Ministry for Primary Industries
Manatū Ahu Matua

SPECIAL PERMIT AMENDMENT
(563/2)

Pursuant to section 97(5) of the *Fisheries Act 1996*:

Victoria University of Wellington
School of Biological Sciences
PO Box 600
WELLINGTON 6140

Client Number: 8730069

is hereby notified that in respect of special permit (563) issued to the above on 19 November 2013, the following amendments to the special permit are made:

1) Condition 21 is hereby revoked and replaced with the following:

21. The permit holder must not knowingly transfer any notifiable, unwanted or pest organism.

2) Condition 23 is hereby revoked and replaced with the following:

23. During the collection of fish, aquatic life, or seaweed the permit holder shall ensure that no aquatic plant, noxious fish, unwanted or pest organism, including eggs and larvae of noxious fish or unwanted and pest organisms, is introduced into any other waterway, either from the water holding the collected fish, aquatic life, or seaweed, or enmeshed in fishing gear.

3) Condition 26 is hereby revoked and replaced with the following:

26. All fish, aquatic life, or seaweed that are not required for research or education purposes and cannot be returned alive to the environment (including all dead, diseased or noxious fish, and unwanted or pest organisms) must be disposed of on land in an appropriate manner consistent with public health standards.

4) Condition 27 is hereby revoked and replaced with the following:

27. All fish, aquatic life, or seaweed not released immediately at point of capture (e.g. retained for research or display) including progeny must be either:

a) returned back to point of capture, if native species, as long as the animals are in good health. If the animals present signs of disease or illness, the species should be placed in isolation and the water contained. If such an event should occur, MPI is to be notified on the emergency hotline (0800 809 966);

b) euthanised and disposed of on land in an appropriate manner consistent with public health standards, once it is not longer required for research or display; or

c) by any other method approved in writing by the Spatial Allocations Manager or relevant District Compliance Manager.

5) Programme 2 approved in Appendix One is hereby revoked and replaced with the attached *Addendum to Schedule A – Aquatic life that may be taken pursuant to condition 4 a) of the Special Permit 563*.

All other conditions of special permit 563 remain unchanged.

David Scranney
Spatial Allocations Manager
DATED at Nelson this 17th day of April 2014.
Acting pursuant to a delegation issued under s 41 of the *State Sector Act 1988*

Addendum to Schedule A – Aquatic life that may be taken pursuant to condition 4 a) of the Special Permit 563

Programme 2:

Title: Assessment of Stunted Paua Populations in Tasman Bay, Marlborough Sounds and Kapiti Island

Intentions/ Purpose: This project forms part of the PhD research of Alix Laferriere, and MSc research of Tracey Bates. The aim of this research is to assess "stunted" and normal paua populations and the environment that they inhabit. The project involves an assessment of paua density and individual size, habitat characteristics, pH trails, shell durability analysis and a translocation experiment. The translocation experiment is for Tasman Bay and Marlborough Sounds paua only.

At Kapiti Island, 300 undersized paua will be collected by SCUBA. These paua will be used in pH trials and in testing shell durability. This will be a lethal extraction with paua disposed of as rubbish as per the University's Operations Manual.

Geographic Areas Investigated: Tasman Bay, Marlborough Sounds and Kapiti Island

Programme of Sampling, Analyses and Time- Frame:
This research consists of two field components; an assessment and an experiment to examine the effect of habitat on stunting. The assessment will include subtidal surveys via SCUBA to enumerate paua and measure individual size with calipers to the nearest mm. Primary and secondary substrate will be classed into the JNCC classification system (bedrock, large boulder, small boulder, cobble, sand, shell hash and a measure of rugosity). Percent cover of four algal classes (canopy, understory, ACA and CCA) will be determined.

The experiment will be a reciprocal translocation experiment moving "stunted" paua into "normal" conditions and" normal" into a "stunted" environment. Kaipiti Island paua will not be translocated. These exact locations will be chosen based off the data in the assessment described above, where I will be able to define stunted and normal populations based off mean length for a sampling area. Paua will be collected from both "stunted" and "normal" populations, measured to the nearest millimeter and tagged with a polyethylene disc following the methods of Naylor & Andrew (2004). Paua will be placed back in their native habitat as well as transplanted to the reciprocal site. Based on other tagging and recapture experiments which yield a 10-15% recovery rate, I would like to take between 600-800 paua per site (Tasman Bay and Marlborough Sounds) and 300 paua from Kapiti Island. I will collect paua from 75mm-125mm to cover both the stunted and normal populations. This would be 2 sites in Tasman Bay for a translocation experiment and 2 sites in Marlborough sounds for a translocation experiment. Kapiti Island collection will be from one site and not translocated. To capture all growing and climatic seasons, paua will be set at liberty for 12 months and then recollected and measured. Growth will be estimated using the maximum likelihood approach of Francis (1988, 1995).

Background and ethical considerations:
Haliotis iris, commonly referred to as the black-foot paua, inhabits intertidal and subtidal rocky reefs of New Zealand and is the focus of an important customary, recreational and commercial fishery. It has been shown that demography, morphology and growth rates of abalone populations and individuals are highly variable on broad and fine spatial scales (Breen & Adkins 1982; McShane et al., 1994; McShane & Naylor 1995) and it has been suggested that physical and biogenic habitat and food availability may affect the demography of the population (McShane & Naylor 1995; Sasaki & Shepherd 2001; Pederson et al., 2008).

There are specific areas along the north and south island of New Zealand, where the paua populations do not reach the minimum legal size limit of 125 mm, these are referred to as "stunted" populations (Shiel & Breen 1991, Naylor & Andrew 2000). Compared to standard abalone the stunted abalone are smaller with shorter shells that are higher, wider and thicker. They are usually found in dense aggregations on reefs that are protected from wave action (McShane & Naylor 1995). In one study of 34 NZ locations, sea surface temperature and relative wave exposure explained a significant amount of variation in mean abalone length among areas (McShane et al, 1994). Low amounts of drift algae has been suggested as a possible mechanism or contribution to the establishment of stunted stocks (Day & Fleming 1992; Shephard et al., 1992; McShane & Naylor 1995). However, the biological mechanism of stunting needs further examination to determine if this morphological difference is a plastic response to the environment or a fixed genetic trait or an interaction of genotype and environment.

Outside of New Zealand translocation of stunted abalone to an area of typical size abalone has been shown to increase growth rates. Such studies suggest that the favourable response in growth is a plastic (phenotypic) response to more and better quality food (Emmett & Jamieson 1989; McShane & Naylor 1995; Dixon & Day 2004). In Australia, a reciprocal transplant experiment of *Haliotis rubra* showed that stunted individuals grew faster in non-stunted areas and non-stunted individuals grew slower in stunted areas. This was explained by stunted populations occurring in areas of low food availability and topographic simplicity whereas non-stunted populations had more food available and topographic complexity (Saunders et al., 2009).

In February 2013, we conducted SCUBA surveys to determine paua density and individual size and to classify habitat at 12 sites within the Horoirangi Marine Reserve and associated control sites in Tasman Bay. The mean size was 80mm, suggesting that these paua populations are stunted. In February 2013, we conducted SCUBA surveys to determine paua density and individual size and to classify habitat at 18 sites within the Long Island Marine Reserve and associated control sites in Marlbourgh sounds. We found that on the southern end of the marine reserve paua reached a mean length of 90mm and on the northern more exposed end of the island a mean length of 110-125mm. We hypothesis that this gradient in size is due to exposure and therefore would like to conduct both a fine scale assessment and translocation within the Long Island Marine Reserve.

**** Great care will be taken with each individual paua to ensure the safety and health of the animal. Minimal exposure to air, gentle treatment, hand placement onto the reef and a non-invasive external tag on the shell will be conducted to achieve the upmost in animal husbandry and safety.**

I am in the process of submitting a permit proposal to work within the marine reserve with the Department of Conservation.

Key Personnel
Alix Laferriere (PhD candidate, primary investigator)
Tracey Bates (MSc student)
Prof Jonathan Gardner (Laferriere's Supervisor),
Up to 4 graduate and undergraduate students or volunteers

Vessels used, Methods of Capture and Disposal: We expect to use a combination of University owned vessels [e.g., Raukawa Challenger (MNZ No122256), Pipi, (MNZ No131132), Tuatua, (MNZ No131949) Tipa (MNZ No 134586)] and undefined commercial vessels. Methods of collection include SCUBA, snorkelling, collection with a "paua tool", hand collection and placement. Organisms' exposure to air will be as limited as possible. All organisms will be kept alive.