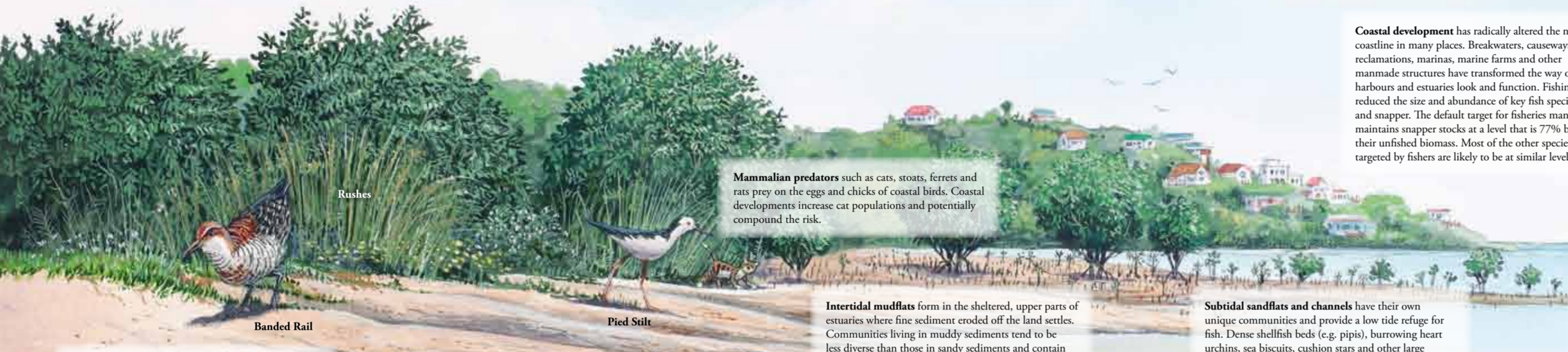


OUR CHANGING GULF: THE ESTUARIES

Our much loved Hauraki Gulf is in a slow but steady decline. Crystal clear waters at Whangateau can sometimes provide a glimpse of what our estuaries once were: clean, highly productive breeding grounds for our favourite fish and shellfish. In just two lifetimes the Firth of Thames has been transformed. Vast mussel beds have been replaced with a muddy seabed. More nitrogen now comes from the farm-fed rivers of the Hauraki Plains than natural ocean upwelling, and nutrient and mud-loving mangroves are on the march across shelly, sandy beaches favoured by our migratory birds. Chemicals and sediments from Auckland's stormwater drains have passed levels which we know are harmful

to marine animals. Whether for boating, aquaculture or tourism water quality is critical for health and success. The Hauraki Gulf Forum has a vision of more fish in the sea, more diversity, more kai moana, better recreational and economic opportunities. Three things need to change to reverse the current trends: commercial and recreational fishing need to be able to exercise clear rights and responsibilities for an enhanced fishery, regenerating marine areas are needed where life flourishes and rejuvenates our Gulf, and rules are needed to limit pollutants from intensive farming and urban development. We need to work together to protect and enhance the Hauraki Gulf Marine Park now.



Rushes

Banded Rail

Pied Stilt

Mammalian predators such as cats, stoats, ferrets and rats prey on the eggs and chicks of coastal birds. Coastal developments increase cat populations and potentially compound the risk.

Intertidal mudflats form in the sheltered, upper parts of estuaries where fine sediment eroded off the land settles. Communities living in muddy sediments tend to be less diverse than those in sandy sediments and contain a greater proportion of smaller animals which feed on material deposited onto the seabed. Characteristic species found on mudflats include mudcrabs (*Helice crassa*) and mudsnails (*Amphibola crenata*).

Subtidal sandflats and channels have their own unique communities and provide a low tide refuge for fish. Dense shellfish beds (e.g. pipipi), burrowing heart urchins, sea biscuits, cushion stars and other large invertebrates live on subtidal flats and in larger channels. These provide food for predators such as whelks, octopus, starfish, and fish. They are also play important roles in physical and chemical processes. For instance, pipipi beds prevent channel erosion by stabilizing and armoring channel beds. "Bulldozing" by heart urchins mixes surface sediments and helps exchange nutrients between the sea floor and water column.

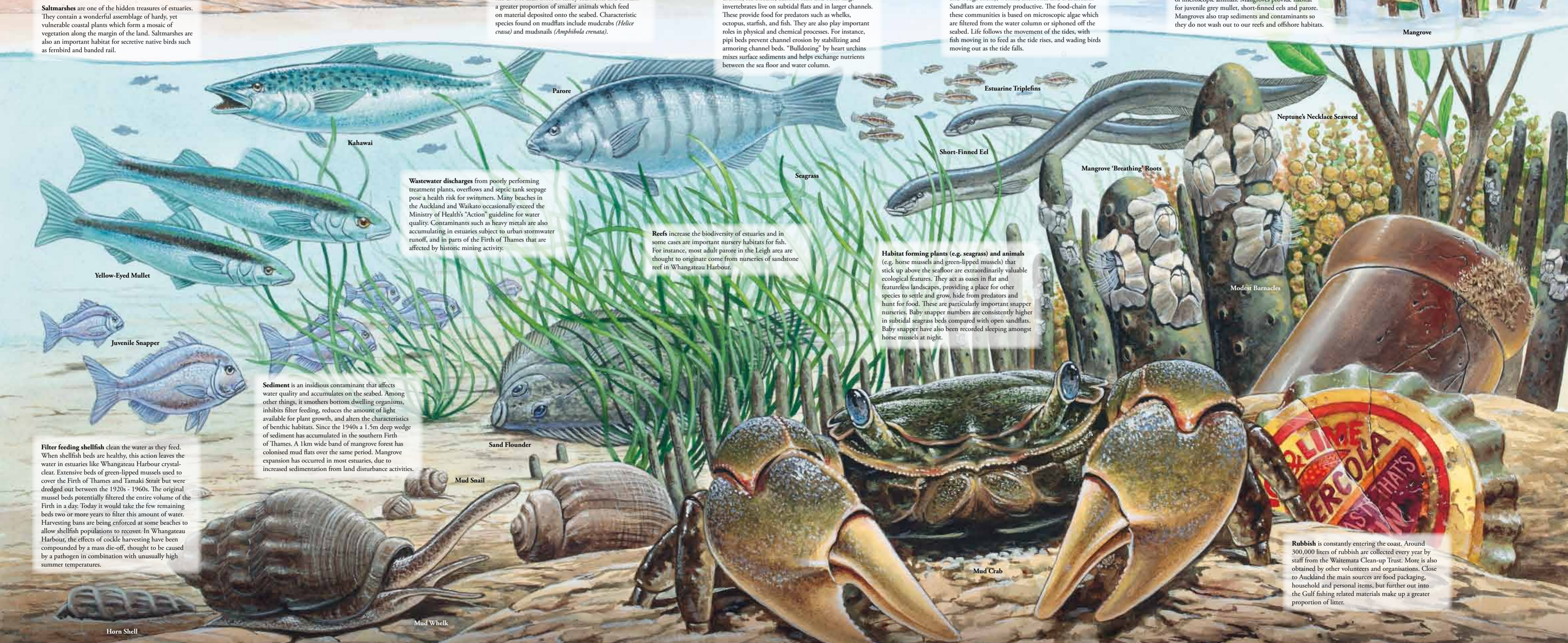
Coastal development has radically altered the natural coastline in many places. Breakwaters, causeways, reclamations, marinas, marine farms and other manmade structures have transformed the way our harbours and estuaries look and function. Fishing has reduced the size and abundance of key fish species such and snapper. The default target for fisheries management maintains snapper stocks at a level that is 77% below their unfish biomass. Most of the other species targeted by fishers are likely to be at similar levels.



Kingfisher

Mangrove forests tend to grow in sheltered, muddy sites. The animals living on the forest floor obtain most of their energy from mangrove leaves, and therefore differ from those found on the open mud flats. The leaves are broken down by fungi and bacteria, which are in turn eaten by a unique and diverse community of microscopic animals. Mangroves provide habitat for juvenile grey mullet, short-finned eels and parore. Mangroves also trap sediments and contaminants so they do not wash out to our reefs and offshore habitats.

Mangrove



Saltmarshes are one of the hidden treasures of estuaries. They contain a wonderful assemblage of hardy, yet vulnerable coastal plants which form a mosaic of vegetation along the margin of the land. Saltmarshes are also an important habitat for secretive native birds such as fernbird and banded rail.

Kahawai

Parore

Estuarine Triplefin

Short-Finned Eel

Neptune's Necklace Seaweed

Mangrove 'Breathing' Roots

Modest Barnacles

Seagrass

Wastewater discharges from poorly performing treatment plants, overflows and septic tank seepage pose a health risk for swimmers. Many beaches in the Auckland and Waikato occasionally exceed the Ministry of Health's "Action" guideline for water quality. Contaminants such as heavy metals are also accumulating in estuaries subject to urban stormwater runoff, and in parts of the Firth of Thames that are affected by historic mining activity.

Reefs increase the biodiversity of estuaries and in some cases are important nursery habitats for fish. For instance, most adult parore in the Leigh area are thought to originate from nurseries of sandstone reef in Whangateau Harbour.

Habitat forming plants (e.g. seagrass) and animals (e.g. horse mussels and green-lipped mussels) that stick up above the seafloor are extraordinarily valuable ecological features. They act as oases in flat and featureless landscapes, providing a place for other species to settle and grow, hide from predators and hunt for food. These are particularly important snapper nurseries. Baby snapper numbers are consistently higher in subtidal seagrass beds compared with open sandflats. Baby snapper have also been recorded sleeping amongst horse mussels at night.

Yellow-Eyed Mullet

Juvenile Snapper

Sediment is an insidious contaminant that affects water quality and accumulates on the seabed. Among other things, it smothers bottom dwelling organisms, inhibits filter feeding, reduces the amount of light available for plant growth, and alters the characteristics of benthic habitats. Since the 1940s a 1.5m deep wedge of sediment has accumulated in the southern Firth of Thames. A 1km wide band of mangrove forest has colonised mud flats over the same period. Mangrove expansion has occurred in most estuaries, due to increased sedimentation from land disturbance activities.

Sand Flounder

Mud Snail

Mud Whelk

Mud Crab

Rubbish is constantly entering the coast. Around 300,000 liters of rubbish are collected every year by staff from the Waitemata Clean-up Trust. More is also obtained by other volunteers and organisations. Close to Auckland the main sources are food packaging, household and personal items, but further out into the Gulf fishing related materials make up a greater proportion of litter.