Allocation Workshops

water quantity limits for managing water takes at low flows

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Purpose

- Refresh on the modelling work
- Confirm flow dependent values
- Confirm subset of values that can be modelled, surrogates
- Think about ‘bottom line’ objectives for minimum flows
- Focus on fish

Modelling work

- CMP ‘large’ model will allow comparison of baseline to Gold/Silver limits only
- ‘Offline’ modelling will allow various other combinations of allocation and minimum flow to be assessed.

Reminder

- Baseline/PNRP limits:
  - Minimum flows = existing
  - Allocation = existing consented
- Gold/Silver limits are:
  - Minimum flows = 80/90% MALF
  - Allocation = 30/50% MALF

Scope and limitations

- Focus on the large, faster flowing rivers.
- Low flows, water takes
- Allocation from small streams will be part of later discussion
- Key assumption = if we manage water quantity for flow sensitive fish, a range of other instream values will be protected

Scope and limitations

Not dealing with these things

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Scope and limitations

Can potentially influence this situation

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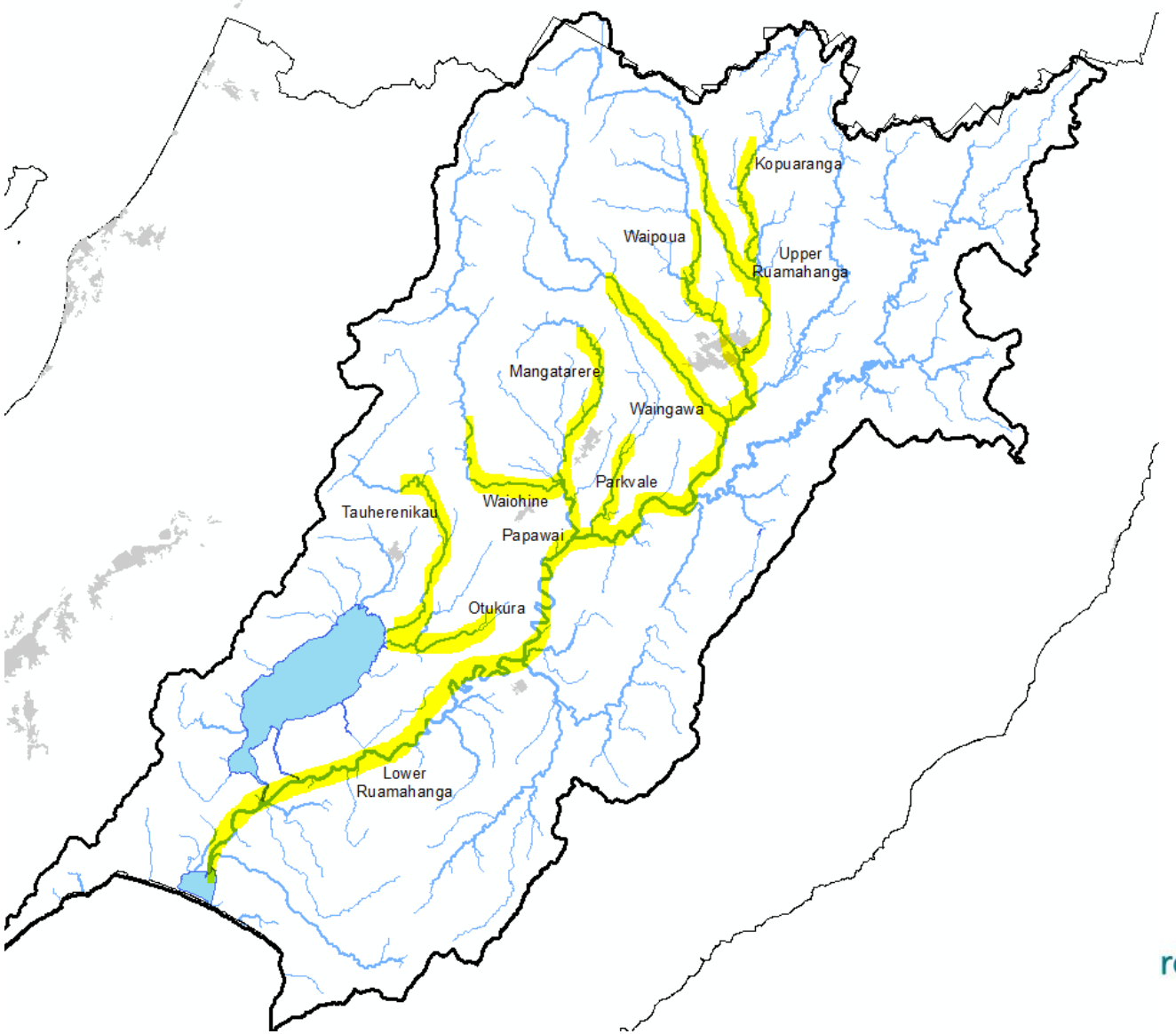
Existing minimum flows



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Existing minimum flows

River	Minimum flow (L/s)	Flow at which non-essential takes cease (L/s)	MALF 7 day (L/s) * = estimate	Minimum flow as proportion of MALF
Kopuaranga River	270		310	87%
Waipoua River	250		375	67%
Waingawa River	1100	1700	1420	77%, 120%
Parkvale Stream	100		140*	71%
Mangatarere Stream	240, 200		165	145%, 120%
Waiohine River	2300	3040	3570	64%, 85%
Papawai Stream	180		210	86%
Upper Ruamahanga River	2400		3605*	68%
Otukura Stream	95		100	95%
Tauherenikau River	1100	1300	1350	96%
Lower Ruamahanga River	8500		12565*	68%

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Existing allocation

River	Allocation (L/s)	MALF 7 day (L/s) * = estimate	Allocation as proportion of MALF
Kopuaranga River	150	605	25%
Waipoua River	129	490	26%
Waingawa River	920	1835	65%
Parkvale Stream	151	140*	108%
Mangatarere Stream	473	330	143%
Waiohine River	1005	3180	32%
Papawai Stream	340	210	160%
Upper Ruamahanga River	954	2400*	40%
Otukura Stream	140	100	140%
Tauherenikau River	233	820	28%
Whole Ruamahanga River	8046	12565*	64%

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Mana whenua values

Summary of mana whenua values from Caleb Royals report (2012)

River/ stream	Wairua	Tinana	Hinengaro	Whanau	Specific observations
Ruamahanga River	Te Hapuakorari Tuere Taniwha and wahi karakia. Urupa. Tohi rites. Rakairuru taniwha	Tuna, inanga, koaro, kokopu, patiki, koura, kanae, kakahi, piharau. Food storage Washing areas Weaving resources	Drinking water Collection of rongoa	Tauranga waka at Hidden Lakes Swimming, waka transport, Numerous Pa - hui	Not enough water in river near Black Rock to create and maintain swimming holes Water 'racing away' due to lowering of bed (gravel extraction) Excessive algae growth during prolonged low flow, compromises cleansing and spiritual values
Waipoua River	Patiki taniwha Tohi rites	Tuna, koura, patiki, trout, watercress	Collection of rongoa Drinking water	Swimming, Kiriwhakapapa migration route	Loss of decent swimming holes Fishery productivity negatively affected by low flows
Kopuaranga River	Urupa. Access to Rangitumau maunga	Kakahi, koura, tuna, kokopu, inanga, trout. Te Wao nui – forest resources	Rongoa collection	Migrational route, deep swimming holes	Basic requirements of iwi values being met at flow rate of about 440 L/s but poor water quality impacting tuna health
Waingawa River		Tuna and koura. Resources from wetlands	Drinking water		
Makoura Stream	Tohi rites, women cleaned after child birth below Ngaumutawa Pa	White Koura, Kanga pirau, karaka and tawa steeping. Tuna.	Lore of wananga shared at Ngaumutawa Puna for drinking water	Playground	Two values most closely associated with flow rate are mahinga kai and storage of kai. Most values compromised by poor quality of water
Booths Creek and Parkvale Stream	Removal of tapu, tohi rites.	Watercress, wai puna (springs), tuna, kakahi, patiki, trout, inanga, koura, piharau. Washing areas, weaving resources	Hikurangi College Papawai and Kotahitanga movement. Drinking water and rongoa collection	Streams were a playground. Kotahitanga	Quality of number of tuna catches declining Concern about compliance with existing minimum flows
Taueru River	All aspects of wairua. Taniwha – Ngarara Huarau. Urupa and ana koiwi.	Maori swamp, tuna, kanga pirau, wai paua/koura, koura, inanga, trout, watercress	Taumataraia whare wananga	Swimming holes, migrational route	Many values compromised due to prolific algae growth at stable low flows
Huangarua River		Large tuna – kokoputuna, inanga, patiki		Migrational pathway to the coast	Not enough water in the river at low flows, too warm, thick algae mats
Waiohine River	Urupa on the banks of river and unmarked graves.	Tuna, inanga, piharau, patiki koura, and kakahi. Washing places.	Rongoa in lowland reaches lower end	Waka transportation	
Makahakaha Stream	Uwhiroa swamp – resting place of Ngarara Huarau. Te Ana o Parakawhiti Baptisms	Pa Tuna – eel weirs, koura, watercress, inanga. Wai maori – for washing and blessings	Purakau provide lessons around behaviour. Drinking water.	Whare whanau – birthing house, cultivation areas	Values compromised at flows of 30-40 L/s
Stonestead Creek		Tuna, inanga, kokopu, patiki, watercress. Harakeke and raupo			Concern about compliance with existing minimum flows
Tauherenikau River		Tuna, inanga, birds, patiki, kanae, harakeke, raupo, aruhe(rahurahu),		Waka transportation	Iwi values appear to be maintained under existing low flows Maintaining connection to lake (and therefore sea) very important
Abbots Creek		Wai maori, birds, tuna		Migrational route	Concern about compliance with existing minimum flows

Recreational values

Comment from community member	Location feedback received
Need to protect favourite swimming holes.	Greytown
Increase in slime in the Waiohine further down.	Greytown
15 years ago was full of fish, but now muddy Moroa water race.	Greytown
Waihenga Bridge – 12 years ago everyone swum there. Then people stopped. If wasn't swimmable there would have been signs.	Martinborough
Kayaked down The Ruamahanga river - Te Ore Ore Bridge. Seen slime on the bottom. Passed Wardells – river was very low. The worst part is the Cliffs – people scared to swim after the publicity. Rivers are not as dirty as the media say.	Carterton
Cliffs in high flows aren't swimmable because MDC releases from the wastewater treatment plant.	Whangaehu
Lost deep pools due to flood protection although less rubbish.	Gladstone
Waipoua – Ruamāhanga confluence not swimmable.	Gladstone
At our place you'll swim in mud (North of Mauriceville).	Kopuaranga
In places where willows have been removed you can now see the stones in the river – rivers moving quickly. The spots we go to are important. Focus on them.	Kopuaranga

Fish – where have they been found?

Gray shading = habitat suitability curves available

Species	Where have they been found? * indicates those listed in pNRP											Flow demands	Choice of species to model as representative of different flow demands
	Main stem*	Kopuaranga	Waipoua*	Waingawa	Waiohine*	Mangatarere*	Tauherenikau	Tauweru	Ruakokopotuna [Huangarua?]	Tauanui*	Turanganui*		
Exotic													
Brown trout – adult	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	High	Yes
Rainbow trout – adult					✓	✓		✓				High	
Trout spawning	✓ (top)	✓	✓	✓ (top)	✓ (top)	✓		✓	✓	✓	✓	High	Yes
Native													
Torrentfish	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	High	Yes
Longfin eel (>300 mm)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Moderate	Yes
Shortfin eel (>300 mm)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Moderate	Yes
Redfin bully	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	Low	
Common bully	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Low	Yes
Upland bully	✓		✓	✓	✓	✓		✓	✓	✓	✓	Low	
Crans bully	✓		✓		✓	✓		✓				Low	
Bluegill bully	✓								✓			Low	
Dwarf galaxias			✓		✓	✓	✓					Moderate	
Smelt	✓	✓	✓	✓	✓	✓	✓		✓		✓	Moderate	
Lamprey	✓	✓	✓		✓	✓	✓					Low	Yes
Koaro	✓	✓								✓	✓	Low	
Brown mudfish	✓		✓		✓	✓						Low	
Giant Kokopu	✓		✓		✓	✓				✓	✓	Moderate?	
Banded kokopu	✓											Low	
Black flounder												Low	
Inanga		✓	✓	✓	✓	✓	✓			✓	✓	??	Yes – Food Producing Habitat
Crustacea													
Koura		✓						✓				??	

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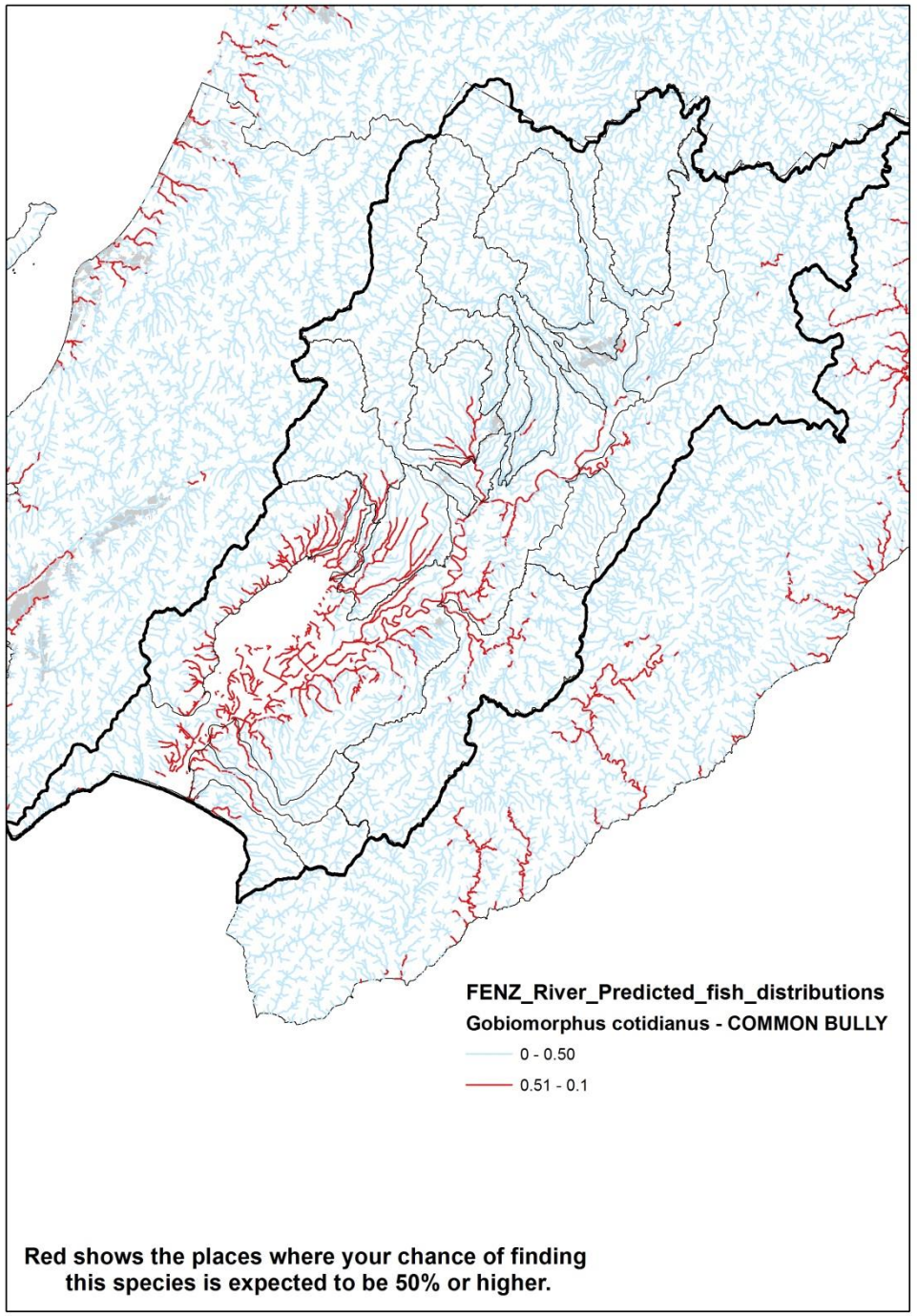
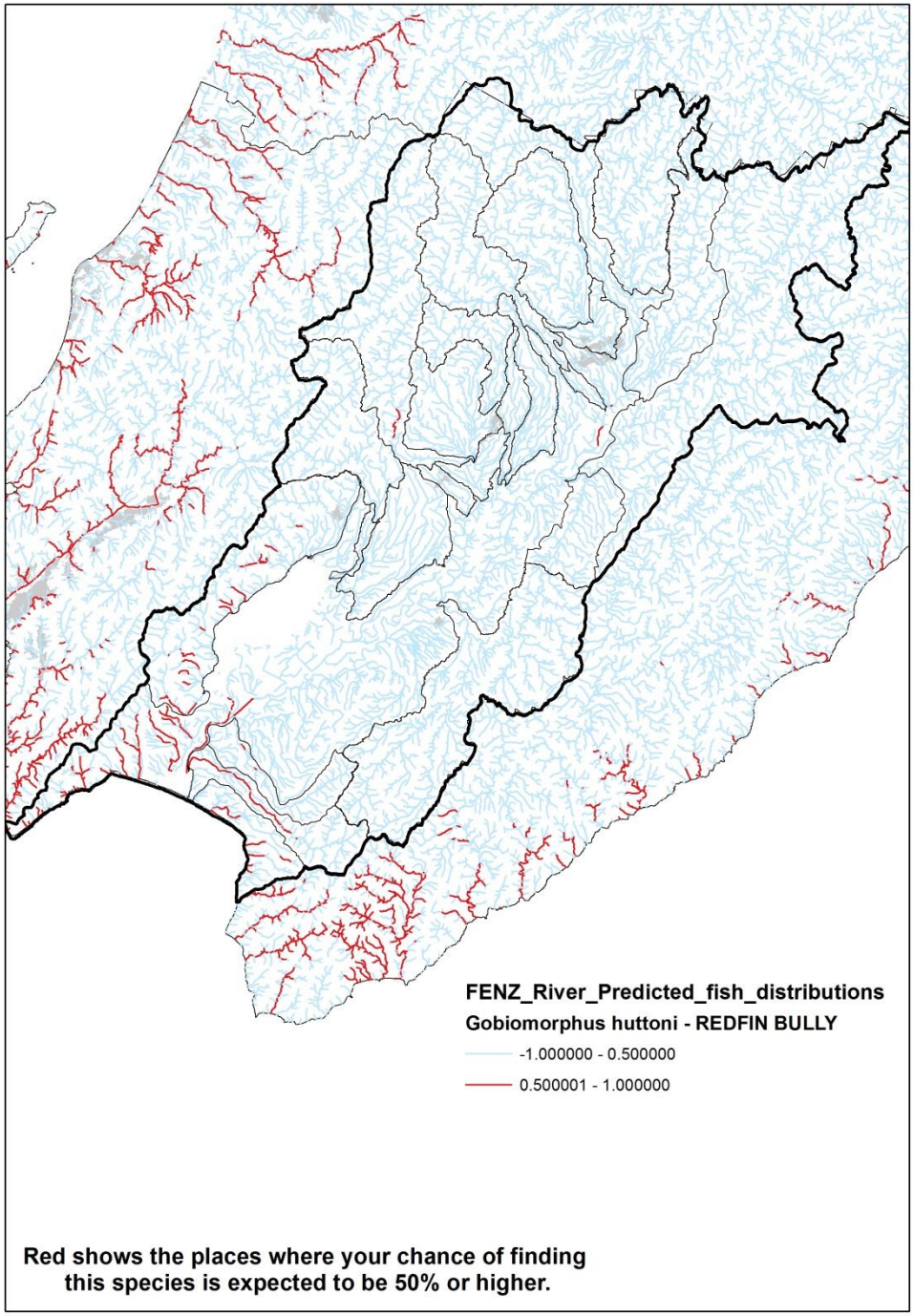
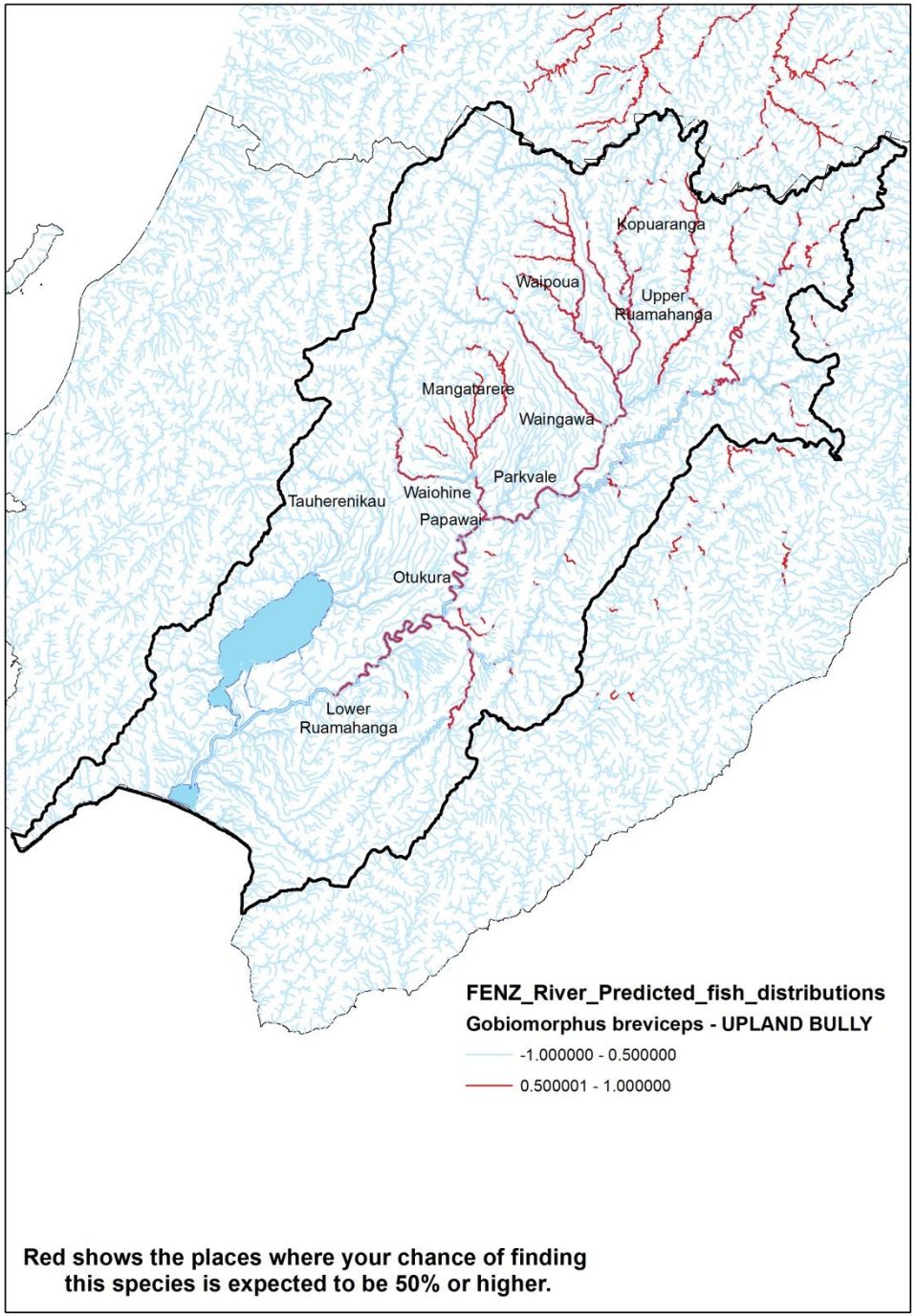
Common bully



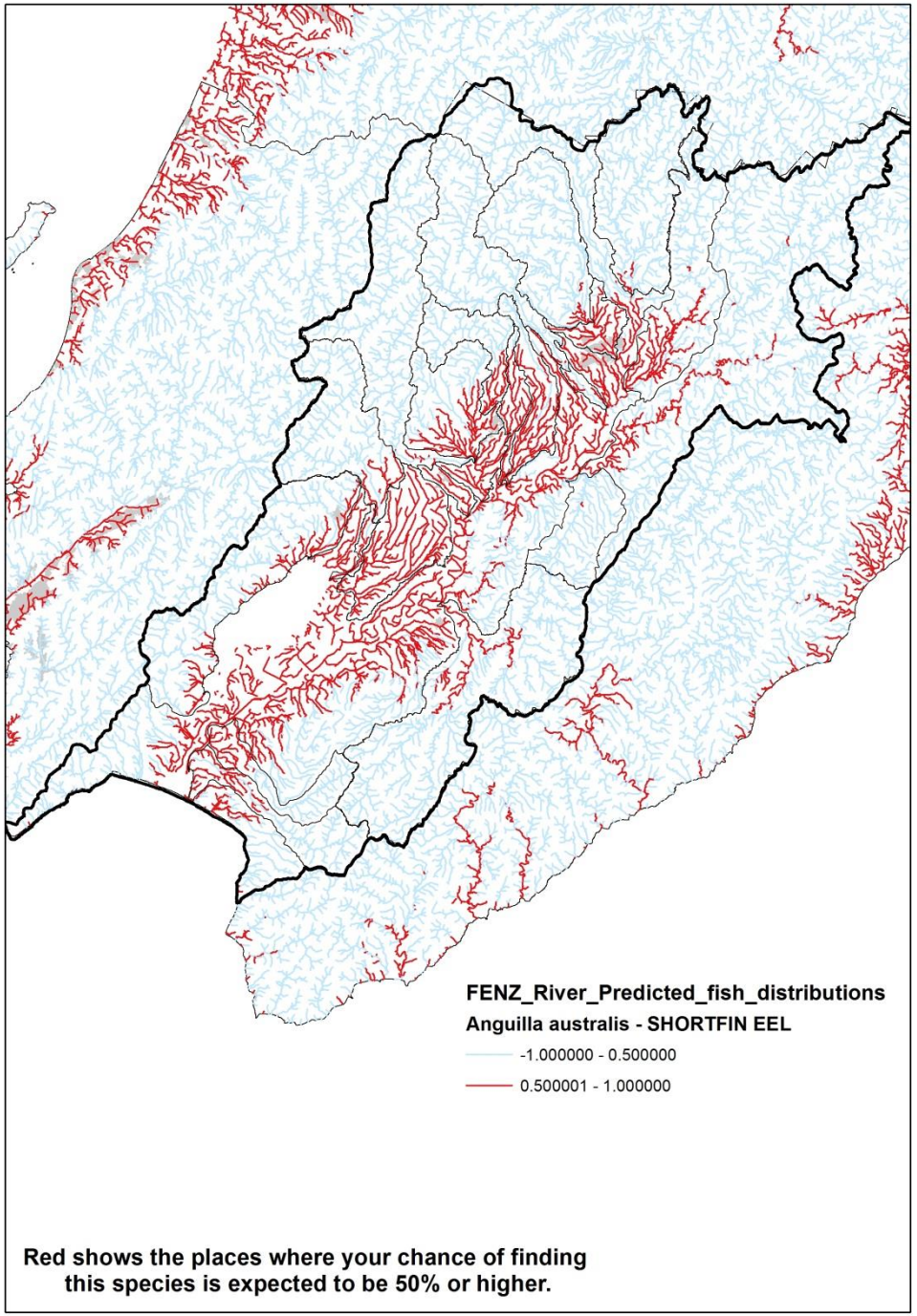
Redfin bully



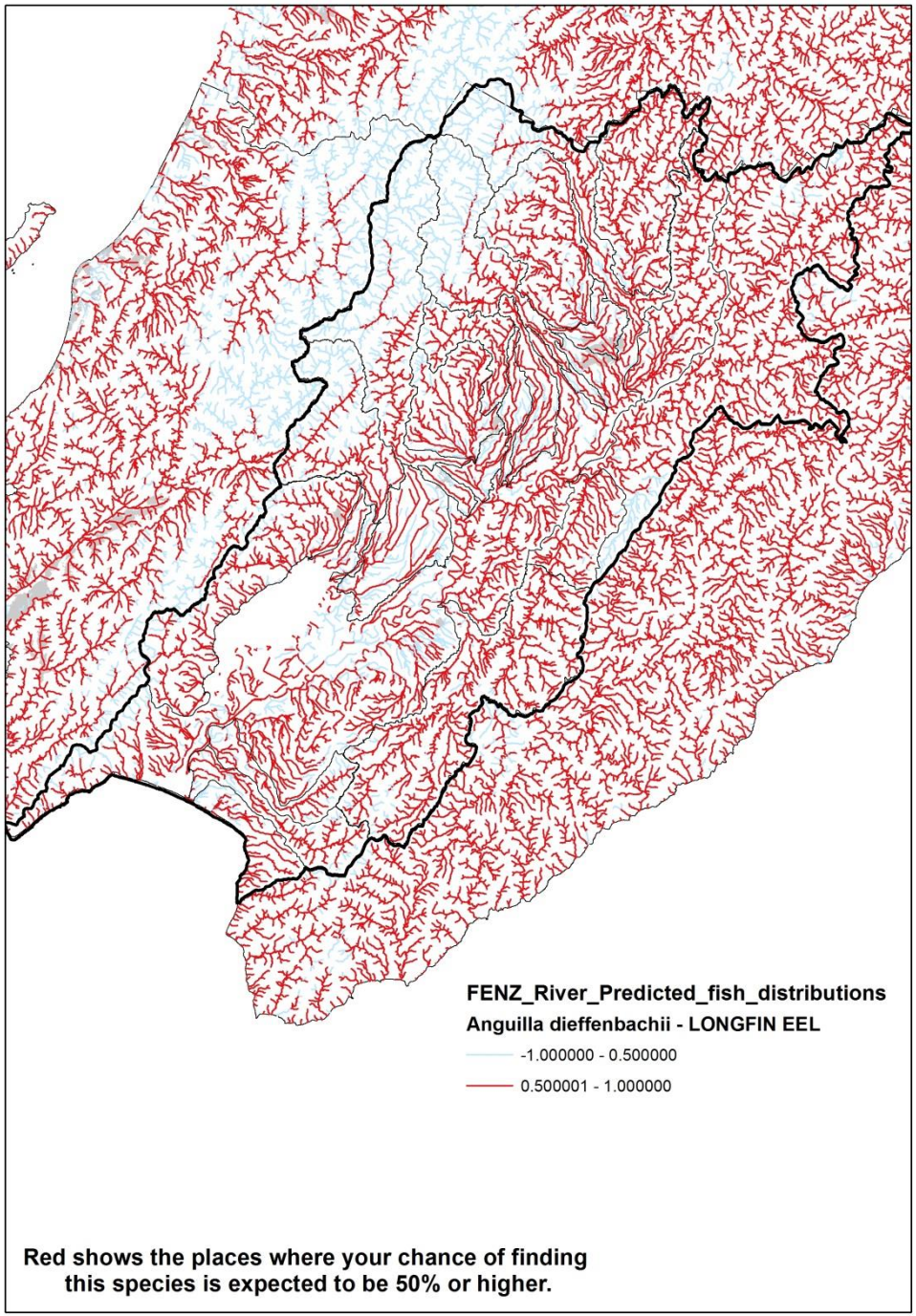
Upland bully



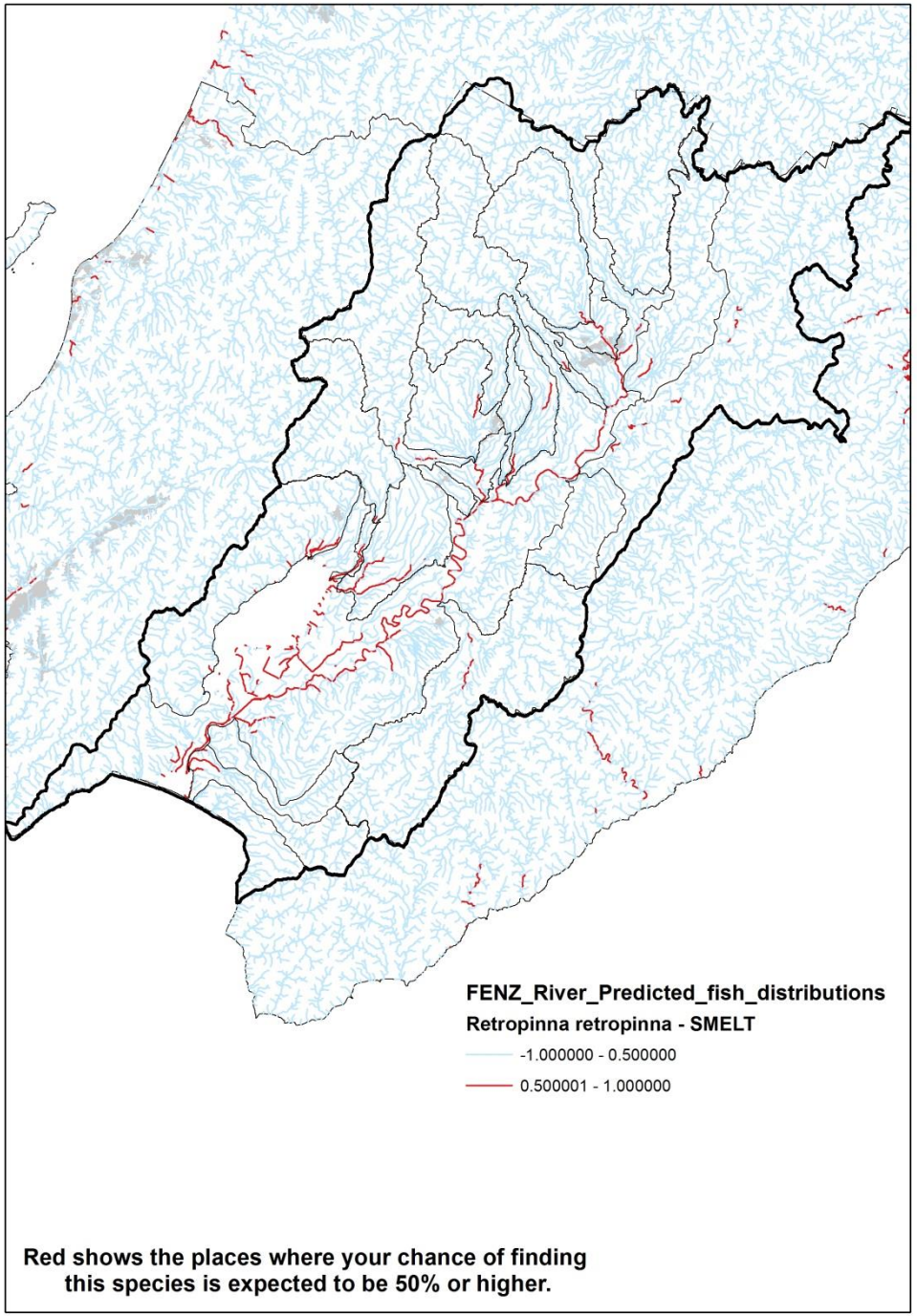
Shortfin eel



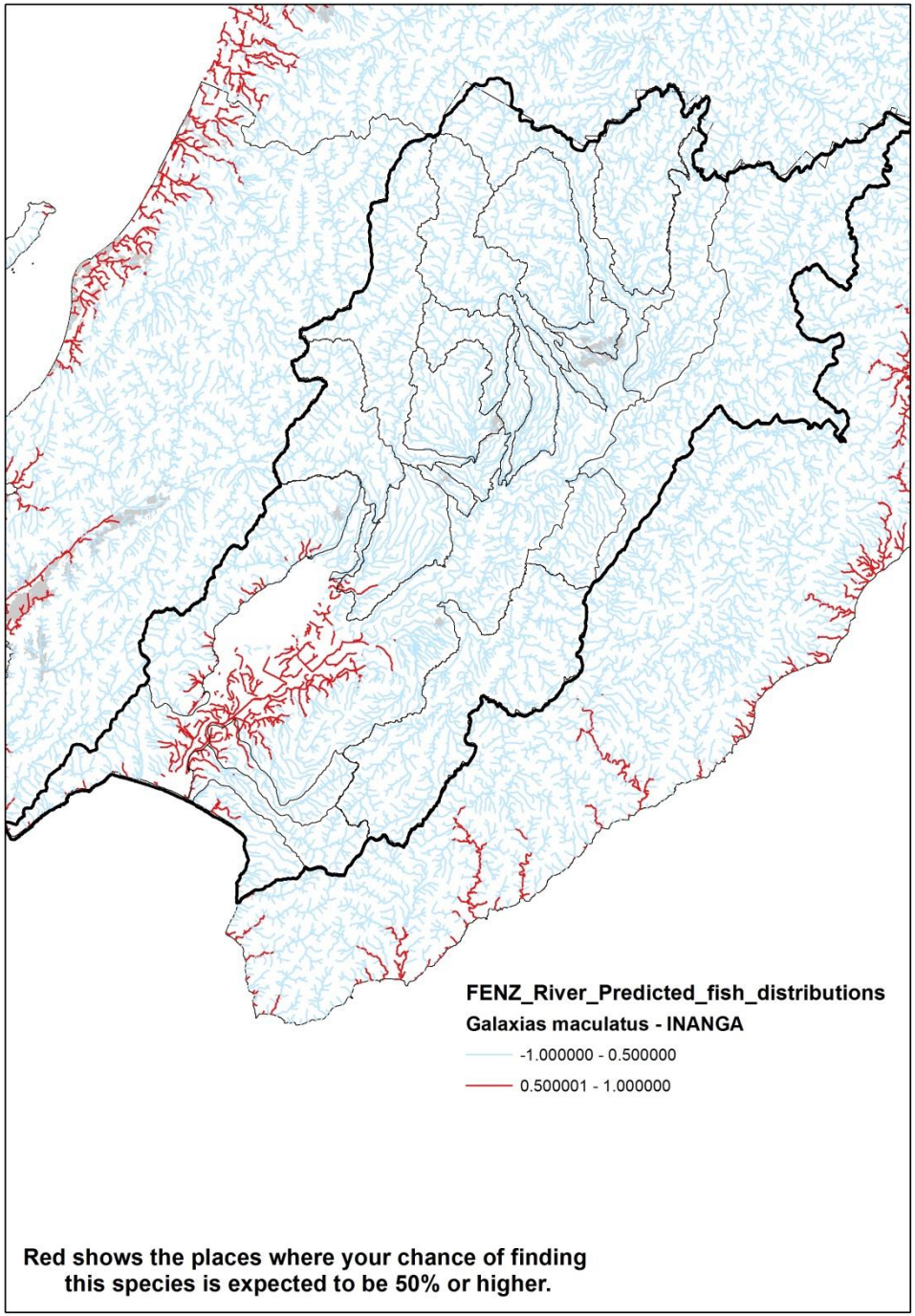
Longfin eel


FENZ_River_Predicted_fish_distributions
Anguilla dieffenbachii - LONGFIN EEL
-1.000000 - 0.500000
0.500001 - 1.000000
Red shows the places where your chance of finding this species is expected to be 50% or higher.

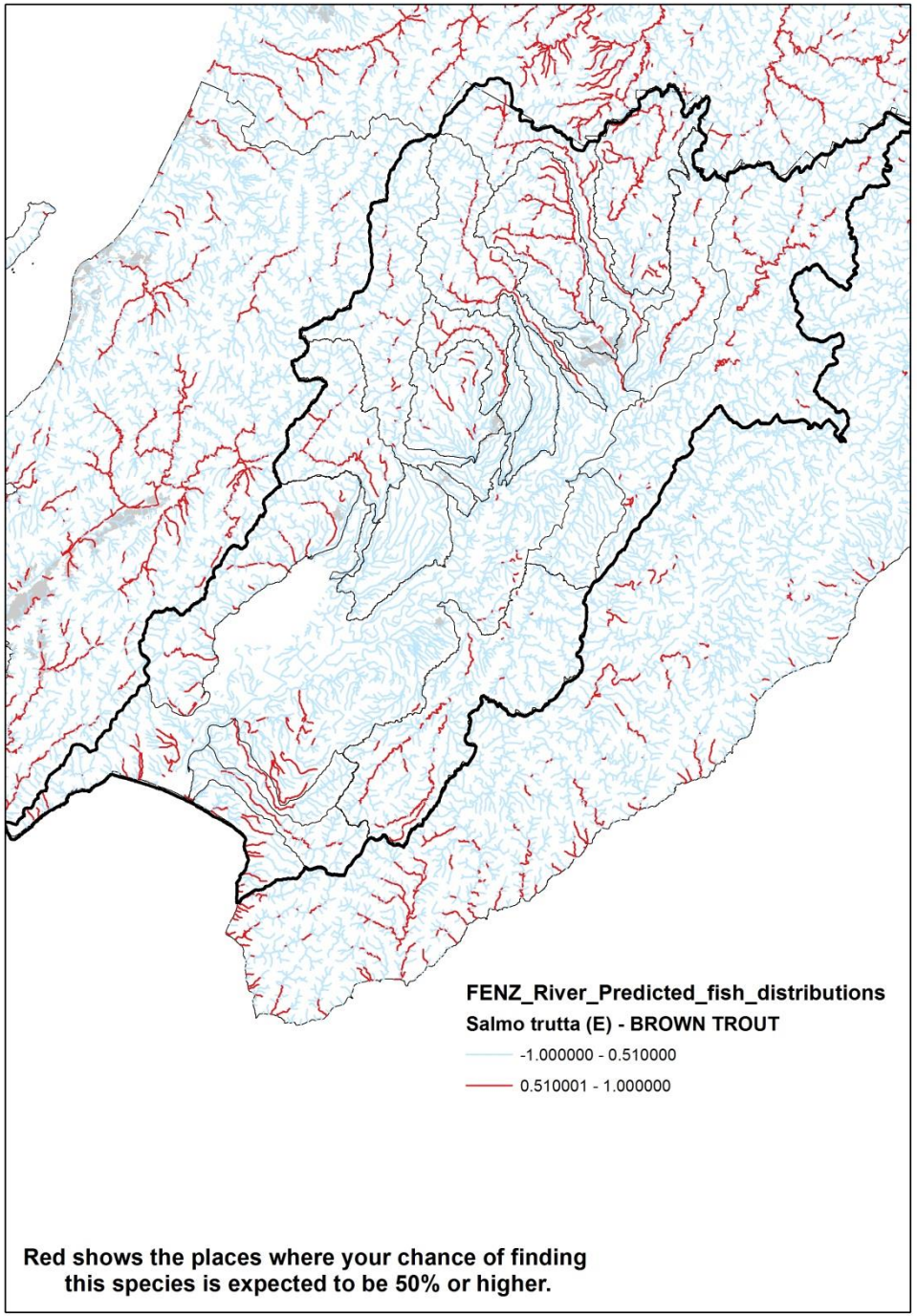
Smelt


FENZ_River_Predicted_fish_distributions
Retropinna retropinna - SMELT
-1.000000 - 0.500000
0.500001 - 1.000000
Red shows the places where your chance of finding
this species is expected to be 50% or higher.

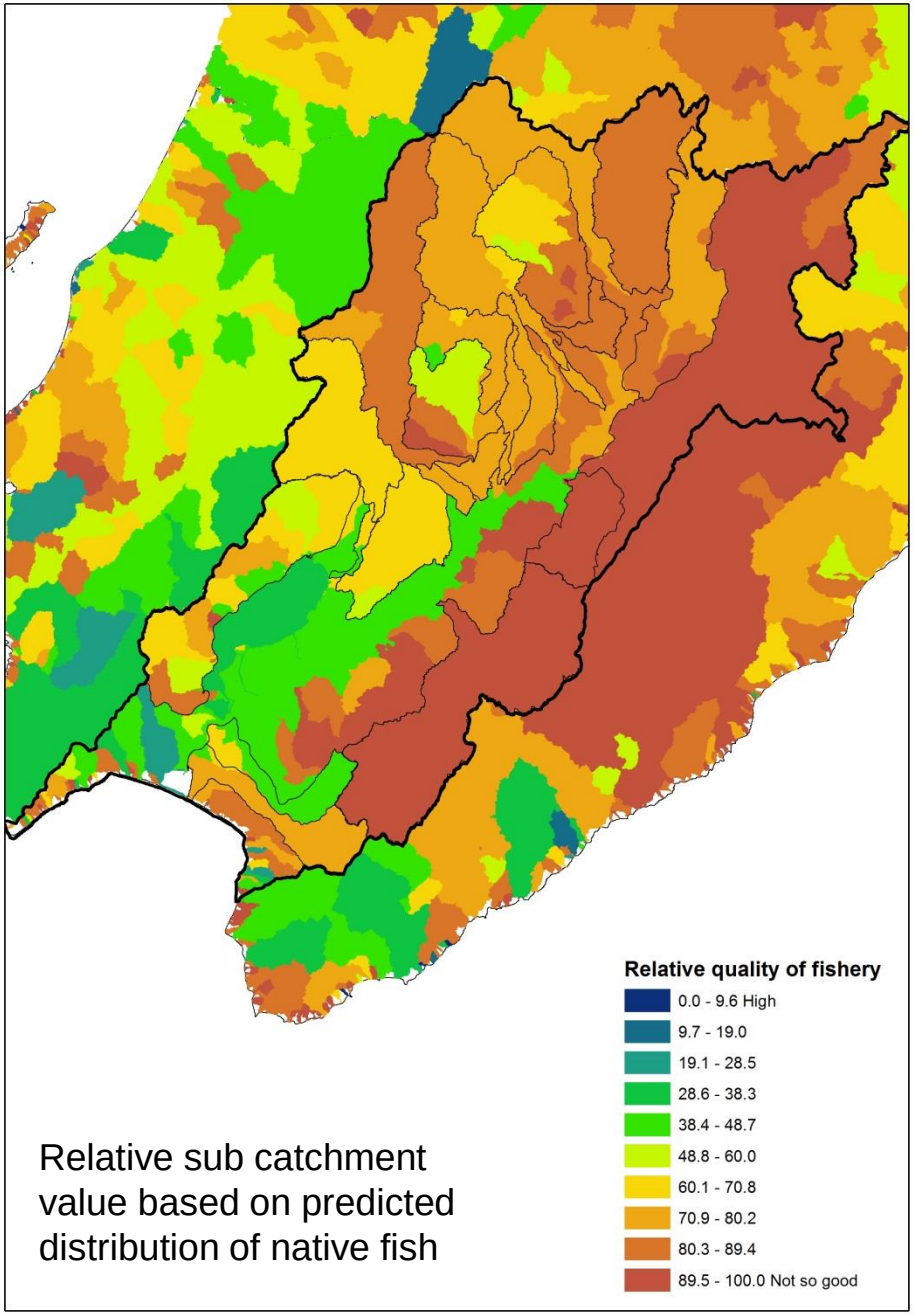
Inanga


FENZ_River_Predicted_fish_distributions
Galaxias maculatus - INANGA
-1.000000 - 0.500000
0.500001 - 1.000000
Red shows the places where your chance of finding
this species is expected to be 50% or higher.

Brown trout


FENZ_River_Predicted_fish_distributions
Salmo trutta (E) - BROWN TROUT
-1.000000 - 0.510000
0.510001 - 1.000000
Red shows the places where your chance of finding this species is expected to be 50% or higher.

Subcatchment comparison



Relative sub catchment value based on predicted distribution of native fish

Modelling objectives

- Need to confirm species and level of protection
- Deciding desirable level of protection is an exercise in risk management (type of river, values held)

Modelling objectives

- >90% retention will maintain existing fish populations
- <50% will result in noticeable impacts

Modelling objectives

- Define ‘optimum’ bottom lines.
  - <10% change from natural?

Caleb minimum flows

TESTING HIGHER MINIMUM FLOWS FOR CULTURAL VALUES – DRAFT RESULTS (UPDATED 30 SEPTEMBER 2016)

Benefit or impact more significant as colour shading gets darker

River/Stream	Existing Minimum Flow (m3/sec))	Recommended Minimum Flow for cultural values* (m3/sec)	% Increase in Minimum Flow	Ecological Benefit	Reliability Trade Off		
				Loss of habitat (%) compared with that available at MALF** Existing Min Flow [New Min Flow]	Existing Summer Reliability (Oct-Apr)	Reduction in reliability	Days of cease-take in 2013 Existing Min Flow [New Min Flow]
Waingawa	1.7	2.5	47%	-15% [0]	87%	-17%	64 [94]
Waiohine	3.05	3.75	23%	-20% [0]	98%	-5%	22 [34]
Waipoua	0.25	0.5	100%	-15% [0]	91%	-16%	47 [93]
Upper Ruamahanga	2.4	10	320%	-30% [0]	96%	-56%	38 [148]
Tauherenikau	1.3	1.35	4%	-5% [0]	94%	-1%	28 [32]
Parkvale	0.1	0.15	50%	n/a	81%	-9%	94 [21]
Kopuaranga	0.27	0.5	85%	-10% [0]	95%	-30%	34 [130]

*Caleb Royal (2012).

In this case, **Food Producing Habitat. The stream or river bed is considered the most important area for food production (periphyton an invertebrates) for fish and 'Food Producing Habitat' refers to the physical space available for this function. Estimated from EFSAP outputs (® NIWA)

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Mean Annual Low Flow

Ecological relevance?

- Return period = 1.8 years
- Represents the lower limit to physical space available to fish before they begin making a reproductive contribution
- Habitat at MALF correlated with trout abundance