Styles Group
Underwater Acoustics

CASE STUDY

Researching Hector's Dolphins in Lyttelton Harbour

Channel deepening and cruise berth project in Lyttelton Port.

Client: Lyttelton Port Company

PROJECT OVERVIEW

Lyttelton Harbour in New Zealand is a special marine environment within the Banks Peninsula Marine Mammal Sanctuary and provides habitat for the endangered Hector's Dolphin.

To keep up with growing demand, The Lyttelton Port Company (LPC) needed to deepen the approach channel for large vessels and construct a new cruise berth terminal. They needed Underwater Acoustic expertise to help them proceed without negatively impacting the marine environment.

OUR SUPPORT

Over the 6 years of the development project, we worked closely with the team at Lyttelton Port Company and Cawthron Institute to monitor and study the local Hector's dolphins around the Harbour, to minimise the impact of the dredging and pile-driving on the marine environment in Lyttelton Harbour.

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During the course of the project we provided:

UNDERWATER NOISE MEASUREMENT

Through collaboration with LPC, Vision Environment and Enviser, eight listening stations (comprising of SoundTraps and/or CPODs), were installed and regularly maintained each month between 2017 and 2021 (before, during and after construction).

UNDERWATER NOISE MODELLING

A comprehensive assessment of underwater noise effects from the dredging and pile driving on the endangered Hector's dolphin within Lyttelton Harbour was delivered.

MITIGATION RECOMMENDATIONS

We assisted in the development of the Marine Mammal Management Plan (MMMP) which sets out the project management response in relation to marine mammals.

MARINE MAMMAL MONITORING

The presence of Hector's dolphins was determined from >100,000 hours of passive acoustic data using our automated detectors and classifiers. The detectors perform a series of advanced signal processing algorithms before the AI engine classifies the acoustic signals. Our in-house built acoustic analysis software integrates parallel computing and so the processing is several orders of magnitude quicker than other software.

DATA ANALYSIS

The underwater acoustic data collected is the largest dataset of its kind in New Zealand. Our intelligent data analysis systems allowed for fast and automated data processing while fully incorporating LPC's construction records, marine mammal observer logs and other datasets into the acoustic data analysis.

ONGOING SCIENTIFIC RESEARCH

A scientific investigation into the noise effects after the cruise berth construction and channel deepening project was required. This is a collaborative project with Cawthron Institute, LPC and Styles Group.

The acoustic data gathered is being used to inform wider scientific research, and ultimately, will be used to inform the development of underwater noise standards to manage impacts on not only Hector and Maui dolphins, but many dolphin species around NZ's coastline and abroad.

Our data analysis allows us to gain new insights into:

- How dredging and pile driving alters the harbour's natural underwater soundscape and
- How any changes to that soundscape may impact Hector's dolphins.
- We are in the process of publishing the results in scientific journals.