine pest	2007	2010
Rodents, rats, mice	8	12
Deer	1	2
Cats	0	1
General		
Ballast discharge	2	2
Bilge water	1	0
Pollution, pollution from boats	3	0
Commercial fishing, inappropriate fishing	1	1
Large vessels, cruise ships	2	0
Power station (fresh water discharge)	1	0
Giardia, parasites	0	2
1080	0	1
Pest species brought in unintentionally by visiting ships	0	1
Stuff that floats in on old fishing gear	0	1
The stuff on boat keels which Bluff Harbour is full of	0	1
Scientific names are impossible to remember, I don't know the names of weeds	0	2
People		
'People'	2	1
DOC, DOC staff, DOC researchers	5	5
Scientists, dolphin researchers	4	0
Greenies, conservationists, green organisations, Greenpeace	2	4
Real Journeys	0	1
Milford Development Authority	1	1
Australians	0	1
Unclear		
Eleyen	1	0
Gardaia	1	0

Respondents who owned or operated a marine vessel in the FMA were asked to indicate the extent of their willingness to undertake various pest introduction prevention strategies. Responses were made on a 7-point scale where 1= 'not at all willing', and 7 = 'very willing'. Respondents were also asked to indicate if they were already taking the action.

Most sub-groups were very willing to take action against marine pests in the FMA (Figure 7.3). The actions that respondents were most willing to undertake were: maintaining an active anti-fouling coating on the vessel, carrying out regular inspections of the vessel and equipment for the presence of fouling, and out-of-water cleaning and drying of the vessel's hull. The action that all sub-groups were *least* willing to carry out was in-water cleaning of the vessel's hull. These preferences were unchanged from 2007. Sample sizes were too small to support tests of statistical differences across the monitoring periods.

Similarly, the ability to draw conclusions about respondents' preventive actions being taken against marine pest introduction, was restricted owing to small sample sizes for that question (Figure 7.4 and Table 7.4). But it appears that, although the willingness

of the recreational fisher/boatie sub-group has remained stable over the monitoring period, there have been substantial increases in willingness to carry out marine pest actions within all other sub-groups and most actions.

Table 7.3: Willingness to take specific action (mean scores) – Q20

	Rec fishers/ boaties		Commercial fishers		Tourism operator/ employee		Other	
	2007 (n=35)	2010 (n=16)	2007 (n=53)	2010 (n=21)	2007 (n=37)	2010 (n=19)	2007 (n=22)	2010 (n=8)
Maintain anti-fouling coating	**5.50**	**6.13**	**6.60**	**6.90**	**6.08**	**6.58**	**5.32**	4.50
Regular inspection	**5.73**	**6.00**	**6.54**	**6.30**	**6.46**	**6.88**	**6.67**	**6.50**
In-water cleaning	4.14	4.88	3.37	4.62	3.90	**5.25**	4.33	4.11
Out-of-water cleaning	**5.33**	**5.71**	**6.46**	**6.35**	**6.75**	**6.35**	**6.50**	**6.00**
Clean, disinfect and dry	**5.00**	4.92	4.90	4.86	**5.59**	**6.05**	**5.87**	**5.29**
Inspect and clean before moving	**5.14**	**5.27**	4.52	4.73	**6.08**	**6.68**	**6.11**	4.33

Notes:

1. Mean scores of 5.0 or greater are emboldened.
2. Since the number of respondents (n) varies by question item, the n given here represents the number of respondents completing the first item. There was very little variation in n across items within the question.

Table 7.4: Percentage already taking action – Q20

	Rec fishers/ boaties		Commercial fishers		Tourism operator/ employee		Other	
	2007 (n=35)	2010 (n=20)	2007 (n=53)	2010 (n=29)	2007 (n=37)	2010 (n=33)	2007 (n=22)	2010 (n=10)
Maintain anti-fouling coating	25.7	35.0	28.3	96.6	29.7	60.6	13.6	50.0
Regular inspection	31.6	35.0	27.5	82.8	27.8	66.7	14.3	60.0
In-water cleaning	21.1	10.0	21.3	41.4	13.9	39.4	14.3	0.00
Out-of-water cleaning	28.9	45.0	27.1	86.2	29.4	59.4	23.8	50,0
Clean, disinfect and dry	22.2	35.0	18.8	65.5	20.6	34.4	28.6	40.0
Inspect and clean before moving	26.3	25.0	20.8	62.1	25.7	50.0	21.7	50.0

Notes:

Since the number of respondents (n) varies by question item, the n given here represents the number of respondents completing the first item. There was very little variation in n across items within the question.

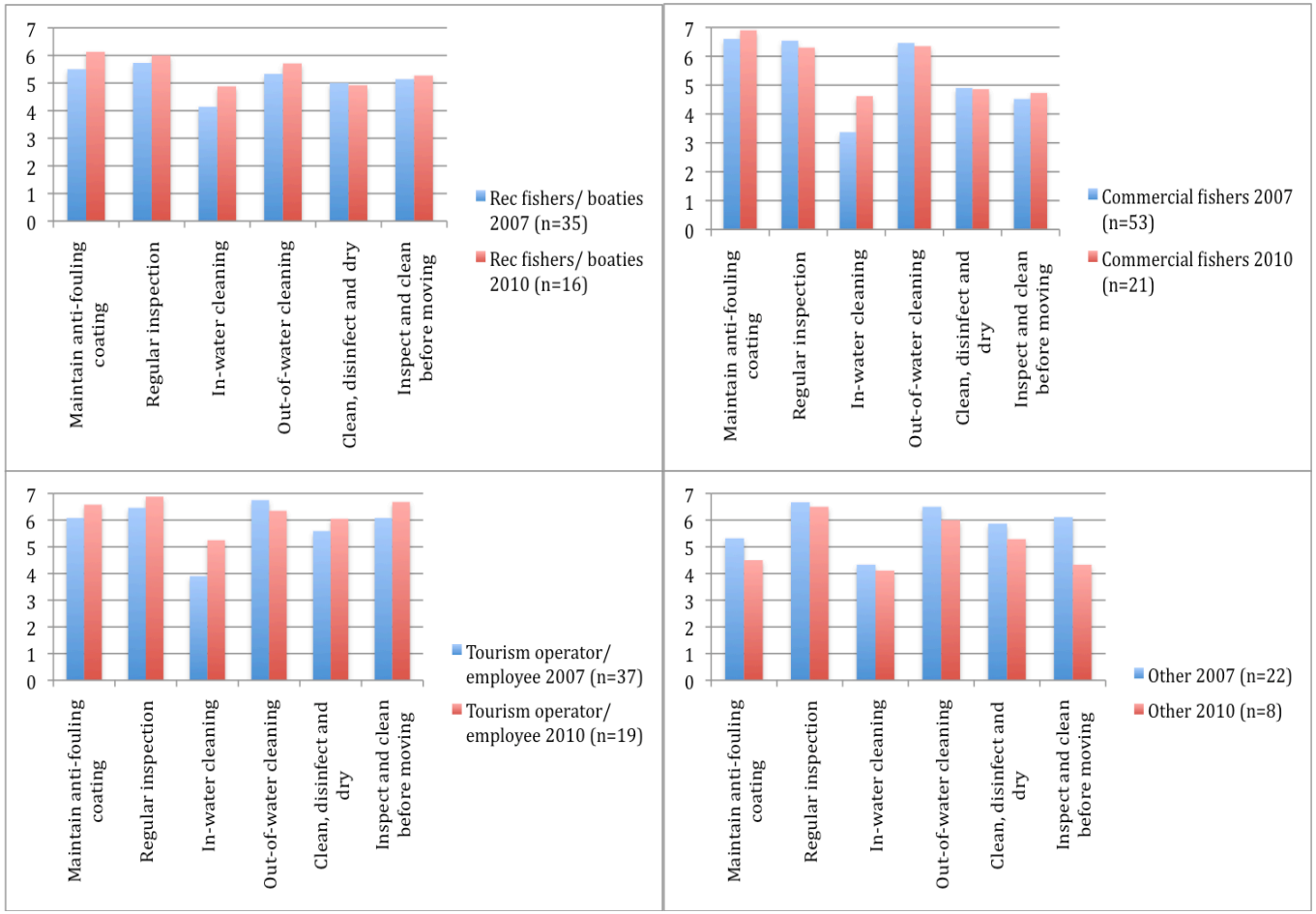


Figure 7.3: FMA users' willingness to undertake actions to help prevent marine pests from entering Fiordland by sub-group – Q20

Notes:

Since the number of respondents (n) varies by question item, the n given here represents the number of respondents completing the first item. There was very little variation in n across items within the question.

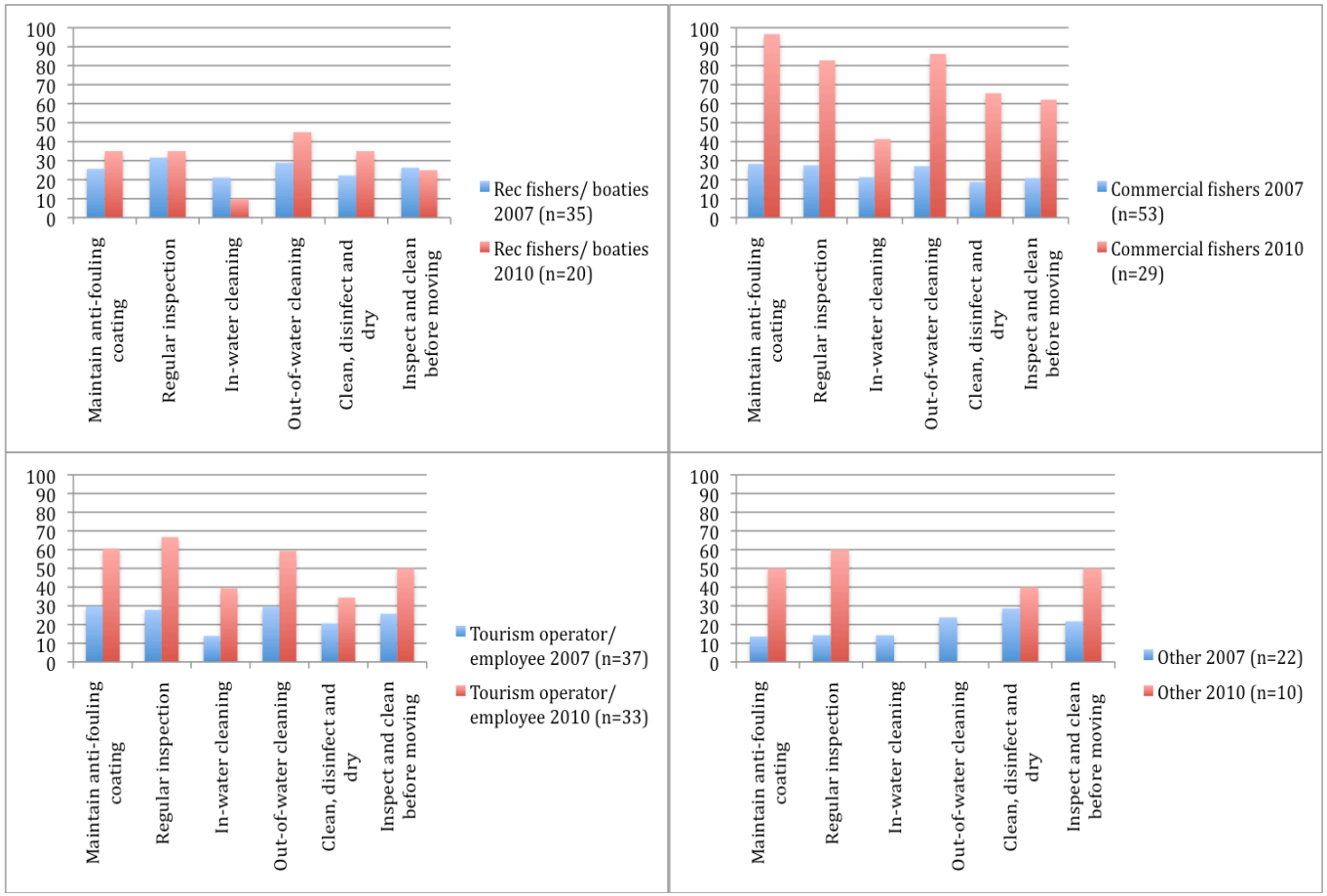


Figure 7.4: Percentage of FMA users' already taking action to prevent marine pests entering Fiordland by sub-group – Q20

Notes:
Since the number of respondents (n) varies by question item, the n given here represents the number of respondents completing the first item. There was very little variation in n across items within the question.

8. Marine reserves

8.1 Summary

Perceptions of marine reserves were stable between 2007 and 2010. The current level of marine reserve protection was considered to be adequate by respondents. Respondents tended to over-estimate the number of marine reserves (a change from 2007) and similarly the proportion of the FMA that is protected by marine reserves. The number and size of marine reserves remained the same between 2007 and 2010: ten marine reserves encompassing 1.1% of the FMA. Respondents indicated that marine reserves have a positive influence upon enjoyment and use. The indicators used to gauge awareness (knowledge of numbers of reserves and areal extent) suggested many people lack knowledge of marine reserves. However, most people appeared to understand the rules surrounding marine reserves, with the exception of widespread confusion about feeding fish and, to a lesser extent, about anchoring.

8.2 Knowledge of marine reserves

There are currently ten marine reserves in the FMA. About one-third of each sub-group correctly identified the number of marine reserves (Figure 8.1). The exception was the 'other' group; almost half (47%) of its members selected the correct response. Of those respondents who answered incorrectly, the majority thought there were more marine reserves than actually exist – in 2007 the tendency was to under-estimate. About one-third of each sub-group (with the exception of the 'other' user group which was about one-fifth) reported that they did not know the number of marine reserves.

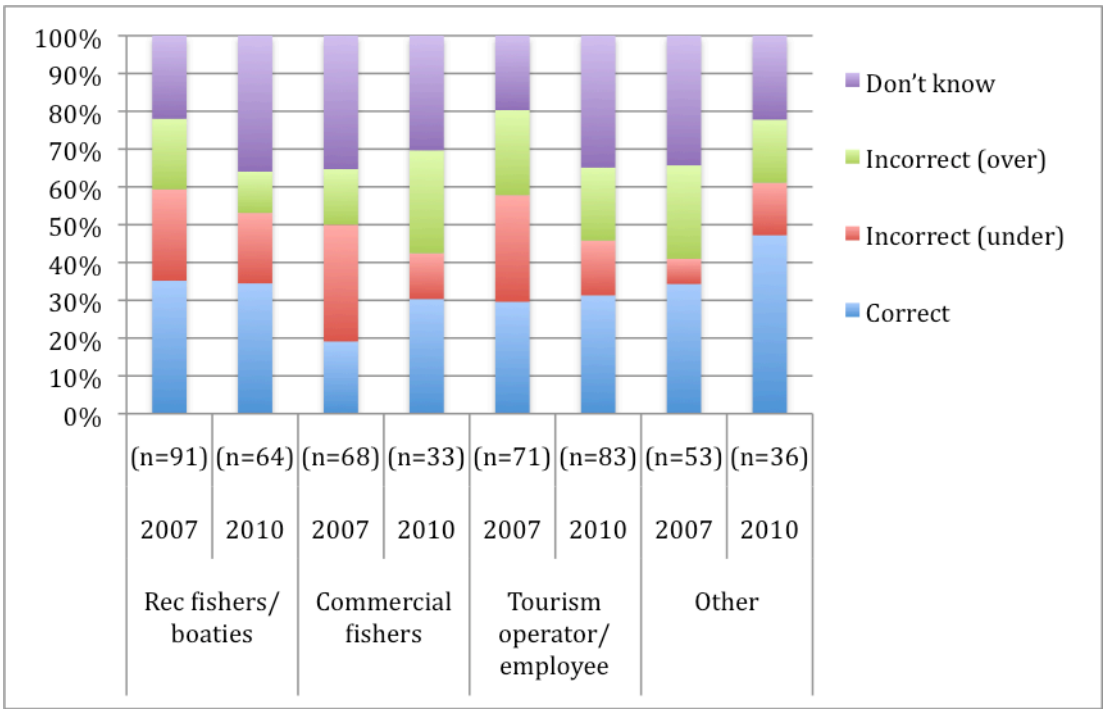


Figure 8.1: FMA users' knowledge of the number of marine reserves in the FMA - Q12

Two user groups exhibited little change between monitoring periods (the recreational fisher/boatie and tourism sub-groups). However, commercial fishers and 'other' FMA users appeared to have increased their knowledge of marine reserves, in that more respondents could correctly identify the number of reserves in 2010 compared with 2007 (from 19% to 30% and from 34% to 47% respectively). However, none of the differences between monitoring periods were statistically significant.

Users were asked whether various identified activities were allowed in marine reserves. Responses were translated from the options chosen by respondents ('allowed', 'sometimes allowed', 'never allowed') into correct/incorrect answers, as shown in Table 8.1. Ticks indicate responses considered 'correct'. One activity (anchoring) had two correct options owing to the fact that anchoring is allowed in marine reserves, but the FMA 'china shop' areas do not allow anchoring. With respect to five activities, researchers may gain permits to undertake the activity but otherwise they are not allowed (fishing from a boat, fishing from shore, collecting rocks and shells, collecting shellfish, erecting structures). In all cases, the normal circumstance of 'never allowed' was treated as the correct response. The question wording was adjusted from 2007 by adding "under normal circumstances" in order to make this clear to respondents.

Table 8.1: Correct responses to Q13 about activities allowed in FMA marine reserves (indicated by a tick)

Activity	This is allowed in marine reserves (✓)	This is sometimes allowed in marine reserves (✓)	This is never allowed in marine reserves (✓)
Fishing from a boat			✓
Kayaking	✓		
Power boating	✓		
Sail boating	✓		
Collecting rocks and shells			✓
Navigating through the reserve	✓		
Collecting shellfish			✓
Anchoring	✓	✓	
Introducing new marine species			✓
Rubbish disposal			✓
Feeding fish	✓		
Erecting structures			✓
Fishing from shore			✓
Diving	✓		
Swimming	✓		
Photography	✓		

The proportions of users correctly identifying whether activities are allowed are shown in Table 8.2. Changes in accuracy of more than 10% from 2007 to 2010 are shown in Table 8.2 by arrows.

Table 8.2: FMA users' knowledge of activities allowed in marine reserves (% correct) - Q13

	Rec fishers/ boaties			Commercial fishers			Tourism operator/ employee			Other		
	2007 (n=92)	2010 (n=62)	change	2007 (n=67)	2010 (n=33)	change	2007 (n=71)	2010 (n=81)	change	2007 (n=50)	2010 (n=34)	change
Fishing from a boat	85.4	83.9		89.6	87.9		87.3	70.4	⇓	96.0	82.4	⇓
Kayaking	94.4	86.9		95.2	100.0		90.4	86.4		96.1	100.0	
Power boating	85.6	67.2	⇓	85.2	87.9		77.8	61.7	⇓	87.8	75.0	⇓
Sail boating	93.2	85.0		95.1	97.1		84.7	81.3		98.0	97.2	
Collecting rocks and shells	85.9	83.3		88.9	91.2		85.9	80.2		88.2	83.3	
Navigating through the reserve	87.8	83.6		95.1	97.1		83.3	77.9		86.0	91.7	
Collecting shellfish	91.1	90.2		93.3	97.1		84.7	85.0		94.1	83.3	⇓
Anchoring	69.4	70.0		70.8	73.5		61.4	72.6	⇑	61.2	83.4	⇑
Introducing new marine species	88.4	90.2		77.8	93.8	⇑	89.7	81.0		79.6	91.7	⇑
Rubbish disposal	95.5	98.4		96.2	100.0		95.7	95.0		96.0	100.0	
Feeding fish	21.7	20.0		50.9	33.3	⇓	5.8	9.3		13.0	16.1	
Erecting structures	87.6	87.1		81.0	82.4		71.4	56.8	⇓	74.0	82.9	
Fishing from shore	86.5	85.5		88.9	93.9		79.7	77.5		92.2	86.1	
Diving	73.0	60.7	⇓	84.4	75.8		72.2	72.8		82.0	80.6	
Swimming	82.2	75.4		95.2	87.9		83.1	82.5		94.1	91.7	
Photography	95.6	93.3		98.4	91.2		91.8	95.1		98.0	94.4	

Notes:

1. Arrows indicate a change in the percentage of 10% or more and show the direction of change. A statistically significant change is denoted by a double arrow.
2. Since the number of respondents (n) varies by question item, the n given here represents the number of respondents completing the first item. There was very little variation in n across items within the question.

Most respondents continued to demonstrate a fairly accurate idea of what activities are allowed in marine reserves. As found in 2007, the main exception to this remains the beliefs about feeding fish. A substantial decrease in accuracy among commercial fishers was found (from 51% accuracy in 2007 to 33% accuracy in 2010). The remaining sub-groups showed relatively constant perceptions between monitoring periods for this item. Feeding fish is allowed in marine reserves.

Anchoring regulations were another source of confusion for respondents in 2007; improvements in understanding are apparent in Table 8.2 (anchoring is allowed except in designated anchor-free zones). However, anchoring rules remain relatively poorly understood.

Decreases in accuracy (of more than 10%) noted in Table 8.2 include knowledge of power boating (for three sub-groups), fishing from a boat (in 2010, 22% of tourism employees believed this was sometimes allowed in marine reserves), and the same sub-group members' belief that 'erecting structures' is sometimes allowed (40%). Collecting shellfish ('other' FMA users) and diving (recreational fishers/boaties) also recorded drops in accuracy of more than 10%. In contrast, improved accuracy about activities was evident for introducing new marine species and, as already mentioned, anchoring.

Some respondents thought that prohibited activities were allowed. Commonly misunderstood activities are given in Table 8.3. The percentages represent the range across sub-groups for those who said a prohibited activity either 'is allowed' or 'is sometimes allowed'.

Table 8.3: Prohibited activities believed to be allowed by a substantial proportion of FMA users – Q13

	2007	2010
Fishing from a boat	10-15%	12-30%
Collecting rocks and shells	10-15%	9-20%
Introducing new marine species	10-20%	6-19%
Erecting structures	12-25%	13-43%
Fishing from shore	10-20%	6-23%

As was the case in 2007, a substantial proportion of respondents in every sub-group stated that they did not know what proportion of the FMA was currently protected by marine reserves (Table 8.4). Of those people who did answer the question, most respondents grossly over-estimated the proportion of the FMA currently protected as marine reserves, a similar result to 2007. Only the 'other' FMA users showed a statistically significant improvement in knowledge, with 9% in 2007 reporting the protected area to be between 1 and 2 per cent, compared with 32% in 2010.[29] The correct answer is 1.1%.

[29] Chi square statistics: χ^2=4.6, df=1, p=.032.

Table 8.4: FMA users' knowledge of the proportion of the total FMA currently protected by marine reserves (% stating each proportion of the FMA) - Q14

	Rec fishers/ boaties		Commercial fishers		Tourism operator/ employee		Other	
	2007 (n=89)	2010 (n=59)	2007 (n=68)	2010 (n=30)	2007 (n=68)	2010 (n=80)	2007 (n=52)	2010 (n=34)
0%	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0
1%	4.5	6.8	5.9	10.0	11.8	5.0	5.8	14.7
2%	9.0	8.5	2.9	3.3	7.4	11.3	3.8	17.6
5%	11.2	13.6	10.3	10.0	8.8	13.8	13.5	5.9
10%	14.6	8.5	7.4	3.3	14.7	8.8	21.2	23.5
15%	7.9	5.1	2.9	0.0	5.9	3.8	5.8	5.9
20%	5.6	3.4	2.9	0.0	2.9	6.3	1.9	5.9
>20%	4.5	8.5	11.8	13.3	4.4	8.8	3.8	2.9
Don't know	42.7	45.8	54.4	60.0	44.1	42.5	44.2	23.5

8.3 Attitudes toward marine reserves

Respondents were asked to evaluate the current level of marine reserve protection in terms of the overall percentage of area protected, the size of individual reserves, and the range of marine habitats protected. Responses were recorded on a 7-point scale, where 1 = 'very inadequate', and 7 = 'very adequate'.

All mean scores were on the adequate side of the neutral point (4) of the scale and views on the adequacy of marine reserves generally were consistent across the three aspects examined – the area protected, size of reserves or range of habitats. Commercial fishers rated the adequacy levels of protection the highest out of all sub-groups, for all three measures (Figure 8.2).

Perceptions of adequacy presented a similar overall pattern in 2007 and 2010, however, some differences within sub-groups were apparent. Commercial fishers recorded increases in perceived adequacy for all three items, differences which were statistically significant.[30] Recreational fishers/boaties recorded small decreases in each of the aspects assessed, whereas both the tourism and 'other' FMA user groups showed small increases in their evaluations of adequacy for all three measures. No statistically significant differences were revealed for these latter two sub-groups.

The relationship between perceptions of adequacy and knowledge of marine reserve protection was examined in 2007 and a statistically significant difference was found - those who believed that more than 5% of the FMA was protected as marine reserve were more likely to believe the level of protection was adequate. Given this relationship, it is reasonable to expect that increased knowledge about marine reserves may influence perceptions of their adequacy. In 2010, little change in knowledge of marine reserves was recorded from 2007.

[30] F-test statistics: F=6.03, df=1, p=.016; F=6.24, df=1, p=.014; F=4.82, df=1, p=.031 respectively.

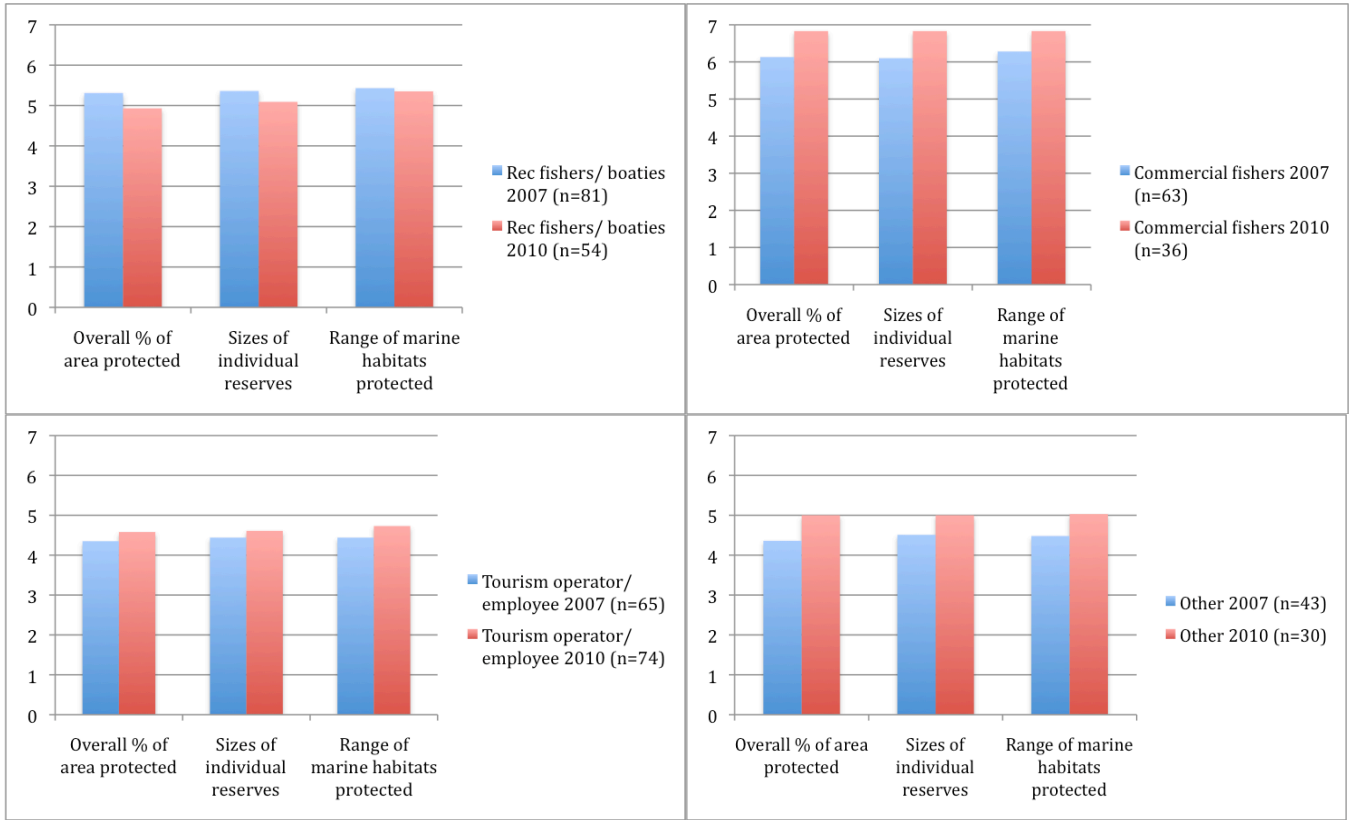


Figure 8.2: FMA users' perceptions of the current level of marine reserve protection in the FMA (1=very inadequate, 7=very adequate) - Q15

Notes:
Since the number of respondents (n) varies by question item, the n given here represents the number of respondents completing the first item. There was very little variation in n across items within the question.

On another 7-point scale, respondents were asked to consider the extent to which marine reserves had a positive or negative influence on their use or enjoyment of the FMA. The mean scores (Figure 8.3) indicate that all sub-groups believed that marine reserves had a slightly positive influence on their use or enjoyment. Commercial fishers continued to hold the lowest overall ranking.

The influence of marine reserves on use and enjoyment was similar in 2007 and 2010. While small increases and decreases between the monitoring periods were shown for all sub-groups, these changes were not statistically significant.

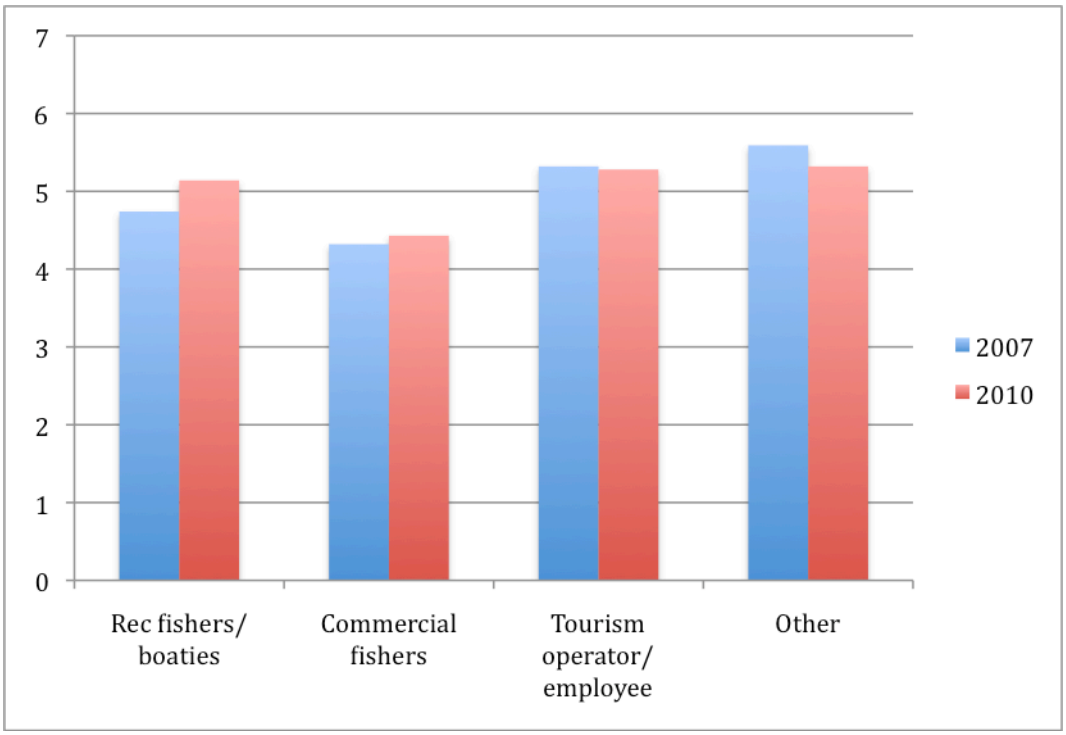


Figure 8.3: Influence of marine reserves on FMA users' use or enjoyment of the FMA (1=very negatively, 7=very positively) - Q16

9. Management

9.1 Summary

Most respondents had seen or heard information about the management of the FMA, mainly from the FMA User Guide, but also information brochures and signs at the water's edge. Some other information sources (such as newspapers) were used by particular user groups. Few differences between the monitoring periods were evident with respect to information sources.

Most people did not feel very well-informed about management of the FMA. While commercial fishers felt better informed in 2010 (c.f. 2007), some of the other sub-groups showed the reverse trend. High proportions of users could not answer some questions as they said they did not know enough about FMA management or the FMG to do so.

The data suggest that the current management regime is not having any substantial positive or negative effect on people's use or experience of Fiordland. Current fishing regulations appear to have a slightly positive effect on recreational and commercial fishing activity in Fiordland and similarly upon enjoyment of recreational fishing. Trends between monitoring periods were slight and positive, especially for the recreational fisher/boatie sub-group.

Most FMA users said they did not want to change any aspect of the current FMA management. Smaller proportions indicated they wanted changes in 2010 compared with 2007.

Awareness of the existence of the Guardians prior to participating in the survey was in the mid range (i.e. 45-64%), except for commercial fishers, with all of those respondents reporting that they knew of the FMG. Most respondents seemed reasonably knowledgeable about the role of the Guardians.

9.2 Information and knowledge about FMA management

The majority of respondents in all user sub-groups across both monitoring phases had heard or seen information about the current management of the FMA: in 2010 the figures were 89% of commercial fishers, 60% of recreational fishers, 54% of tourism operators/employees, and 69% of 'others' (Figure 9.1). No significant differences were evident for any sub-group between the monitoring periods, although data suggest modest increases for commercial fishers, and decreases for the recreational fisher/boatie and tourism sub-groups.

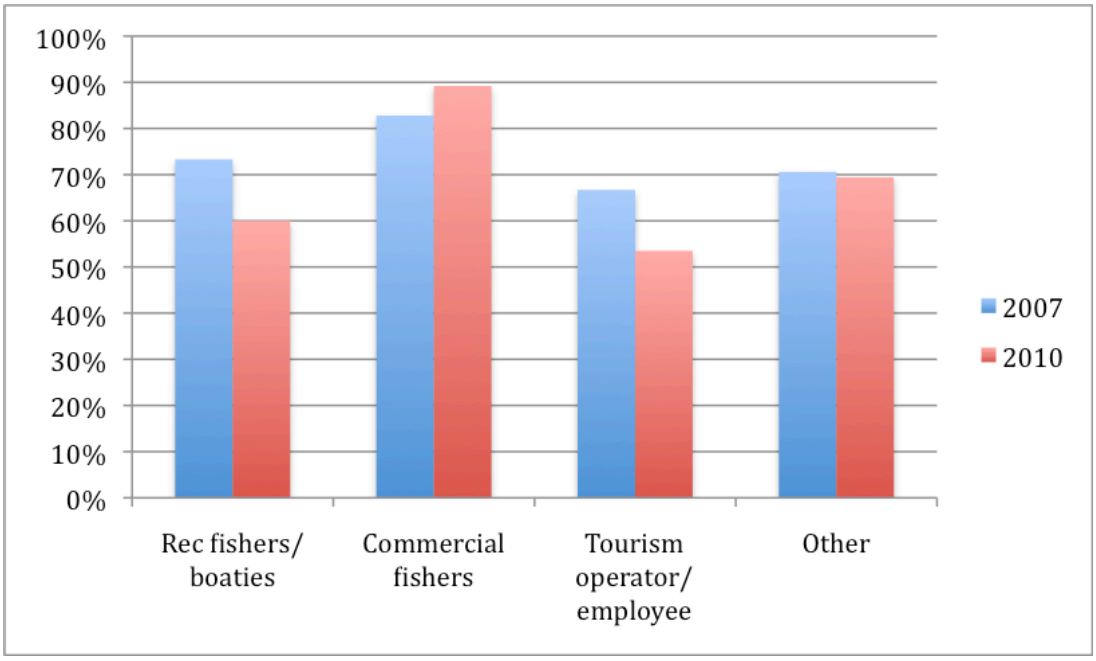


Figure 9.1: FMA users' knowledge of information about the current management of the FMA - Q21

The FMA User Guide stands out as the most used information source for all sub-groups (the Guide was not available in 2007). Retaining their prominence from 2007, information brochures and signs at the water's edge were important sources for all sub-groups, although commercial fishers did not obtain information from water-edge signs to any large extent. See Table 9.1 and Figure 9.2.

Specific sub-groups used some different sources: many commercial fishers read about FMA management in magazines (47%), tourism operators/employees learnt about FMA management through their work place (61%), and 'other' users relied on newspapers (64%). Information sources that were used the *least* by respondents (in both 2007 and 2010) were: commercial radio and marine radio.

One trend evident between 2007 and 2010 was the decrease in reliance on many information sources, with the exception of the internet and workplaces for most sub-groups. 'Other' FMA users also showed increased use of newspapers, a trend not found for remaining groups.

'Other' sources of information were listed by 18 respondents (13%) and the most frequently cited sources were: government agencies (n=6), the Marine Guardians (n=5) and tour guides (n=2).

Table 9.1: Sources of information about current management of the FMA (% using the information source) - Q22

	Rec fishers/ boaties			Commercial fishers			Tourism operator/ employee			Other		
	2007 (n=67)	2010 (n=39)	change	2007 (n=55)	2010 (n=34)	change	2007 (n=48)	2010 (n=46)	change	2007 (n=37)	2010 (n=25)	change
FMA User Guide	n/a	61.5		n/a	79.4		n/a	76.1		n/a	80.0	
Newspapers	43.3	20.5	↓↓	54.5	35.3	↓	45.8	15.2	↓↓	43.2	64.0	↑
Information brochures	83.2	35.9	↓↓	64.3	64.7		72.9	56.5	↓	89.2	76.0	↓
Signs at water's edge	52.2	33.3	↓	20.0	26.5		50.0	43.5		73.0	64.0	
Commercial radio	6.0	2.6		10.9	11.8		6.3	0.0		2.7	4.0	
Marine radio	4.5	2.6		20.0	14.7		6.3	2.2		8.1	16.0	
Internet	7.5	12.8		5.5	2.9		10.4	17.4		16.2	20.0	
Articles in magazines	52.2	25.6	↓↓	76.4	47.1	↓↓	47.9	17.4	↓↓	48.6	32.0	↓
Friends or family	34.3	28.2		14.5	8.8		20.8	15.2		32.4	32.0	
Other people at wharves/ramps	16.4	7.7		20.0	20.6		22.9	21.7		18.9	12.0	
Work place or work mates	19.4	10.3		29.1	35.3		55.1	60.9		43.2	36.0	
Other	7.5	7.9		9.3	14.3		16.7	6.5	↓	10.8	16.0	

Note:
Arrows indicate a change in the percentage of 10% or more and show the direction of change. A statistically significant change is denoted by a double arrow.

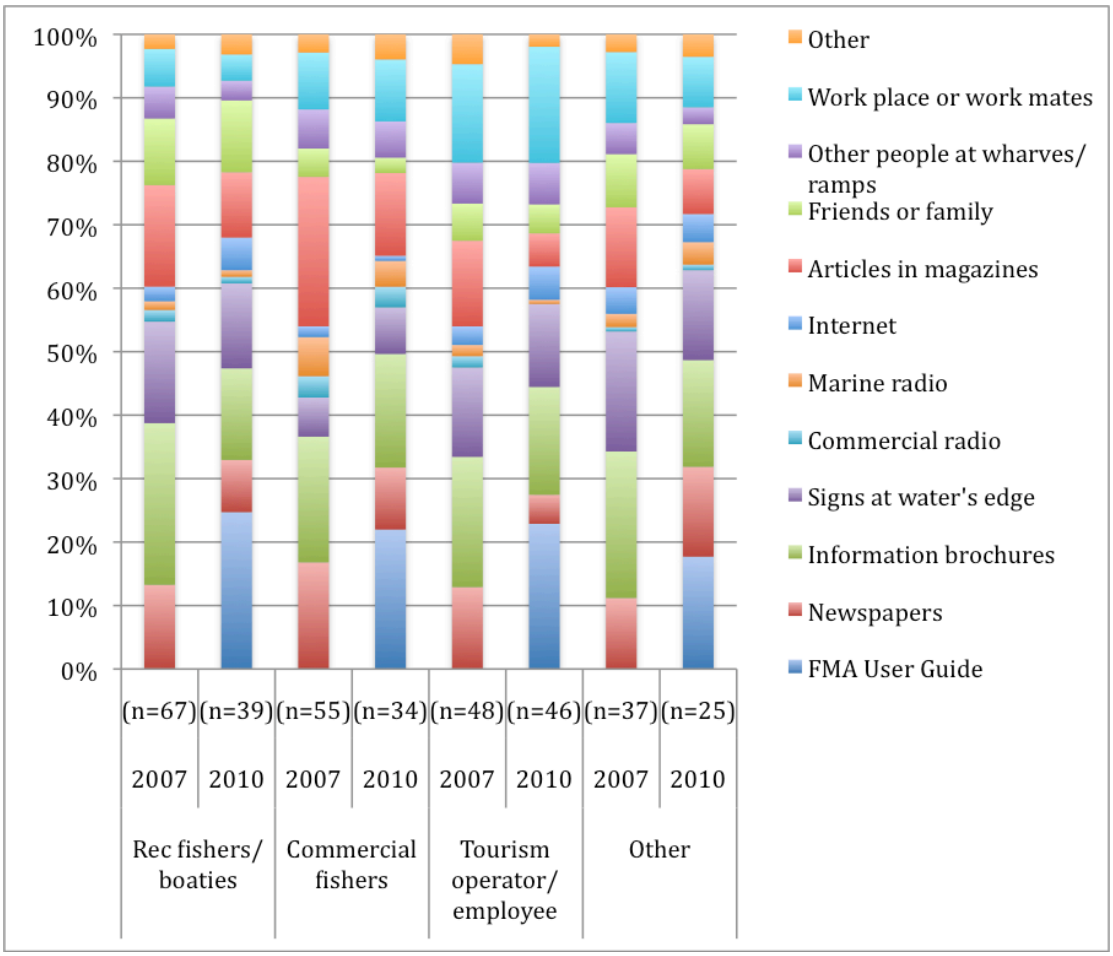


Figure 9.2: Sources of information about current management of the FMA - Q22

Respondents were asked to evaluate the extent to which they felt well-informed about management of the FMA. In order to do this, a 7-point scale was used in which 1 = 'not well-informed at all', and 7 = 'very well-informed'.

None of the respondents felt that they were very well informed about the management of the FMA (Figure 9.3). Mean scores for the sub-groups ranged between 3.18 and 4.97, with commercial fishers feeling the most well-informed.

Between monitoring periods, both commercial fishers and 'other' FMA users showed an increase in the degree to which they feel informed about FMA management. The former increase was statistically significant.[31] The tourism and recreational fisher/boatie sub-groups both showed a decrease. The latter difference was statistically significant.[32]

[31] F-test statistics: F=5.83, df=1, p=.018.
[32] F-test statistics: F=5.52, df=1, p=.020.

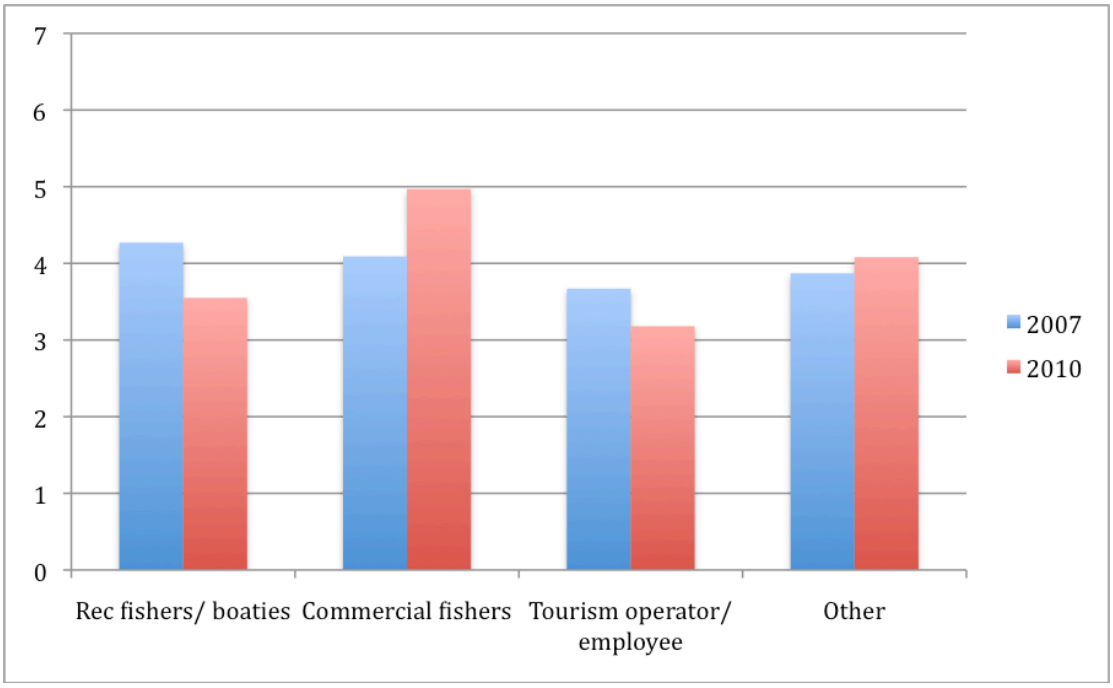


Figure 9.3: FMA users' sense of feeling informed about FMA management (1=not well-informed at all, 7=very well-informed) - Q23

9.3 Effect of FMA management on use and experience

A 7-point scale was used to assess the nature of FMA management's effect on users' experience and use. On the scale, 1 represents 'very negatively' and 7 represents 'very positively'.

The data suggest that the current management regime is not having any substantial positive or negative effect on people's use or experience of Fiordland. Overall FMA management exerted a slight positive effect (Figure 9.4). 'Other' users were the sub-group most positively influenced by FMA management.

The effects of FMA management on users' experience is increasingly positive, with all sub-groups showing more positive scores in 2010 than 2007. Differences were found to be statistically significant for recreational fishers/boaties and 'other' users.[33]

Many respondents took the opportunity to comment in support of their response to Q24 (see Volume 2). No commonly held views were apparent. Comments include supportive statements (e.g. "I love that this work is being undertaken to maintain the marine environment. This way it makes the place a special place") and criticism of FMA management (e.g. "I am concerned about losing the access to the commercial paua fishing grounds and loss of income with no compensation"). Three people asked for more information.

[33] F-test statistics: F=4.87, df=1, p=.029 and F=6.19, df=1, p=.015 respectively.

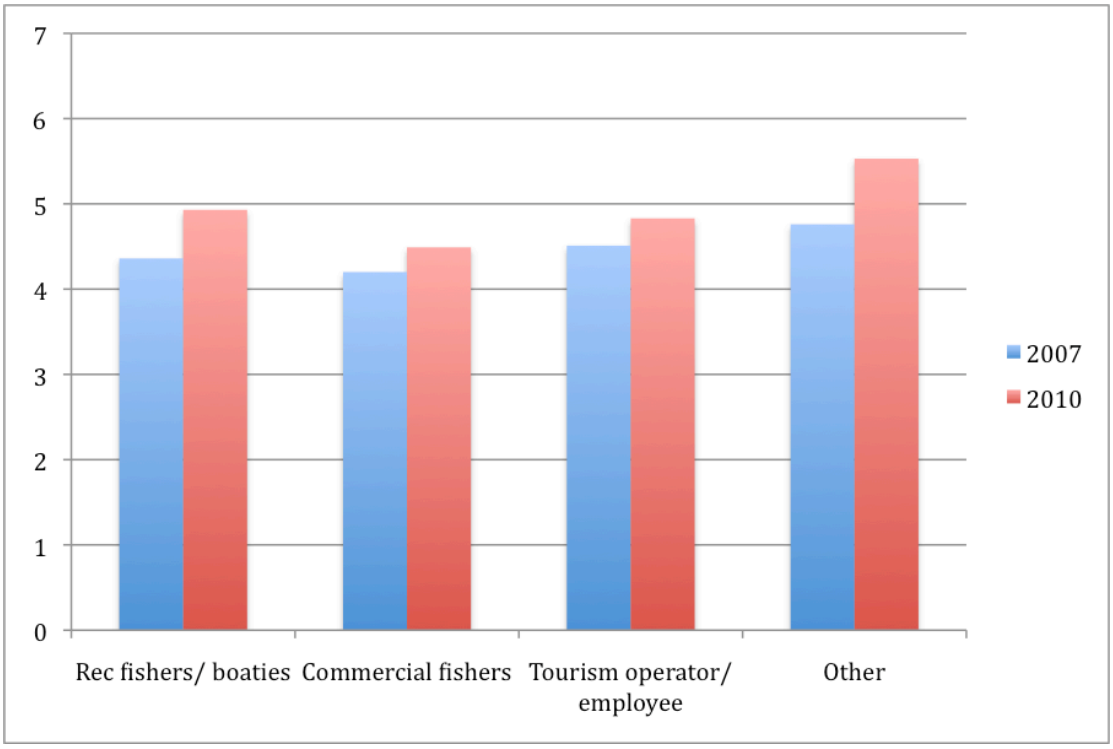


Figure 9.4: Effect of FMA management upon FMA users' use or experience of Fiordland (1=very negatively, 7=very positively) - Q24

Commercial fishers and all people who recreationally fish in the FMA (not just those who are categorised as a 'recreational fisher/boatie') were asked specific questions about the effects of the fishing regulations upon their activity and their enjoyment of the area.

Respondents were asked to rate how current fishing regulations affected their commercial fishing activity in Fiordland on a scale of 1-7, in which 1 represented 'very negatively' and 7 represented 'very positively' (Q30). The mean score for the commercial fisher sub-group in 2007 was 4.33, indicating that the current regulations had a slightly positive effect on their activities. In 2010, this mean score had dropped to 3.87, suggesting that the effects of regulations were now perceived more negatively. This difference was not confirmed as statistically significant. Calculations were not undertaken for other sub-groups who indicated that they commercially fished the FMA owing to the very small numbers of respondents.

Some (n=13) commercial fishers wrote a comment in response to Q30. Most comments were either neutral or indicated FMA management did not affect their commercial fishing activity. A small number of negative implications were identified. One positive comment was made (that they have access to the areas they require).

The current fishing regulations do not appear to have a substantial positive or negative effect on recreational fishing *activities* in the FMA (Figure 9.5). All user groups scored means in the centre of the 7-point scale, indicating that the regulations have only small effects on their recreational fishing activity. Corresponding with the results about management effects on use or experience, the 'other' sub-group was the most positively influenced.

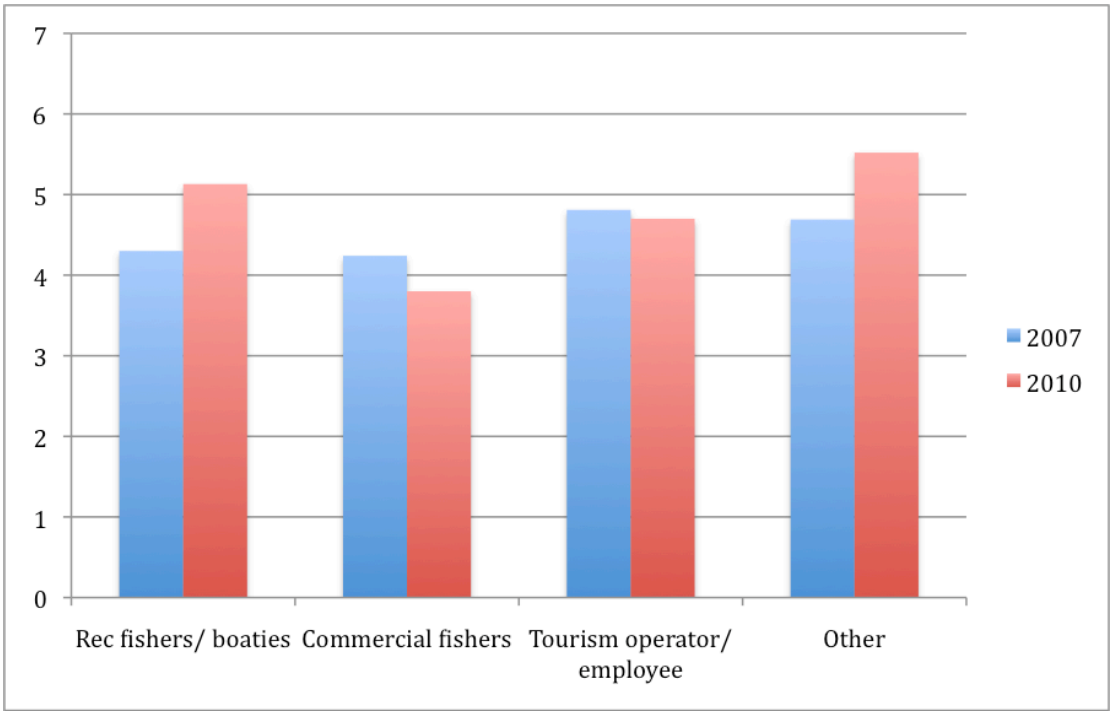


Figure 9.5: Effect of current FMA fishing regulations upon recreational fishing *activity* (1=very negatively, 7=very positively) - Q33

Between 2007 and 2010, a positive shift in the effect of FMA fishing regulations on recreational fishing activity for recreational fishers/boaties was recorded.[34] This was the only statistically significant change between the monitoring periods.

In response to Q33, written comments were made by respondents who recreationally fish. Comments were mainly supportive of the fishing regulations or else neutral. Some fishers made specific suggestions - primarily about lifting the crayfish limit for recreational fishers, and, with respect to the blue cod regulations, requests to both loosen and tighten up the regulations. A small number of comments were negative or dismissive of the benefit of the regulations. A cluster of comments (n=10) concerned fishing to get a feed, put by one fisher as follows: "Crayfish are more plentiful. Blue Cod are coming. The emphasis is now on just getting a 'feed' rather than loading up to the limit". As this quote illustrates, a small number of fishers commented on the positive changes they had observed in the fishery – larger sized fish and higher catch rates.

In 2007, about equal numbers of positive and negative comments were recorded. While not a quantitative measure, in comparison, the 2010 comments suggested a more positive perception towards fishing regulations by recreational fishers.

Similarly, the current fishing regulations do not appear to have a substantial effect on people's recreational fishing *enjoyment* (Figure 9.6). As with the previous question, results indicated that the regulations have a slightly positive effect on recreational fishing enjoyment for all user groups. Again, there is some evidence of a small

[34] F-test statistics: F=7.69, df=1, p=.006.

increase since 2007 in how these regulations are influencing recreational fishing enjoyment. All sub-groups except for commercial fishers showed positive gain. For recreational fishers/boaties (only), this increase was statistically significant.[35]

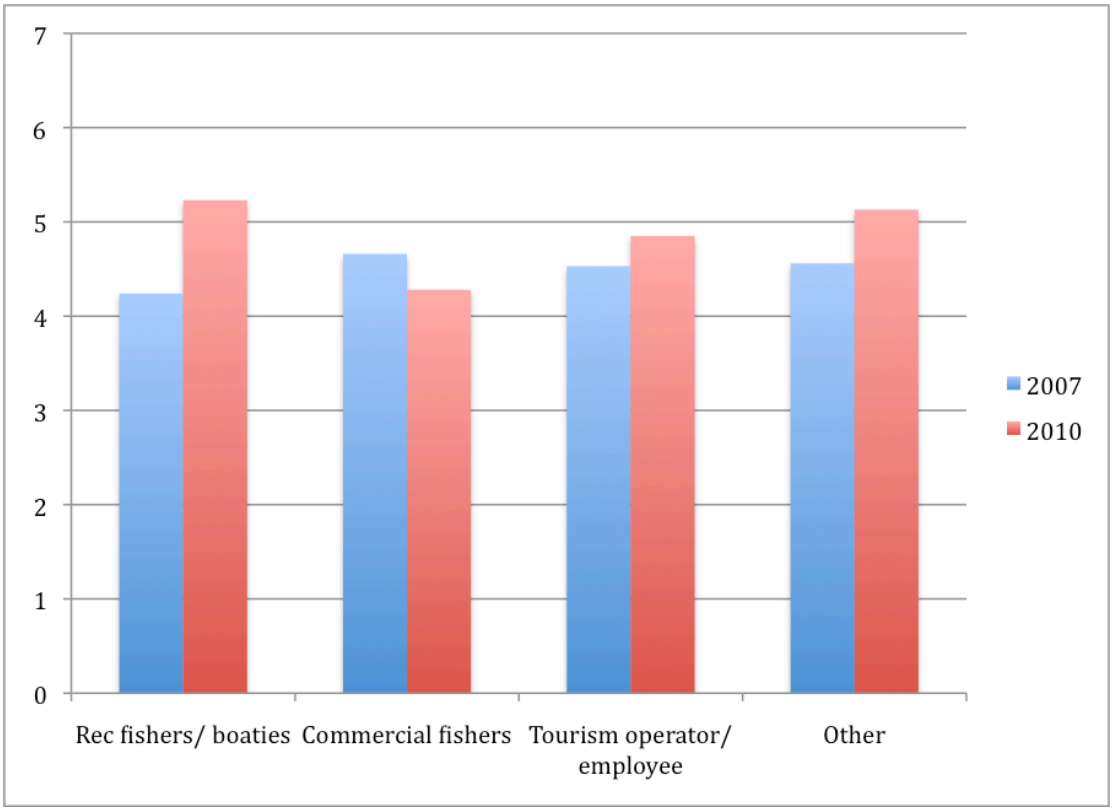


Figure 9.6: Effect of current FMA fishing regulations upon recreational fishing *enjoyment* (1=very negatively, 7=very positively) - Q34

Comment provided by recreational fishers to explain their response varied. Positive comments noted an increase in fish numbers and support for protection of the fishery. Negative comments were fewer in number and included those who noted that the regulations prevented them from catching the number of fish they wanted and safety issues (when bad weather) with respect to having to travel further out of the fiord to catch fish. Many (n=21) people said the regulations had no effect on them.

9.4 Desired changes to FMA management

Most user groups seemed satisfied with the current management of the FMA (Figure 9.7). Commercial fishers were the most satisfied: 9% wanted to change some aspect of FMA management; 66% did not. 'Other' users were more evenly split, while the remaining sub-groups displayed a much larger proportion seeking no changes (c.f. those wanting changes).

[35] F-test statistics: F=12.57, df=1, p<.001.

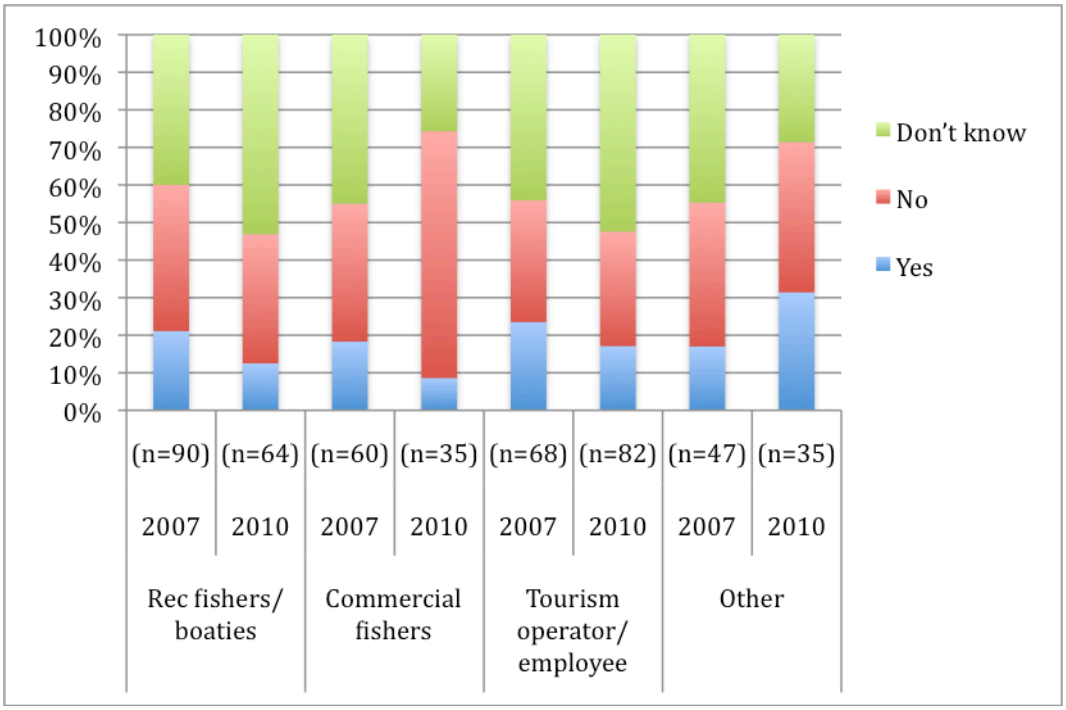


Figure 9.7: Desire for change to FMA management - Q27

Satisfaction with FMA management, as measured by this question, has increased between 2007 and 2010. Smaller proportions of users in three sub-groups wished to change FMA management – only 'other' users experienced an increase. In terms of those advising that no change was required, all user sub-groups show a static trend between 2007 and 2010, with the exception of commercial fishers. In 2007, that sub-group recorded one-third saying that no change was needed - this increased to two-thirds in 2010. This difference was statistically significant.[36]

Relatively high proportions of the each sub-group continued to report that they 'don't know' enough about the management of the area to comment on change, although for commercial fishers and 'other' users there was a marked reduction in this category in 2010.

Users who expressed what changes they would like to see (Q27) tended to suggest more regulation or higher levels of protection. A much smaller number wanted fewer regulations or specific regulations loosened up. Comments about the crayfish regulations (n=6) included various detailed suggestions. Nine people asked for more information and five people made comments about the management agencies (largely negative about DOC and ES) and involvement of stakeholders. See Volume 2.

Comments made by FMA users at the end of the questionnaire covered a wide range of topics, including positive comments about FMA management, requests for more information, suggestions about fishing regulations (seeking either more or less regulation) and comments about the need to deal with sewerage problems.

[36] Chi square statistics: χ^2=7.54, df=2, p=.023.

9.5 Knowledge of the Fiordland Marine Guardians

Awareness of the existence of the Fiordland Marine Guardians (prior to participating in the survey) varied by user group (Figure 9.8). Commercial fishers remained the sub-group with the highest reported awareness (every respondent had heard of the Guardians) and the increase between 2007 and 2010 for this sub-group was statistically significant.[37] Of the remaining user groups, recreational fishers/boaties and tourism operators/ employees recorded decreases in awareness of the FMG (2010 levels of awareness were 45% and 49% respectively). 'Other' FMA users increased their awareness of the FMG to a level of 64% awareness in 2010. None of these differences between 2007 and 2010 was statistically significant.

Involvement as a survey respondent is likely to have inflated results (increased the awareness of the FMG), but this potential distortion should remain constant across monitoring periods and therefore not affect trends analysis.

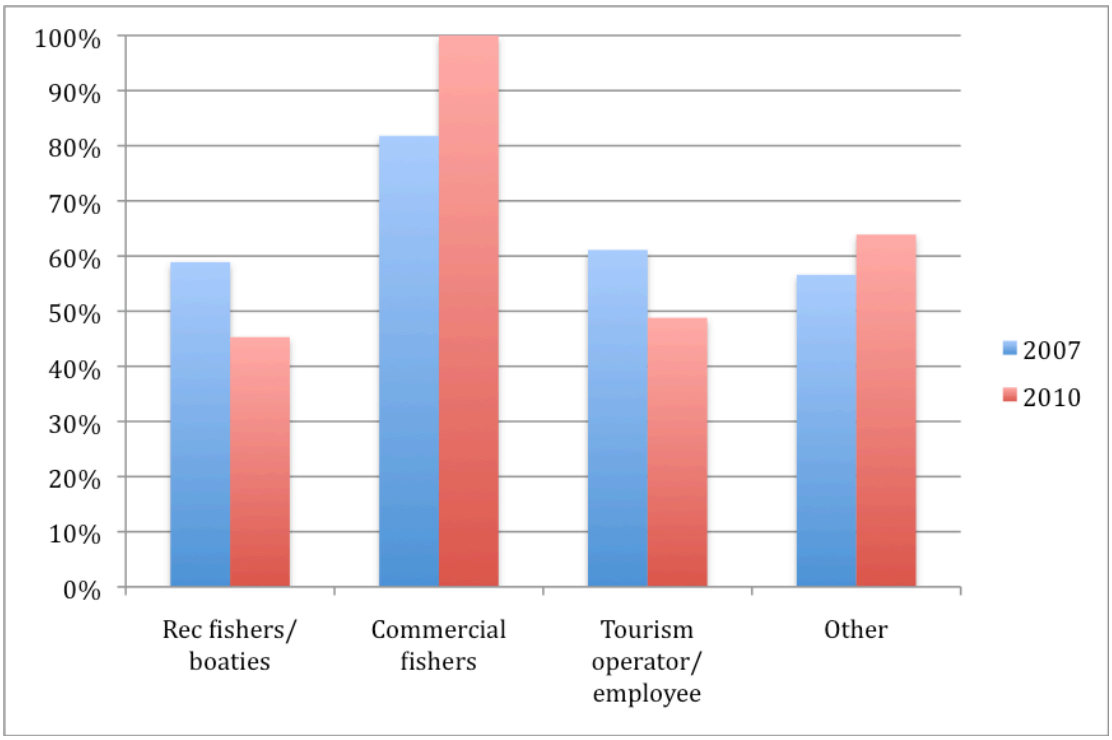


Figure 9.8: FMA users' awareness of the existence of the Fiordland Marine Guardians – Q25

When questioned about the role of the FMG, most respondents appeared reasonably well informed. Figure 9.9 and Table 9.2 depict the proportions of each sub-group that indicated which specified tasks were a role of the FMG.

Of the five functions presented for respondents to consider, two were bogus: 'to monitor the impact of hydro activity on Lake Manapouri', and 'to audit commercial fishing operations'. The latter function replaced one used in the 2007 questionnaire

[37] Chi square statistics: χ^2=7.61, df=1, p=.006.

that proved problematic (because it was partially true)[38] - 'to help assess applications for commercial operations within the FMA'. Owing to the potential for confusion on this item in 2007, and its rewording in 2010, results for this question cannot be matched for 2007 and 2010.

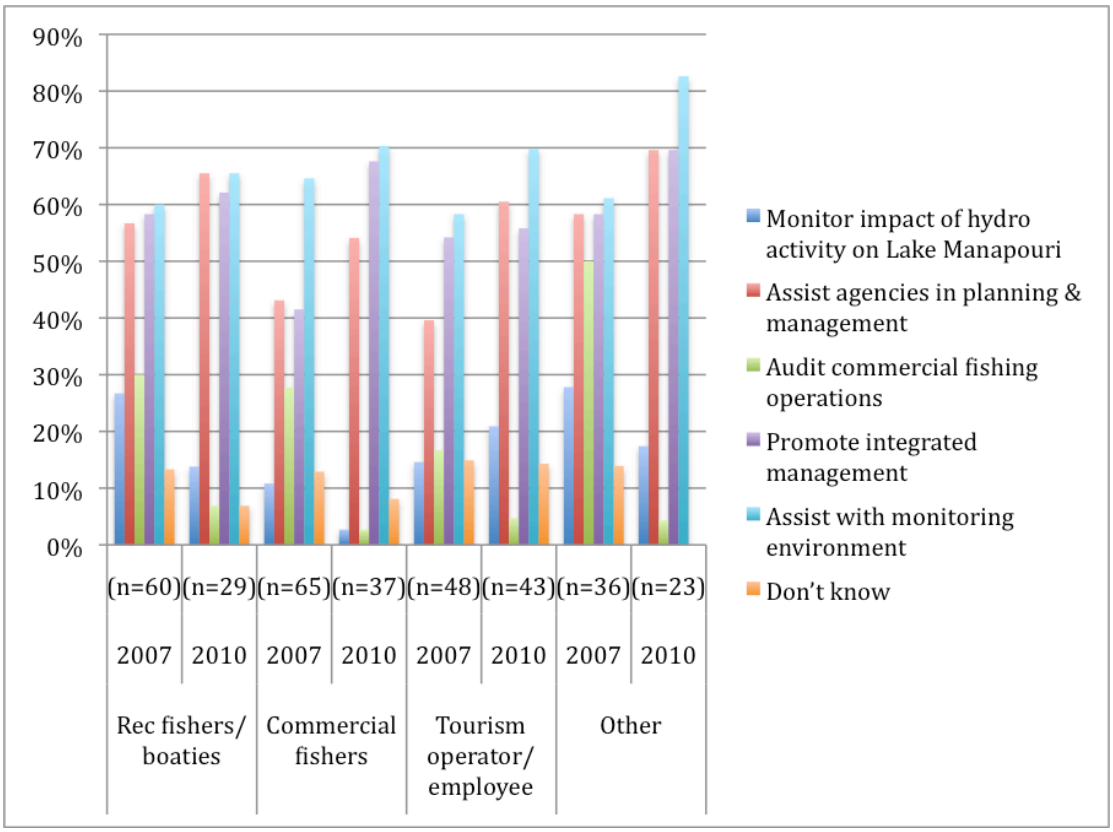


Figure 9.9: FMA users' knowledge of the roles of the Fiordland Marine Guardians (% stating function is a role of the FMG) – Q26

Between 2007 and 2010, respondents' knowledge about the FMG's role remained reasonably constant. The most recognised roles continue to be:

- Assisting management agencies in monitoring the state of the marine environment within the FMA (66% to 83% recognition of this role across sub-groups)
- Assisting agencies in planning and management of the FMA (recognition levels between 54% and 70%)
- Promoting integrated management of the FMA (recognition levels between 56% and 70%).

Most people recognised that monitoring the impact of hydro activity on Lake Manapouri was not a function of the FMG. The proportion of sub-groups indicating they did not know about the FMG roles varied from 0-14%. In 2010, no 'other' users said they did not know.

[38] FMG can put in a submission on such applications, although they do not assess them (this is a regional council role).

Changes between the two monitoring phases relate mostly to the item for which the wording was changed and are therefore not meaningful results.

All sub-groups, except the tourism operators/employees, showed a decrease in selection of the spurious role 'monitor the impact of hydro activity'. Commercial fishers demonstrate substantial increases in awareness of the 'assisting agencies in planning' and 'promoting integrated management' roles. The latter difference was statistically significant.[39]

Amongst the tourism sub-group, one statistically significant change occurred between monitoring periods: increased awareness of the role 'assisting agencies in planning and management of the FMA'.[40] There appears also to have been an increase in awareness of the role 'assisting management agencies in monitoring the state of the marine environment' (a change that was not statistically significant).

'Other' users displayed the greatest number of shifts in perceptions of the FMG roles between monitoring periods, however, none was statistically significant.

[39] Chi square statistics: χ^2=6.39, df=1, p=.011.
[40] Chi square statistics: χ^2=3.96, df=1,p=.047.

Table 9.2: FMA users' knowledge of the roles of the Fiordland Marine Guardians (% stating it is a role) – Q26

	Rec fishers/ boaties			Commercial fishers			Tourism operator/ employee			Other		
	2007 (n=67)	2010 (n=29)	change	2007 (n=55)	2010 (n=37)	change	2007 (n=48)	2010 (n=43)	change	2007 (n=37)	2010 (n=23)	change
Monitor impact of hydro activity on Lake Manapouri	26.7	13.8	↓	10.8	2.7		14.6	20.9		27.8	17.4	↓
Assist agencies in planning & management of FMA	56.7	65.5		43.1	54.1	↑	39.6	60.5	↑↑	58.3	69.6	↑
Audit commercial fishing operations	30.0	6.9	↓	27.7	2.7	↓	16.7	4.7	↓	50.0	4.3	↓
Promote integrated management of FMA	58.3	62.1		41.5	67.6	↑↑	54.2	55.8		58.3	69.6	↑
Assist monitoring the state of environment within FMA	60.0	65.5		64.6	70.3		58.3	69.8	↑	61.1	82.6	↑
Don't know	13.3	6.9		12.9	8.1		14.9	14.3		13.9	0.0	↓

Notes:

1. Arrows indicate a change in the percentage of 10% or more and show the direction of change. A statistically significant change is denoted by a double arrow.
2. 'Audit commercial fishing operation' was worded differently in 2007 - therefore trends are not meaningful.

10. Conclusions

10.1 Trends

10.1.1 No major shift in user perceptions

This report presents the results of the second iteration of the FMA user monitor. It measures data from 2010 against 2007 data benchmarks.

Overall, little appears to have changed in the 3-year period. The uniformity of findings is the primary conclusion of this study. Given the short 3-year period between iterations of the monitor, the relative stability in user perceptions is perhaps not surprising.

10.1.2 Some differences by sub-group, but no coherent set of changes

Some differences between 2007 and 2010 were found for specific sub-groups, although few trends were apparent across *all* user groups. In other words, the shifts in perceptions of the FMA do not represent a coherent or consistent (amongst users) set of changes in perception by all types of users.

The 'other' FMA user sub-group displayed the most erratic set of changes between 2007 and 2010. This user group comprises kayakers and divers (not on a commercially-guided trip), hunters, researchers and a variety of other types of people. Their shifts in perceptions and use may relate to the mixed nature of this group - it is the most heterogeneous of the sub-groups.

10.1.3 No emerging threats identified by users

Many questions in the survey provide for users to identify 'other' responses, thus any 'new' or emerging threats and issues may be captured. No emerging issues were apparent from the 2010 study.

10.2 Perceptions and effects of FMA management

The 2007 study report concluded with a statement about users' perceptions of the FMA and its management. This paragraph is repeated here as it remains true in 2010 and may best address the requirements of the review of the management of the FMA:

> Taken as a whole, the data about perceptions of FMA management suggest that the FMG has avoided 'ruffling too many feathers' to date. The current management regime does not appear to be having any significant positive or negative effect on people's use or experience of Fiordland, and most respondents do not want to change any aspect of current FMA management. While most respondents had seen/heard information about the management of the FMA, overall they did not feel very well-informed about FMA management. The question arises as to whether this is a problem. Despite some misperceptions about its role, awareness and knowledge of the FMG was reasonably sound.

10.3 Method

Three methodological conclusions may be drawn. First, it would be wise to avoid overlap with other user surveys in the future, where 'competition' for survey respondents could occur. It is likely that the concurrent administration of the Milford Sound/Piopiotahi User Monitor and the FMA survey decreased the number of recreational fisher/boatie participants.

Second, the commercial fishers' contacts list remains problematic. In order to obtain a larger sample of commercial fishers (which would be very desirable), further action is required. A balance needs to be reached between contacting people who do not fish in the FMA (and potentially annoying them) and increasing this sub-sample. Indeed, any further refinements to maximise response rates for all sub-groups (and thus increase sample sizes) would be helpful.

Third, the value to the FMG/agencies from each information item (survey question/s) is worthy of reconsideration prior to the next administration of the survey. While monitoring requires consistency of application of the method to ensure any changes recorded relate to the phenomenon being measured, the monitor was designed to allow for some addition/deletion of questions. Over time, some issues may no longer be pertinent to management, while other factors may emerge and require inclusion.

10.4 Value of the monitor

The user monitor is valuable as it measures users' perceptions of the FMA: a critical element of management. This relates both to the measurement of key issues (already in the survey) in order to identify improvement or worsening of conditions (e.g. users' knowledge of marine pests; users' opinions of the effect of regulations upon their enjoyment of the FMA), as well as the ability to cater for the emergence of new threats as perceived by users (where users have the opportunity to list 'other' things within questions – e.g. 'other' threats to the marine environment).

The value from the monitor will increase over time as time-series data build up with each iteration of the survey. Trends analysis will offer greater insight as the data time-series increases. It is suggested that the monitor is repeated every five years, or whenever the FMG/agencies detect changes associated with FMA use that demand attention. Commercial boat passengers should be monitored in future iterations.

References

Booth, K.L., Espiner, S.R. and Higham, J.E.S. (2007). *Fiordland (Te Moana o Atawhenua) Marine Area User Study 2007*. Report prepared by Kay Booth and Associates for Biosecurity New Zealand, Department of Conservation, Environment Southland, Fiordland Marine Guardians, Ministry for the Environment, Ministry of Fisheries, New Zealand.

Appendix: Questionnaire

Fiordland Marine Area User Survey 2010

Please help us learn more about how the Fiordland Marine Area is used and valued

This survey is intended to collect information about how people make use of the Fiordland Marine Area (FMA) for work and recreation. We are also interested in learning what people know and think about this place, and how these things change over time.

For the purposes of this study, the FMA includes 13 major fiords, and extends 12 nautical miles offshore from Awarua Point at the northern limit, to Sandhill Point at the southern limit. Please see the map in Question 6 for more detail.

If you have never visited the FMA, please tick this box ☐ and return the uncompleted booklet in the freepost envelope provided. Thank you for your time.

If you have visited the FMA, even only occasionally, please continue with the survey!

The survey is organised into five sections:

1. your connection with Fiordland;
2. what you think about this place;
3. managing Fiordland's marine environment;
4. your activities in the FMA; and
5. personal profile information.

Please follow the directions carefully, and answer each of the questions in this booklet as accurately and truthfully as you can. There are no 'right' or 'wrong' answers, and your responses are just as valuable as those of every other person who completes the survey.

Section 1 Your connection with Fiordland

Q1 What activities have you ever undertaken in the Fiordland Marine Area?

(please tick all relevant boxes)

1☐ Commercial fishing
2☐ Recreational boating or fishing
3☐ Kayaking
4☐ Diving
5☐ Hunting
6☐ Working in the tourism industry
7☐ Operating a charter vessel
8☐ Conducting research
9☐ Other_____

Q2 Which of the following best describes your use of the Fiordland Marine Area?

(please tick one box only)

1☐ Commercial fisher
2☐ Recreational boater or fisher
3☐ Kayaker
4☐ Diver
5☐ Hunter
6☐ Tourism operator / tourism employee
7☐ Charter vessel operator
8☐ Researcher
9☐ Other_____

Q3 About how often do you visit the Fiordland Marine Area?

(please tick one box only)

1☐ Less than once a year
2☐ Once a year
3☐ 2 to 3 times per year
4☐ 4 to 6 times per year
5☐ 7 to 9 times per year
6☐ 10 - 20 times per year
7☐ 21 – 40 times per year
8☐ 41 – 100 times a year
9☐ More than 100 times a year

Q4 How long have you been going to the Fiordland Marine Area?

(please tick one box only)

1☐ Less than 1 year
2☐ 1 – 5 years
3☐ 6 to 10 years
4☐ 11 to 20 years
5☐ More than 20 years

Q5 On your most recent visit, how did you access the Fiordland Marine Area?

(please tick one box only)

1☐ By road into Milford Sound
2☐ Over Lake Manapouri and the Wilmot Pass into Doubtful Sound
3☐ By helicopter from Tuatapere
4☐ By helicopter from Milford
5☐ By helicopter from Te Anau
6☐ By boat from Bluff
7☐ By boat from Stewart Island
8☐ By boat from Riverton
9☐ By boat from elsewhere
Please state: _____
10☐ Other _____

Q6 On your most recent visit, how long did you stay in the Fiordland Marine Area? (please tick <u>one</u> box only)

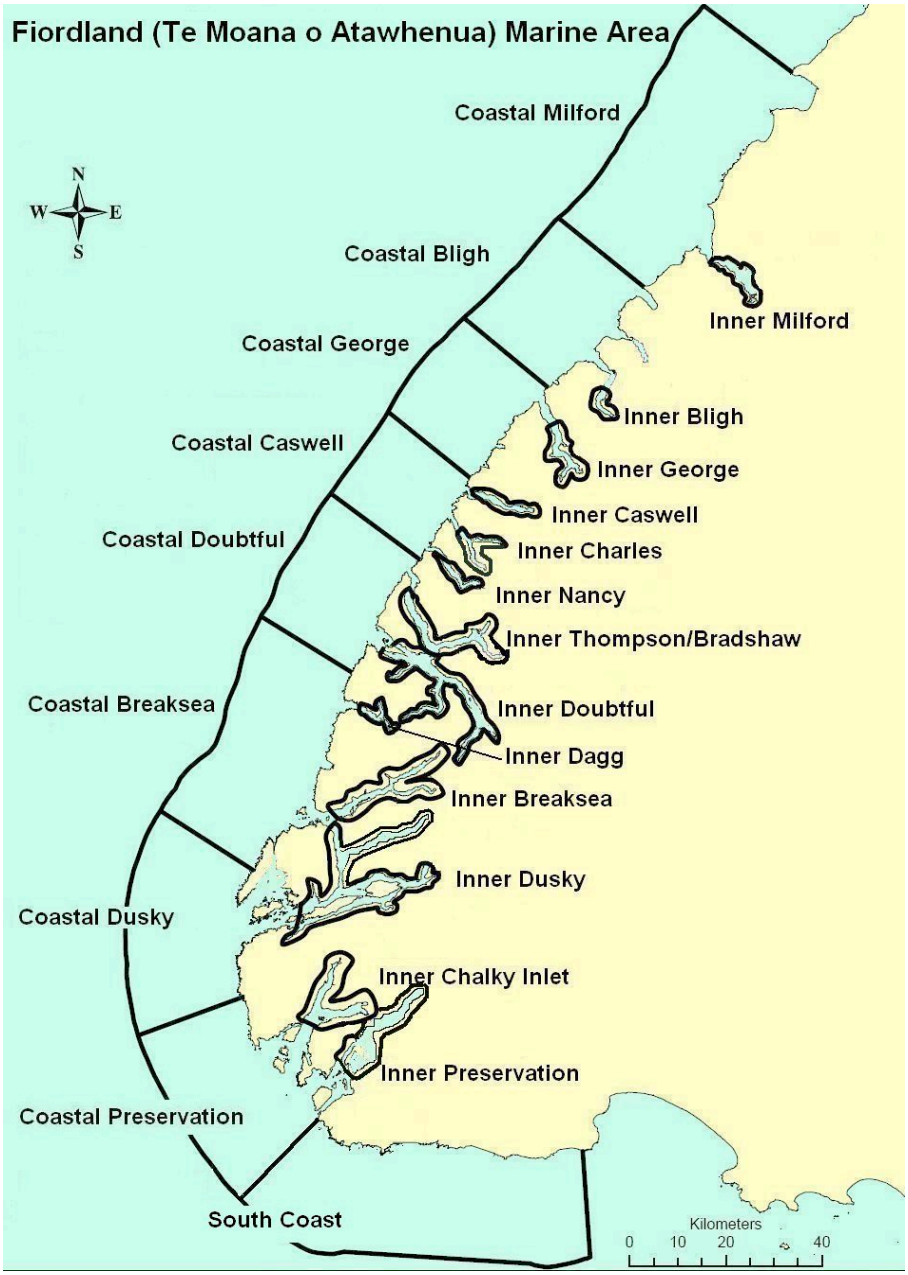
1☐ Less than 1 hour	5☐ Two days
2☐ 1 or 2 hours	6☐ Three or four days
3☐ Half a day	7☐ Between five and seven days
4☐ One day	8☐ More than seven days

Q7 On your most recent visit to the Fiordland Marine Area, where did you go?

Please mark the map below to show the parts of the FMA that you went to.

Use an **X** to indicate each fiord or coastal section that made up part of your <u>most recent</u> trip.

If you don't know where you went, tick here ☐, then go to Q8



Q8 The following is a list of possible reasons for visiting the Fiordland Marine Area. For each of the reasons listed, please show how well it describes your own reasons for visiting. There is a space at the end of the list if you need to add other reasons.

Using the scale, please show how well each reason describes why you go to the FMA. Show your choice by circling a number between 1 and 7.

1 = 'Does not describe my reasons at all'

7 = 'Describes my reasons exactly'

Possible reasons for visiting the Fiordland Marine Area	Does not describe my reasons at all						Describes my reasons exactly
To work	1	2	3	4	5	6	7
To see a new place	1	2	3	4	5	6	7
To experience nature	1	2	3	4	5	6	7
To meet new people	1	2	3	4	5	6	7
To get away from the town or city	1	2	3	4	5	6	7
To see wildlife	1	2	3	4	5	6	7
To view scenery	1	2	3	4	5	6	7
To be with friends / family	1	2	3	4	5	6	7
To learn about nature or history	1	2	3	4	5	6	7
To catch fish / shellfish	1	2	3	4	5	6	7
To experience wilderness	1	2	3	4	5	6	7
To get 'back to basics' for a while	1	2	3	4	5	6	7
To get away from people	1	2	3	4	5	6	7
To see a familiar place	1	2	3	4	5	6	7
To experience a quiet place	1	2	3	4	5	6	7
To pursue recreation activities	1	2	3	4	5	6	7
For cultural reasons	1	2	3	4	5	6	7
For spiritual reasons	1	2	3	4	5	6	7
To experience the special character of Fiordland	1	2	3	4	5	6	7
Other reason(s):							
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7

Section 2: What you think about this place

Q9 The following is a list of possible values for the Fiordland Marine Area. Please rate the importance of each to you.

Show the level of importance to you by circling a number between 1 and 7 on each line.

1 = 'Not at all important'

7 = 'Very important'

How important is it to you that the FMA has…	Not at all important						Very important
A wide variety of marine species	1	2	3	4	5	6	7
Absence of marine pests and weeds	1	2	3	4	5	6	7
High water quality	1	2	3	4	5	6	7
Presence of unique wildlife such as corals, dolphins, and penguins	1	2	3	4	5	6	7
Good fishing opportunities	1	2	3	4	5	6	7
Beautiful scenery / views	1	2	3	4	5	6	7
Plentiful tourism opportunities	1	2	3	4	5	6	7
Remote wilderness places	1	2	3	4	5	6	7
Peace and quiet	1	2	3	4	5	6	7
Absence of people (other than my companions)	1	2	3	4	5	6	7
Maori cultural values	1	2	3	4	5	6	7
Spiritual values	1	2	3	4	5	6	7

Q10 The following is a list of activities that may threaten marine environments and the things people value about them.

Using the scale, please show how much you think each activity is a current threat to the Fiordland Marine Area.

Show the level of threat by circling a number between 1 and 7 on each line.

1 = 'No threat at all'

7 = 'Significant threat'

(Alternatively, you may tick 'don't know' if you wish)

	No threat at all						Significant threat	
Commercial water craft	1	2	3	4	5	6	7	☐ don't know
Recreational fishing	1	2	3	4	5	6	7	☐ don't know
Commercial fishing	1	2	3	4	5	6	7	☐ don't know
Aspects of current management	1	2	3	4	5	6	7	☐ don't know
Tourism	1	2	3	4	5	6	7	☐ don't know
Marine pests	1	2	3	4	5	6	7	☐ don't know
Pollution	1	2	3	4	5	6	7	☐ don't know
Diver damage to marine species	1	2	3	4	5	6	7	☐ don't know
Recreational kayaking	1	2	3	4	5	6	7	☐ don't know
Recreational power craft	1	2	3	4	5	6	7	☐ don't know
Recreational sailing craft	1	2	3	4	5	6	7	☐ don't know
Climate change	1	2	3	4	5	6	7	☐ don't know
Anchor damage to marine species	1	2	3	4	5	6	7	☐ don't know
Other (please list below):								
	1	2	3	4	5	6	7	
	1	2	3	4	5	6	7	

Q11	In your opinion, how has the quality of the Fiordland Marine Area changed over the last 5 years?	1☐ It has improved 2☐ It has stayed the same 3☐ It has worsened 4☐ I don't know
	Please explain your answer here:	

Section 3 Managing Fiordland's marine environment

(A) Marine Reserves

Q12 How many marine reserves are there in the Fiordland Marine Area?

1☐ None	5☐ 8 - 10
2☐ 1 - 2	6☐ 11 - 15
3☐ 3 - 4	7☐ More than 15
4☐ 5 - 7	8☐ I don't know

Q13 What activities are allowed in marine reserves?

The list below contains a variety of marine activities. For each activity, please show whether you think, under normal circumstances, the activity is *allowed*, *sometimes allowed*, or *never allowed* in marine reserves. Show your choices by placing a tick (✓) in the relevant column.

For each activity, please tick only one column

Activity	This is allowed in marine reserves (✓)	This is sometimes allowed in marine reserves (✓)	This is never allowed in marine reserves (✓)
Fishing from a boat			
Kayaking			
Power boating			
Sail boating			
Collecting rocks and shells			
Navigating through the reserve			
Collecting shellfish			
Anchoring			
Introducing new marine species			
Rubbish disposal			
Feeding fish			
Erecting structures			
Fishing from shore			
Diving			
Swimming			
Photography			

Q14 What proportion of the total Fiordland Marine Area is currently protected by marine reserves? (please tick one box only)

1☐ 0 per cent
2☐ 1 per cent (approx)
3☐ 2 per cent (approx)
4☐ 5 per cent (approx)
5☐ 10 per cent (approx)
6☐ 15 per cent (approx)
7☐ 20 per cent (approx)
8☐ More than 20 per cent
9☐ I don't know

Q15	What do you think of the current level of marine reserve protection in the Fiordland Marine Area, in terms of:	Very **in**adequate						Very adequate
	Overall percentage of the FMA protected in marine reserves?	1	2	3	4	5	6	7
	Sizes of individual reserves?	1	2	3	4	5	6	7
	The range of marine habitats protected in marine reserves?	1	2	3	4	5	6	7

Q16	Very negatively						Very positively
How do marine reserves influence your use or enjoyment of the Fiordland Marine Area?	1	2	3	4	5	6	7

(B) Marine Pests

Q17 Have you seen, read, or heard any information about marine pests of threat to Fiordland?
1☐ Yes
2☐ No

Q18 Can you name any marine pests that currently threaten the Fiordland Marine Area?
1☐ Yes (please list below)
2☐ No (go to Q19)

Please list any marine pests you think currently threaten the FMA:

Q19	Do you currently own or operate a marine vessel in the Fiordland Marine Area?	$_1$☐ Yes (go to Q20) $_2$☐ No (go to Q 21)

Q20 The following is a list of actions that you can take to help prevent marine pests from entering Fiordland.

Using the scale provided, please indicate your willingness to undertake each action. Show your level of willingness by circling a number between 1 and 7 on each line.

1 = 'Not at all willing to do this'

7 = 'Very willing to do this'

In the final column, please also indicate if you are already taking this action

Actions	Not at all willing						Very willing	
Maintaining an active anti-fouling coating on the vessel	1	2	3	4	5	6	7	☐ already taking action
Regular inspection of the vessel and equipment for presence of fouling	1	2	3	4	5	6	7	☐ already taking action
In-water cleaning of the vessel's hull	1	2	3	4	5	6	7	☐ already taking action
Out-of-water cleaning and drying of the vessel's hull	1	2	3	4	5	6	7	☐ already taking action
Cleaning, disinfecting and drying marine equipment (buoys, lines, fishing gear etc)	1	2	3	4	5	6	7	☐ already taking action
Inspection and cleaning of vessel and equipment before using in a different location	1	2	3	4	5	6	7	☐ already taking action

(C) Information about management of the FMA

Q21	Have you ever seen or heard any information about the current management of the Fiordland Marine Area?	$_1$☐ Yes (go to Q22) $_2$☐ No (go to Q23)

Q22 Where did you see or hear the information about the current management of the Fiordland Marine Area? (please tick any that apply)

$_1$☐ Fiordland Marine Area User Guide
$_2$☐ Newspapers
$_3$☐ Information brochures
$_4$☐ Signs at the water's edge
$_5$☐ Commercial radio
$_6$☐ Marine radio
$_7$☐ Internet
$_8$☐ Articles in fishing / boating / diving magazines
$_9$☐ Friends or family
$_{10}$☐ Other people at wharfs / ramps
$_{11}$☐ Work place or workmates
$_{12}$☐ Other (please specify)

_____

		Not well-informed at all						Very well-informed
Q23	How well-informed do you feel about how the Fiordland Marine Area is managed?	1	2	3	4	5	6	7

		Very negatively						Very positively
Q24	How does the management of the Fiordland Marine Area affect your use or experience of Fiordland?	1	2	3	4	5	6	7
	Please explain your answer here:							

Q25 Prior to receiving this survey, had you heard of a group called the *Fiordland Marine Guardians* (FMG)?

1☐ Yes (go to Q26)

2☐ No (go to Q27)

Q26 What is the role of the Fiordland Marine Guardians?

(please tick any that you think apply)

1☐ To monitor the impact of hydro activity on Lake Manapouri

2☐ To assist agencies in planning and management of the FMA

3☐ To audit commercial fishing operations

4☐ To promote the integrated management of the FMA

5☐ To assist management agencies in monitoring the state of the marine environment within the FMA

6☐ I don't know

Q27 Is there any aspect of the current Fiordland Marine Area management that you would like to change?

1☐ Yes (please explain below)

2☐ No

3☐ I don't know

Please explain the aspects of marine management you would like to change:

Section 4 Your main activities in the Fiordland Marine Area

Q28 Are you a commercial fisher in the Fiordland Marine Area?

1☐ Yes (go to Q29)
2☐ No (go to Q31)

Q29 How many weeks / months in total per year (approximately) do you commercially fish in the Fiordland Marine Area?

(please tick one box only)

1☐ less than 1 week
2☐ 1 – 2 weeks
3☐ 3 – 4 weeks
4☐ 5 – 6 weeks
5☐ 7 - 11 weeks
6☐ 3 – 4 months
7☐ 5 – 6 months
8☐ 7 – 8 months
9☐ 9 – 10 months
10☐ 11 – 12 months

Q30 How do current Fiordland Marine Area fishing regulations affect your commercial fishing activity?

Very negatively 1 2 3 4 5 6 7 Very positively

Please explain your answer here:

Q31 Do you fish recreationally in the Fiordland Marine Area?

1☐ Yes (go to Q32)
2☐ No (go to Q35)

Q32 How often do you fish (for recreation) in the Fiordland Marine Area?

(please tick one box only)

1☐ Daily
2☐ Weekly
3☐ Monthly
4☐ Every 2-3 months
5☐ Once every 6 months
6☐ Once a year
7☐ Less than once a year

Q33 How do current Fiordland Marine Area fishing regulations affect your recreational fishing *activity*?

Very negatively 1 2 3 4 5 6 7 Very positively

Please explain your answer here:

		Very negatively						Very positively
Q34	How do current Fiordland Marine Area fishing regulations affect your recreational fishing *enjoyment*?	1	2	3	4	5	6	7

Please explain your answer here:

Section 5: About you

Q35 In which part of New Zealand do you normally live?
(please tick one box only)

1☐ Southland	7☐ Tasman	13☐ Bay of Plenty
2☐ Otago	8☐ Wellington	14☐ Waikato
3☐ Canterbury	9☐ Manawatu –Wanganui	15☐ Auckland
4☐ West Coast	10☐ Taranaki	16☐ Northland
5☐ Marlborough	11☐ Hawkes Bay	17☐ I don't normally live in New Zealand
6☐ Nelson	12☐ Gisborne	

Q36 Are you:
1☐ Male
2☐ Female

Q37 What is your age in years?

1☐ 15 – 19	6☐ 40 - 44	11☐ 65 - 69
2☐ 20 – 24	7☐ 45 - 49	12☐ 70 - 74
3☐ 25 - 29	8☐ 50 - 54	13☐ 75 – 79
4☐ 30 - 34	9☐ 55 - 59	14☐ 80 yrs +
5☐ 35 – 39	10☐ 60 - 64	

Thank you very much for your participation in this research

If you have any other comments to make about the Fiordland Marine Area or its management, please record them here:

Please place the completed survey into the FREEPOST envelope provided (there is no need to attach a stamp) and return it as soon as possible