



*Mytilopsis sallei*, black striped mussel. Photo courtesy of The Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia.

## APPENDIX 4: BLACK-STRIPED MUSSEL (*MYTILOPSIS SALLEI*): AN INVASIVE DREISSENIID MUSSEL CASE IN AUSTRALIA'S NORTHERN TERRITORY

### THE DISCOVERY

On March 27, 1999, divers with the Commonwealth Scientific and Industrial Research Organization (CSIRO), an independent agency of the Australian federal government responsible for scientific research towards protecting Australia's industries and economy (a program which included environmental monitoring for invasive species threats), reported an infestation of black-striped mussels in Cullen Bay Marina, Darwin, NT, Australia. The divers discovered that the new mussel had heavily colonized all available substrates in the marina. Divers immediately recognized the mussel as a dreissenid mussel—the same family of mussels as zebra and quagga mussels that had been making news in the North American Great Lakes. Samples were sent to an expert on mussels at The Museum and Art Gallery of the Northern Territory (MAGNT), and confirmed to be the invasive black-striped mussel.

### THE DAMAGE

Black-striped mussels are a member of the family Dreissenidae, like zebra and quagga mussels. They are an extremely invasive family of mussel that form dense colonies on a wide range of substrates, clog water intakes and other mechanisms, can cut feet and hands of swimmers, filter-feed all available food from the water column, and cause a water body to turn clear and ecologically unstable.

### THE POLICY RESPONSE

Once the mussel was confirmed to be an AIS, the Minister and Chief Executive Officer of the Department of Primary Industry and Fisheries were immediately notified of an outbreak. At the time, it was noted that 147 vessels were in Cullen Bay, there were a few hundred vessels in other area

marinas where black-striped mussels were also found, and there were over a hundred vessels currently at sea, including over 50 from the Northern Prawn Fleet, that had been in these harbors over the past few months. A special meeting was called with the Northern Territory Cabinet—at which time it was agreed upon to amend the Northern Territory Fisheries Act (1988). During the emergency amendment, the black-striped mussel was listed as an aquatic pest, aquatic pests were then designated with disease and contaminated fish, and areas with aquatic pest outbreaks were authorized as restricted areas that could be quarantined. The infested marinas were now listed as restricted areas which prohibited any movement of aquatic life, vessels, or equipment, in or out. Once all amendments were made, the Cabinet authorized the use of any funds necessary, without specification of a funding limit, to combat and eradicate the mussel invasion.

### ACTION TAKEN

Officials at CSIRO entered an 'Alert Phase' to initiate the above policy response and to form an incident management task force. The task force included teams responsible for the following areas: 1) media and communications, 2) vessel tracking, 3) emergency services, 4) public health, 5) diving surveys, 6) eradication biology, and 7) treatment. Federal funding was allocated and teams assembled in a matter of a few weeks, at which time officials entered an 'Operational Phase.' Surveys were conducted to map the extent of the AIS outbreak. Areas infested with the AIS were federally quarantined under both the 1988 Northern Territory Fisheries Act and the Commonwealth Quarantine Act of 1908 which ceased all vessel movement in or out of the now restricted marinas and allowed vessels to be removed from the water if necessary. Affected marinas were treated first with chlorine, and later with copper sulfate, and all vessels in the marinas and at sea were tracked down, boarded, and disinfected.

The media campaign carried out during the outbreak is still considered a model approach for managing information requirements during an emergency AIS situation. According to the Report of the Marine Pest Incursion Management Workshop, held 27-28 August 1999, and published by Environment Australia (Ferguson 2000), some key successes in the media and communications approach were:

- Consistent messaging throughout the outbreak (including electronic and print media, public notices, the website launched for live updates on the AIS response, public meetings and government briefings);
- Presentation of a positive image of participating agencies and individuals, including scientists and stakeholders;
- Messaging geared towards the achievements of groups and/or individuals on the ground responding, which in turn encouraged the general public to participate in the operation;
- High quality video and photos of the response, which were all made readily available for news sources and other outlets;
- Cooperation between government agencies, the scientific community and the media which in turn generated a high level of trust;
- A website with regular updates that alleviated the need for stakeholders to communicate directly with personnel managing the response;
- The use of fact-sheets to distribute information generally and to targeted audiences proved particularly effective;
- The role of the NT Primary Industry and Fisheries Minister in providing credible and well informed messages to the media and to stakeholders was important in achieving the cooperation of local communities;
- One expert was designated as a reference for all difficult, technical, or operational questions. The person came to be seen as a source of accurate information. If another respondent referred a question to this person it was seen as a positive action and not a diversion or evasion of the question; and
- Daily media advertisements and the use of an information caravan in the area where major response activity was taking place provided a controlled outlet for essential information to the public.

In the case of the black-striped mussel in Australia, early detection surveys led to early detection of this AIS. Given that surveys were conducted for the sole reason of detecting new

AIS threats, the Australian government already had an action plan, equipment and personnel in place to address such an outbreak. The mussel infestation was successfully eradicated through a coordinated treatment of “quarantined” marinas. It is clear that Australians are much more motivated to take action against AIS threats than the U.S. and/or Canada for the Great Lakes. This is partly due to the fact that government officials in these regions have a deep understanding of the potential impact an AIS can have on environmental and human health as well as the overall economy—no new introduction are worth the extra effort. A shared sentiment across interviews and cases was that we need to adopt this mentality for the North American Great Lakes.

## CURRENT STATUS

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The response to the black-stipe mussel in Darwin, NT, AU is considered one of the most successful AIS responses to date. The treatment of the three infected harbors, requiring a total 187 tons of liquid sodium hypochlorite and 7.5 tons of copper sulfate, resulted in 100% mortality and full eradication of the AIS threat within a two-week period. A national taskforce was established shortly after the successful eradication of the AIS threat when officials recognized the need for continental-scale cooperation and the need to coordinate national action to prevent the spread of the mussel and any other AIS to other states should another outbreak occur. A national workshop was held in Darwin in fall of 1999 to evaluate the response, make recommendations for future AIS outbreak responses, and make recommendations for improved management infrastructure for AIS response at a national level in the future (Bax et al. 2002). More information for the black-striped mussel case can be found at: <https://www.dpi.nsw.gov.au/fishing/pests-diseases/marine-pests/found-in-australia/black-striped-mussel>.

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