



Hauraki Gulf
Marine Park
Ko te Pataka kai
o Tikapa Moana



Hauraki Gulf Forum
Tikapa Moana

State of our Gulf

Tikapa Moana – Hauraki Gulf – State of the Environment Report 2011 – Executive Summary



The Hauraki Gulf Marine Park Act 2000 requires the Hauraki Gulf Forum to prepare and publish, once every three years, a report on the state of the environment in the Hauraki Gulf, including information on progress towards integrated management and responses to strategic and prioritised issues.

The Gulf has undergone an incredible transformation over two human lifespans. That transformation is continuing in the sea and around the coast, with most environmental indicators either showing negative trends or remaining at levels which are indicative of poor environmental condition.

Humans have lived in New Zealand for only a relatively short time, but their impacts on the natural environment have been profound. The degradation of the environment began with the

arrival of Maori, and was accelerated once European settlement occurred. Within the last two human lifespans we have seen the extinction of a number of native terrestrial species, native forests and vast wetlands being replaced by pastoral land use, rapid sedimentation of the coastal zone, the destruction of ecologically important marine habitats (e.g. extensive subtidal mussel beds in the Firth of Thames and Tamaki Strait), large reductions in the populations of fished species, and continuing growth in urbanisation leading to the loss, modification and contamination of the coast.

New Zealand has ground-breaking environmental regulations, which should have reduced environmental degradation and habitat loss in the Gulf and allowed the recovery of depleted species, ecological communities and habitats over the past 20 to 30 years.

This State of the Environment Report evaluates the current state of the environment and fisheries within the Hauraki Gulf Marine Park against historical information and an assessment of what the state of the Gulf would likely have been prior to human presence impacts. This historical baseline provides a useful reference point to evaluate the extent of change which has occurred in the Gulf, but the reference point cannot be interpreted as a target and the changes indicated cannot automatically be interpreted as failures in management. It is inevitable, and contemplated by the relevant legislation, that some change will occur as a result of people using and enjoying the natural resources of the Gulf, but it is important that these changes are kept within levels which maintain the overall healthy functioning of the Gulf as a natural system.

Encouraging signs are apparent for a few indicators, such as improving trends in total suspended solids concentrations along the Auckland coast, which appears to be a response to the former Auckland Regional Council's efforts at reducing sediment run-off through regulatory and non-regulatory initiatives. Nutrient concentrations have displayed declining trends also in most of Auckland's rivers, but this may be due to a decrease in dairy farming rather than response-specific management initiatives, and opposite trends are apparent in the Waikato. Kahawai catch limits have also been set at levels that will allow the north-eastern stock (KAH1) to rebuild to about 52% of unfished levels by 2028.

Most of the indicators examined in the report suggest that the Gulf is experiencing ongoing environmental degradation, and resources are continuing to be lost or suppressed at environmentally low levels:

- An empirical estimate of actual snapper biomass obtained in 1995 indicated that at that time snapper biomass had been reduced to 10.4% to 12.6% of the “virgin”, or unfished, biomass. Modelling predicted that limiting the total allowable catch to current levels would allow the stock to increase above the biomass required to produce the maximum sustainable yield within 20 years, with a 100% probability. An empirical estimate of snapper biomass has not been made since 1995, so the model predictions have yet to be verified. However, a stock assessment is scheduled for 2012. The maximum sustainable yield is the default fisheries target, which is produced at c. 23% of virgin snapper biomass in the Hauraki Gulf-Bay of Plenty substock. This means that, under the current management criteria, 77% of the potential snapper biomass will remain missing from the Hauraki Gulf-Bay of Plenty ecosystem.
- The “vulnerable biomass” of crayfish, in the CRA2 fishery area, was estimated to be around 20% of 1945 levels in 2002. Biomass was expected to remain at that level through to 2007. Best available information suggests the CRA 2 fishery is still above the statutory target level, and therefore, the total allowable catch has not been altered since 1997.
- The size characteristics of the fished and unfished snapper and crayfish populations differ substantially. Fished populations tend to be comprised of few, mainly young individuals that are below or near the legal size limit, while protected populations tend to have large numbers of older, large individuals above the legal size. This has implications for reproduction and population resilience during prolonged periods of poor recruitment.
- Trawl survey data from the Hauraki Gulf indicates that rare and threatened fish species, fish diversity, and fish size and productivity displayed negative trends in the Firth of Thames between 1965 and 2000.
- Significant, local reductions in shellfish populations have been recorded at three beaches, apparently due to harvesting, environmental stress, disease, or a combination of these conditions. A 36% reduction in cockle abundance occurred in Whangateau Harbour between 2004 and 2010. Cockle abundance also declined at Umupuia between 1998 and 2007, but subsequently increased due to an influx of small cockles. These locations have a low proportion of large cockles too, with only 1% to 2% of the population being of harvestable size. Similar declines and changes in population size structure have also been reported at Cheltenham Beach.

Cockle numbers at other beaches monitored by the Ministry of Fisheries have been relatively stable.

- Toxic metal and organic contaminants are causing localised effects in Auckland estuaries. A number of metal contaminants exceed sediment guideline values in the southern Firth of Thames as well. Threshold effects level (TEL) guideline values are exceeded at 21 of the 50 sites that are regularly monitored by Auckland Council. Probable effects level (PEL) guidelines are only exceeded at the lower tidal banks of Meola Creek and Motions Creek in the Waitematā Harbour. Management actions are not expected to remediate areas affected by urban and legacy contamination, but may slow accumulation and prevent the degradation of areas with clean sediments.
- Riverine inputs of nitrogen to the Firth of Thames now exceed loads from oceanic sources. Waihou and Piako rivers dominate nutrient loads to the Gulf, contributing around 90% of nutrients entering from the Waikato Region and exceeding river and wastewater loads from the Auckland Region. The mass load of nitrogen from Hauraki rivers is estimated to have increased by about 1% per year between 2000 and 2009, while phosphorus decreased by about 5% per year during the same period. The long-term implications of increasing nitrogen loads are poorly understood.
- Fourteen or more of the 42 beaches monitored in the Auckland Region between January 2006 and April 2009 exceeded the “action”-level guideline for marine bathing each year. Exceedance of this guideline indicates that swimming, or other forms of contact recreation, may pose a health risk. In the Waikato Region, eight of the 16 sites monitored exceeded the action threshold at least once in January-February 2006, while two sites exceeded the action threshold in January-February 2008.
- A number of studies carried out over the past decade or so have confirmed that sediment is a serious environmental contaminant that degrades coastal habitats and is toxic to most marine organisms.
- Modern sediment accumulation rates are typically greater than those for natural sedimentation rates. However, there are signs that management initiatives in the Auckland Region are reducing suspended solids concentrations on the Auckland coast.
- Sediment accumulation has contributed to the expansion of mangroves in many, if not all, estuaries in the Gulf.
- Changes in the composition of benthic communities that are consistent with increased sediment-mud content have been detected at sites in Puhoi, Wairewa, Orewa, Turanga and Waikopua estuaries, and in Mahurangi Harbour. The proportions of mud and fine sand increased significantly between 2001 and 2006 at monitoring sites in the Firth of Thames, but these changes were not matched by negative trends in species sensitive to fine sediments.
- A total of 139 non-indigenous marine species have been recorded in the Hauraki Gulf. Four arrivals in the past 10 years are notable for their potential to cause significant ecological and/or economic effects: the Mediterranean fanworm, the clubbed sea squirt, the Asian kelp, and the Japanese mud crab. Three of these are formally classified as unwanted species.
- Large amounts of litter continue to enter the coastal environment. Plastics are particularly problematic owing to their environmental persistence and effects on wildlife and aesthetics.
- Between 1960 and 2005 seven of the 15 most common waders displayed declining trends in the Firth of Thames’ Ramsar site. By comparison, four wader species increased in number, and four species maintained relatively stable populations. Mangrove expansion and other habitat changes were implicated in the decline of at least four species.
- Between 1989 and 2008 two endangered Bryde’s whales were killed in the Hauraki Gulf from entanglement in mussel farm spat lines, and 11 Bryde’s whales were killed by lethal injuries that were consistent with vessel strike.
- Forty-seven per cent of the Gulf’s mainland bays and beaches are fully urbanised, intensively developed or moderately developed, while the land surrounding 38% of bays and beaches was either undeveloped or contained only scattered buildings. The Waikato Region has more undeveloped bays and beaches than the Auckland Region, with 36% undeveloped in Waikato cf. 5% in Auckland.
- Large-scale development of new or “greenfield” coastal land has occurred around the margins of the Auckland urban isthmus in the past 10 to 15 years. Smaller-scale developments have also taken place around the outlying towns of Warkworth, Snells Beach, Omaha, Matakana and Beachlands.
- There was a steady increase in the number of dwellings in east-coast settlements on Coromandel Peninsula between the 1991 and 2006 censuses, with holiday homes responsible for a large proportion of development. In 2006, 48% of dwellings in the Thames-Coromandel District were unoccupied, with most of these consisting of holiday homes and/or baches.
- A third of the commercial holiday parks on Coromandel Peninsula closed between 1996 and 2006.

Not enough information was available to adequately characterise the impact that some activities are having, but local and international studies suggest that the magnitude and scale of their effects are likely to be among the most significant in the Gulf:

- Bottom trawling is one of the most commonly used methods of catching fish in the Hauraki Gulf, accounting for around 30 to 40% of the total commercial catch and occurring in most areas north of a line running from Kawau Island to Colville Bay. Virtually nothing is known about seabed ecology in trawled areas, but they are likely to contain (or have once contained) ecologically important habitats and features that are sensitive to bottom disturbance. Local and international research suggests that trawling causes substantial reductions in species and habitat diversity.
- Commercial scallop fishing has occurred in an area of 350 to 450 km² for most of its history, but dropped to 200 km² in 2001, and 100 km² in 2005, with effort shifting from the central Gulf and Aotea (Great Barrier Island) to Mercury Bay and Bay of Plenty. The areas targeted by commercial and recreational fishers contain a variety of benthic habitats. Habitat-forming or ecologically important species are commonly collected in scallop dredges, including horse mussels, dog cockles, starfish, sponges, kelp and turfing algae. Very little information is available on the current or historical ecology of scallop fishing areas, or the impacts of dredging on them.
- Of the top 15 fish species caught commercially:
 - the current status of nine species is not known;
 - overfishing of two species is about as likely as not to be occurring, but can't be confirmed either way (tarakihi and trevally);
 - three species (pilchard, baracoutta and grey mullet) are not considered to be at risk of collapse, but not enough is known about the stocks to assess whether they are at or above target levels or depleted;
 - two species (snapper and kahawai) are considered to be at or above target levels, and are not depleted or at risk of collapse.
- In addition, harmful algae and pathogens have had a major ecological and economic impact on the Hauraki Gulf over the past 30 years. The causes, historical incidence and implications of mass mortalities are poorly understood, but their impact has been significant. Mass mortalities have included: the loss of around 80% of juvenile oysters on oyster farms; the loss of 60 to 80% of cockles in Whangateau Harbour; the largest recorded fish kill in the world (pilchards); the die-off of the main canopy-forming kelp on northern reefs (*Ecklonia radiata*); a major loss of scallops; the death of tens of thousands of fish in the central-inner Gulf; and the loss of around 8,500 paua at a farm in Kennedy Bay.



Island and marine conservation efforts are clearly producing positive outcomes:

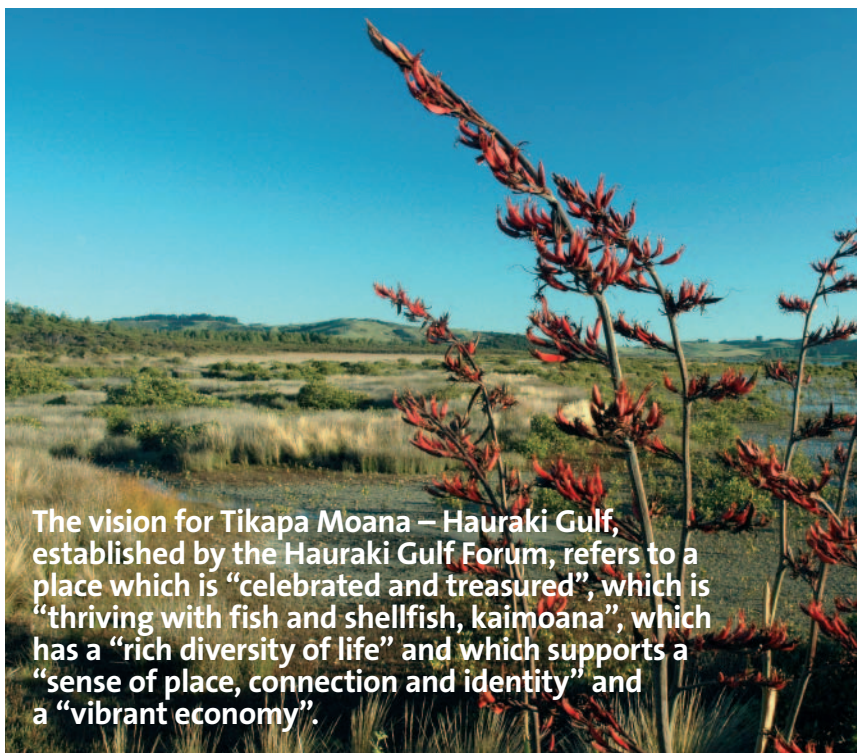
- Many islands in the outer Gulf have a high proportion of native forest cover. Hauturu (Little Barrier Island) is almost fully forested, while 86% or more of Aotea (Great Barrier Island) and Kawau Island are covered by indigenous forest, broadleaved indigenous hardwoods, or manuka and kanuka. Most of the islands around Coromandel Peninsula are also covered in native vegetation, the notable exceptions being Great Mercury and Slipper islands. Rangitoto Island is covered with native forest, while volunteers have planted around 206,000 trees on Motuora and 280,000 trees on Tiritiri Matangi. Motutapu and Motuihe have been partially revegetated, and the Rotoroa Island Trust is replanting on Rotoroa Island.
- Forty-three per cent of islands in the Gulf that are larger than 10 ha are currently free of mammalian herbivorous and predatory pests. Pests have been eradicated also from Rangitoto and Motutapu islands, but their pest-free status is yet to be confirmed. The elimination of mammalian pests has allowed one nationally critical (takahe) and four nationally endangered (hihi, kokako, North Island weka and brown teal) bird species to be translocated to, or among, islands in the Gulf. In addition, one nationally critical (Mercury Island tusked weta) and two nationally endangered (Mahoenui giant weta and wetapunga) insects, and one nationally vulnerable (Whitaker's skink) reptile have been translocated.
- A number of other less-threatened species have also been translocated among islands.
- At least two of the Gulf's marine reserves and the only marine park (i.e. Tawharanui, which is awaiting formal gazetting as a Marine Reserve) have allowed the local recovery of heavily fished species such as snapper and crayfish, which has led to corresponding changes in reef ecology and productivity.

Why are most environmental indicators either showing negative trends or remaining at levels which are indicative of poor environmental condition?

- Many of the initiatives are not of a sufficient scale or intensity to successfully address the targeted environmental issues and/or to make a measurable difference to the environmental quality of the Gulf as a whole.
- Many of the initiatives lack clear goals in terms of measurable improvement in the environmental quality of the Gulf’s marine area. A focus on mitigation of the effects of individual activities has in many cases failed to effectively address cumulative effects. This is particularly the case with the management of sediment and nutrient discharges.
- In some key areas there has been a lack of management response including non-point discharges from many rural activities and the broader environmental impacts of fishing activity.
- There are often difficulties in translating policy or the outcome of strategic planning exercises into actions which affect activities on the ground, such as through the introduction of stronger rules into regional and district plans.
- In some key areas management is fragmented between different management agencies. For example, there is currently particularly poor integration between fisheries management and management under the RMA. There is also fragmentation between planning and management efforts in the Auckland and Waikato regions.
- In many cases technical, political, social or economic roadblocks prevent the implementation of solutions.



The full report is available from www.haurakigulfforum.org.nz



The vision for Tikapa Moana – Hauraki Gulf, established by the Hauraki Gulf Forum, refers to a place which is “celebrated and treasured”, which is “thriving with fish and shellfish, kaimoana”, which has a “rich diversity of life” and which supports a “sense of place, connection and identity” and a “vibrant economy”.

If this vision is to be achieved a management response is likely to include at least the following elements.

- **Tangata whenua relationships are acknowledged and reflected in resource management practice:** There is growing appreciation of the Maori world view of connectedness between humans and the natural world, strengthened roles for tangata whenua in decision-making backed by settlements of historical Treaty claims, and traditional knowledge and tikanga find application in the way resources are managed, with resulting protection and enhancement of culturally important environmental resources and values.
- **A flourishing “green-blue network”:** The Gulf has a network of restored island sanctuaries and protected, regenerating areas within the marine area. The network will provide places where biodiversity thrives, where the ecological health and productivity of the marine area is enhanced and where the resilience of these natural systems is strengthened. The network will be the focus of community engagement in caring for the Gulf and will support diverse recreational opportunities and thriving low-impact business opportunities.
- **Enhancement of fisheries:** Fishing activity is carefully managed to ensure that important marine species, habitats and ecological processes are not damaged. Alternatives to the maximum sustainable

yield are more widely implemented to improve ecosystem outcomes, while also providing thriving fish stocks that support a prosperous local fishing industry, and generously provide for cultural, subsistence and recreational harvests.

- **Sediment and contaminants kept on the land:** Effective catchment management will ensure that the input of sediment, nutrients and other contaminants to the Gulf is minimised, and levels do not exceed ecological limits. The Gulf’s harbours and estuaries will be healthy and teeming with life. They will support thriving shellfish beds and a rich fauna of bird life. They will also provide safe nursery areas for juvenile fish thereby contributing to fisheries productivity. Mangroves will no longer be expanding into new intertidal areas.
- **Knowledge generation occurs within an ecosystem-based management framework:** Only intact, healthy ecosystems can provide the complete range of benefits that humans want and need over a long period of time. Research therefore focuses on ways of preventing the environmental costs of current activities being passed to future generations. Economic opportunities are identified, which provide for sustainable growth while halting the serial depletion of natural resources. Ways for protecting and restoring marine ecosystems, and the services they provide, are developed and implemented.

The Hauraki Gulf Forum is a statutory body charged with the promotion and facilitation of integrated management and the protection and enhancement of the Hauraki Gulf. The Forum has representation on behalf of the Ministers of Conservation, Fisheries and Maori Affairs, elected representatives from Auckland Council (including the Great Barrier and Waiheke local boards), Environment Waikato, and the Waikato, Hauraki, Thames Coromandel and Matamata Piako district councils, plus six representatives of the tangata whenua of the Hauraki Gulf and its islands.

Contact: Tim Higham, Hauraki Gulf Forum Manager, Auckland Regional Council
Ph 09 624 4749 tim.higham@aucklandcouncil.govt.nz www.haurakigulfforum.org.nz

Photo credits: Roger Grace