

CASE STORY OCEANIA 02: SHELLFISH AQUACULTURE IN A MARINE MAMMAL HABITAT

Marlborough Sounds | New Zealand | Australasia

Havelock, a small coastal village in the South Island of New Zealand, has the distinguishing title of “green-lipped mussel farming capital of the world”. This proud community harvests much of its internationally famous fare from the productive waters of the Marlborough Sounds. Mussel farming, an occupation that began on a small scale in the Sounds in the 1970’s, is now the largest aquaculture industry in New Zealand.

Economic development is a high priority of the New Zealand Aquaculture Council, the voice of the marine farming industry, with a national goal of increasing annual profits from \$380 million NZD (approximately \$304 million USD) in 2010 to \$1 billion NZD (approximately \$800 million USD) by 2025. Mussel farms in the Marlborough Sounds currently take up 28,000,000 m² of space (extending out to 200 m or more from shore and up to 40 m in depth) and farm operators have recently applied for extensions to existing farms in an effort to increase profits.

Several stakeholders who pride themselves in conserving the natural environment have voiced concern over the proposed expansion. Diverse marine mammal species, including fur seals and bottlenose, common, and dusky dolphins, naturally occur in the Marlborough Sounds at various times throughout the year. One concern is that the addition of vertically-suspended mussel lines will restrict marine mammal movement by taking up three-dimensional space, which may ultimately lead to displacement of some species from the habitat. Some fear that this will lead to alterations of the natural ecosystem with far-reaching impacts on the animals that utilize the bay.

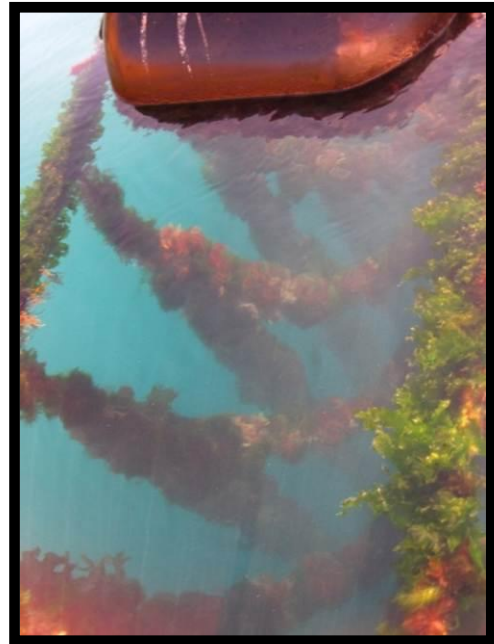
Within the small Marlborough Sounds region, stakeholders with conflicting perspectives on aquaculture expansion often live in close proximity. One local community member stated that people are careful about expressing their opinions because of the conflict it can create among neighbors. The following sections describe several of the current stakeholder perspectives.

Stakeholder Perspectives

Family Heritage

Family heritage is built upon unique traditions, creating diverse interfamilial views within a community. In one small village in the Marlborough Sounds District, a plaque commemorates the social and economic contributions made by local farming families where land has been farmed for over a century and a half. Some of these families have expanded to commercial marine farming in recent decades where shellfish aquaculture has become a central practice. Many farmers hope to further develop and expand the businesses they have cultivated in order to increase profits and preserve tradition.

Green-lipped mussels are valued not only by the farmers themselves, but by members of the coastal community that have a rich history in consuming local seafood. The annual Havelock Mussel Festival, one of many seafood festivals around the country, attracts up to 6,000 attendees each year and is tailored to families.



Green-lipped mussel farm in New Zealand
Photo: Sarah Piwetz

Some non-farming families, however, oppose the expansion of mussel farms. Opposition is based partially on pastime activities provided by the open waters of the Marlborough Sounds, where families regularly spend time. A number of residents, including experienced mariners, fear that additional mussel farms will not only reduce recreational space, but pose problems for boaters under way, particularly during nighttime navigation. Many bays and passages within the Sounds are important thoroughfares for local boaters and the Marlborough District Council Harbormaster has openly opposed the establishment of mid-bay farms because of the risk they pose for boat operators.

Other non-farming families are wary of farm expansion based on an affinity for the marine mammals that utilize the bay. One local New Zealander reminisced about a childhood memory in which he and his brother saved a dolphin that was entangled in fishing line. These waters are home to the legend of Pelorus Jack, a beloved Risso's dolphin that purportedly escorted ships safely through the treacherous waters of French Pass in the early 20th century. Inspiring children's books, songs, poems, and a chocolate bar, Pelorus Jack became a famous household name. Local families embraced Jack and the Risso's became the first marine mammal species protected by law in New Zealand.

Environmental Advocates

Many New Zealanders are concerned that additional farms will "...spoil the wild ambience of the bay...". The "Friends of Nelson Haven", a coastal protection organization for the Sounds, values open space for nature heritage and public recreational use, and opposes the addition of new marine farms in certain areas.

Environmental advocates recognize that indigenous flora and fauna are supported by the bay systems of the Marlborough Sounds, and voice the importance of protecting the natural environment. One local fisherman described how mussels once proliferated in nutrient-rich waters, but excessive farming has stripped the nutrients over time resulting in slower development. When asked about the marine mammals in the area, he said that all natural things have a place in the ecosystem and balance can be maintained when the environment is not artificially altered. Another conservationist stated that the introduction of unnatural artifacts in the water drives away naturally occurring biota, disrupting the entire ecosystem. He believes that some mussel farmers may be ignorant of the impact their farming practices have, while others are well aware. This "farming mentality", he said, equates to focusing on financial gain rather than ecosystem health.



Near-shore mussel farms in the Marlborough Sounds, New Zealand
Photo: Sarah Piwetz

Marine mammal scientists advise the need for prudence when considering placement of shellfish aquaculture facilities in natural habitats. The concern is that physical structures that take up three dimensional space in water reduce useable habitat for some species of marine mammals. In the Marlborough Sounds, dusky dolphins forage in a specialized manner by corralling schooling fishes into "bait-balls" where maneuverability is critical and vertically suspended mussel lines may reduce the ability to acquire prey. Additionally, farms may infringe on near-shore resting and breeding space. Habitat degradation may also escalate due to an increase in harvesting vessel traffic.

Agency Regulators

New Zealand has a democratic parliamentary system with distinct departments responsible for different sectors of government. The Department of Conservation manages marine mammals in New Zealand waters and oversees their protection under the Marine Mammals Protection Act of 1978. However, local territorial authorities (for example the Marlborough District Council) are responsible for managing matters such as coastal navigation, structures in water, and marine farming, which may affect the preservation and protection of indigenous fauna. In 1996 the New Zealand Environment Court was established to hear appeals on decisions made by councils. In the case of green-lipped mussel farm expansion in Admiralty Bay, Marlborough Sounds, the Court weighed stakeholder perspectives and directed that additional research be conducted on potential impacts of shellfish aquaculture on dusky dolphins prior to further expansion of the industry in the area.



Dusky dolphins swimming near mussel farms in the Marlborough Sounds
Photo: Kristin Hodge

under New Zealand law 20% (or the financial equivalent) of new aquaculture space is allocated to coastal native tribes, many of which participate in the commercial industry today.

Development Advocates

Many marine farmers advocate strongly that their industry is relatively benign. One local farmer in the Marlborough Sounds believes mussel farms do not negatively impact the ecosystem on a large or long-term scale. He stated that dusky dolphins are plentiful in the bay and that if farming lines were removed, nothing would change. Others believe that when filter feeding mussels are managed properly they can actually enhance the ecosystem. They argue that bivalves are natural water purifiers that reduce turbidity by removing particulate material from the water column, including phytoplankton, acting as intermediaries in nitrogen and phosphorus cycling. This process is important in stabilizing phytoplankton growth which, when in excess, can block sunlight important to benthic vegetation production. Plants serve as a nursery habitat for young fishes which, in turn, provide a food source for marine mammals. Another development advocate stated that although caution should be maintained when extending farms, the unsubstantiated notion of adverse impacts should not limit the growth of potentially sustainable practices.

One group of development advocates believe that aquaculture can provide economic support and social cohesion within coastal communities that are culturally linked to the marine environment. Without sustainable aquaculture, they believe some community members may face economic hardship. Shellfish aquaculture producers in New

Māori, the native people of Aotearoa (the Māori name for New Zealand), arrived from Polynesia more than 400 years before the first European settlers and currently make up about 15% of the national population. Traditional Māori culture regards the sea and marine mammals as important natural resources and time-honored treasures. The Treaty of Waitangi signed in 1840 between Māori and the British Crown, and subsequent legislation, preserve certain rights historically significant to Māori. Kaitiakitanga (or guardianship) is a key component of Maori culture and local and national government agencies generally consult with Māori tribes over management issues that affect cetaceans and other marine values. Additionally,

Zealand state that marine farming provides for constructive “use of natural and physical resources for the production of food” generating employment and financial gain on local and regional levels. For example, in the Marlborough Sounds alone, approximately 1,000 people are employed directly by the aquaculture industry. In addition to national consumption, aquaculture is an important revenue earner for New Zealand as exported produce.

Sources

- Agreement in Principle for the Settlement of the Crown’s Pre-Commencement Space Obligations under the Maori Commercial Aquaculture Claims Settlement Act 2004 for Te Wai Pounamu and the Cormandel. October 13, 2008. Pages 1-23.
- Childerhouse, S., and A. Baxter. 2010. Human interactions with dusky dolphins: a management perspective. Pages 245-275 in B. Würsig, and M. Würsig, editors. *The Dusky Dolphin, Master Acrobat off Different Shores*. Elsevier Ltd., China.
- Donoghue, M. 1996. The New Zealand experience – one country’s response to cetacean conservation. Pages 423-445 in M.P. Simmonds, and J.D. Hutchinson, editors. *The Conservation of Whales and Dolphins*. John Wiley and Sons Ltd.
- Environment Court of New Zealand, te Kooti Taiao o Aotearoa (accessed September 3, 2011)
<http://www.justice.govt.nz/courts/environment-court>
- Māori culture, business, and tourism (accessed September 22, 2011)
<http://www.maori.com/>
- Marine Farming Association (accessed September 1, 2011)
<http://www.nzmfa.co.nz/default.asp>
- Markowitz, T.M., S.L. Dans, E.A. Crespo, D.J. Lundquist, and N.M.T. Duprey. 2010. Human interactions with dusky dolphins: harvest, fisheries, habitat alteration, and tourism. Pages 211-244 in B. Würsig, and M. Würsig, editors. *The Dusky Dolphin, Master Acrobat off Different Shores*. Elsevier Ltd., China.
- Orams, M.B. 2003. Marine ecotourism in New Zealand: an overview of the industry and its management. Pages 233-248 in B. Garrod, and J.C. Wilson, editors. *Marine Ecotourism: Issues and Experiences*. Channel View Publications.
- Rice, M.A. 2008. Environmental effects of shellfish aquaculture in the northeast. *Northeastern Regional Aquaculture Center Publication* **105**: 1-6.
- Shumway, S.E., C. Davis, R. Downey, R. Karney, J. Kraeuter, J. Parsons, R. Rheault, and G. Wikfors. 2003. Shellfish aquaculture – In praise of sustainable economies and environments. *World Aquaculture* **34**(4): 15-17.
- Würsig, B., G.A. Gailey. 2002. Marine mammals and aquaculture: conflicts and potential resolutions. Pages 45-59 in R.R. Stickney, and J.P. McVay, editors. *Responsible Marine Aquaculture*. CAP International Press, New York, USA.

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Piwetz, S. (2011). CASE STORY OCEANIA02: SHELLFISH AQUACULTURE IN A MARINE MAMMAL HABITAT. Seminar in Cross-Cultural Communication: Communities and Conservation. Biodiversity Stewardship Lab. Wildlife & Fisheries Sciences. Texas A&M University. Retrieved from http://wfsc.tamu.edu/jpackard/behavior/wfsc681/Documents/4cases/oceania02_shellfish_Piwetz.pdf