CAWTHRON

Native Fish Distribution in the Nelson City Council Area

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EXECUTIVE SUMMARY

This report reviews the current state of knowledge of native fish distributions within the Nelson City Council (NCC) area and proposes a monitoring strategy that will allow NCC to gain a better understanding of native fish distributions throughout the city. Fish survey data is available for all of the main catchments within the NCC area. The main areas with little information on fish community composition are the upper reaches of the Whangamoa River and all the small streams that flow directly into Tasman Bay between Glenduan and Cape Soucis. Future monitoring efforts should concentrate on these areas to determine the diversity of fish present in these systems.

Nineteen species of freshwater fish (of which 16 were native) have been reported within the NCC area. Of these, longfin eel and giant kokopu are noted as being in 'gradual decline' in the Department of Conservation's threatened species classification list, while lamprey are listed as being 'sparse'. All of the other species are not considered to be threatened. Brown trout are the most widespread introduced fish within the region and there have been single reports of introduced rainbow trout and goldfish. Gambusia, koi carp and tench have also been reported within the region, but appear to have been successfully eradicated.

The distribution of particular species of freshwater fish within the region is largely associated with their life history requirements since many of the native fish are diadromous and require access to and from the sea as part of their life cycle. For example, shortfin eel, common smelt, giant kokopu, banded kokopu, inanga, giant bully, yelloweye mullet and estuarine triplefin are primarily found close to the coast and/or in the lower reaches of the larger rivers. However, some of the diadromous species (longfin eel, koaro, and to a lesser extent torrentfish, redfin bully and lamprey) are very strong migrants and are even found in the headwaters of the major catchments (Maitai, Roding, Wakapuaka). The few non-diadromous freshwater fish species (upland bully, koura, brown trout) found in the NCC area are widely distributed.

Two of the threatened species of freshwater fish (giant kokopu and lamprey) have only been reported on a single occasion in the NCC area. Future monitoring efforts should involve more surveys in the areas where they have been recorded previously to determine the size and viability of these populations. Other monitoring could be targeted to sites above and below potential barriers (dams, culverts, fords) to determine if fish passage is being affected.

A variety of techniques can be used to survey freshwater fish populations. However, we recommend that a combination of electric fishing and spotlighting techniques are the primary methods used in future surveys in the NCC region.

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1. INTRODUCTION

This report reviews the current state of knowledge of native fish distributions within the Nelson City Council (NCC) area and proposes a monitoring strategy that will allow NCC to gain a better understanding of native fish distributions, thus allowing prioritisation of protection and restoration efforts in different parts of the city.

This project has been funded by the Foundation for Research, Science and Technology via the Envirolink scheme (Project NLCC7).

2. EXISTING DATA

Fish survey data for the rivers within the NCC area boundary were extracted from the New Zealand Freshwater Fish Database (http://www.niwascience.co.nz/services/nzffd; accessed 21 November 2006). The database contained 114 records for the NCC area, collected between 1965 and 2006. Some additional Cawthron data from a small stream at Cable Bay and from the Maitai River (Stark 2003) has also been included.

All of the major catchments have been sampled, with the most concentrated effort in the Maitai Catchment (Figure 1). However, there are relatively few records from the Whangamoa Catchment and none from the upper part of this catchment. Apart from one record on Pepin Island, there are no records from any of the small streams flowing directly into Tasman Bay between Glenduan and Cape Soucis (Figure 1).

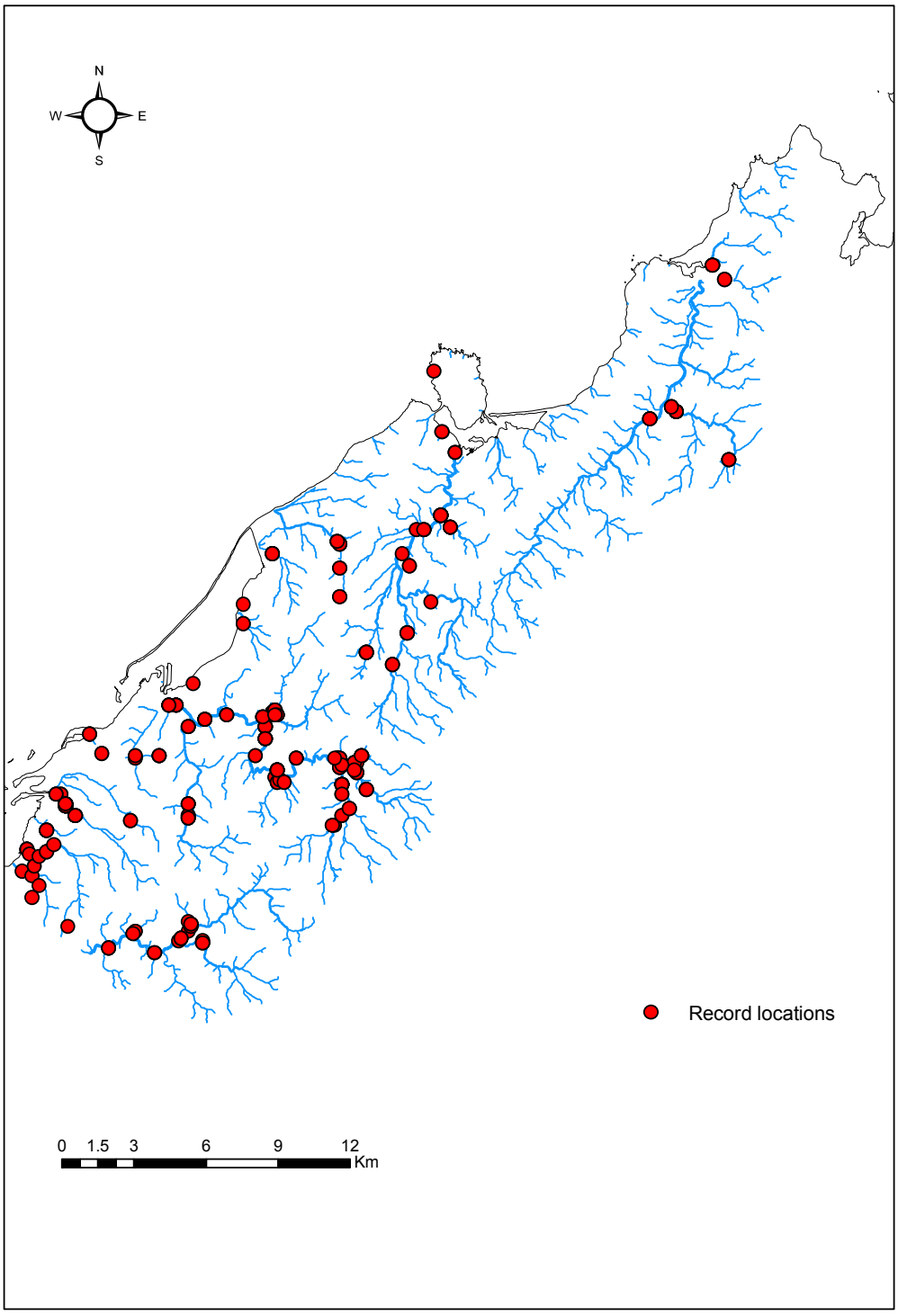

Figure 1. Locations of fish records in the NZFFD.

There have been 19 different species of fish (plus the crustacean - koura) recorded in streams within the Nelson City Council area boundary (Table 1). Sixteen of these fish were native. Locations of the records for each species are shown in Figures 2-6. Longfin eels and giant kokopu are listed as in 'gradual decline' in DoC's threatened species classification list, while lamprey are listed as 'sparse' (Hitchmough 2002). All other freshwater fish that have been recorded in the NCC area are not considered to be threatened. New Zealand's only known extinct freshwater fish, the New Zealand grayling (*Prototroctes oxyrhynchus*), was recorded in the Maitai River in the late 19th Century (Hector 1870). However, grayling began to disappear throughout New Zealand shortly after European settlement and were last reported in the late 1920's or early 1930s (McDowall 2000).

The diversity of fish species recorded in the NCC area is similar to what has been recorded in other parts of the upper South Island. Dwarf galaxias have been reported in the neighbouring Waimea Catchment (Hay & Young 2005) and might also be expected in the NCC area. Shortjaw kokopu have been found in Abel Tasman National Park and also in the Marlborough Sounds (Strickland et al. 2003) and so it would not be surprising if they were found in the NCC area.

Table 1. List of fish species (and crayfish) recorded from the Nelson City Council area. Introduced species are shown with a *.

Species	Common name	Number of records
Geotria australis	Lamprey	1
Anguilla dieffenbachii	Longfin eel	82
Anguilla australis	Shortfin eel	14
	Unidentified eel	7
Retropinna retropinna	Common smelt	6
Galaxias argenteus	Giant kokopu	1
Galaxias fasciatus	Banded kokopu	12
Galaxias brevipinnis	Koaro	14
Galaxias maculatus	Inanga	13
Salmo trutta	Brown trout*	57
Oncorhynchus mykiss	Rainbow trout*	1
	Unidentified salmonid*	1
Carassius auratus	Goldfish*	1
Cheimarrichthys fosteri	Torrentfish	4
Gobiomorphus huttoni	Redfin bully	20
Gobiomorphus cotidianus	Common bully	7
Gobiomorphus gobioides	Giant bully	1
Gobiomorphus hubbsi	Bluegill bully	1
Gobiomorphus breviceps	Upland bully	27
	Unidentified bully	3
Aldrichetta forsteri	Yelloweye mullet	3
Grahamina nigripenne	Estuarine triplefin (Cockabully)	2
Paranephrops planifrons	Koura (Freshwater crayfish)	31

Longfin eel are the most commonly recorded fish species in the NCC area and have been found throughout the region (Figure 2). They were most often recorded in the Maitai catchment, but this may be due to higher sampling effort in this area. Shortfin eel are also spread throughout the region, but tend to be found in the lower reaches of river systems which is typical for this species. There is only a single record of lamprey, from the Collins River in 1996.

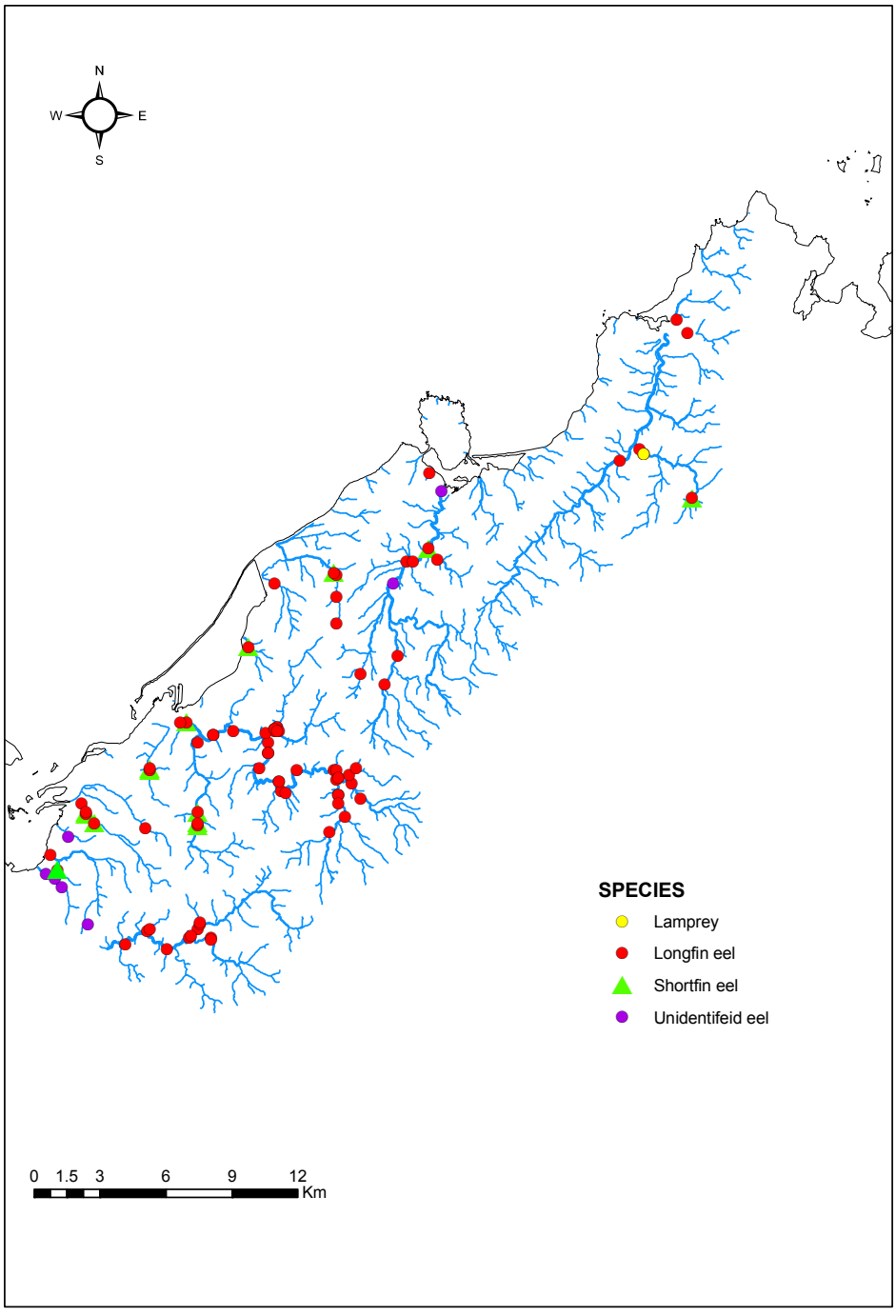

Figure 2. Locations of eels and lamprey recorded in the NCC area.

Koaro are very strong migrants with a strong preference for unmodified catchments and tended to be found in upper catchment reaches that offer remnant tracts of native forest. The other galaxiid species recorded (banded kokopu, giant kokopu and inanga) were primarily found in the lower reaches (Figure 3). There was only one record of giant kokopu, from Poorman Valley Stream in 2004. Surprisingly, inanga have not been officially reported from the Maitai River catchment. However, this probably reflects a lack of reporting rather than an absence of this species (Crowe et al. 2004). Whitebaiting is relatively popular in the lower reaches of the Maitai River and presumably the whitebaiters are targeting inanga (and perhaps banded kokopu and koaro). Similarly, koaro have not been reported from the Whangamoa River catchment, but would be expected to be present in the forested upper reaches of this catchment.

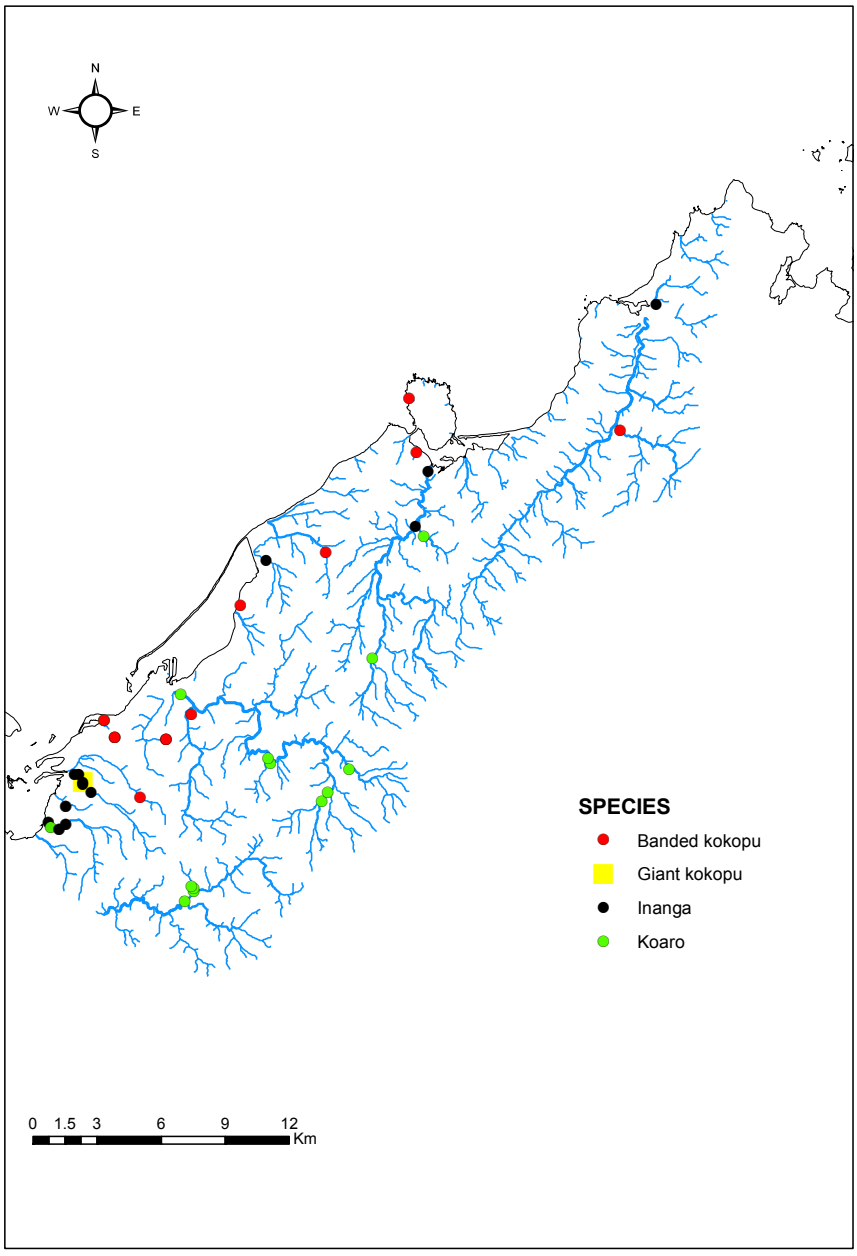

Figure 3. Locations of galaxiid species recorded in the NCC area.

Five species of bully (*Gobiomorphus*) have been recorded in the NCC area (Figure 4). Upland bullies do not require access to the sea during their life cycle, which may explain their widespread occurrence throughout the region. Redfin bullies were also found throughout most of the NCC area, whereas common bullies were only found in the lower reaches. There were only single recordings of giant bully and bluegill bully; from the Maitai River in 1982 and the South Branch of the Maitai River in 1989, respectively.

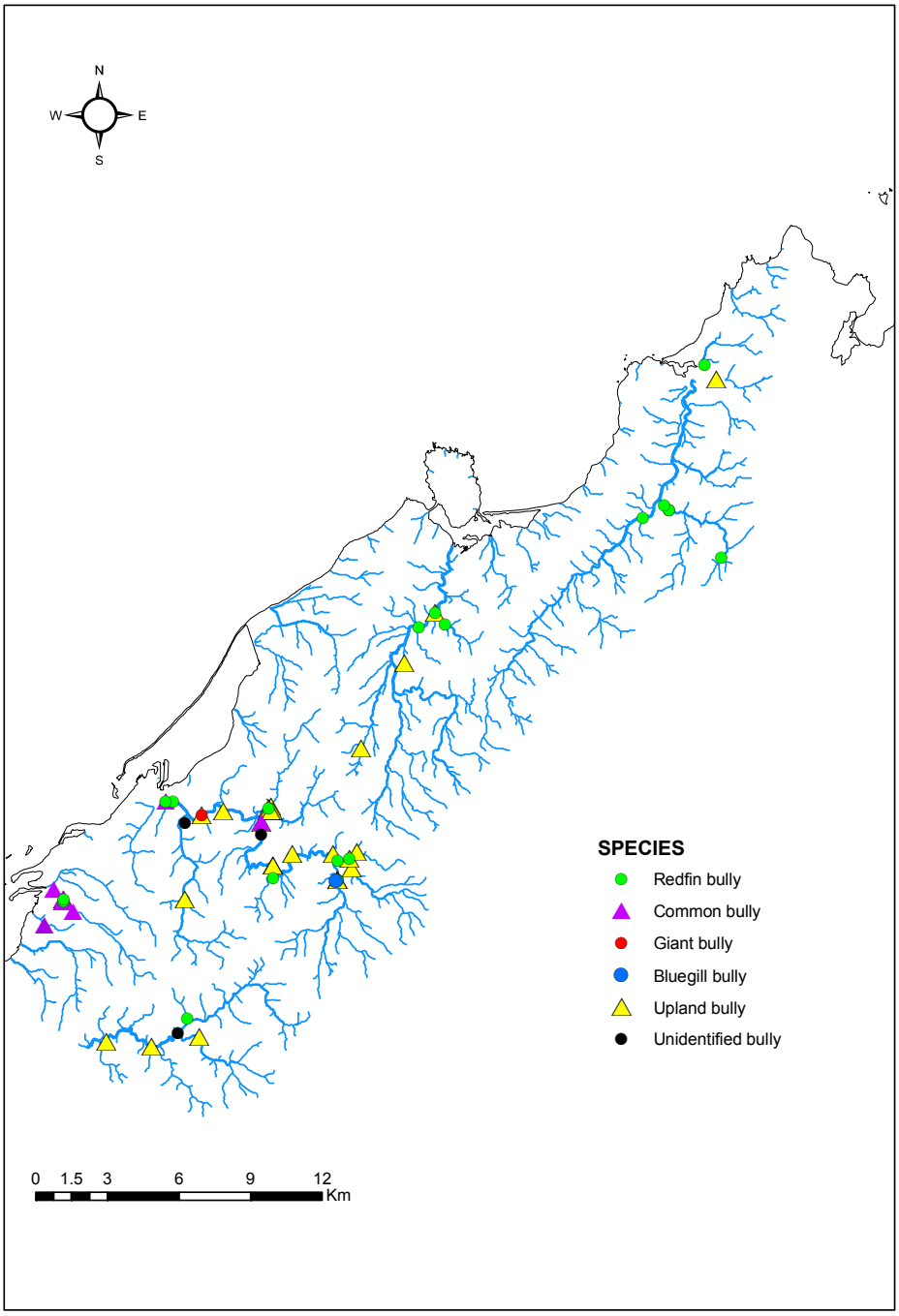

Figure 4. Locations of *Gobiomorphus* species recorded in the NCC area.

Koura are found throughout most of the NCC area (Figure 5). Common smelt, estuarine triplefins and yelloweye mullet were usually found close to the river mouths, which is typical for these species. Torrentfish were most commonly found in the Maitai catchment, although they have also been recorded in the Wakapuaka River.

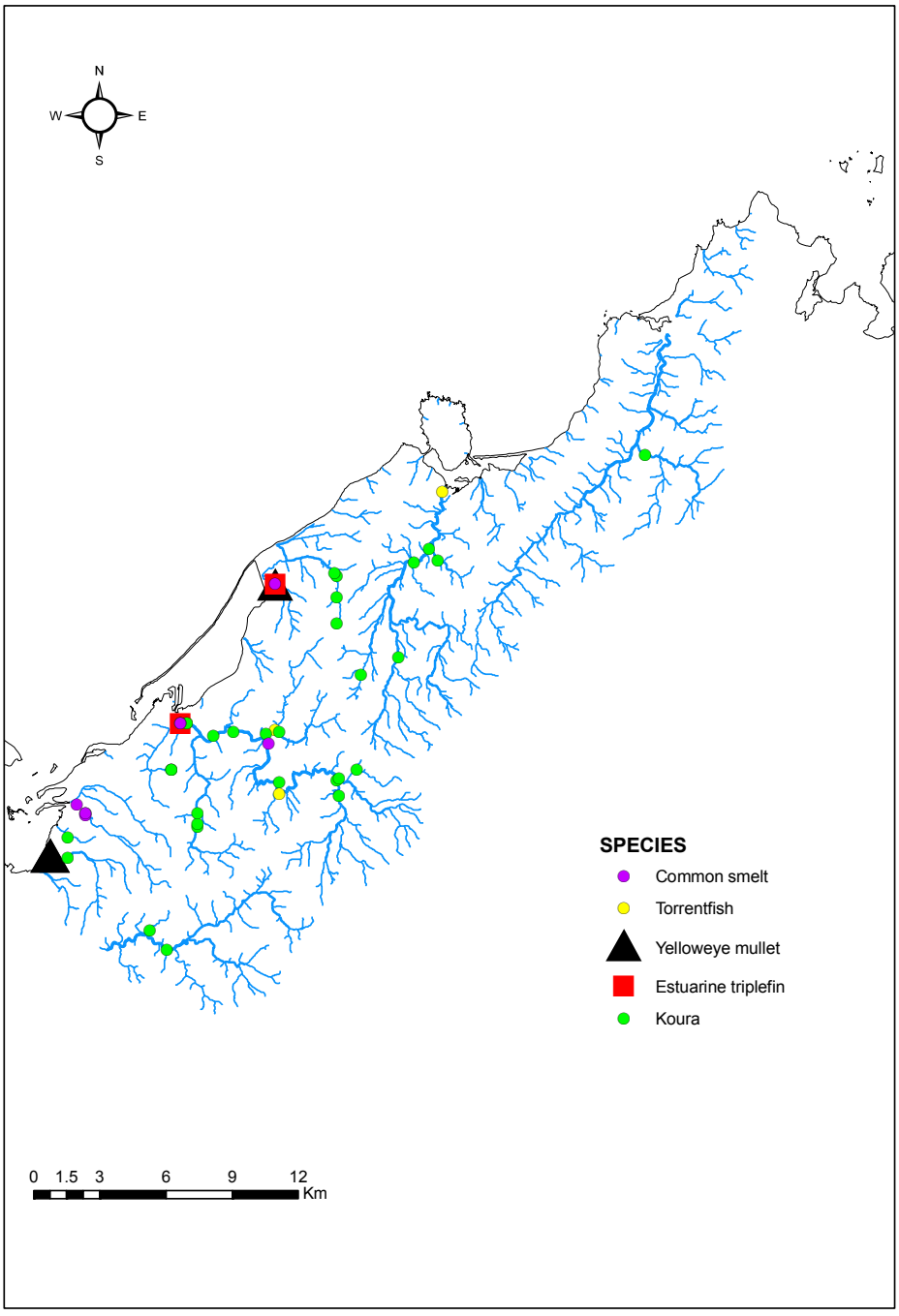

Figure 5. Locations of common smelt, torrentfish, yelloweye mullet, estuarine triplefin and koura recorded in the NCC area.

Most of the fish species recorded in the NCC area were native, but three exotic species have also been recorded; brown trout, rainbow trout and goldfish. Of these exotic species, only brown trout are widely distributed in the NCC area (Figure 6), with only one record of rainbow trout (2003) and goldfish (2001). Koi carp (Queens Garden), gambusia and tench (Orphanage Stream) have also been reported within the region, but appear to have been successfully eradicated (Elkington & Maley 2005).

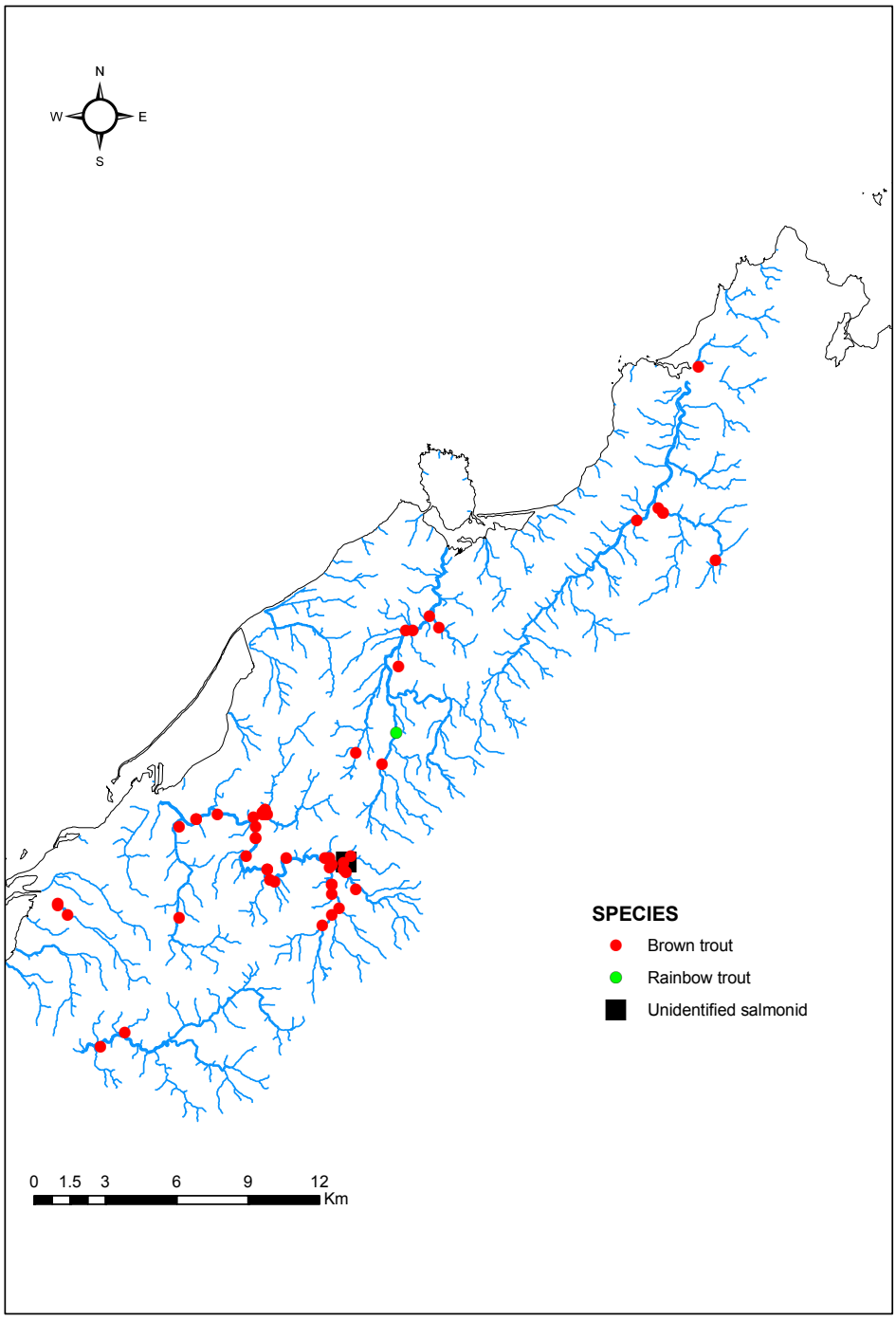

Figure 6. Locations of brown trout and rainbow trout recorded in the NCC area.

3. FUTURE MONITORING OPTIONS

3.1. Sites

As mentioned above, there are relatively few records from the Whangamoa Catchment and only one record from any of the small streams flowing directly into Tasman Bay between Glenduan and Cape Soucis (Figure 1). Therefore, it would be wise to focus some sampling effort on these areas. Access will be difficult for many of the small streams flowing directly into the Bay, but it may be possible to access the lower reaches of these streams from the coast using a boat.

It would also be useful to determine the status of the threatened species that have been recorded rarely within the NCC area. This would involve more surveys in and around the areas where they have been recorded previously (Poormans Valley Stream for giant kokopu and Collins/Whangamoa River for lamprey) to determine the size and viability of these populations. Further surveys in other parts of the NCC region that have similar habitat characteristics could then be conducted to determine if these species are really restricted to small parts of the NCC area.

Other monitoring could be targeted to sites above and below potential barriers (dams, culverts, fords) to determine if fish passage is being affected.

3.2. Methods

A variety of methods can be used to survey freshwater fish populations. These include electric fishing, spotlighting, trapping, netting, and drift and crawl diving.

Electric fishing is the most common technique used in small to moderate sized streams and involves passing an electric current through the water to stun fish. Once the electric current is turned off the fish generally recover quickly. Electric fishing is an effective method on larger species that are predominantly found in the water column, but less effective on small species or those that seek cover among the substrate during the day.

Spotlighting involves visiting sites at night and using a bright spotlight to observe any fish that are active (Figure 7). Spotlighting is very effective for most of the native fish species because they are often most active at night and can be easily seen.

Fish traps (either baited or unbaited) or nets can be used to capture most species of freshwater fish. However, their effectiveness is dependent on the types of habitat sampled.

Drift diving is primarily used for surveying trout populations in moderate-large clear rivers and involves a group of snorkel divers drifting down a river counting fish as they pass them. Some drift diving has been conducted on the Maitai River, but most of the waterbodies within the

NCC area are too small for this technique. Crawl diving upstream can be particularly effective for observing small cryptic species, such as many of the native species.

Figure 7. Spotlighting one of the streams feeding into the Wakapuaka Estuary.

All of these techniques can be used qualitatively to determine the presence/absence of particular species, or in a quantitative or semi-quantitative fashion to estimate the densities of particular species.

For the sites mentioned above, we recommend that a combination of electric fishing and spotlighting is used to survey these sites.

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