

Figure 8 Distribution of ecologically significant intertidal communities found in the Southern Kaipara (from Hewitt and Funnell 2005).

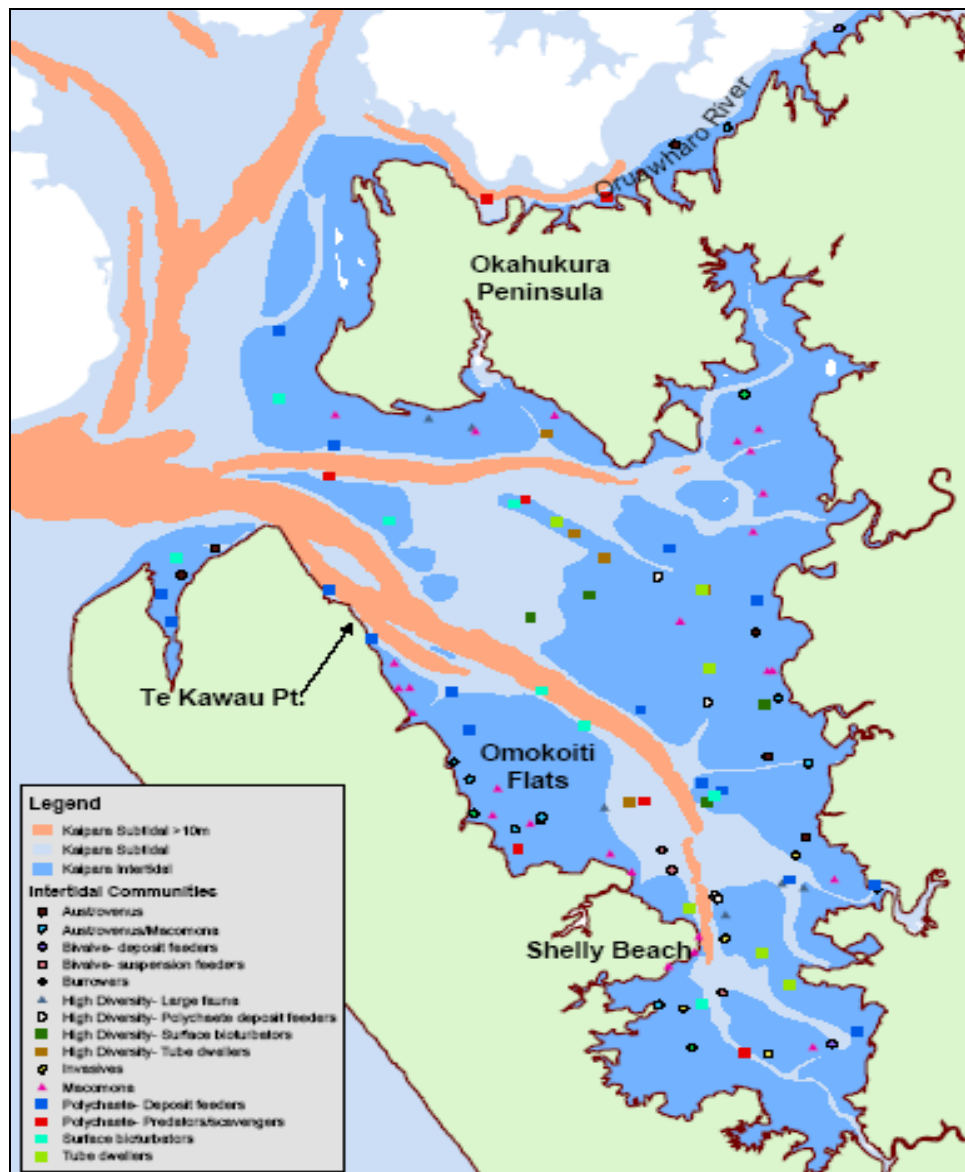


Figure 9 Interpolated plots of the distribution of total numbers of individuals (A), number of taxa (B), and number of orders (C) found in the cores taken from the intertidal sites (from Hewitt and Funnell 2005).

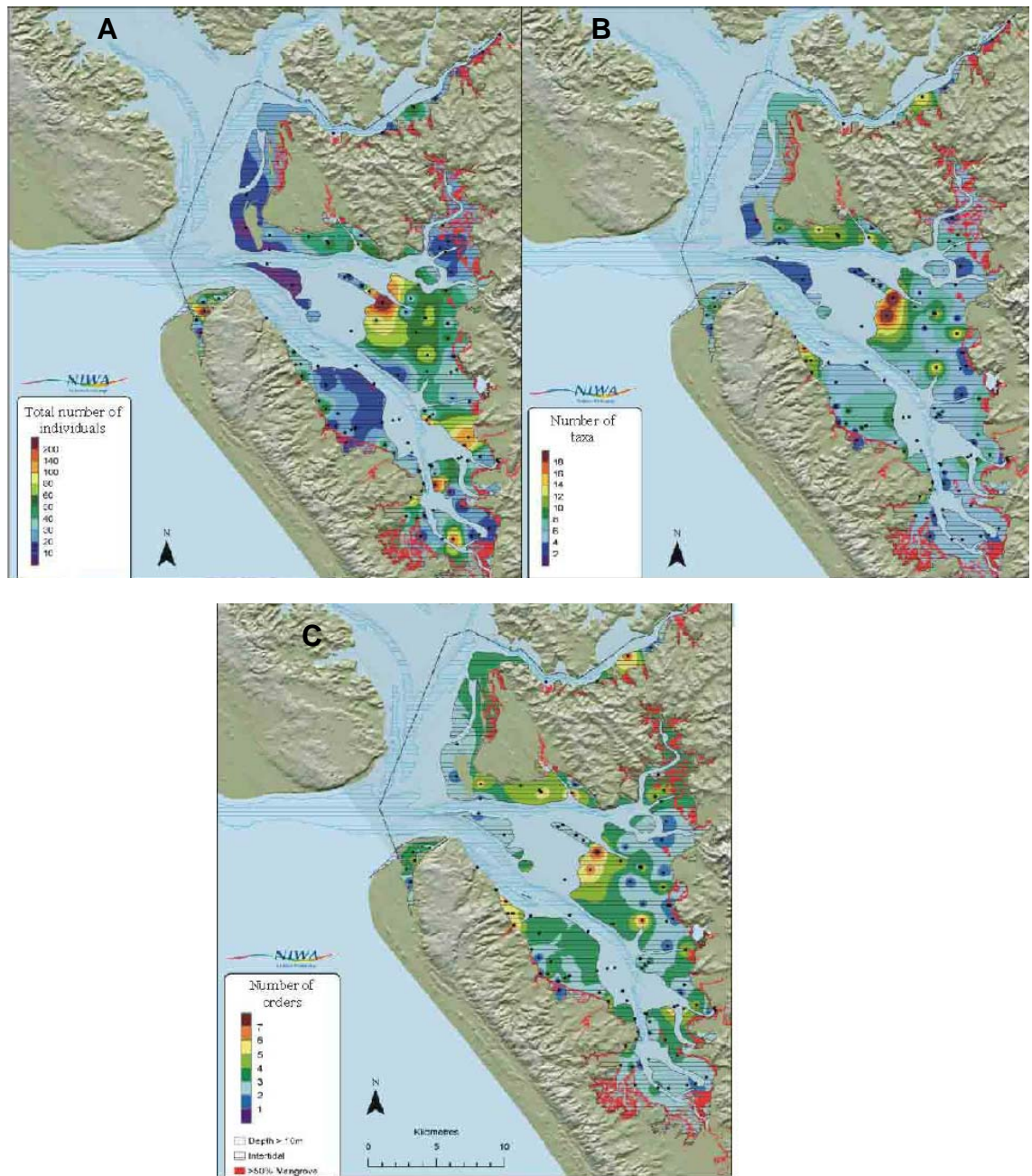


Figure 10 Distribution of subtidal epibenthic habitats found in the Southern Kaipara (from Hewitt and Funnell 2005).

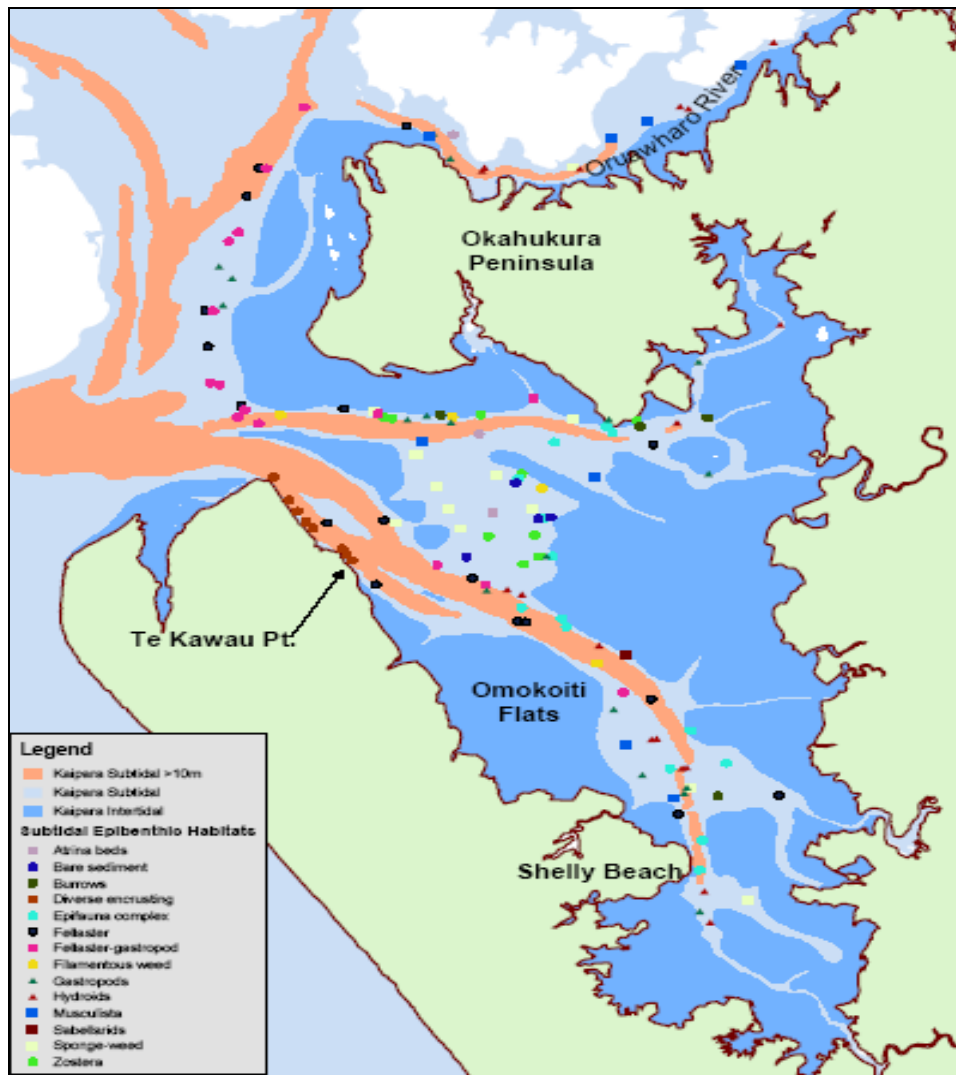


Figure 11 Distribution of ecologically significant subtidal communities found in the Southern Kaipara (from Hewitt and Funnell 2005).

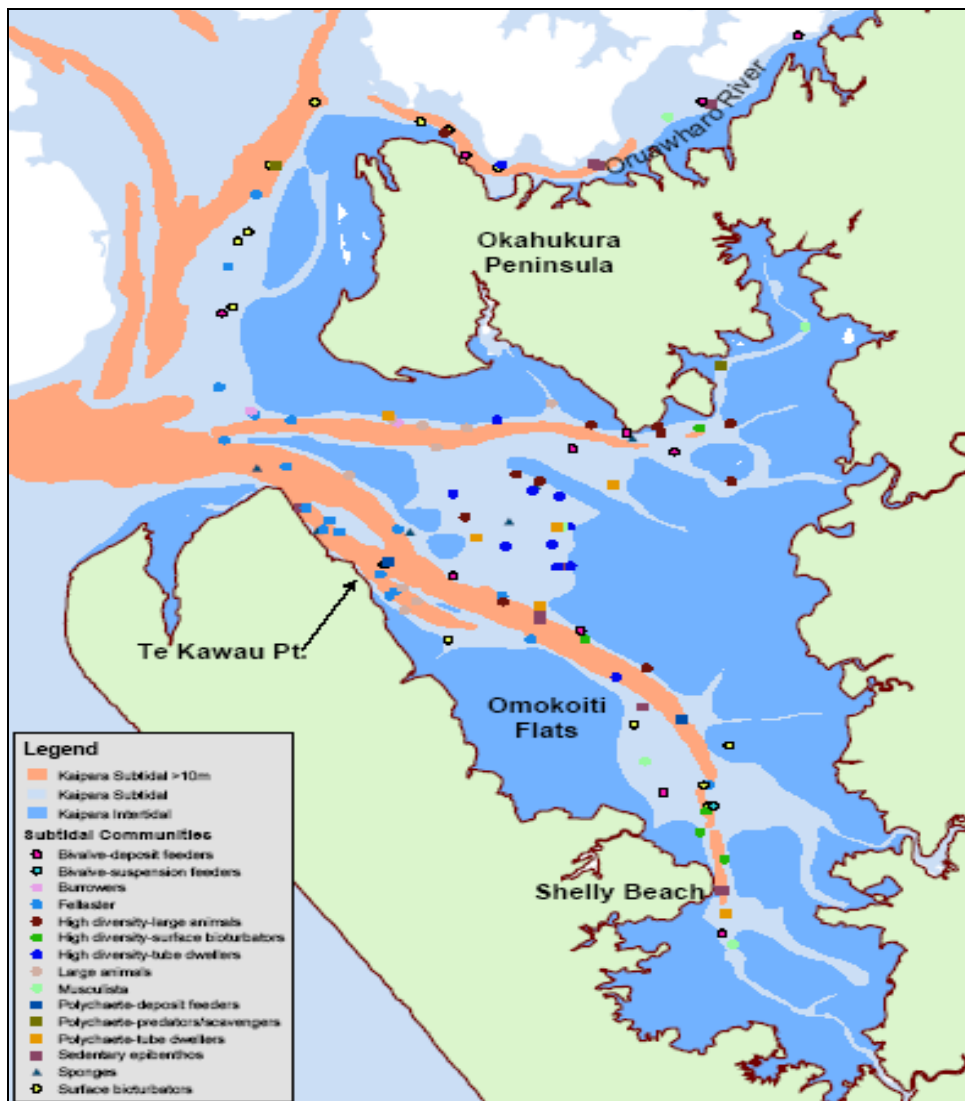
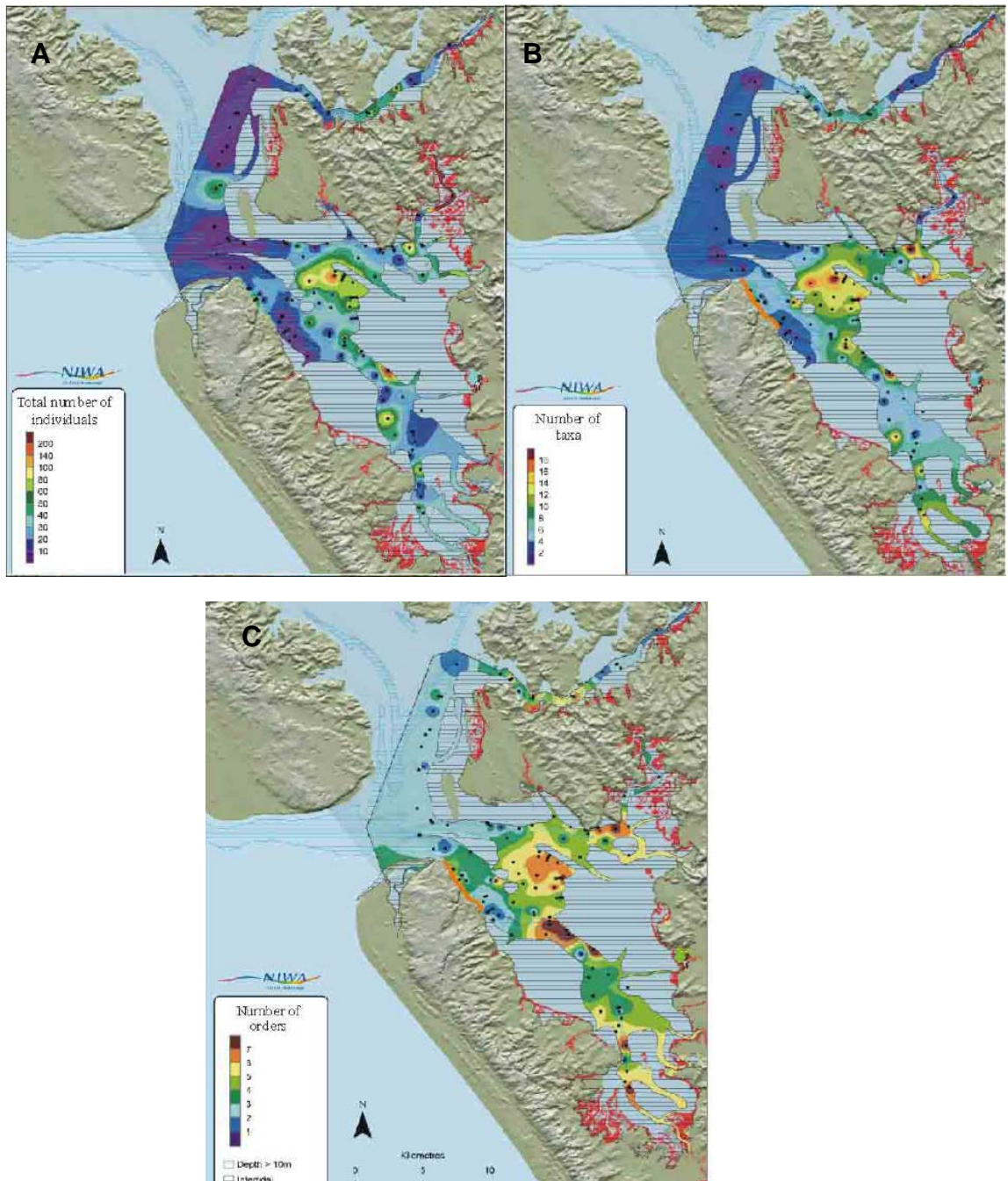


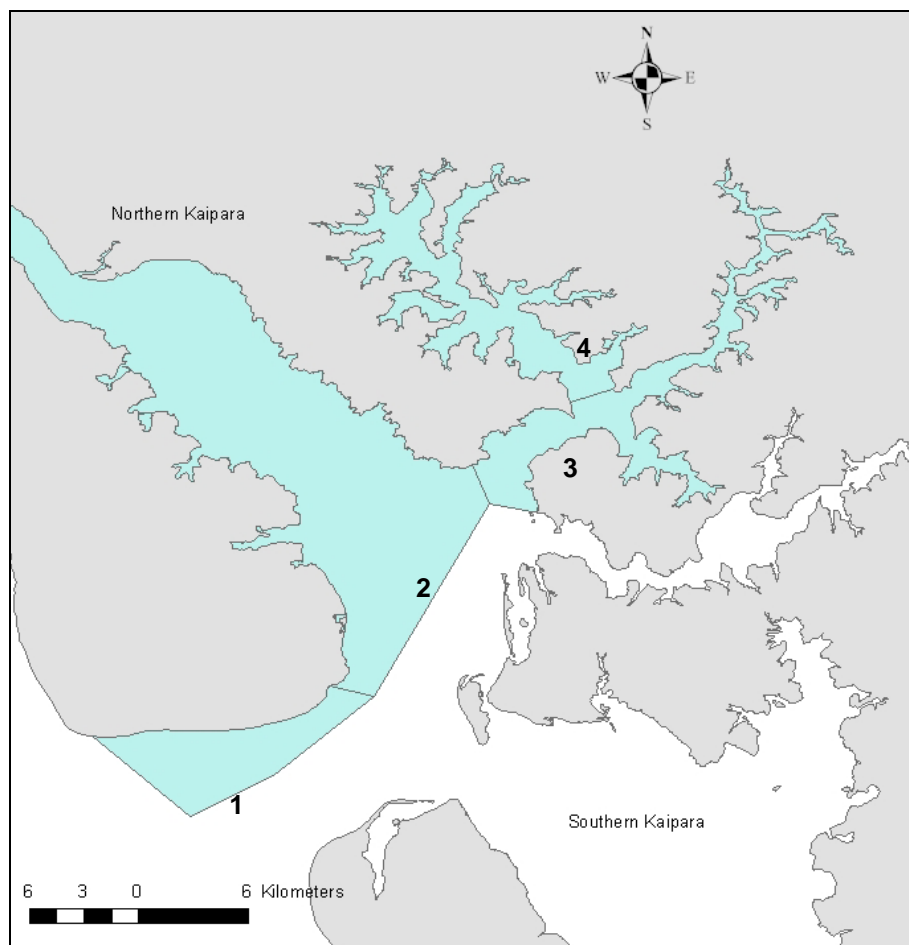
Figure 12 Interpolated plots of the distribution of total numbers of individuals (A), number of taxa (B), and number of orders (C) found in grabs taken from the subtidal sites (from Hewitt and Funnell 2005).



3.2.2 Northern Kaipara Harbour

The intertidal and subtidal areas of the northern Kaipara are influenced by several relatively large rivers including the Arapaoa River, Otamatea River, Oruawharo River and Wairoa River (Figure 1). Compared to the southern Kaipara, the northern Kaipara has been studied in far less spatial detail. Several studies have focused on benthic communities within discrete locations (e.g. the Otamatea River; see Robertson et al. 2002 and Poynter 2002) with only one-off studies being carried out in other regions. Findings from these studies suggest that the abundance and distribution of dominant taxa are, largely, characteristic of a degraded environment. In order to summarise the dominant benthic communities, the northern Kaipara was divided into four discrete areas (Figure 13). The following sections contain a concise description of the habitats present in these areas.

Figure 13 Four discrete areas within the northern Kaipara used to describe benthic marine habitats and communities: 1 Harbour entrance; 2 Wairoa Arm; 3 Otamatea River including Whakaiki River; 4 Arapaoa River.



3.2.2.1 Area 1: Harbour entrance to Pouto Point

The central area of the harbour (<30m) is characterised by sandstone outcrops with occasional deposits of sand. The sandstone outcrops are dominated by a diverse mussel reef community, with the dominant species being green-lipped mussel (*Perna canaliculus*) and a range of gastropods, amphipods, and carnivorous polychaetes (CREST 2007). The eastern areas of the harbour are dominated by tuatua (*Paphies subtriangulata*), sand dollar (*Fellaster zelandica*), polychaetes, and amphipod communities. Gordon et al. (2006) report an invasive bryozoan, *Membraniporopsis tubigera*, around Pouto Point that caused problems for local flounder fishers in 2003 due to net fouling. The present abundance and distribution of this species within the harbour is unknown.

3.2.2.2 Area 2: Northern Kaipara, Wairoa arm

The coastal area north of Pouto Point is characterised by numerous muddy embayments (e.g. Oneroa Bay and Kellys Bay) and extensive reclamations, particularly around Dargaville (Shaw and Maingay 1990). The area between Pouto Point and Sail Rock is presently designated as an oyster reserve (see section 3.3.2). The eastern coastal areas of the Wairoa arm are characterised by extensive intertidal sand and mudflats between Kumuakiti Point and Paraoanui Point, with numerous muddy embayments present between Werewere Point and Te Kauri Point. The benthic communities of the Wairoa River arm have been poorly described. Subtidal mussel (*Perna canaliculus*) beds occur adjacent to Pareotaunga Point (T. R. Haggitt., pers. obs. 2006), although the spatial extent of these is presently unknown. The occurrence of intertidal mudflats and muddy embayments suggests that the common benthic communities found in the Otamatea River and Arapaoa River (see the following sections) are likely to be found throughout the Wairoa River arm.

3.2.2.3 Area 3: Otamatea River including Whakaki River

The Otamatea and Whakaki River areas are typified by numerous muddy embayments and intertidal mudflats. Many creeks drain into the Otamatea River (e.g. Kaiwaka River, Awaroa Creek, Takahoa Creek) and into the Whakaki River (e.g. Paki Creek, Stony Creek). Robertson et al. (2002) describes the general abundance patterns of dominant taxa, with cockles (*Austrovenus stutchburyi*) and the nut shell *Nucula hartvigiana* common in the lower reaches of the rivers and Oligochaete worms more abundant in the upper reaches. It is suggested that these distribution patterns are due to the sediment characteristics (which increase in muddiness from lower to upper reaches) of the sites surveyed. Common gastropods in the river include *Zeacumantus lutulentus*, *Diloma subrostrata*, *Diloma zelandica*, and *Cominella glandiformis*. Areas surrounding Coates Bay are characterised by large monospecific patches of the tubeworm *Pomatoceros caerulus* whereas numerous boulders within the bay (known as the 'Mussel Ring') are encrusted with oysters (both live and dead) and low densities of mussels (*Perna canaliculus*) (Poynter 2002). Large patches of *Hormosira banksii* are typical of the mid-shore regions of the bay, with *Xenostrobus pulex* and *Zeacumantus*

lutulentus common in upper reaches (Poynter 1992). *Musculista senhousia* occurs in dense patches throughout the Otamatea River, particularly around The Bluff (Tinopai) and adjacent to Otara Head at the entrance to the Whakaki River (P. & C. Yardley., pers. comm. 2007). Within the Otamatea River, oyster reserves are presently designated between Batley Wharf and Tanoa Point, and between Papanoa Point and Onoke Point (see section 3.3.2).

3.2.2.4 Area 4: Arapaoa River

The Arapaoa River is characterised by numerous embayments, rocky headlands, and extensive intertidal mudflats. Numerous creeks drain into the Otamatea River. Morton and Miller (1968) describe the basic zonation pattern of the dominant organisms within the Whakapirau Creek area, noting that oysters (*Crassostrea gigas*) are predominant on the upper shore and eventually give way to large reef-like clumps of *Pomatoceros caerulus* raised above the muddy and silty substratum. This area is also characterised by the common gastropod fauna of mudflats (*Zediloma subrostrata*, *Micrelenchus huttoni*, *Xymene plebeius*, *Zeacumantus lutulentus*, and *Cominella glandiformis*). Morton and Miller (1968) noted a general absence of zoning algae, with no trace of *Corallina* spp. or *Hormosira banksii*. The species associations observed by Morton and Miller (1968) are common throughout the Arapaoa River (Haggitt and Mead., pers. obs. 2004). Jeffs et al. (1992) also noted the occurrence of the Chilean oyster, *Tiostrea chilensis*, within the Pahi Bank area of the Arapaoa River. Oyster reserves occur between Wakaiti and Tahupo Creek (Arapaoa River), and between Te Kopua Point and Waipako (encompassing the Arapaoa and Otamatea Rivers) (see section 3.3.2).

3.3 Fisheries

Information on fish within Kaipara Harbour includes:

- ❑ Research on fish in estuarine and coastal habitats – including the Kaipara Harbour, funded by the Foundation for Research Science and Technology (FRST). (Morrison and Francis 2004). See project summaries for contract C01X0222 (Fish usage of estuarine and coastal habitats) on the FRST website (<http://www.frst.govt.nz/database/>).
- ❑ Sampling associated with an AEE for an oyster farm (Kelly et al. 2001).
- ❑ Ministry of Fisheries catch and catch per unit effort data.
- ❑ Two reviews on commercially targeted species (Hartill 2002, Paulin and Paul 2006).
- ❑ Data contained within the New Zealand Freshwater Fish Database (NZFFD).

The FRST funded studies have been focused on determining the juvenile fish usage of estuarine and coastal habitats throughout New Zealand. Preliminary results indicate that within the Kaipara harbour:

- ❑ Juvenile yellow-eyed mullet (*Aldrichetta forsteri*) and grey mullet (*Mugil cephalus*) are common in most areas of the Kaipara, with grey mullet generally found in higher abundances (NIWA 2003).
- ❑ The invasive sand goby (*Papillogobius exquisitus*) occurs within and around the Kaipara River (NIWA 2003).
- ❑ There was a high association of juvenile grey mullet (20–40 mm length) with mangrove habitat (Table 1) and intertidal seagrass meadows in the Kaipara Harbour. Other species found to occur in mangrove habitat were red gurnard, anchovy, and flounder. The sparid *Pagrus auratus* (i.e. snapper), which utilises northern New Zealand estuaries and sheltered coastal embayments as nursery grounds, was absent from mangrove habitat within the Kaipara.
- ❑ The Kaipara Harbour has been estimated to provide almost three-quarters of estuarine-based snapper recruitment to the West Coast of the North Island. Snapper utilise New Zealand estuaries and sheltered coastal embayments as nursery grounds, with high densities reported (thousands per km²) of snapper less than one-year old associated with subtidal horse mussel beds, and a strong association with seagrass meadows in the extreme low intertidal / upper subtidal areas (Morrisey et al. 2007).

Table 1 Average fyke net catches for Kaipara Harbour fish species associated with mangroves. Abundances are expressed as average numbers of individuals (SE) per 14.5 m net set (day and night catch combined). Data extracted from Morrisey et al. (2007).

Common name	Scientific name	Kaipara Harbour
Yellow-eyed mullet	<i>Aldrichetta forsteri</i>	84.8 (28.8)
Grey mullet	<i>Mugil cephalus</i>	24.2 (18.0)
Estuarine triplefin	<i>Grahamina nigripenne</i>	0.3 (0.2)
Smelt	<i>Retropinna retropinna</i>	03 (03)
Short-finned eel	<i>Anguilla australis</i>	10.5 (2.5)
Anchovy	<i>Engraulis australis</i>	24.8 (24.0)
Sand flounder	<i>Rhombosolea plebeia</i>	1.2 (0.8)
Yellow-belly flounder	<i>Rhombosolea leporina</i>	1.5 (0.5)
Exquisite goby	<i>Favonigobius exquisitus</i>	1.2 (0.8)
Garfish	<i>Hyporhamphus ihi</i>	0.5 (0.5)

While much of the data from the FRST funded studies are yet to be formally published, preliminary results indicate that the West Coast adult snapper population is principally comprised of 4 to 8 year old fish whereas historical populations were dominated by fish aged 10 to 30 or more years. Successful snapper recruitment from harbours such as the Kaipara is seen as essential for supporting the adult stocks on the West Coast. Accordingly, data collected from surveys of juvenile snapper in the West Coast harbours of the North Island (particularly the Kaipara) could provide an early warning of

snapper recruitment problems. The research also indicates that environmental degradation of important fish nursery habitats (e.g. seagrass in the Kaipara Harbour) could have a significant cascading effect on fish, including the West Coast snapper population.

Another investigation concerning fish (Kelly et al. 2001) was carried out, as part of an assessment of the environmental effects, for an oyster farm consent application. This investigation described a low diversity of fish (Table 2) within the vicinity of Aquaculture Management Area D that was originally proposed by the ARC.

Table 2 Dominant subtidal fishes and crustacea identified by Kelly et al. (2001).

Common name	Species
Anchovy	<i>Engraulis australis</i>
Goby	<i>Acentrogobius lentiginosus</i>
Gurnard	<i>Chelidonichthys kumu</i>
Garfish	<i>Hyporhamphus ihi</i>
Long Snouted Pipefish	<i>Stigmatopora longirostris</i>
Smelt	<i>Retropinna retropinna</i>
Sand Flounder	<i>Rhombosolea plebia</i>
Speckled Sole	<i>Peltorhamphus latus</i>
Common Shrimp	<i>Palaemon affinis</i>
Sand Shrimp	<i>Pontophilus australis</i>
Pill Box Paddle Crab	<i>Ovalipes punctatus</i>
Crab	<i>Halicarlinus cookie</i>
Tunneling Mud Crab	<i>Helice crassa</i>

Numerous elasmobranchs (sharks, skates, and rays) have been reported to use the Kaipara Harbour for breeding and foraging. Important shark species include the great white shark (*Carcharodon carcharias*), rig (Hartill 2002, Ministry of Fisheries 2006), and school shark (*Galeorhinus galeus*) (Ministry of Fisheries 2006d, NABIS 2007).

The New Zealand Freshwater Fish Database (NZFFD 2007) suggests that the Kaipara Harbour is also used by a relatively high number of native freshwater fish species (12) and a low number of exotic fishes (3) compared to other harbours in the Auckland Region. Important species include the nationally vulnerable galaxiid (*Galaxias* spp.) mainly recorded in the South Kaipara (Hotoe, Omaumau, and Araparera Rivers) and the long-finned eel (*Anguilla dieffenbachii*) which has experienced a gradual decline in abundance across the Auckland Region in recent years (NZFFD 2007).

Kaipara Harbour Fisheries

The Kaipara Harbour has been an important source of fish for Māori since the fourteenth century and for European settlers since the early nineteenth century. Despite a range of sustainability issues and management conflicts for many species

over time, the harbour continues to support customary, commercial, and recreational fisheries. However, there is continual, and even escalating, concern from all three of these fisheries over the present state of various fish stocks within the Kaipara Harbour (Kaipara Harbour Sustainable Fisheries Management Study Group 2003).

3.3.1 Commercial fishing

Currently, commercial fishing occurs throughout the Kaipara Harbour. Historically, the harbour has supported major commercial finfish fisheries for rig, flatfish (most commonly yellow-belly and sand flounder), school shark, and grey mullet; as well as shellfish fisheries for oysters (*Crassostrea gigas*), tuatua (*Paphies subtriangulata*), and mussels (*Perna canaliculus*) Table 3. Rig, flatfish, and mullet form the bulk of the commercial catch within the Kaipara at present.

In addition to Ministry of Fisheries plenary reports (Ministry of Fisheries 2006a-e) which detail the current state of commercial fisheries in large fisheries management areas (FMAs) including the Kaipara Harbour, several recent reviews assess the status of important commercial species, specifically for the Kaipara. Hartill (2002) described the commercial status of grey mullet, rig, and flatfish fisheries in the Kaipara Harbour based on Ministry of Fisheries set net and ring net data. Paulin and Paul (2006) describe, in detail, both the historical and current status of the grey mullet fishery within the Kaipara.

Commercial fishing is undertaken by both a local and non-local fleet, with the local fleet making up approximately 90% of the commercial fishers (Hartill 2002, Peart 2007). Over the last decade, there has been increasing spatial conflict between commercial fishers on the harbour (Kaipara Harbour Sustainable Fisheries Management Study Group 2003).

3.3.1.1 Grey mullet

One of the first commercial fisheries in New Zealand caught mullet; these were heavily targeted within the Kaipara between 1880 and 1895. During this time, commercial operations supported three canning factories and fishing occurred throughout the year. There was no management or monitoring of the fishery and wastage was common (Paulin and Paul 2006). Following a perceived decline in stocks and concerns about overexploitation, a petition to the government by fishermen led to a closed season between December and February; this was later amended to cover only a small area of the Kaipara. A formal study was carried out in 1895 in response to continued concern over stock declines and to investigate the need for a closed season, . The study recognised that mullet spawned in the open sea outside the harbour but there was a general lack of information on mullet biology, which limited the conclusions of the study.

By 1900, the Kaipara mullet fishery had largely collapsed due to a combination of factors: reduced stocks, reduced market demand, fishermen targeting more favourable species in the Hauraki Gulf, and a lack of government subsidies to canneries.

Consequently, the grey mullet stocks had largely recovered by 1910. Between 1930 and 1974, average mullet landings were 45 tonnes per year, based on records from Annual Fisheries Reports, with no evidence of stock limiting the supply. With an increase in local market demand for mullet in the late 1970s, mullet landings increased quickly and have since fluctuated between 200 and 400 tonnes, with the Kaipara fishery contributing between 25 and 50% of the total New Zealand take (Paulin and Paul 2006).

Both set- and ring-netting techniques are currently used to target grey mullet within the Kaipara (Quota Management Area GMU 1, Ministry of Fisheries 2006a), with the majority of the catch in recent years being obtained by ring-netting. Following the highest grey mullet take within the Kaipara in 1996-97 (385 t), set-net data illustrate a decline in local and non-local catches from 1996-97 onwards (Figure 16), with a simultaneous decline in local set-net fishing effort. Conversely, ring-net fishing has increased within the harbour since 1998-99 and grey mullet catches using this method have also increased (Figure 16), with the majority of grey mullet landed as a consequence of the specific targeting of this species (Hartill 2002, Paulin and Paul 2006). Data presented by Hartill (2002) from 1989-90 up to 2000-01 suggests catch rates are declining in the harbour, although recent data presented by Paulin and Paul (2006) indicate increased mullet landings between 2002-2004 that are comparable with grey mullet landings in the late 1990s (i.e. >200 tonnes). However, Paulin and Paul (2006) highlight sustainability concerns for grey mullet within the Kaipara and identify problems that make it difficult to determine the maximum sustainable yield for this species. These include:

- ❑ Changes in catch efficiency due to alteration of fishing methods (set-net / ring-net).
- ❑ Fishermen targeting other commercial species and obtaining grey mullet as by-catch.
- ❑ A lack of information on the unfished (virgin) stock size.
- ❑ Lack of basic biological information for this species (e.g. it is not known if the mullet within the Manukau and Kaipara Harbours are the same biological stock).

These problems are also relevant to other commercial species in the Kaipara Harbour.

3.3.1.2 Flatfish

The yellow-belly flounder, *Rhombosolea leporina*, and the sand flounder, *Rhombosolea plebeia*, are commercially fished within the Kaipara Harbour (Figure 14) (Quota Management Area FLA 1). Unlike the majority of quota species, the eight commercially fished flatfish species are managed as a single fishery; one catch limit is set for the total catch of the eight species in each QMA. The Kaipara Harbour flatfish fishery, as a proportion of FLA 1 landings, has steadily increased from 1993-94.

Set nets are used to catch flounder and recent surveys suggest that three-quarters of the West Coast catch is taken from the Kaipara and Manukau Harbours (Hartill 2002, Ministry of Fisheries 2006b). Within the Kaipara, flatfish catches were high for the

1996-97 and 1997-98 fishery years and peaked at 316 t for the 2000-01 fishing year (Figure 16).

3.3.1.3 Rig

Rig (*Mustelus lenticulatus*) is landed in coastal waters throughout New Zealand, with the Kaipara Harbour (within Quota Management Area SPO 1) accounting for between 10 and 20% of the total New Zealand catch. Within the Kaipara, rig is caught by set-netting (see Figure 15 for areas where rig are targeted), and fishing effort and catches by both local and non-local fleets increased substantially between 1990 and 2000 (Figure 16). These increases were accompanied by a downward trend in catch per unit effort within the harbour, suggesting a decline in Kaipara rig abundance (Hartill 2002) since the early 1990s. In the mid 1990s, the local fishing fleet was responsible for ~80% of catches but by 2000 local catches had declined to between 60-65% of the total catch. It is currently unknown whether the current total allowable commercial catch (TACC) is sustainable within SPO1 (Ministry of Fisheries 2006c).

Figure 14 Areas targeted for flounder and grey mullet by commercial fishers within the Kaipara Harbour (Information from commercial fishers P. and C. Yardley., pers. comm. 2007).

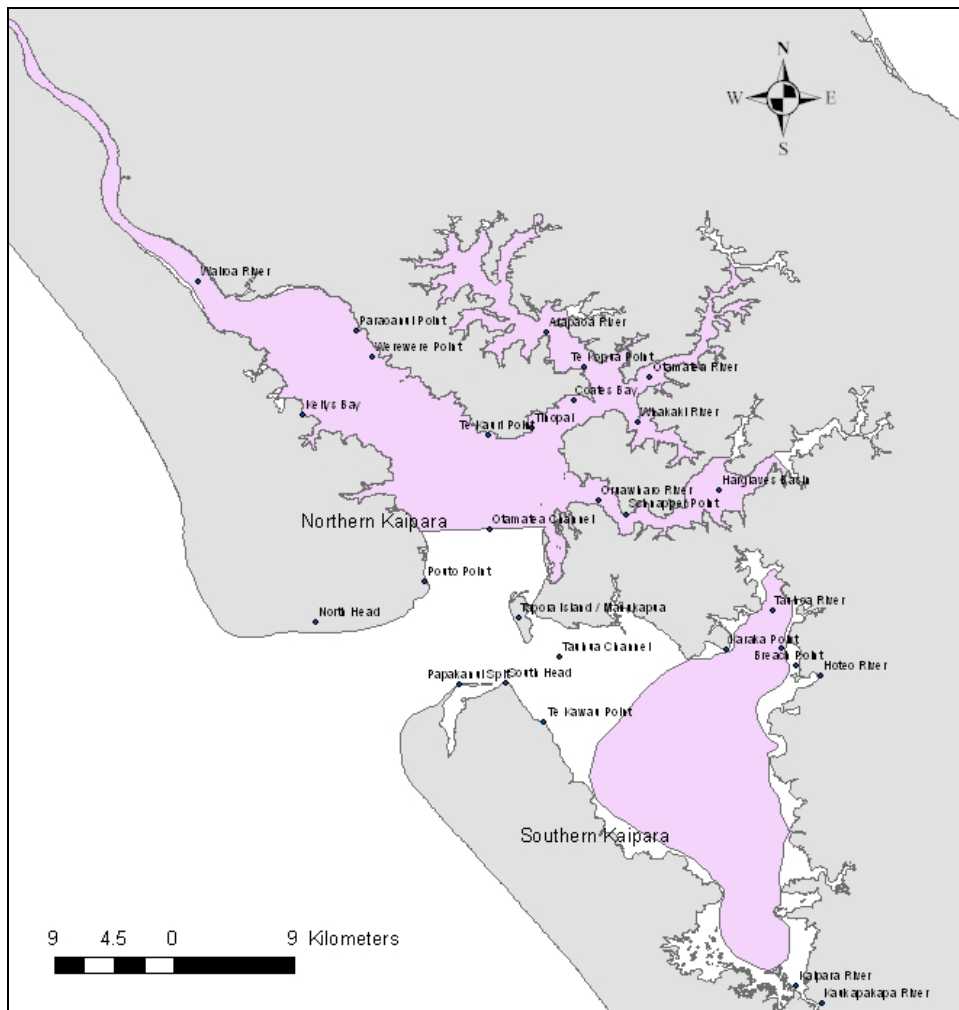


Figure 15 Areas targeted for rig by commercial fishers within the Kaipara Harbour (Information from commercial fishers P. and C. Yardley., pers. comm. 2007).

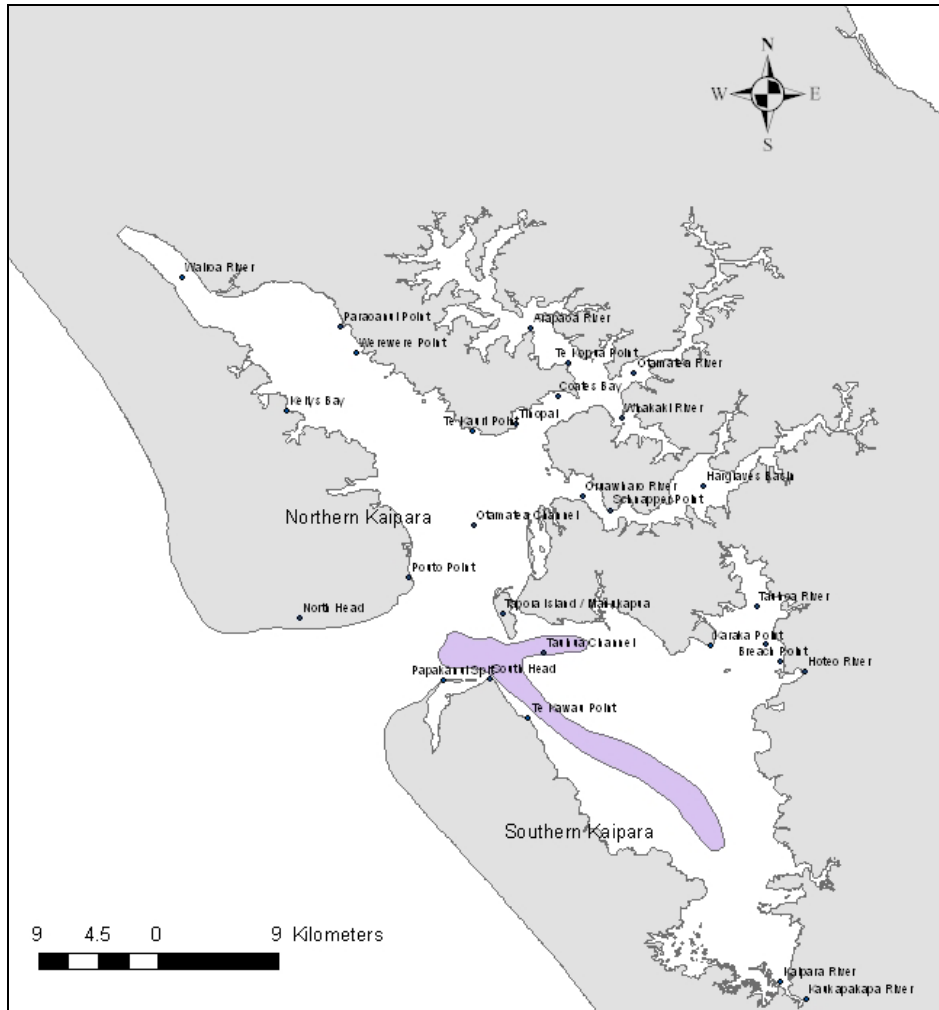
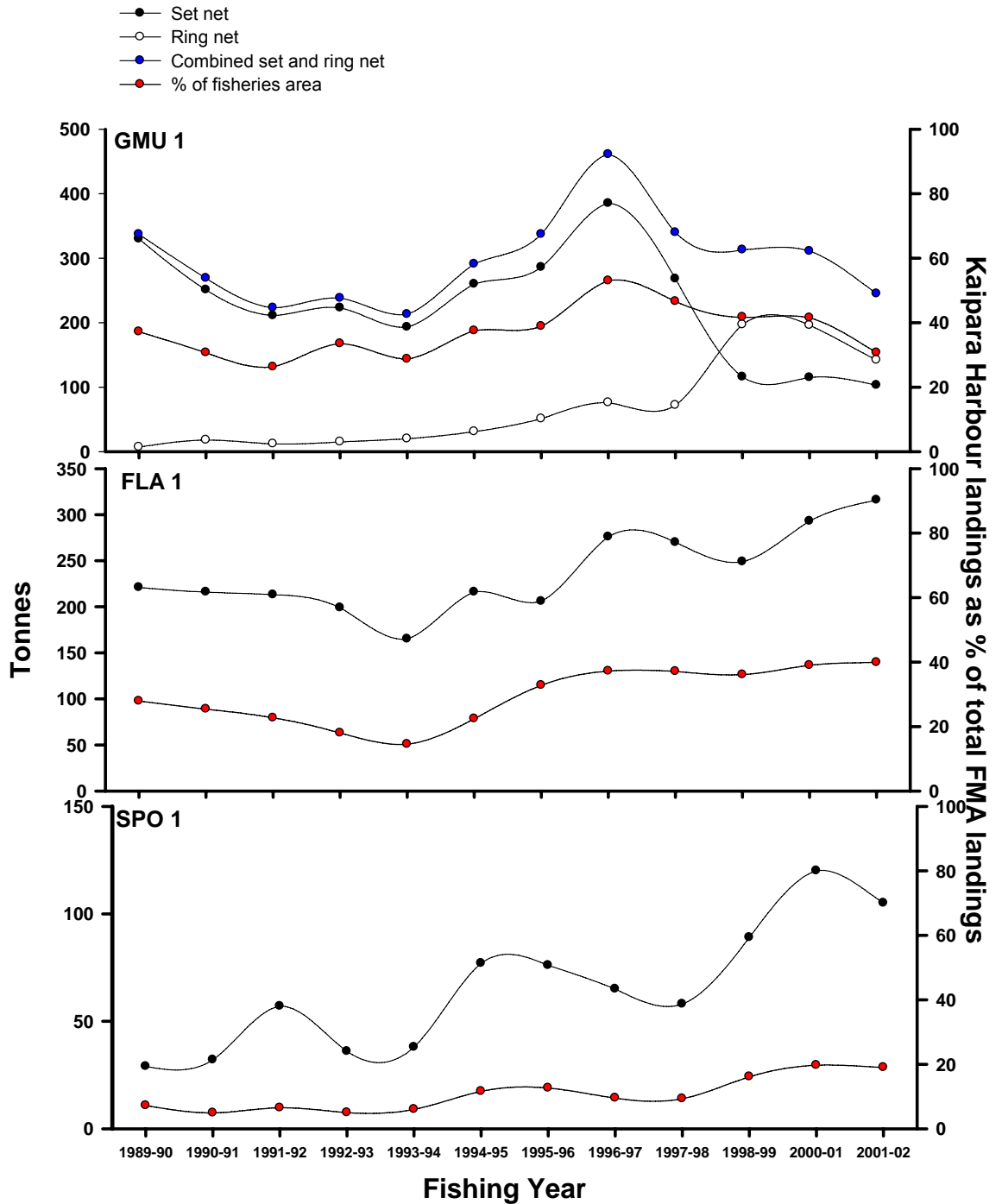


Figure 16 Annual set-net and ring-net landings (tonnes) for the Kaipara Harbour; and Kaipara Harbour landings as a percentage of total landings within each fisheries management area (FMA) for grey mullet (FMA = GMU 1), flatfish (FMA = FLA 1), and rig (FMA = SPO 1) from 1989-90 to 2001-02. Data summarised from Hartill (2002). Note: Ring-net data applies only to grey mullet, and y axis for tonnage data differs among graphs.



3.3.1.4 School shark

School shark (*Galeorhinus galeus*) catches within the Kaipara Harbour declined from 35 tonnes in 2001-02 to 6 tonnes in 2005-06 but this decline is reported as being due mainly to fishers retiring from the fishery (Ministry of Fisheries 2006d). Approximately 1% of the total Quota Management Area SCH 1 commercial catch is currently caught in the harbour. Despite this low percentage of overall catch, the Ministry of Fisheries is concerned about the impacts that school shark fishing within the Kaipara Harbour (statistical area 044) may have on the wider SCH 1 stock, and suggests that the harbour may be a habitat of particular importance to the school shark fishery as pupping females migrate there to give birth. Not surprisingly, results from modelling indicate that removing the larger females from the population poses a significant risk to the sustainability of the stock. In response, the Ministry of Fisheries has put forward for discussion possible measures to protect pregnant school shark in the Kaipara. One suggestion is that it may be prudent to prohibit their taking in the Kaipara from November to January, when school sharks give birth. In their plenary report for the 2005-06 year, the Ministry of Fisheries invited stakeholders to comment on this suggestion and make any alternative suggestions for the protection of pregnant school shark in the Kaipara.

Measures that restrict fishing at certain times of the year would help to protect pregnant females. However, school shark caught as by-catch is probably the most significant issue that needs to be addressed. The Ministry of Fisheries data suggests that over the last five years approximately 60% of catches in SCH 1 were from by-catch, with only 40% as target stock. As a result, commercial landings from SCH 1 have exceeded the Total Allowable Commercial Catch in all fishing years since 1994-95 (except in 2005-06). Of the target fishery, 64% has been taken by set-net and 34% by bottom longline. Where school shark were taken as a by-catch, 45% was taken by bottom trawl (mainly while targeting tarakihi with some snapper and trevally), 32% by bottom longline (mainly while targeting hāpuku with some snapper) and 19% by set-net (mainly while targeting rig with some red gurnard and tarakihi). Around 30% of the total SCH 1 catch emanates from the East Coast with around 70% from the West Coast.

In 2000, *Galeorhinus galeus* was listed as Globally Vulnerable in the IUCN (i.e. World Conservation Union) Red List and that status remains unchanged. School shark are considered to be Critically Endangered in the south-west Atlantic, Vulnerable in Australia and South Africa, Near Threatened in New Zealand, and Least Concern in the Eastern North Pacific (see: <http://www.iucnredlist.org/>).

3.3.1.5 Tuatua

Tuatua (*Paphies subtriangulata*) is closely related to *P. australis* (Pipi) and *P. ventricosa* (Toheroa). However, unlike pipi, tuatua and toheroa are surf clams and prefer to live on more open exposed sandy beaches with an easily perceptible slope and direct wave access unimpeded by land (Morton and Miller 1968). Tuatua is the most inshore New Zealand species of surf clam and its distribution verges on the intertidal zone (Dr. Coral

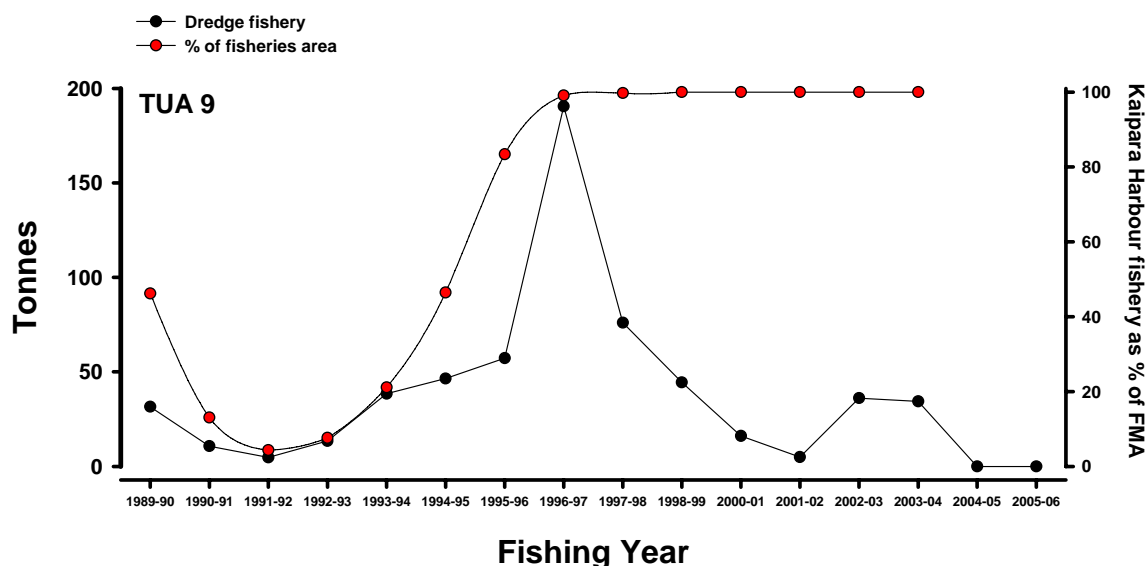
Grant., pers. comm. 2005). Tuatua can occur on a large range of beach types ranging from high energy, dissipative beaches to sheltered, reflective beaches.

Historically, subtidal tuatua beds have been the most prolific within the harbour mouth between North Head and Kaipara Head, Kaipara Head and Potu Point, and around Manukapua Island (Tapora) (Grace 1995-2004). Intertidal beds are found only around Manukapua Island.

Tuatua was introduced into the quota management system in 1 October 2005, with the boundaries of the tuatua quota management areas being similar to those of the previous fishery management areas. Since then, commercial fishing has been allowed to continue only in a specified commercial area of the Kaipara Harbour entrance within the TUA 9 quota management area (Figure 17). A total allowable commercial catch (TACC) of 43 tonnes, representing the average of reported landings taken from the Kaipara fishery between 1990–91 and 2003–04, was allocated to this area (Ministry of Fisheries 2006e).

Tuatua can be harvested throughout the year and there is no minimum legal size (MLS) although fishers are most likely to favour large individuals (J. Williams., pers. comm. 2007). The commercial fishing year runs from 1 October to 30 September, and commercial catches are measured in greenweight. The Kaipara catch increased over the 1990s, peaking in 1996-97, but has subsequently declined. This decline may reflect a decrease in fishing effort, as commercial fishing in the Kaipara is intermittent with only one or two fishers involved, but there is insufficient information to assess the sustainability of the Kaipara tuatua stocks. For example, there are no estimates of fishery parameters or abundance for the Kaipara or any other tuatua stocks. Similarly, there are no biomass time series for tuatua that could indicate whether tuatua populations are changing in response to past and current levels of harvesting. Consequently, the status of all tuatua stocks is unknown (Ministry of Fisheries 2006e). A draft plenary report has been submitted to the Ministry of Fisheries regarding the tuatua fishery but was not available at the time of writing.

Figure 17 Annual landings of tuatua within the Kaipara Harbour (tonnes), and Kaipara Harbour tuatua landings as a percentage of total landings within Fisheries Management Area TUA 9 (now called Quota Management Area TUA 9). Data are from 1989-90 to 2005-06.



3.3.1.6 Mussels

Green-lipped mussel (*Perna canaliculus*) dredging was carried out within the Kaipara Harbour entrance between the 1970s and early 1990s. Presently *P. canaliculus* is within the quota management system and Kaipara is within quota management area GLM 9. The total allowable commercial catch for GLM 9 in 2005-06 was 180 tonnes with reported landings of 229 tonnes (Ministry of Fisheries 2007). Specific information for the Kaipara is not readily available. There are no stock assessments or biomass estimates for green-lipped mussels, nor is it known if the current catch limits will allow the stocks to move towards a biomass that will support the maximum sustainable yield.

3.3.2 Customary fishing

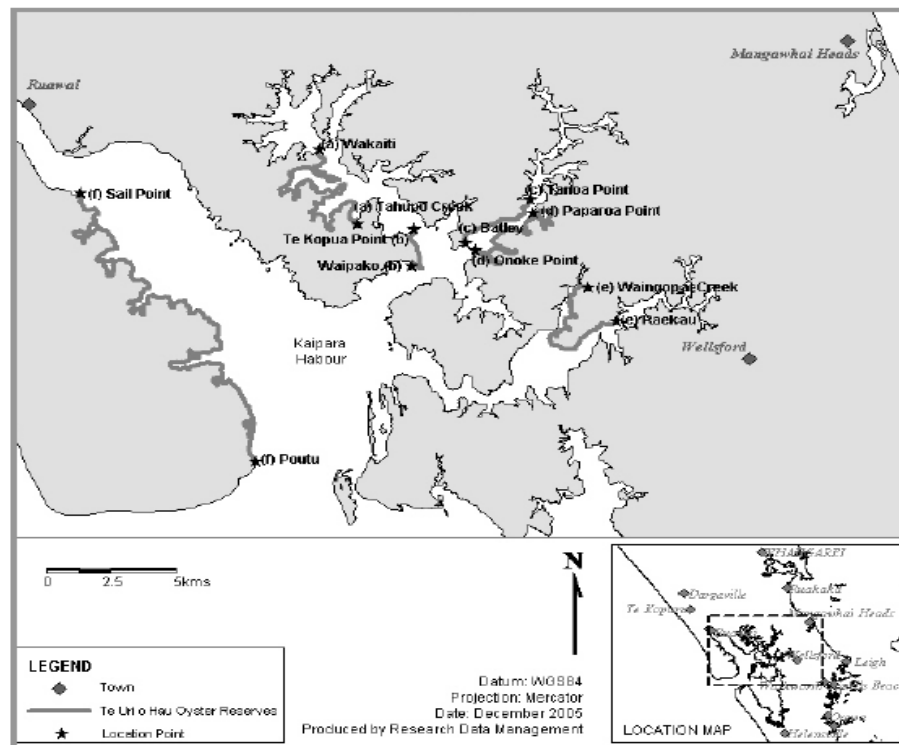
The Kaipara Harbour is a significant customary fishery that is a primary source of food for the large number of Marae located along the harbour edge. Traditionally, large fishing camps were set up around the harbour with snapper, kawhai, and shark being the main species targeted. The 2002 Deed of Settlement between the Crown and Te Uri o Hau recognises that the northern Kaipara is the traditional fishing ground of the Te Uri o Hau hapu. As part of the cultural redress, the Deed of Settlement states that Te Uri o Hau will be appointed as an Advisory Committee to the Minister of Fisheries, which will provide advice on the management of fisheries in the Te Uri o Hau area of interest. This includes the customary interest of Te Uri o Hau in those fisheries generally; and in the toheroa, shark, ray, flounder, snapper, kahawai, and mullet fisheries in particular. The Crown also agreed to:

- ❑ Consult with Te Uri o Hau and safeguard Te Uri o Hau’s existing customary fishing rights, if the numbers of toheroa rise to commercial catch levels.
- ❑ Make regulations which define the existing oyster reserves (Figure 18) in parts of the Kaipara Harbour (established in 1913 as a reserve exclusive to Te Uri o Hau), and provide for a management structure nominated by Te Uri o Hau to manage customary food-gathering of oysters in the reserves.

In response to the Deed of Settlement, an initial position paper on the Kaipara oyster reserves was released by Ministry of Fisheries in December 2005. The paper invited public submissions but its current status is unknown.

Te Uri o Hau has also been proactive in developing a Customary Take Management Plan for the harbour (Kaipara Harbour Sustainable Fisheries Management Study Group 2003). Presently, there is concern over the protection of customary fishing rights and the difficulty that customary fishers have in catching snapper, grey mullet, flounder, and sharks (both rig and school shark), coupled with depletion of shellfish beds (tuatua and scallop). Alterations in fisheries habitats and the environmental impacts associated with increased coastal development are also causing concern (Kaipara Harbour Sustainable Fisheries Management Study Group 2003).

Figure 18 Location of six oyster reserves in the Kaipara Harbour (Ministry of Fisheries 2005).



3.3.3 Recreational fishing

Line fishing is the primary method used by recreational fishers in the Kaipara. Snapper (*Pagrus auratus*) form the bulk of the recreational take, with gurnard (*Chelidonichthys kumu*), kahawai (*Arripis trutta*), and kingfish (*Seriola lalandi*) caught to a lesser extent. Local fishers also target flounder and mullet on the edges of channels (Kaipara Harbour Sustainable Fisheries Management Study Group 2003).

Focal areas for recreational fishing within the southern Kaipara include The Graveyard (near the harbour entrance) and the area between Shelly Beach and the entrance (Kaipara Harbour Sustainable Fisheries Management Study Group 2003) (Figure 19). Important recreational areas in the northern Kaipara include parts of the Oruawharo River, the Otamatea Channel (east of Lady Franklin Bank) into the Otamatea River as far as Paparoa Point, and north of Pahi in the Arapaoa River.

Historically, scallop (*Pecten novaezelandiae*) beds within the Kaipara Harbour have also been targeted heavily by fishers. Scallops are commonly found in the northern Kaipara at the mouth of the Otamatea River including Timber Bay (and areas to the south) and north of Ngaupiko Point; and in the southern harbour between Shelly Beach and Oyster Point to north of Kakanui Point (Kaipara Flats) (Figure 20) but in recent years have declined greatly in abundance. In response to concerns from local Tāngata Whenua and the Kaipara Harbour Sustainable Fisheries Management Study Group, all non-commercial (customary and recreational) scallop harvesting within the harbour was banned for a two-year period from 15 July 2005 in an effort to improve the fishery. This ban has since been extended through to 13 September 2008.

Intertidal tuatua (*Paphies subtriangulata*) are also targeted by recreational and customary fishers on the extensive intertidal sandflats between Waikiri Creek and Otekawa Creek (Tapora), and between Manukapua Island and Waikiri Creek Spit (Tapora). There has been recent concern regarding a decline in tuatua abundance within this area (Thomas De Thierry., pers. comm. 2006).

Historically, intertidal mussels have been harvested at Coates Bay in the area known as the "Mussel Ring" (Poynter 1998), while subtidal mussels (*Perna canaliculus*) occur in dense beds in the Wairoa River Arm of the Kaipara Harbour, adjacent to Pareotaunga Point. These beds are periodically dredged (T. Haggitt., pers. obs. 2006).

The native rock oyster (*Saccostrea cucullata*) has been important within the Kaipara Harbour for customary, recreational, and commercial fishers but has been largely superseded by harvesting of the Pacific Oyster (*Crassostrea gigas*) which is ubiquitous throughout much of the harbour. Presently there are no obvious concerns regarding abundance, although in recent years there have been issues with water quality for shellfish gathering (refer to Section 4.1.2).