

Hauraki Gulf Use and Values Survey

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INSTITUTE FOR
APPLIED ECOLOGY NEW ZEALAND
AN INSTITUTE OF AUT UNIVERSITY
aquaculture • bioactives • conservation • global change

AUT
UNIVERSITY

- Completed as part of my PhD at AUT University on the social dynamics of conservation decision making.
- Research team from Institute for Applied Ecology New Zealand, School of Applied Sciences (Barbara Bollard Breen) and the School of Public Health and Psychosocial Studies (Chris Krägeloh & Rex Billington).
- Research approved by the AUT Ethics Committee and the Maori Research Facilitation Committee.



Whangarei

Leigh
Omaha
Waikowhiri
Snells Beach
Orewa
Riverhead
Waitakere
AUCKLAND
Manukau



Coromandel
Whitianga
Tairua
Pouarua
Thames
Whangamata
Ngatea
Kerepehi
Paeroa
Waihi
Te Aroha
Morrinsville
Waharoa
Matamata
Tirau

Tauranga

Hamilton

Whakatane

- Values
- Use
- Environmental health

- 4495 total points
- 1491 participants

Hauraki Gulf: All survey data points



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S



Whangarei



- **Values**

- Use
- Environmental health

- 16652 total value points

Value		# points	% total
Recreation	<i>Recreation or leisure</i>	3575	21
Scenery	<i>Attractive scenery and views, sights, smells or sounds</i>	3399	20
Conservation	<i>Environmental conservation</i>	1466	9
Native species	<i>Native animals, plants or trees</i>	1452	9
Wilderness	<i>Being wild, uninhabited, or untouched by human activity</i>	1073	6
Tourism	<i>Tourism, travel, or sightseeing</i>	1062	6
Community	<i>My community</i>	1029	6
Historical	<i>Historical significance</i>	940	6
Identity	<i>My identity</i>	795	5
Home	<i>Because it is my home and I live here</i>	565	3
Culture	<i>My culture or heritage</i>	477	3
Research	<i>Scientific research</i>	405	2
Employment	<i>Work, income or employment</i>	278	2
Spiritual	<i>Spiritual significance</i>	136	1

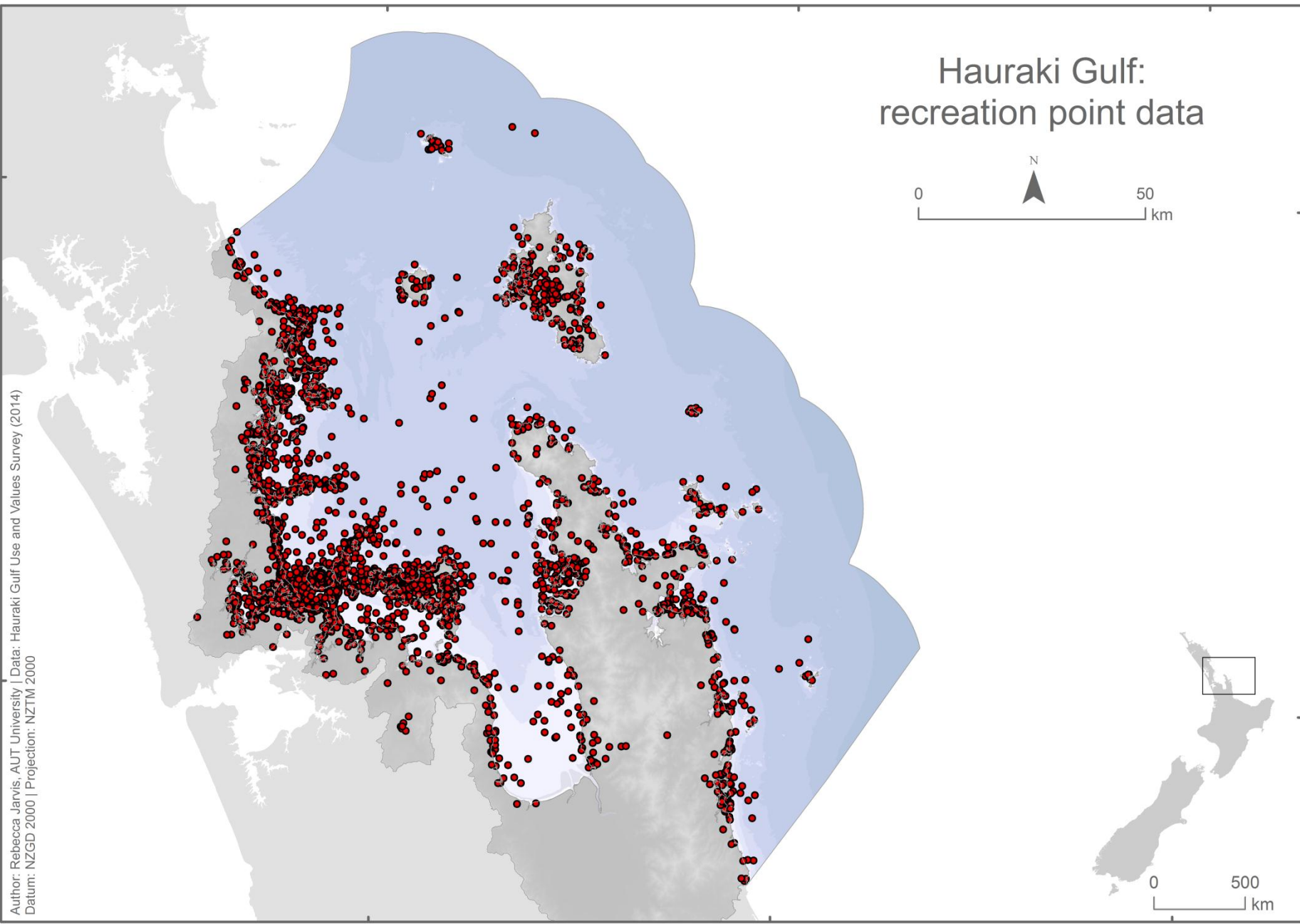
Hauraki Gulf: recreation point data



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

36°0'0"S
37°0'0"S

175°0'0"E 176°0'0"E 177°0'0"E



Hauraki Gulf: scenery point data



36°0'0"S

37°0'0"S

Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E



0 500
km

Hauraki Gulf: conservation point data



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: native species point data



36°0'0"S

37°0'0"S

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175°0'0"E

176°0'0"E

177°0'0"E



0 500
km

Hauraki Gulf: wilderness point data



36°0'0"S

37°0'0"S

Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E



Hauraki Gulf: tourism point data



36°0'0"S

37°0'0"S

Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E



0 500
km

Hauraki Gulf: community point data



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

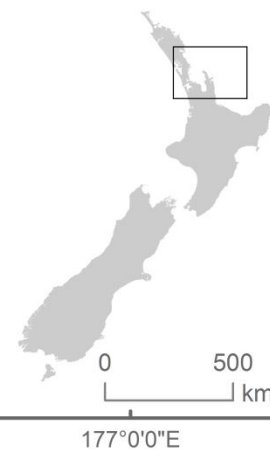
176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: historic point data



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: identity point data



36°0'0"S

37°0'0"S

Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E



Hauraki Gulf: home point data



36°0'0"S

37°0'0"S

Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

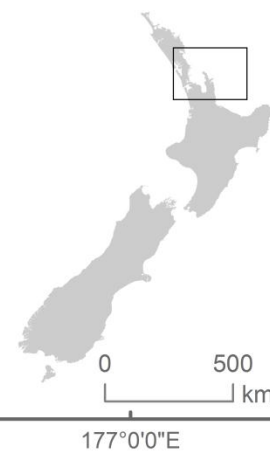
176°0'0"E

177°0'0"E



0 500
km

Hauraki Gulf: culture point data



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
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175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: research point data



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

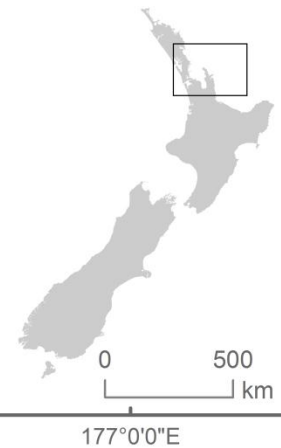
176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: employment point data



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: spiritual point data



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000



175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Value hotspots:

1. Kernel density analysis of point data of each value type
2. Standardised by subtracting mean density and dividing by standard deviation
3. Upper third of density plotted as hotspot

Hauraki Gulf: recreation hotspots



36°0'0"S

37°0'0"S

Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E



Hauraki Gulf: scenery hotspots



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000



175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: conservation hotspots



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000



175°0'0"E

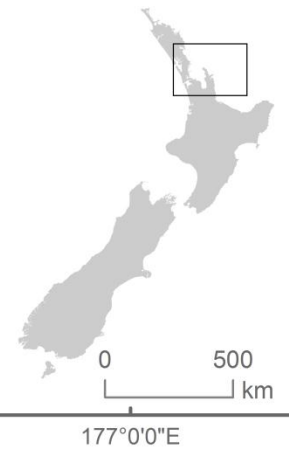
176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: native species hotspots



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
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175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: wilderness hotspots



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: tourism hotspots



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000



0 500
km

175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: community hotspots



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: historic hotspots



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000



175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: identity hotspots



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000



175°0'0"E

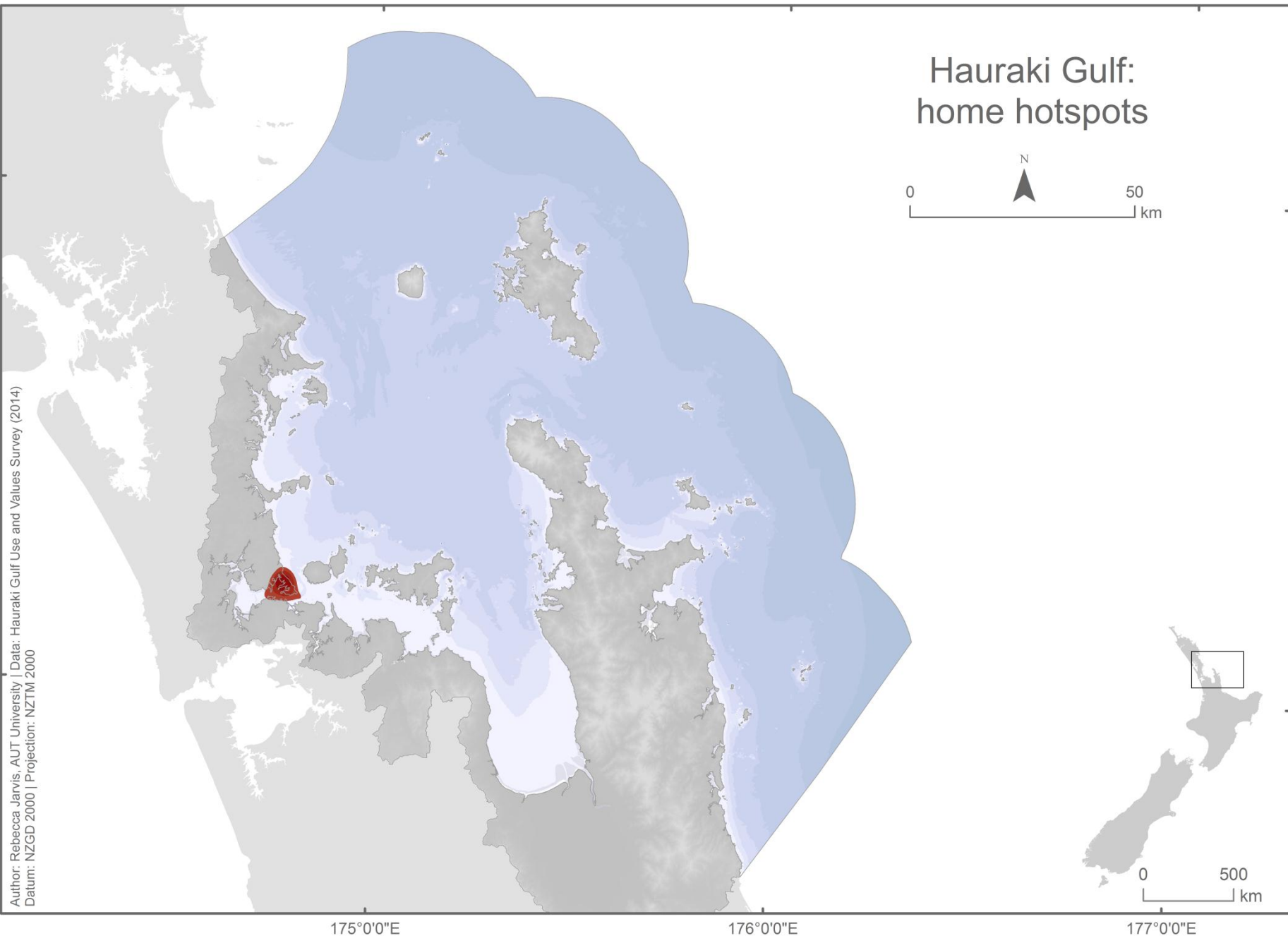
176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: home hotspots



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

Hauraki Gulf: culture hotspots



36°0'0"S

37°0'0"S

Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
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175°0'0"E

176°0'0"E

177°0'0"E

0 500
km



Hauraki Gulf: research hotspots



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
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175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: employment hotspots



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000



175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: spiritual hotspots



36°0'0"S

37°0'0"S

Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E

0 500
km



Value density maps:

1. Kernel density analysis of point data of each value type
2. Standardised by subtracting mean density and dividing by standard deviation
3. >0 standardised kernel density plotted as value density maps

Hauraki Gulf: recreation value density



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

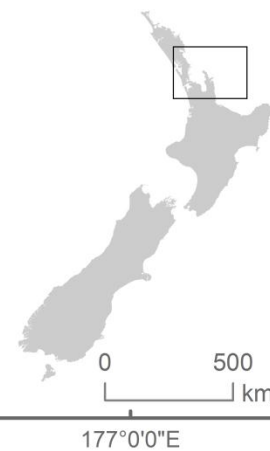
176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: scenery value density



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
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175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: conservation value density



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175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: native species value density



36°0'0"S

37°0'0"S

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175°0'0"E

176°0'0"E

177°0'0"E



Hauraki Gulf: wilderness value density



175°0'0"E

176°0'0"E

177°0'0"E

Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

36°0'0"S

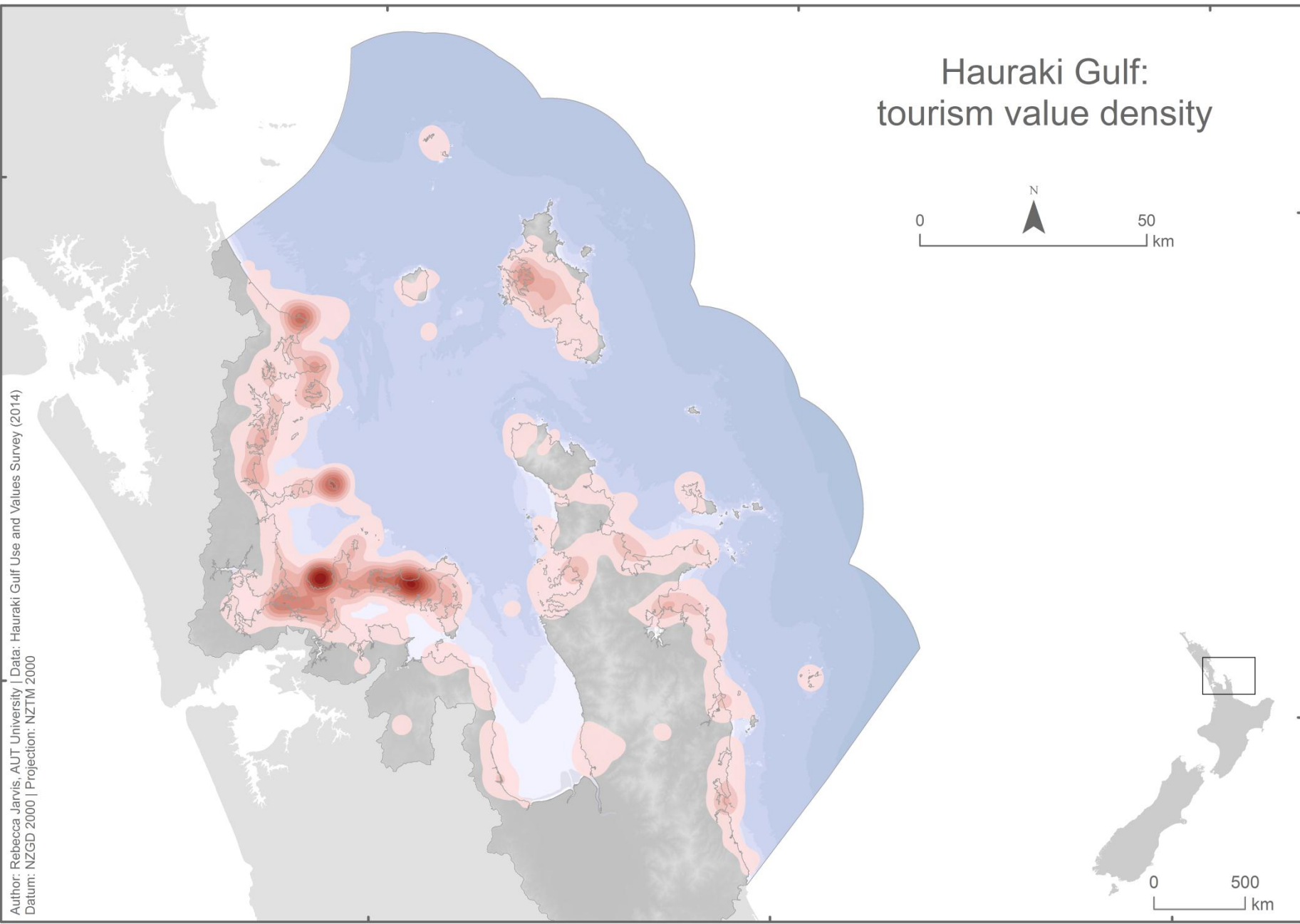
37°0'0"S

Hauraki Gulf: tourism value density



36°0'0"S
37°0'0"S

Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000



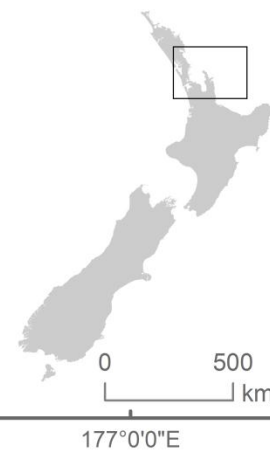
175°0'0"E

176°0'0"E



177°0'0"E

Hauraki Gulf: community value density



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
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175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: historic value density



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

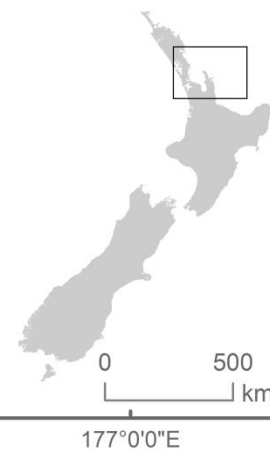
176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: identity value density



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
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175°0'0"E

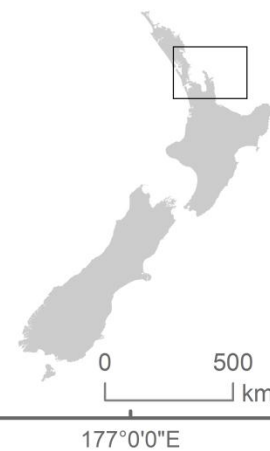
176°0'0"E

177°0'0"E

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Hauraki Gulf: home value density



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Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: culture value density



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

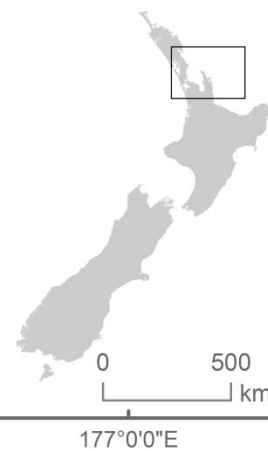
176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: research value density



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175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: employment value density



175°0'0"E

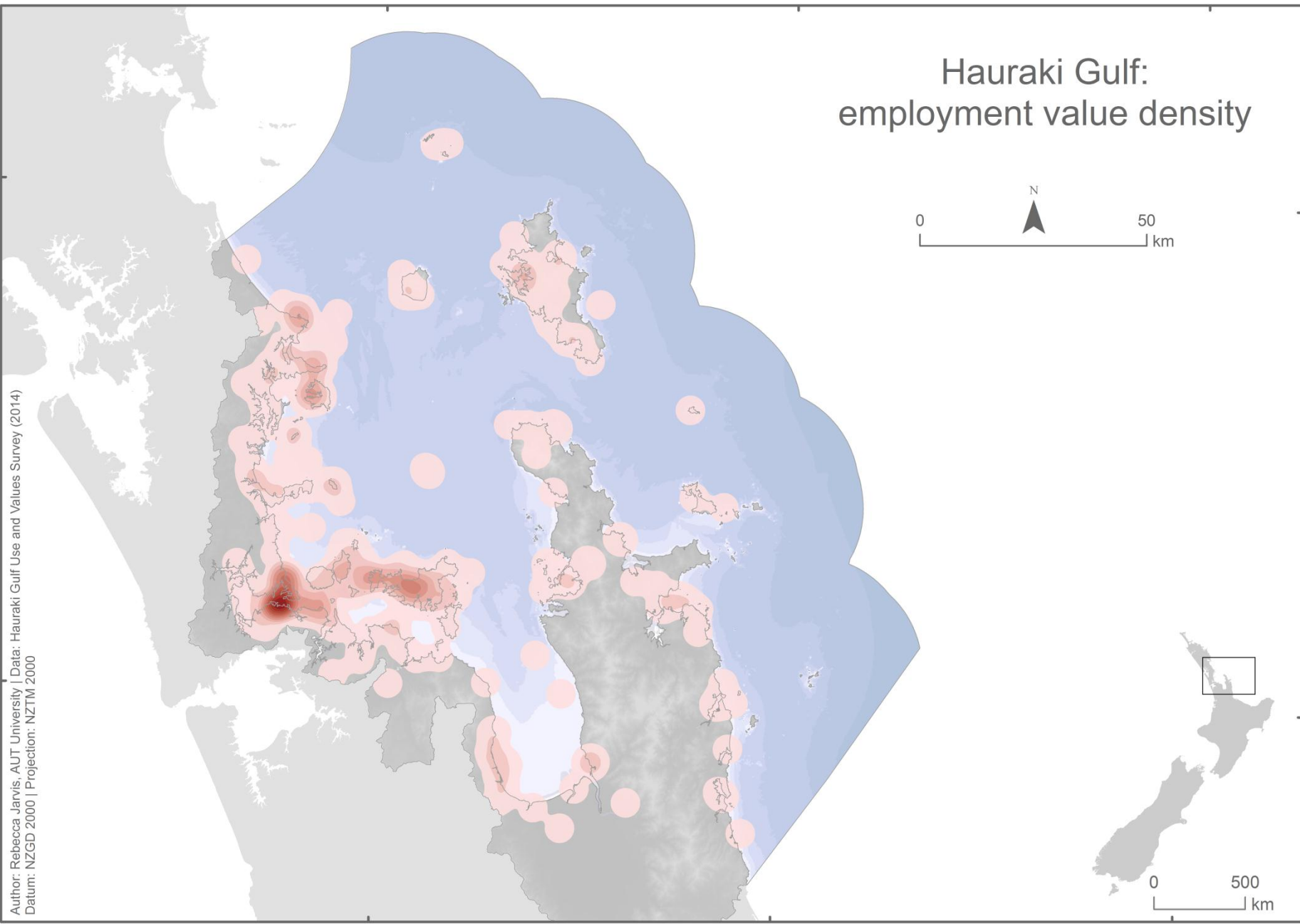
176°0'0"E

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36°0'0"S

37°0'0"S

Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
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Hauraki Gulf: spiritual value density



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S



Whangarei

- Values
- **Use**
- Environmental health

Leigh
Omaha
Waikowiri
Snells Beach

Orewa

Riverhead

Waitakere

AUCKLAND

Manukau

Coromandel

Whitianga

Tairua
Pouarui

Whangamata

Thames

Ngatea
Kerepehi

Paeroa

Waihi
Waihi

Te Aroha

Morrinsville

Hamilton

Waharoa

Matamata

Tauranga

Whakatane

- 23766 total activity points



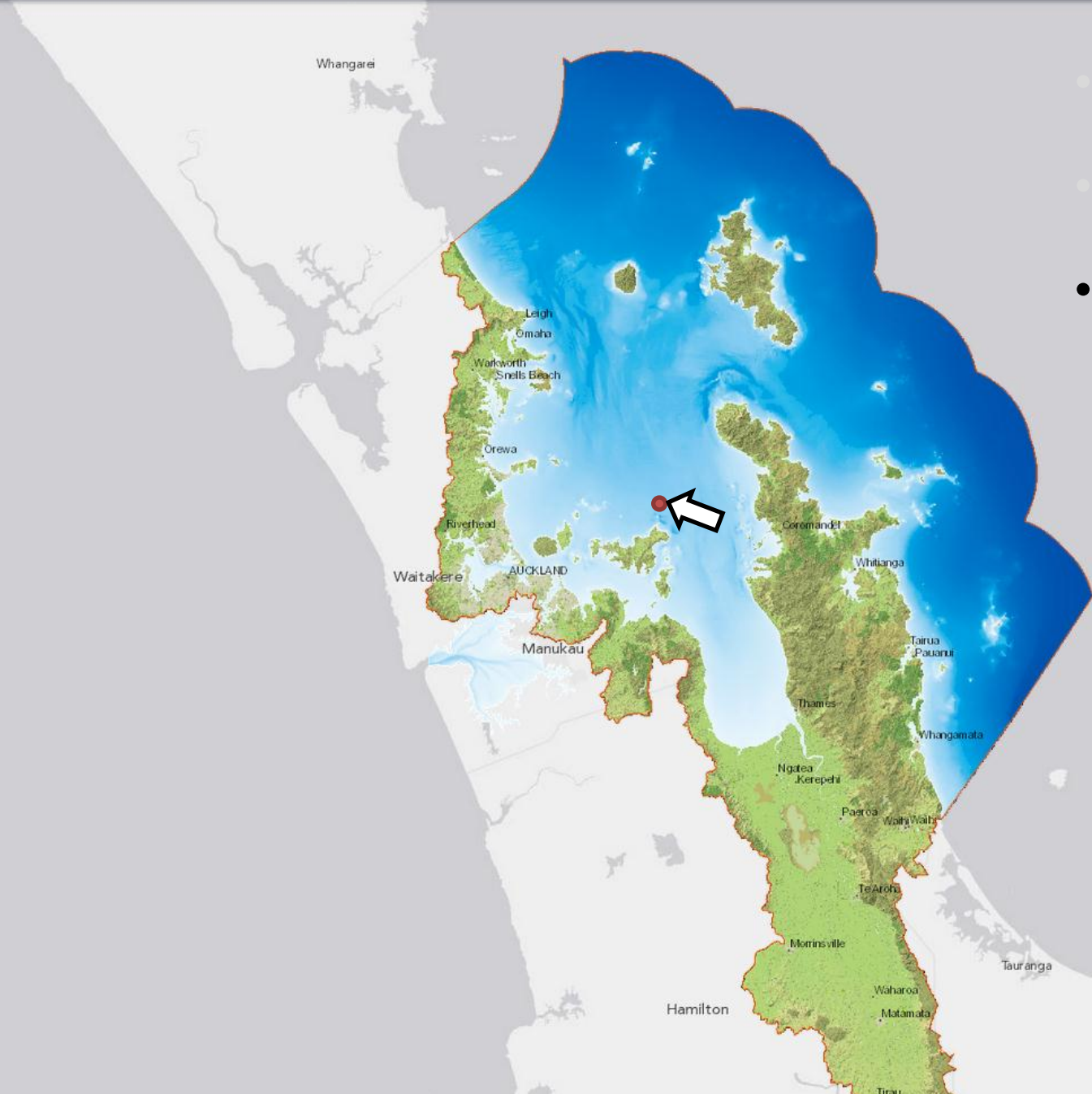
Use/ Activities:

4 wheel drive / dirt bike / quad bike on beach	Exploring historic sites	Restaurants / bars / cafes
Aquaculture	Exploring the beach / coast	Rock climbing
Attending a public event	Ferry transport	Rowing
Attending hui and events at my marae	Fishing - commercial	Running / jogging
Beachcombing	Fishing - recreation (from boat)	Scientific research
Bird watching	Fishing - recreational (line from shore)	SCUBA diving
Boating - anchoring	Gathering kaimoana for tangi or hui	Shipping
Boating - charter boat	Gathering raranga weaving material	Shopping
Boating - launching	Gathering rongoa	Snorkelling
Boating - mooring	Geocaching / orienteering	Spearfishing
Boating - motor boating	Golf	Spiritual rite
Boating - racing	Hiking / tramping	Stand up paddle boarding
Boating - sailing	Horseriding / equi-boarding	Sunbathing / relaxing on beach
Body boarding / body surfing	Hunting / duck shooting	Surfing
Camping	Jet skiing	Swimming
Caravanning / campervanning	Kayaking / canoeing	Visiting vineyards / winetasting
Collecting shellfish by diving / snorkelling	Kite surfing / kiting / buggying	Volunteering
Collecting shellfish from the shore	Mahinga kai	Waka ama training / racing
Conservation/ restoration / clean-ups	Marine mammal watching	Waka highway
Cycling / mountain biking	Paragliding	Walking
Dog walking	Photography / underwater photography	Water skiing
Dragon boating	Picnic / BBQ	Wind surfing
Environmental education	Playing games / sport	Yoga / meditation



Activity top 20	# points	% total
Walking	2309	10
Swimming	2194	9
Exploring the beach / coast	1742	7
Picnic / BBQ	1448	6
Fishing - recreation (from boat)	1260	5
Boating - anchoring	1198	5
Sunbathing / relaxing on beach	1181	5
Bird watching	954	4
Kayaking / canoeing	767	3
Snorkelling	756	3
Hiking / tramping	755	3
Boating - sailing	742	3
Restaurants / bars / cafes	615	3
Exploring historic sites	571	2
Playing games / sport	517	2
Boating - motor boating	498	2
Marine mammal watching	451	2
Dog walking	441	2
Environmental education	440	2
Camping	415	2



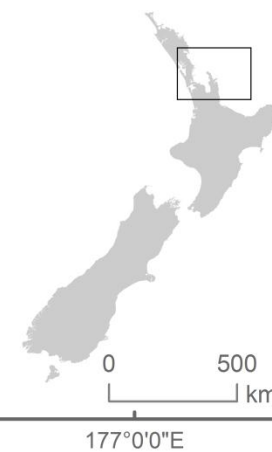


- Values
- Use
- **Environmental health**

Hauraki Gulf: public perceptions of environmental health



- very good
- good
- average
- poor
- very poor



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Datum: NZGD 2000 | Projection: NZTM 2000

175°0'0"E

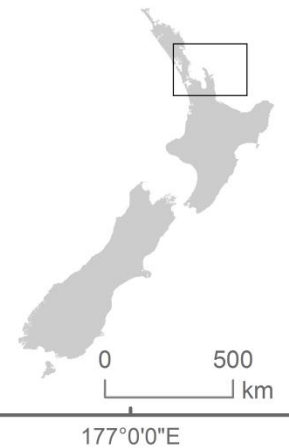
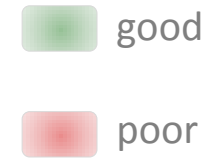
176°0'0"E

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Hauraki Gulf: clusters of good & poor environmental health



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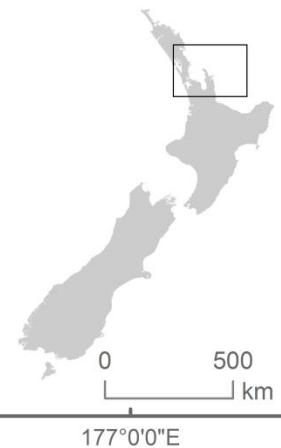
36°0'0"S

37°0'0"S

Hauraki Gulf: public perceptions of environmental health (change in last 5 years)



- improved
- stayed the same
- degraded



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
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175°0'0"E

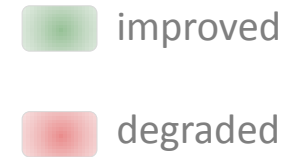
176°0'0"E

177°0'0"E

36°0'0"S

37°0'0"S

Hauraki Gulf: clusters of improved & degraded environmental health (last 5 yrs)



Author: Rebecca Jarvis, AUT University | Data: Hauraki Gulf Use and Values Survey (2014)
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175°0'0"E

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177°0'0"E

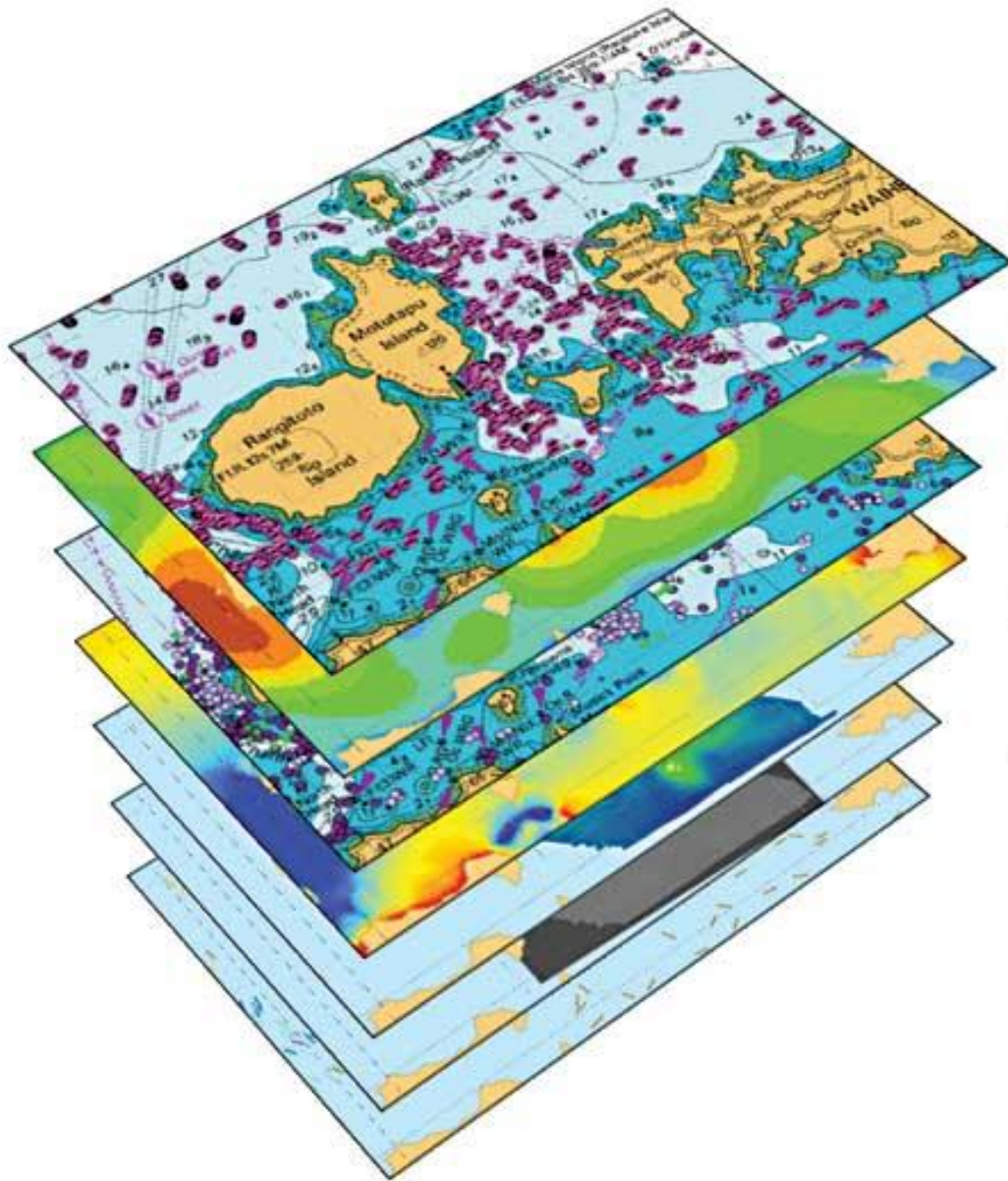
36°0'0"S

37°0'0"S



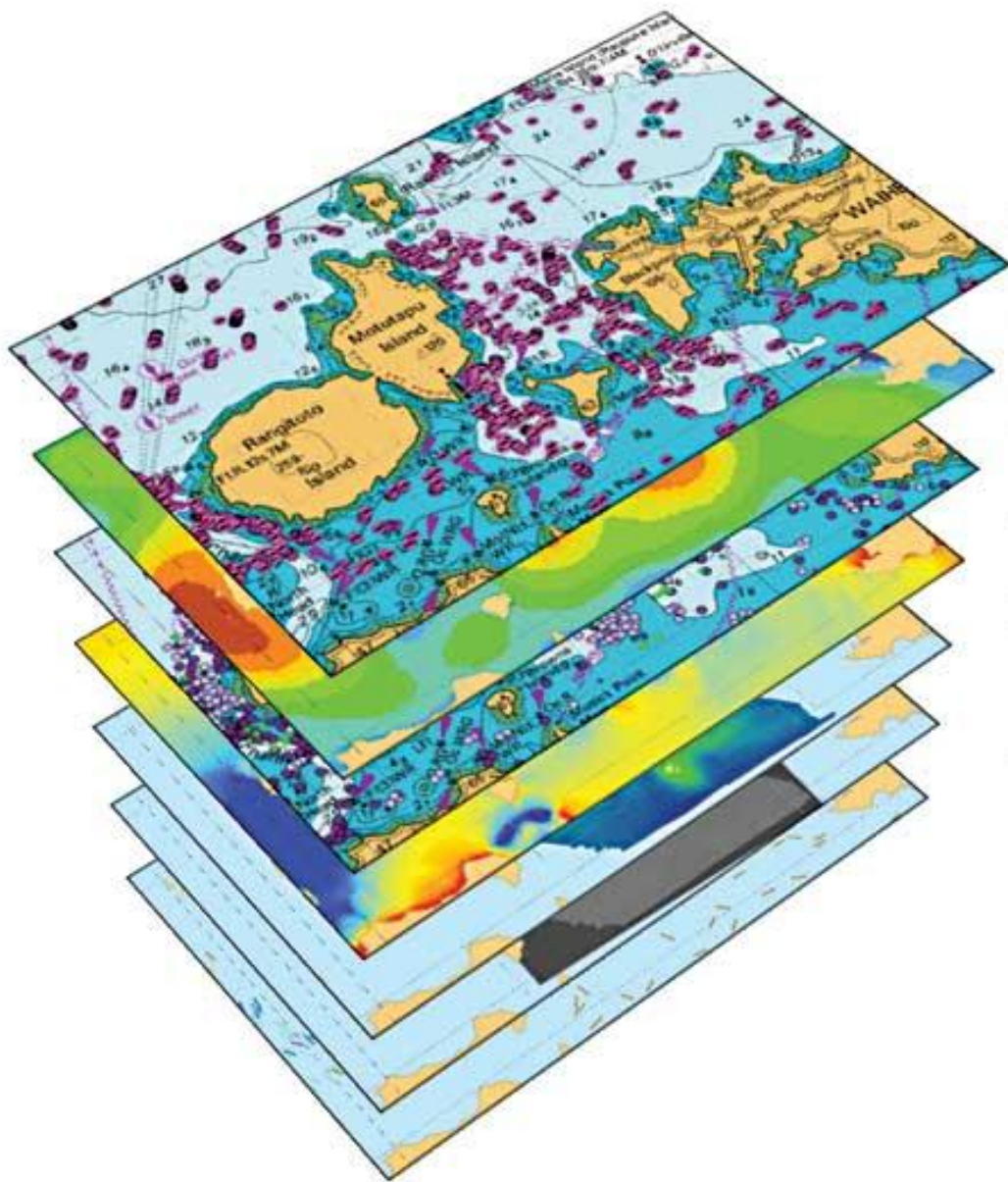
Improved	points	% total	Degraded	points	% total
restoration of native plants	188	27	increased litter	192	18
restoration of native animals	129	18	fish abundance reduced	166	15
invasive animal control	88	12	reduced water quality	149	14
increased water quality	55	8	increased development	106	10
improved access	51	7	shellfish decreased	106	10
invasive plant control	38	5	sedimentation	105	10
protection/ reserve	35	5	overcrowding	66	6
fish abundance increased	34	5	terrestrial runoff	44	4
less litter	33	5	seagrass decreased	30	3
sediment control	22	3	reduction in native plants	24	2
increased education	20	3	increased invasive plants	20	2
shellfish increased	8	1	reduction in native animals	18	2
seagrass improved	6	1	dog presence	11	1
aquaculture removed	2	<1	increased invasive animals	9	1
			aquaculture increased	9	1
			more kina	9	1
			algal bloom	8	1





Marine Spatial Plan

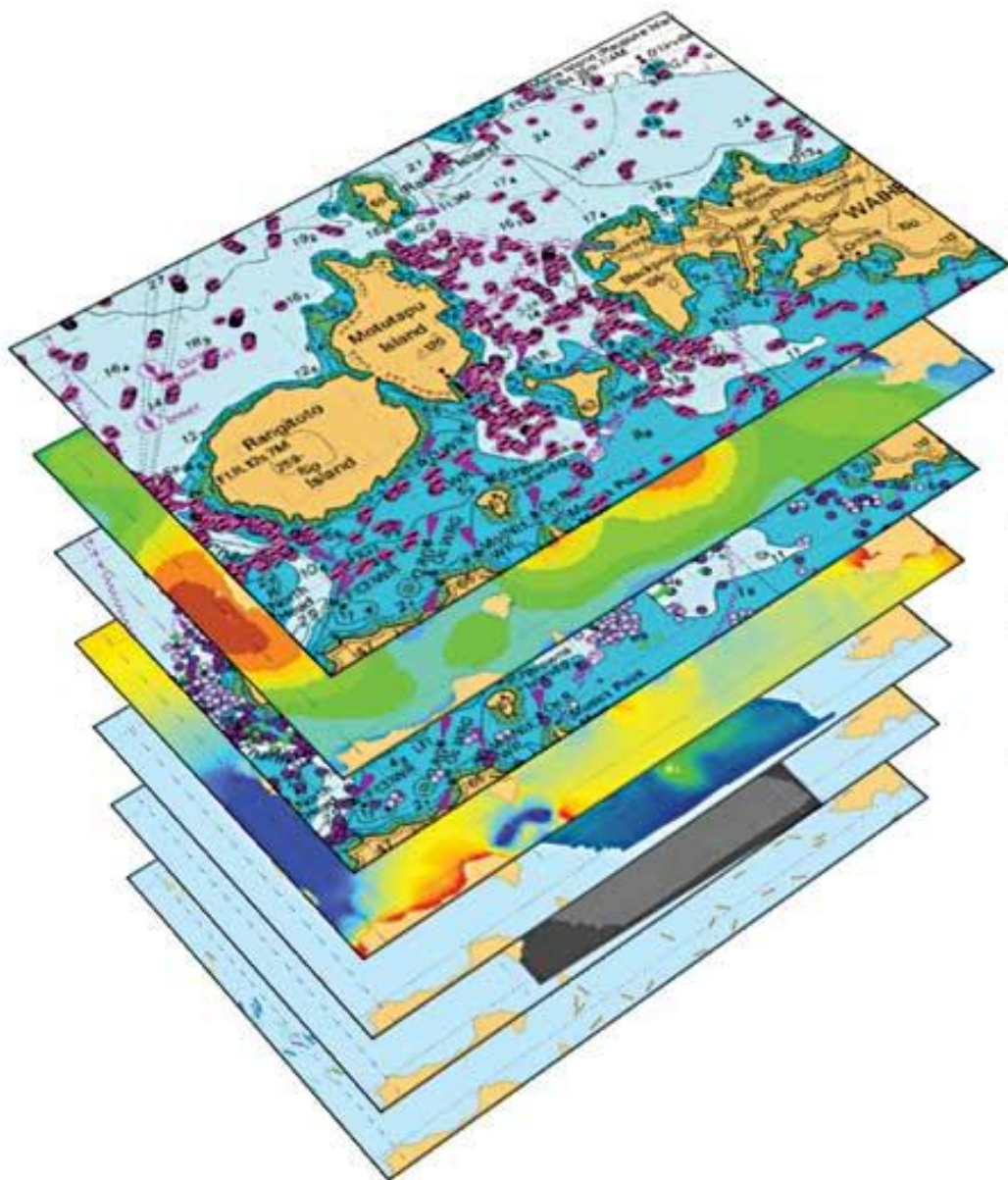
Over 50 environmental,
economic and commercial data
layers



**Social use and
values data**

Marine Spatial Plan

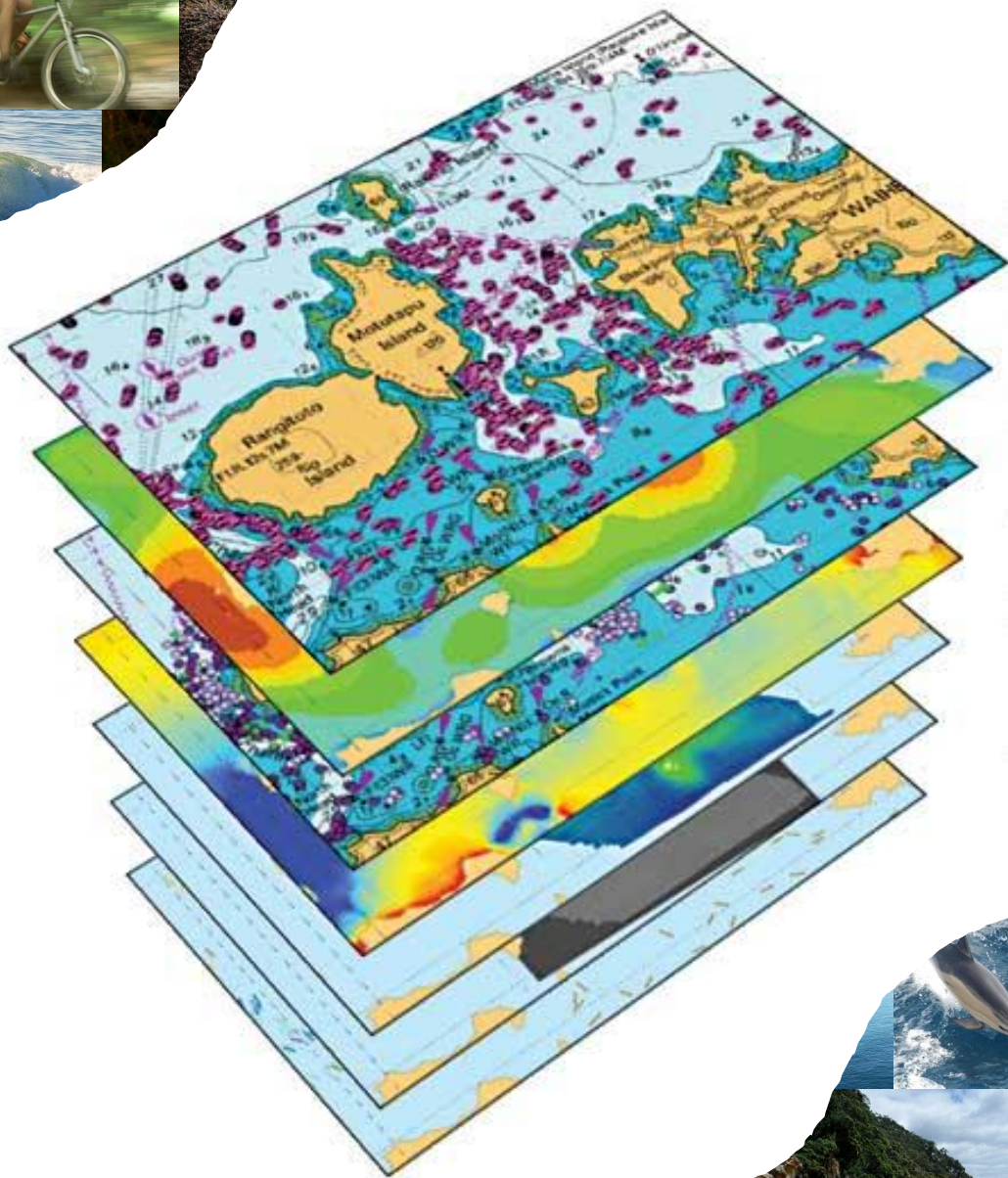
Over 50 environmental,
economic and commercial data
layers



Social use and
values data

Values

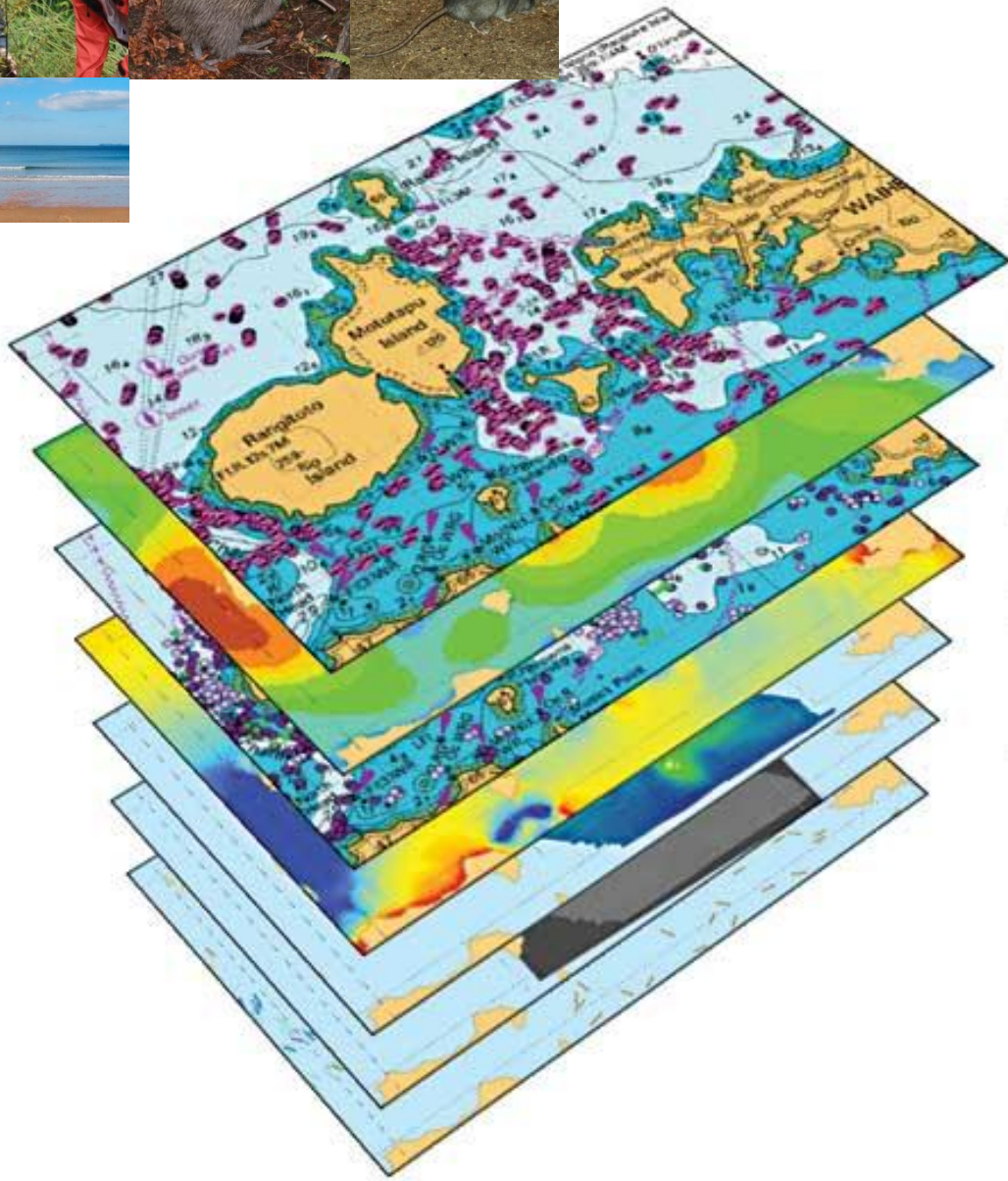
Recreation
Scenery
Conservation
Native species
Wilderness
Tourism
Community
Historical
Identity
Home
Culture
Research
Employment
Spiritual



Social use and
values data

Uses





Social use and
values data

Environmental health

very good – very poor

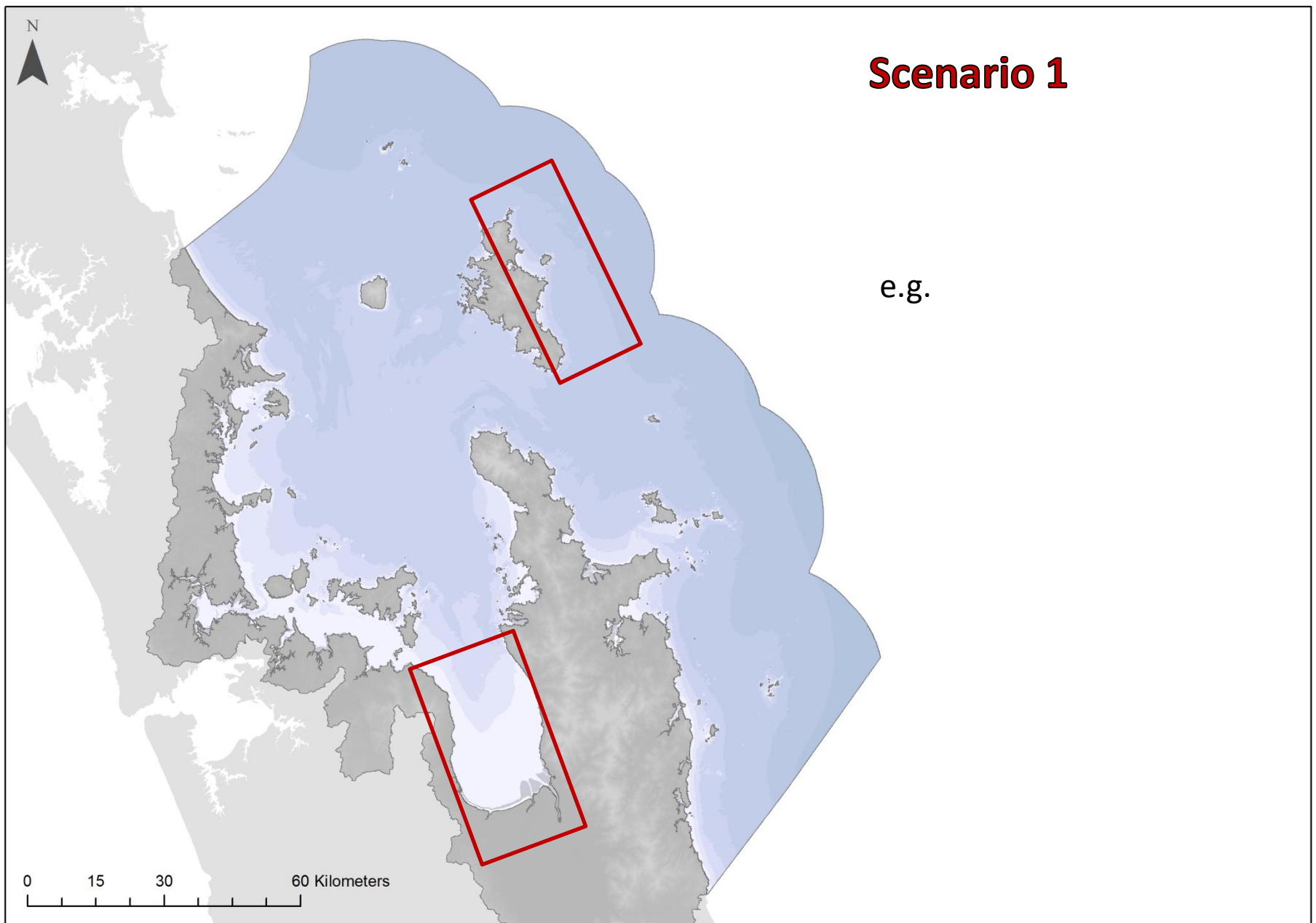
improved – degraded

Graphic: Ude Shankar, NIWA

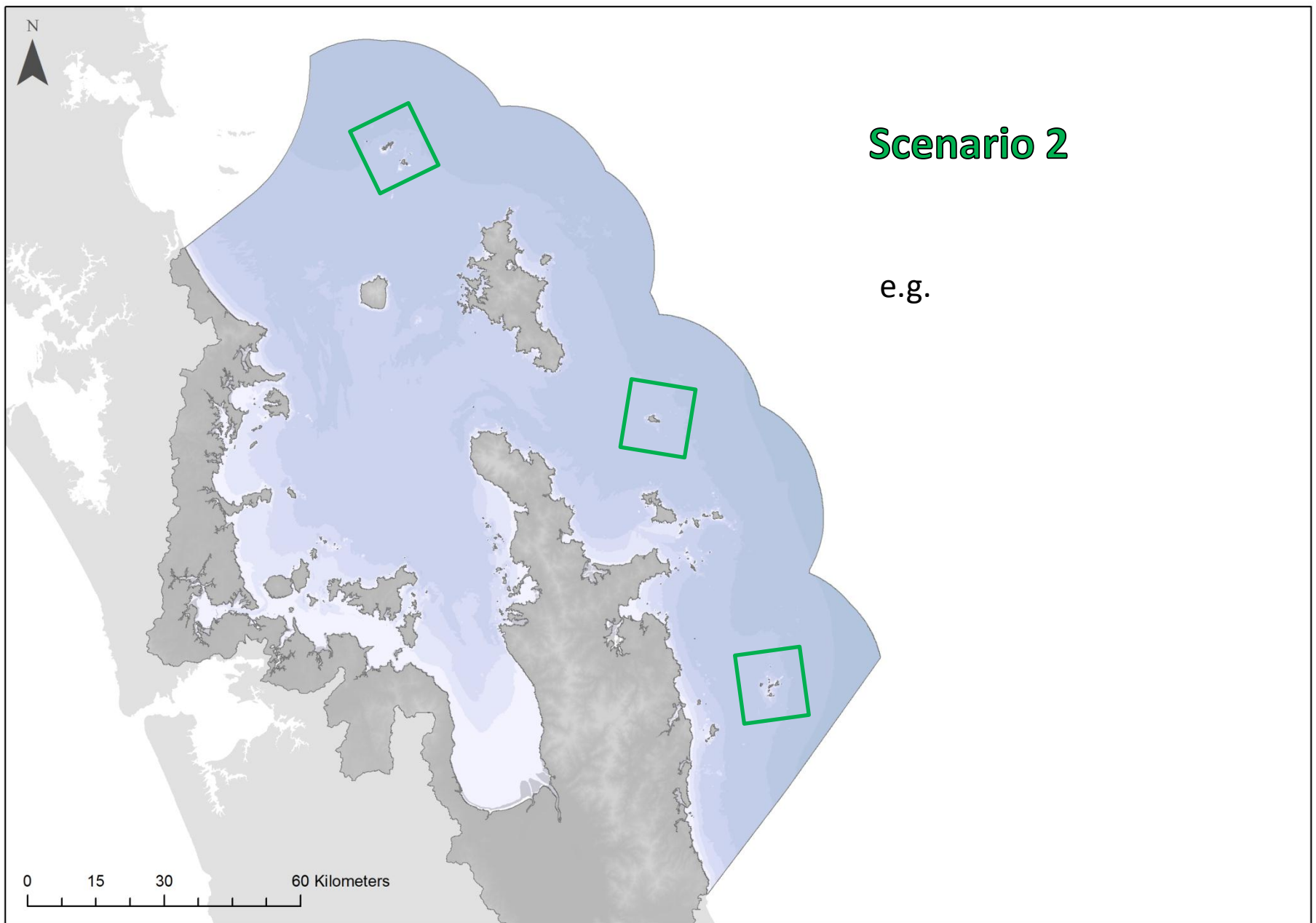


Recommended next steps:

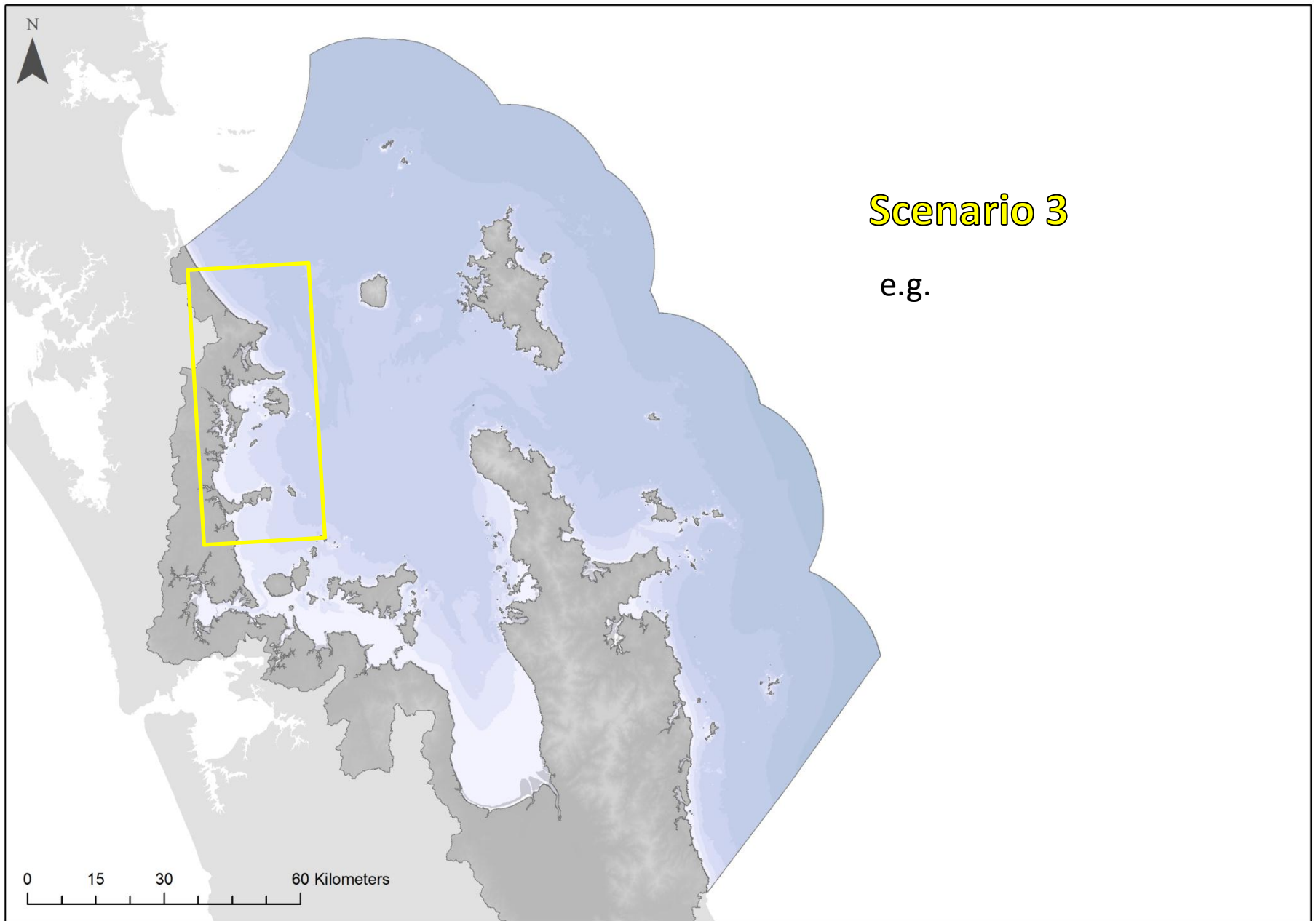
- Incorporate social use and values data with environmental and economic data
- Sketch proposals for marine planning
- Model alternative management scenarios
- Evaluate results and tradeoffs
- Compare environmental, economic and social data for different management scenarios
- Identify areas of potential conflict and areas where different management actions are most likely to be socially acceptable and well-supported



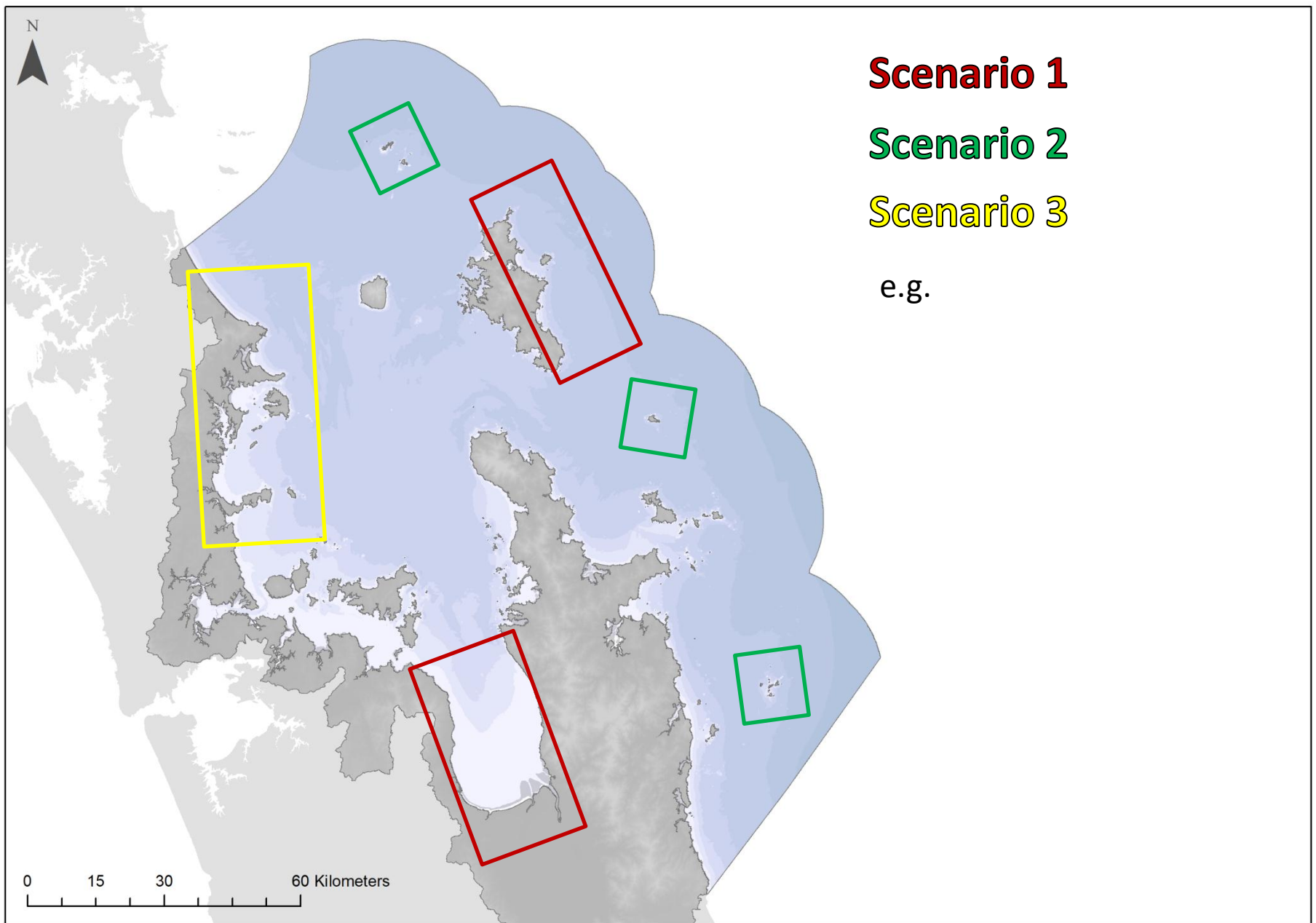
(example of data use)



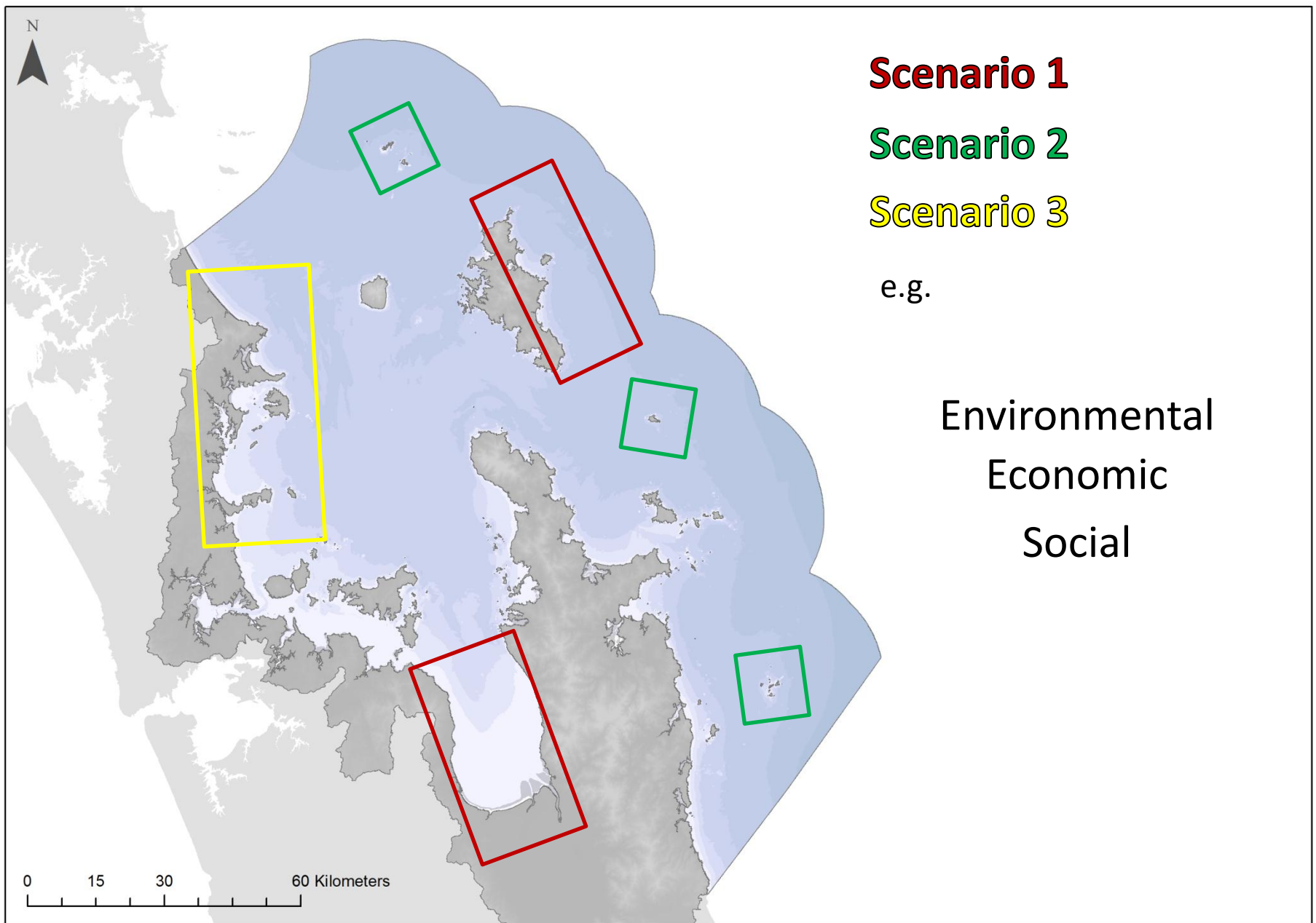
(example of data use)



(example of data use)



(example of data use)



(example of data use)



Acknowledgements

Sea Change – Tai Timu Tai Pari Team & Partners
Institute for Applied Ecology New Zealand, AUT

& everyone who completed the survey!



Hauraki Gulf
Marine Park
Ko te Pataka kai
o Tikapa Moana
Te Moananui a Toi

In partnership with mana whenua and the following agencies:



Hauraki Gulf Forum
Tikapa Moana
Te Moananui a Toi

Ministry for Primary Industries
Manatū Ahu Matua



Department of
Conservation
Te Papa Atawhai



Thank you!



Key papers

- Alessa, L. N., Kliskey, A. A., & Brown, G. (2008). Social–ecological hotspots mapping: A spatial approach for identifying coupled social–ecological space. *Landscape and Urban Planning*, 85(1), 27–39. doi:10.1016/j.landurbplan.2007.09.007
- Brown, G., & Weber, D. (2012). Measuring change in place values using public participation GIS (PPGIS). *Applied Geography*, 34, 316–324. doi:10.1016/j.apgeog.2011.12.007
- Whitehead, A. L., Kujala, H., Ives, C. D., Gordon, A., Lentini, P. E., Wintle, B. A., & Raymond, C. M. (2014). Integrating Biological and Social Values When Prioritizing Places for Biodiversity Conservation. *Conservation Biology*, 28(4), 1–12. doi:10.1111/cobi.12257