



6 August 2018

Richard Johnson
Environmental Protection Authority
Private Bag 63002
WELLINGTON 6140

Dear Mr Johnson

Request for advice under section 56 of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 regarding the Coastal Resources Limited Application - EEZ100015

As per your request dated 6 July 2018, MPI is providing advice on specific biosecurity questions in relation to a marine dumping consent application lodged by Coastal Resources Limited (CRL).

This advice addresses EPA's question #2 and associated subparts:

2. Request for assessment of the significance of invasive species establishing populations in coastal areas identified in Appendix 5 of Coastal Resource's Limited's application.

a) An assessment of the significance of any adverse ecological or other effects that may arise from the dispersal and establishment of populations of invasive species due to CRL's proposed dumping activity.

Given the locations and activities associated with this marine consent application, the sea squirt *Eudistoma elongatum* and the fanworm *Sabella spallanzanii* (an Unwanted Organism¹) are the non-indigenous species of biosecurity concern. These species have regional distributions that do not extend into the eastern Coromandel / western Bay of Plenty, and the most likely pathway for their spread into these areas from CRL's activities is via hull fouling of project vessels and barges.

Mediterranean fanworm (*Sabella spallanzanii*; hereafter, *Sabella*)

Based on its previous invasion history, *Sabella* may have local impacts on areas of suitable habitat within the eastern Coromandel and western Bay of Plenty:

Habitat structure – The physical complexity created by *Sabella*'s elongate, stalked growth form may provide additional cover that fish could use to avoid predators². Conversely, it's possible that increased habitat complexity could act as a physical barrier and negatively affect the foraging efficiency of fishes and/or other organisms.³

¹ Under the Biosecurity Act 1993, Unwanted Organism means any organism that a chief technical officer believes is capable or potentially capable of causing unwanted harm to any natural and physical resources or human health.

² Parry *et al.* (1996) Mapping and distribution of *Sabella spallanzanii* in Port Phillip Bay. Final Report to Fisheries Research and Development Corporation. FRDC Project 94/164. 51 pp.

³ Wallentinus I and Nyberg CD (2007) Introduced marine organisms as habitat modifiers. Marine Pollution Bulletin 55: 323–332.

Biodiversity – Competition with *Sabella* for food and space may have negative impacts on native filter-feeding organisms⁴, and the physical structure of *Sabella* stalks and feeding fans can inhibit the settlement of other sessile epifaunal organisms.⁵ In soft sediment habitats, *Sabella* changes the composition and abundance of infaunal macro-organisms (primarily small, mobile crustaceans), and these effects vary over space and time.⁶

Nutrient cycling – *Sabella* excretes ammonium (NH₄⁺) into the water column.⁵ In situations where *Sabella* is widespread and occurs at high densities in soft sediments, this nutrient loading can lead to changes in ecosystem structure and function.⁵

Aquaculture – In the western Coromandel, *Sabella* is becoming a high-density fouling pest of mussels and mussel lines⁷, and has the potential to reduce yields (by competing with mussels for food and space) and production rates (by clogging machinery and increasing handling/processing time).

Potential effects in the eastern Coromandel and western Bay of Plenty

Sabella's potential ecological effects (e.g., on habitat structure, biodiversity, nutrient cycling) in the region are essentially unpredictable. Environmental impacts of non-indigenous species are often subtle and location-specific, requiring intensive study to characterise.^{8, 9} Conversely, *Sabella*'s potential socio-cultural impacts (i.e., on regional mussel aquaculture) are likely to be consistent with those observed in western Coromandel mussel farms. At present, Jackson Bay is the only mussel aquaculture site in the eastern Coromandel—establishment of *Sabella* in the region could pose a risk not only to this operation, but also to potential future expansion of the local industry.

Australian droplet tunicate (*Eudistoma elongatum*; hereafter, *Eudistoma*)

Prior to its establishment in New Zealand, *Eudistoma* had no previous invasion history, and there is little information on its ecology. It has the potential to impact upon subtidal and low intertidal habitats:

Biodiversity -- non-indigenous tunicates can potentially compete with native species for resources (e.g., food, space) and subsequent flow-on effects may influence local ecosystem structure and function.^{10,11}

Aesthetics – *Eudistoma* grows in white, ropelike colonies 5–30 cm long, and occurs on a variety of substrates (e.g., rocks, mud, shells). Populations can manifest as extensive aggregations of unsightly sausage-shaped colonies, and are often highly visible on beaches and mudflats during low tide.

⁴ Currie *et al.* (2000) Reproduction and distribution of the invasive European fanworm *Sabella spallanzanii* (Polychaeta: Sabellidae) in Port Phillip Bay, Victoria, Australia. *Marine Biology* 136: 645–656.

⁵ Holloway MG and Keough MJ (2002) An introduced polychaete affects recruitment and larval abundance of sessile invertebrates. *Ecological Applications* 12: 1803-1823.

⁶ Ross *et al.* (2007) Impacts of two introduced suspension feeders in Port Phillip Bay, Australia. *Marine Ecology Progress Series* 340: 41–53.

⁷ King SL (2017). Managing the Unwanted Organism *Sabella spallanzanii* (Gmelin, 1791): investigating how desiccation, fragmentation and acetic acid can be used to manage this pest on aquaculture facilities. MSc Thesis, University of Waikato. 64 pp.

⁸ Branch GM and Steffani NC (2004) Can we predict the effects of alien species? A case-history of the invasion of South Africa by *Mytilus galloprovincialis* (Lamarck). *Journal of Experimental Marine Biology and Ecology* 300: 189–215.

⁹ Simberloff *et al.* (2013) Impacts of biological invasions: what's what and the way forward. *Trends in Ecology & Evolution* 28: 58–66.

¹⁰ Morrisey *et al.* (2009) Biology and ecology of the introduced ascidian *Eudistoma elongatum*, and trials of potential control options. MAF Biosecurity Technical Paper No. 2009/21. 59 pp.

¹¹ Zhan *et al.* (2015) Ascidiaceans as models for studying invasion success. *Marine Biology* 162: 2449–2470.

Aquaculture – In Northland, *Eudistoma* is a nuisance to oyster aquaculture operations, fouling equipment and stock.

Potential effects in the eastern Coromandel and western Bay of Plenty

As with *Sabella*, the potential ecological effects of *Eudistoma* can't be reliably predicted—there are substantial knowledge gaps around its ecology, and the environmental interactions and effects of introduced species are often idiosyncratic and context-specific.^{12,13} It's possible that large, visible *Eudistoma* aggregations could impact upon regional marine tourism and recreation sectors, but the likelihood and potential magnitude of this effect are unknown.

b) Advice on the implications of any adverse effects due to the proposed dumping activity on biosecurity, e.g. implementation of management plans; mediation measures, etc.

Legislative framework

Sabella spallanzanii is an Unwanted Organism under the Biosecurity Act 1993, and as such owners and operators of marine vessels, craft and equipment are required to meet their obligations under the Biosecurity Act 1993 (in particular, Part 4) around reporting and restrictions regarding the communication, release, or spread of any pest or unwanted organism.

The Pest Management National Plan of Action 2011 defines roles in marine pest management based on 'who is best placed' to lead an intervention. The plan identifies lead decision makers responsible for bringing together parties with a role in the management of pests in marine environment. If the dredging activities were to result in an incursion of *Sabella* in novel areas, a decision on an appropriate response is likely to fall to the relevant regional council with support from MPI. MPI currently provides financial and technical support to affected regional councils to manage *Sabella*.

Councils are also responsible for managing pests in their region. Regional Pest Management Plans, developed in accordance with the Biosecurity Act, set out the strategic and statutory framework for the management of pest plants and animals in a particular region. These plans also provide specific management objectives for selected plants and animals within a council's jurisdiction. *Sabella* is not currently listed in Regional Pest Management Plans in areas potentially affected by this activity (Waikato, Auckland, and Bay of Plenty).

Councils can, however, also undertake a Small Scale Management Programme (SSMP) to control or eradicate an Unwanted Organism under specified circumstances. A SSMP has been established by the Bay of Plenty Regional Council to eradicate *Sabella* from Tauranga Harbour, and to exclude *Sabella* from other parts of the Bay of Plenty region.¹⁴

If the dredging activities were to introduce invasive species, such as *Sabella*, to locations where they previously did not occur an appropriate response will take into account the status of an organism in a given area, its potential effects, the efficacy of proposed response measures, and the capability and capacity for regulatory authorities, including MPI and regional councils, to respond.

¹²Cordell *et al.* (2013) Ecological implications of invasive tunicates associated with artificial structures in Puget Sound, Washington, USA. *Biological Invasions* 15: 1303–1318.

¹³Robinson *et al.* (2017) Mind the gap—context dependency in invasive species impacts: a case study of the ascidian *Ciona robusta*. *NeoBiota* 32: 127–141.

¹⁴Bay of Plenty Regional Council (2015) Small-Scale Management Programme – Mediterranean Fanworm (*Sabella Spallanzanii*) MJFW-133911-513-40-V1:hl

Managing biosecurity risks from CRL's activities

MPI considers CRL's vessels should be regularly maintained according to best practice¹⁵ to ensure biofouling is controlled to an acceptable level. Maintenance that restricts fouling to a slime layer and goose barnacles would reduce the chance of spreading marine pests. The development of a Biosecurity Management Plan that specifies the measures CRL intends to take to mitigate the risk of spreading invasive species may be an appropriate tool to manage biosecurity risks (particularly the risks associated with vessel and equipment movements).

As per MPI's initial response to CRL's consultation documents, the proposed consent conditions place an obligation on the Consent Holder to obtain comment from MPI concerning its proposed Sediment Sampling Plan, and Sampling Results, from a biosecurity perspective (see section 9 of the EIA, condition 1). MPI has an interest in ensuring the biosecurity risks associated with CRL's operations are appropriately mitigated. However, we consider it more appropriate for MPI to provide advice about any future sampling plans and results, and any implications for biosecurity, directly to the EPA.

I hope this feedback is helpful and assists with the review process. If you have any queries regarding our comments please feel free to contact me.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Daniel Kluza', with a long horizontal line extending to the right.

Dr Daniel Kluza
Principal Adviser
Science & Risk Assessment (Animals and Aquatic)

¹⁵ Georgiades *et al.* (2018) Technical guidance on biofouling management for vessels arriving to New Zealand. Ministry for Primary Industries, Wellington, New Zealand. 16 pp.