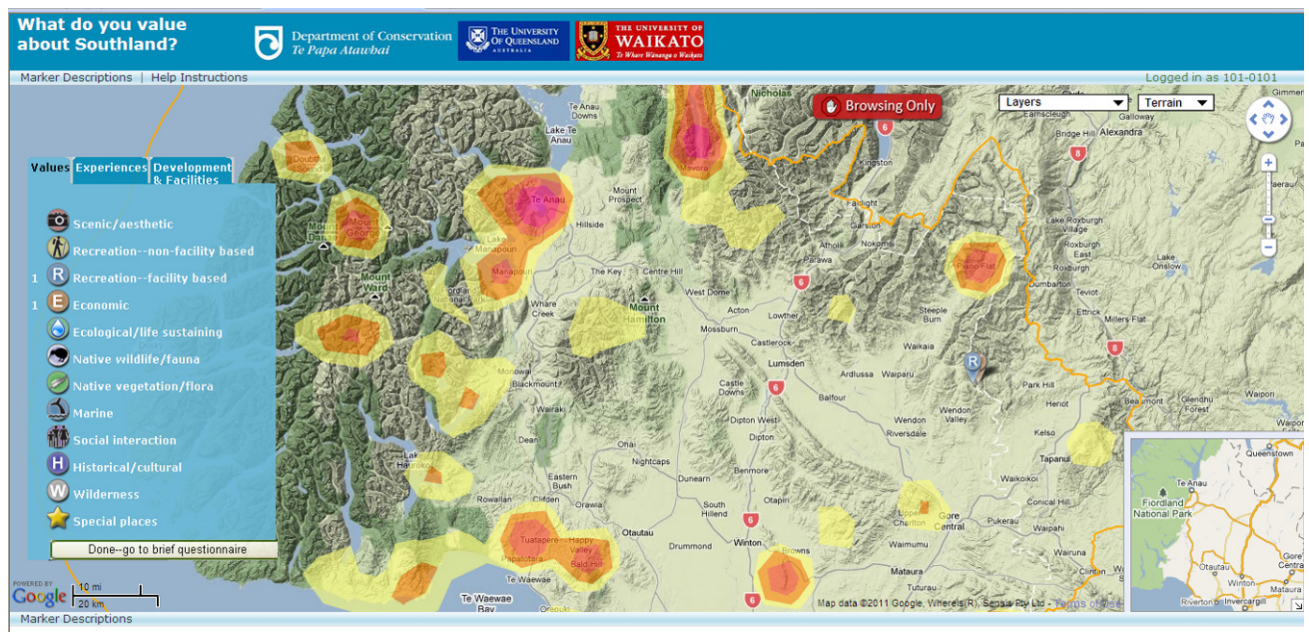




Identifying Conservation Values, Park Experiences, and Development Preferences in the Southland Region of New Zealand

A summary of a Public Participation Geographic Information System Study in the Southland region



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Prepared by Em Oyston, analysis by Greg Brown

Technical Support Officer - Recreation

Southland Conservancy

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1.0 Introduction

In January and February 2011 the Department of Conservation (DOC), University of Queensland, and the University of Waikato jointly conducted a pilot-study which collected public values, experiences, and development preferences for conservation land within the Southland region. This data was collected through a self-administered online mapping interface and questionnaire method known as Public Participation Geographic Information Systems (PPGIS).

This report provides an overview and summary of key findings of the pilot-study. A more technical report which covers the results and methodologies in an in-depth manner will be available on request from the Department of Conservation (DOC) Southland Conservancy.

The objectives of the study were twofold:

- To identify the spatial location of conservation land values, experiences, and facilities/development preferences in the Southland Region of New Zealand.
- To evaluate an internet system for capturing and reporting community information regarding conservation management in New Zealand

The data collected in the study will be used for pre-consultation purposes for the second generation Conservation Management Strategy (CMS) for the Southland Region. A CMS is a 10-year regional strategy that provides direction for the management of public conservation lands and waters, and species for which DOC has responsibility.

Approximately 268 individuals provided information about their conservation area values, experiences and development preferences through the Southland Values website (www.landscapemap2.org/nzdoc).

This study was the first PPGIS effort in New Zealand with the goal of identifying conservation area values, experiences, and development preferences. As a pilot effort, the project had mixed results. The positive aspects of the research project included:

- 1) Sufficient data was collected to assist DOC with the CMS planning process for the Southland region;
- 2) A PPGIS website that was robust and continuously available for mapping;
- 3) Results that provided basic descriptive information about the distribution of conservation area values, experiences, and development/facilities preferences in the region;
- 4) Feedback was received and lessons were learnt regarding how to improve the survey method for future projects.

2.0 Methodology

An interactive website was designed and promoted (<http://www.landscapemap2.org/nzdoc>) that allowed Southland residents and visitors to conservation areas to identify and map their park experiences and values over a 50 day period (10 January to 28 February 2011).

Respondents were sought by inviting a random sample of residents from households in the Southland region to participate in the study (n=750) by posting letters with instructions and access codes to complete the online survey. Visitors to conservation areas were also approached on-site and provided with instructions and access codes if they wanted to complete the survey online at their convenience. Members of the public who heard about the survey through public promotion or word of mouth could also request access codes online to complete the survey.

Values mapped by respondents were then symbolised according to their category value (e.g. aesthetic/scenic, wilderness, no development, etc) and 'hotspot' maps were generated under four different categories listed in **Table 1**. The resulting hotspot maps are available for public viewing and comment at <http://www.landscapemap2.org/nzdoc/mapviewer3>

Table 1: Categories for PPGIS analysis and their grouped values

Category	Values included
Natural Heritage	Scenic/Aesthetic Ecological/Life-sustaining Native Wildlife Native vegetation Marine Wilderness Solitude
Recreation	Recreation (non-facility based) Recreation (facility based)
Historic	Historic/cultural NZ identity/heritage Learning
Business enabling	Economic Energy development Natural resource development Tourism development Other development

A significant amount of qualitative data from annotated mapped markers in addition to questionnaire responses were also received. This data was thematically coded and then analysed.

Statistics for dominant 'values', 'experiences', and 'development preferences' were also calculated for conservation areas.

3.0 Distribution and response rate

A total of 5250 markers were mapped by the closing of the study representing 178 full responses (participant who mapped at least one spatial attribute and completed the survey questions) and 91 partial responses (participants who mapped at least one attribute but did not complete survey questions) for a total of 268 participants. These 268 individuals were comprised of 182 general public, 21 randomly sampled households, and 65 visitors. 60% of respondents were from Southland; 12% from Otago; 16% from other regions in NZ; and 12% were international visitors. Response rates for the survey are listed in **Table 2**.

Table 2: Overview of response rates

Respondent type	Number of codes distributed	Number of responses	Response rate	Total # of points plotted	Avg. # of points plotted per person
Postal distribution	723	21	3%	336	16
On-site distribution	387	65	16.8%	781	12
Code requested from web-site	?	182	?	4133	23
Total	1200+	267	-	5250	17

Response rates were lower than expected, particularly with regards to the postal distribution system. It is highly probable that some of the “general public” responses actually represent individuals from randomly sampled households or visitors that used the dynamic access code rather than the assigned access code but the actual number is in determinant.

4.0 Results and analysis

4.1 Distribution of values by conservation area

Table 3 shows the distribution of ‘values’ markers respondents placed by category, and by conservation area.

Table 3: Percentage of mapped values located within conservation areas in Southland Region.
Bold/underlined values indicates the largest percentage for that category.

Conservation area	Aesthetic	Economic	Historic	Life sustaining	Marine	Native vegetation	Native wildlife	Recreation w/facilities	Recreation	Social interaction	Special places	Wilderness
Catlins Conservation Park	12.9	0.0	7.1	11.8	2.4	14.1	23.5	2.4	17.6	1.2	4.7	2.4
Catlins Marine Mammal Sanctuary	21.7	2.3	12.6	1.7	18.3	4.0	14.9	2.9	9.7	1.7	8.0	2.3
Blue Mountains Forest	12.8	0.0	2.6	7.7	0.0	7.7	12.8	0.0	43.6	2.6	2.6	7.7
Dean Forest	5.6	0.0	0.0	5.6	0.0	5.6	11.1	0.0	66.7	0.0	0.0	5.6
Hokonui Forest	17.4	0.0	4.3	4.3	0.0	17.4	4.3	13.0	30.4	4.3	0.0	4.3
Longwood Forest	15.4	0.0	11.5	2.6	0.0	9.0	6.4	3.8	34.6	5.1	1.3	10.3
Mavora Park	19.7	2.2	0.0	3.6	1.5	6.6	7.3	15.3	29.9	4.4	6.6	2.9
Pyke Forest	15.2	0.0	6.5	0.0	4.3	8.7	6.5	23.9	30.4	0.0	0.0	4.3
Seaward Moss	20.0	0.0	15.0	10.0	0.0	20.0	35.0	0.0	0.0	0.0	0.0	0.0
Slopedown	9.5	0.0	14.3	16.7	2.4	19.0	16.7	0.0	9.5	0.0	11.9	0.0
Snowdon Forest	8.3	2.1	0.0	10.4	0.0	12.5	6.3	8.3	45.8	2.1	2.1	2.1
Takitimu	16.4	0.0	3.0	6.0	0.0	9.0	9.0	7.5	40.3	1.5	1.5	6.0
Tiwai Spit	8.7	8.7	8.7	4.3	13.0	13.0	30.4	0.0	8.7	0.0	0.0	4.3
Toetoes	11.1	0.0	11.1	16.7	0.0	27.8	22.2	0.0	0.0	0.0	5.6	5.6
Waikaia Forest	23.2	1.8	0.0	3.6	0.0	8.9	7.1	8.9	33.9	3.6	3.6	5.4
Croydon Bush Scenic Reserve	14.8	3.7	0.0	7.4	0.0	18.5	18.5	11.1	18.5	3.7	3.7	0.0
Eyre Mountains/Taka Ra Haka Conservation Park	17.5	2.1	0.0	12.4	0.0	8.2	10.3	9.3	34.0	2.1	1.0	3.1
Fiordland National Park	15.3	2.6	3.0	4.6	5.0	9.5	13.1	11.2	23.0	2.4	4.1	6.1
Forest Hill Scenic Reserve	19.3	0.0	7.0	8.8	0.0	15.8	14.0	7.0	17.5	7.0	3.5	0.0
Motupohue Scenic Reserve	21.5	0.0	6.3	1.3	11.4	13.9	13.9	8.9	15.2	2.5	1.3	3.8
Piopiotaahi Marine Reserve	32.6	9.5	4.2	4.2	18.9	4.2	3.2	7.4	4.2	2.1	6.3	3.2
Taipari Roa (Elizabeth Island) Marine Reserve	14.7	8.8	2.9	2.9	23.5	5.9	5.9	8.8	11.8	8.8	0.0	5.9
Te Waewae Bay Marine Mammal Sanctuary	18.2	1.5	13.6	1.5	10.6	9.1	3.0	10.6	19.7	3.0	4.5	4.5
Waituna Wetlands Scientific Reserve	10.3	1.7	6.9	8.6	5.2	12.1	15.5	1.7	22.4	3.4	8.6	3.4

Values in the Southland Region are unevenly distributed among the different conservation units. About 42 percent of all mapped values were located in Fiordland National Park (n=1,593) followed by Catlins Marine Mammal Sanctuary (5%, n=175) and Mavora Park Conservation Area (4%, n=137). The results show that aesthetics and recreation are important values for all conservation units with the exception of Seaward Moss and Toetoes Conservation Areas where no recreation values were identified.

4.2 Distribution of experience by conservation area

Table 4 shows the distribution of ‘experience’ markers respondents placed by category, and by conservation area.

Table 4: Percentage of mapped experiences located within conservation areas in Southland Region. Bold/underlined indicates the largest percentage for the category.

Conservation area	Poor access	Crowding	NZ identity	Poor information	Learning	Negative experience	Noise	Positive experience	Solitude	Wildlife/vegetation
Catlins Conservation Park	0.0	4.5	4.5	0.0	9.1	4.5	0.0	18.2	40.9	18.2
Catlins Marine Mammal Sanctuary	3.6	1.8	12.7	0.0	12.7	3.6	0.0	12.7	18.2	34.5
Blue Mountains Forest	9.1	0.0	18.2	0.0	9.1	9.1	0.0	9.1	9.1	36.4
Longwood Forest	23.1	0.0	23.1	7.7	7.7	7.7	0.0	0.0	7.7	23.1
Mavora Park	3.8	0.0	11.5	0.0	0.0	7.7	7.7	15.4	50.0	3.8
Pyke Forest	0.0	0.0	18.8	0.0	0.0	6.3	0.0	25.0	25.0	25.0
Seaward Moss	0.0	0.0	30.8	0.0	30.8	0.0	0.0	0.0	7.7	30.8
Slopedown	0.0	5.6	16.7	5.6	16.7	0.0	5.6	16.7	16.7	16.7
Snowdon Forest	8.3	0.0	8.3	0.0	8.3	0.0	0.0	8.3	66.7	0.0
Takitimu	45.0	0.0	15.0	0.0	5.0	5.0	0.0	0.0	20.0	10.0
Waikaia Forest	14.3	7.1	28.6	7.1	7.1	0.0	0.0	0.0	21.4	14.3
Eyre Mountains/Taka Ra Haka Conservation Park	23.5	0.0	17.6	0.0	5.9	0.0	0.0	0.0	47.1	5.9
Fiordland National Park	2.5	12.0	9.5	1.1	11.6	3.5	9.2	13.7	25.4	11.6
Forest Hill Scenic Reserve	8.0	4.0	16.0	4.0	16.0	0.0	4.0	8.0	20.0	20.0
Motupohue Scenic Reserve	0.0	0.0	30.8	0.0	7.7	0.0	0.0	23.1	15.4	23.1
Piopiotaahi Marine Reserve	0.0	41.8	5.5	0.0	1.8	3.6	38.2	3.6	3.6	1.8
Te Waewae Bay Marine Mammal Sanctuary	5.9	0.0	23.5	5.9	17.6	0.0	0.0	5.9	29.4	11.8
Waituna Wetlands Scientific Reserve	0.0	0.0	9.1	0.0	18.2	0.0	0.0	27.3	18.2	27.3

Experiences in the Southland Region are unevenly distributed among the different conservation areas. About 44 percent of all mapped experiences were located in Fiordland National Park (n=284) followed by Catlins Marine Mammal Sanctuary (9%, n=55) and Piopiotaahi Marine Reserve (9%, n=55). The results show that solitude experiences are common in most conservation areas with the exception of Piopiotaahi Marine Reserve where crowding experiences were more frequent. The highest percentage of poor access experiences was recorded at the Takitimu Conservation Area.

Seaward Moss (part of the Waituna/Awarua complex) Motupohue Scenic Reserve (encompasses Bluff Hill) rated highly as areas that represented the NZ identity.

4.3 Distribution of development by conservation area

Table 5 shows the distribution of ‘development preferences’ markers respondents placed by category, and by conservation area.

Table 5: Percentage of mapped development preferences located within conservation areas in Southland Region. Bold/underlined indicates the largest percentage for the category.

Conservation area	Energy	Less facilities	Less people	More facilities	More people	Natural resource	No development	Other development	Tourism
Catlins Conservation Park	0.0	0.0	5.3	10.5	0.0	10.5	52.6	5.3	15.8
Catlins Marine Mammal Sanctuary	0.0	0.0	5.3	10.5	5.3	5.3	26.3	15.8	31.6
Mavora Park	0.0	7.1	0.0	0.0	0.0	0.0	92.9	0.0	0.0
Slopedown	0.0	0.0	0.0	18.2	0.0	18.2	45.5	0.0	18.2
Snowdon Forest	0.0	0.0	0.0	0.0	16.7	0.0	33.3	25.0	25.0
Takitimu	0.0	7.1	0.0	35.7	7.1	0.0	35.7	7.1	7.1
Eyre Mountains/Taka Ra Haka Conservation Park	0.0	0.0	0.0	9.1	0.0	0.0	63.6	9.1	18.2
Fiordland National Park	1.2	1.8	13.6	4.7	4.7	2.4	49.7	4.1	17.8
Forest Hill Scenic Reserve	0.0	0.0	0.0	10.0	0.0	10.0	40.0	20.0	20.0
Piopiotaahi Marine Reserve	0.0	0.0	42.4	6.1	3.0	0.0	21.2	3.0	24.2

Development preferences in the Southland Region are unevenly distributed among the different conservation areas. About 54 percent of all mapped experiences were located in Fiordland National Park (n=169) followed by Piopiotaahi Marine Reserve (11%, n=33), Catlins Marine Mammal Sanctuary (6%, n=19) and Catlins Conservation Park (6%, n=19). The results indicate that no development preference is the dominant preference in most conservation areas with the exception of Catlins Marine Mammal Sanctuary where tourism development was most frequent. More park facilities were the most frequent category by percentage at the Takitimu Conservation Area. The highest percentage of preferences for seeing fewer people was recorded at Piopiotaahi Marine Reserve.

4.4 Dominant ‘values’, ‘experiences’ and ‘development’ preferences for conservation areas

The dominant values, experiences, and development preferences were calculated for each conservation area. **Table 6** presents this information where 10 or more values, experiences, or development preferences were mapped within a conservation area.

Table 6: Dominant values, experiences, and development preferences in Southland conservation areas

Conservation area	Dominant value	Dominant experience	Dominant development preference
Catlins Conservation Park	Native wildlife	Solitude	No development
Catlins Marine Mammal Sanctuary	Aesthetic	Wildlife/vegetation	Tourism
Blue Mountains Forest	Recreation	Wildlife/vegetation	-
Dean Forest	Recreation	-	-
Hokonui Forest	Recreation	-	-
Longwood Forest	Recreation	Poor access NZ identity Wildlife/vegetation	-
Mavora Park	Recreation	Solitude	No development
Pyke Forest	Recreation	Positive experience Solitude Wildlife/vegetation	-
Seaward Moss	Native wildlife	NZ identity Learning Wildlife/vegetation	-
Slopedown	Native vegetation	NZ identity Learning Positive experience Solitude Wildlife/vegetation	No development
Snowdon Forest	Recreation	Solitude	No development
Takitimu	Recreation	Poor access	More park facilities No development
Tiwai Spit	Native wildlife	-	-
Toetoes	Native vegetation	-	-
Waikaia Forest	Recreation	NZ identity	-
Croydon Bush Scenic Reserve	Native vegetation Native wildlife Recreation	-	-
Eyre Mountains/Taka Ra Haka Conservation Park	Recreation	Solitude	No development
Fiordland National Park	Recreation	Solitude	No development
Forest Hill Scenic Reserve	Aesthetic	Solitude Wildlife/vegetation	-
Motupohue Scenic Reserve	Aesthetic	NZ identity	-
Piopiotaahi Marine Reserve	Aesthetic	Crowding	Less people
Taipari Roa (Elizabeth Island) Marine Reserve	Marine	-	-
Te Waewae Bay Marine Mammal Sanctuary	Recreation	Solitude	-
Waituna Wetlands Scientific Reserve	Recreation	Positive experience Wildlife/vegetation	-

4.5 Hotspot mapping analysis

Figures 1 – 4 present the ‘hotspot’ mapping analysis for the four categories of Natural Heritage, Recreation, Historic, and Business Enabling and the values, experiences, and development preferences they encompass (see **Table 1**). Hotspot analyses represent the density of markers placed by respondents in relation to a spatial area. Red represents a high density of values while yellow represents a lower density. Low density or single marker placements within a 1km radius do not register as hotspot areas.

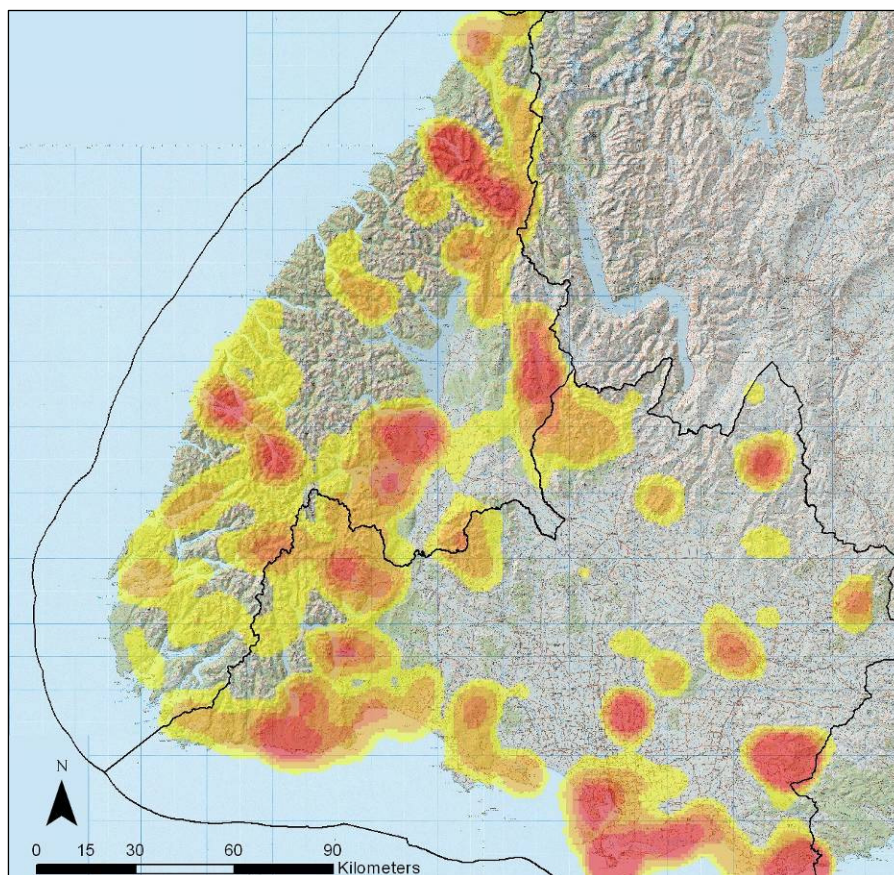


Figure 1: ‘Natural Heritage’ hotspot analysis

Figure 1 shows areas with the highest density of respondents’ natural heritage values are Milford Sound, the Upper Hollyford Valley, Mavora Lakes, Doubtful Sound and Deep Cove, Lake Te Anau and Manapouri, Green Lakes, Lake Hauroko, the Waitutu Forest, New River Estuary, Motupuhue/Bluff Hill, Waituna Lagoon and Awarua Bay, Forest Hill, the Catlins and Slopedown Forest, and Waikaia Bush.

Figure 2 shows areas with the highest density of respondents’ recreation values are the Te Anau/Manapouri and Kepler areas, Mavora, Green Lakes, Lake Hauroko, the Longwoods, New River Estuary, Bluff, Waituna Lagoon, Curio Bay, Waikaia Bush, and the Slopedown/Catlins Forest area.

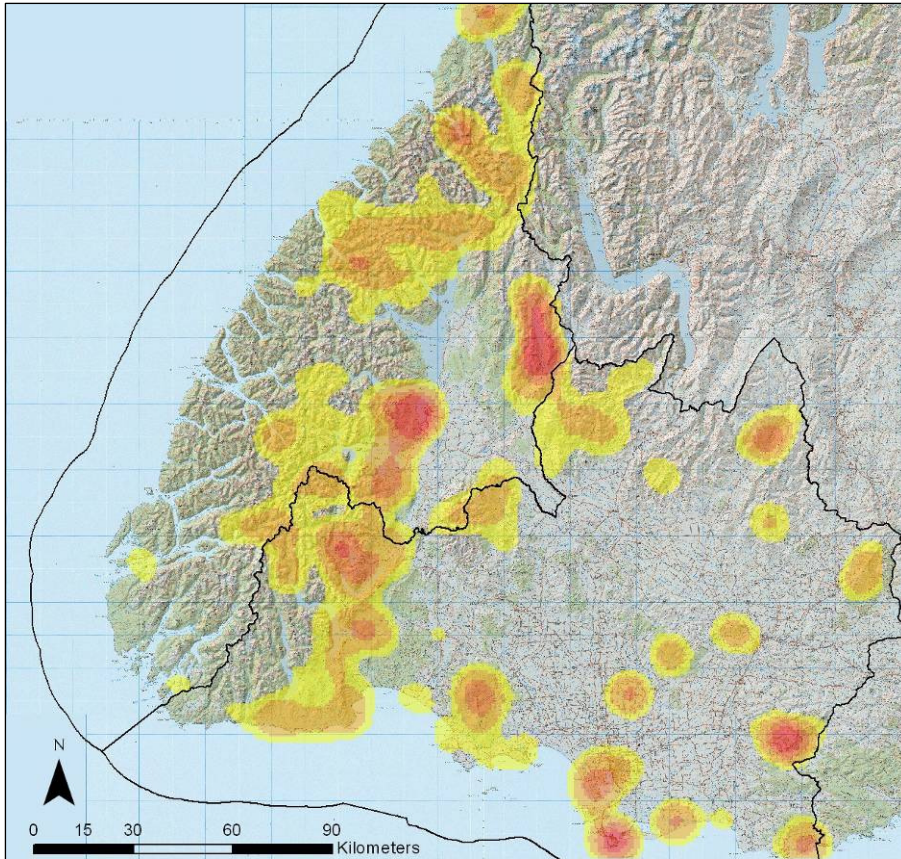


Figure 2: 'Recreation' hotspot analysis

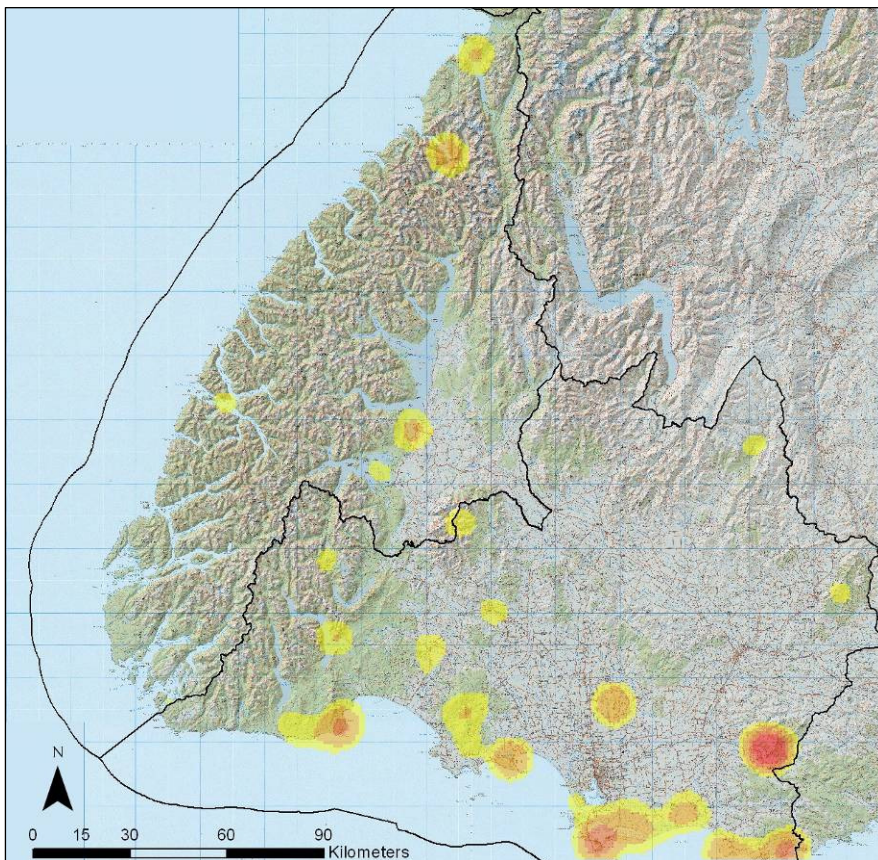


Figure 3: 'Historic' hotspot analysis

Figure 3 shows areas with the highest density of respondents' historic values are Milford Sound, Martin's Bay, Lake Te Anau, Port Craig, Riverton, Bluff Hill/Motupuhue, Curio Bay, and Slopedown Forest.

Figure 4 shows areas with the highest density of respondents' business enabling values are concentrated in Milford Sound, Te Anau, Bluff, Slopedown Forest, and Curio Bay.

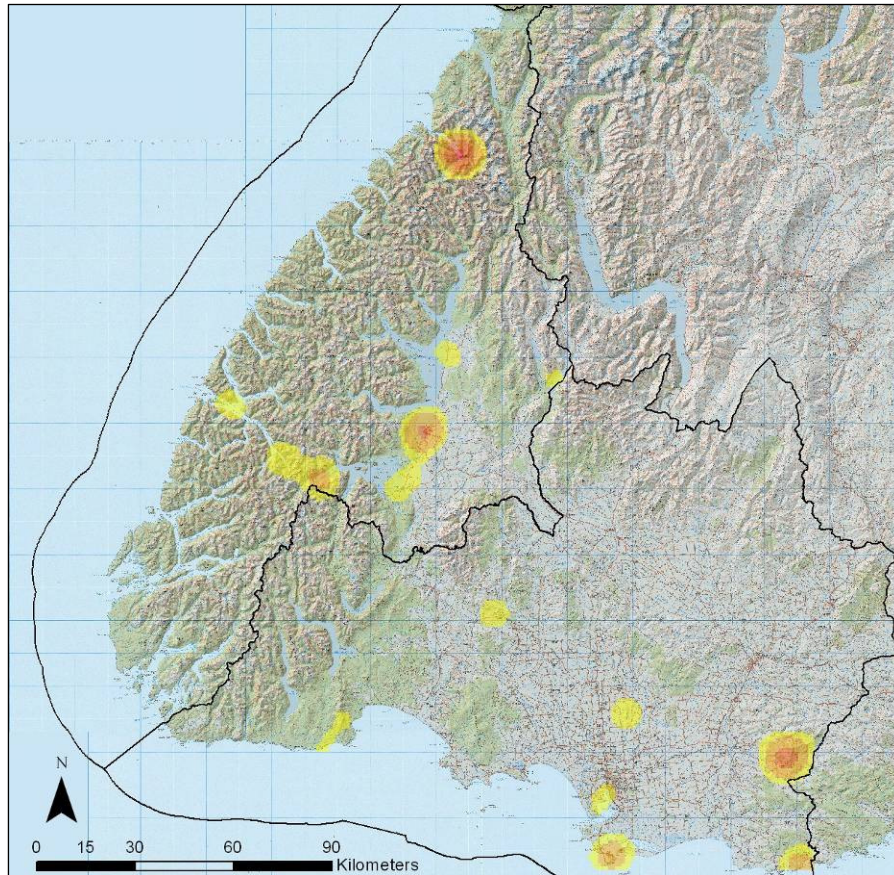


Figure 4: 'Business enabling' hotspot analysis

5.0 Recommendations for future studies

One of the objectives of the study was to evaluate how effective the PPGIS survey was for capturing and reporting community information regarding conservation management in New Zealand. As this study was the first PPGIS effort in New Zealand focusing on conservation management, many lessons were learnt as to how the methodology and use of PPGIS could be improved for future projects.

Feedback received from respondents and recommendations that may provide solutions are listed in **Table 7**.

Problem	Recommendation/Solution
<ul style="list-style-type: none"> ▪ Taking too much time to place all values and experiences ▪ Respondents want to value areas, not individual points 	<ul style="list-style-type: none"> ▪ Minimise the number of different markers to approximately 10 (reduced from ~30). ▪ Allow mapping of polygons/areas rather than individual points.
<ul style="list-style-type: none"> ▪ Unable to save points/points disappear 	<ul style="list-style-type: none"> ▪ Create a login system that uses respondents email address and password. Respondent's points were saved provided they used their unique access code when logging in, however this was not clearly communicated to users.
<ul style="list-style-type: none"> ▪ The map did not provide enough detail/difficult to find places 	<ul style="list-style-type: none"> ▪ Provide a navigation bar that provides spatial bookmarks for key visitor sites to allow easy and quick navigation for respondents.
<ul style="list-style-type: none"> ▪ The mapping interface is slow to load 	<ul style="list-style-type: none"> ▪ Respondents require broadband internet access to complete the survey within a sensible timeframe. Unfortunately, some rural areas in Southland do not have good access to broadband internet. An option would be to offer respondents access to a dedicated computer at a local visitor centre.

In addition to issues with the mapping/questionnaire interface raised by the public, there are concerns with sampling that need to be addressed in future studies.

The quantitative data produced from the survey could not be considered statistically representative of the Southland population as responses were not from a true random sample, but to an extent 'self-selected' as the response method relied on the will of a respondent to complete the survey. Although this bias can not be eliminated, it could be reduced with a larger sample size.

To achieve a larger sample size in future, it is recommended that postal distribution methods are avoided as they have proved to have an extremely low response rate. More effort and resources should be dedicated to public awareness and advertising of the survey in the media, and having computers in visitor centres which respondents can use. An incentive such as a reward or prize may also be increase response rates.