

Vessel and Gear Fouling

The Problem

- The introduction of exotic species into new environments can pose a major threat to the integrity of natural communities, the existence of rare and endangered species, the viability of living resource-based industries and pose risks to human health. Marine pests can be as damaging as oil spills but their effects are much more persistent.
- Any mechanism that can transport organisms from shallow coastal waters across natural oceanic barriers has the potential to help exotic marine organisms invade new environments. International shipping, by transporting marine organisms as fouling on their hulls or in the intakes for seawater systems, provides one such mechanism.
- Once introduced to Australian waters, exotic species can be subsequently spread to new areas within Australian waters by fouling on commercial and recreational vessels, fishing and aquaculture gear (e.g. cages, nets, lines, floats and anchors), and other marine equipment (e.g. buoys).

The Context

- The transport of exotic organisms on the hulls of seagoing vessels has occurred since we began exploring the oceans. For centuries, relatively slow moving wooden hulled vessels involved in exploration, conquest, trade and colonisation were a vector for moving fouling and boring organisms. Vessels were often cleaned or repaired during these voyages resulting in the introduction of whole assemblages of exotic organisms in ports and sheltered embayments throughout the 'New World'. Today, the cosmopolitan nature of many wood-boring species (e.g., limnoriid isopods and teredinid bivalves) is evidence of this process.
- While wooden-hulled vessels continue to be used in some areas (e.g., some fishing and recreational vessels), following World War II most vessels involved in international and domestic trade were steel-hulled. This change in vessel construction stopped the transport of wood boring organisms but did not prevent the movement of other fouling species. It was only with the development of toxic anti-fouling coatings that the transport of fouling species by ships was reduced.
- For large vessels, it is often assumed that the widespread use and efficacy of anti-fouling paints, more frequent hull cleaning, reduced time in port and increased speeds of modern vessels have together largely eliminated hull fouling as a source of introductions. However, recent surveys of vessels visiting Australian ports show that hull fouling is still a vector for the transport of these species. Fouling organisms still occur on specific areas of vessels, such as the dry dock strips on keels, and seawater intakes and anchor wells are also known to provide havens for exotic organisms.
- The recent incursion of the black striped mussel (*Mytilopsis sallei*) into northern Australia shows that recreational vessels can also play a role in introducing exotic fouling organisms. Vessels entering Australia from Indo-Pacific ports where *Mytilopsis* is present pose a major risk for the introduction of the mussel into northern Australia.
- Fouling on the hulls of domestic vessels (both commercial and recreational), in particular those that spend long periods moored in waters where exotic fouling organisms are present, are also a likely means for spreading these species to new areas. For example, small boats have been implicated in spreading the Japanese seaweed *Undaria pinnatifida* in southern

Tasmania and in New Zealand, and spreading the fan worm *Sabella spallanzanii* in Western Australia.

- The movement of fouled aquaculture equipment such as fish cages, settlement and grow-out lines, and shellfish trays between areas is potentially a major vector for spreading exotic fouling organisms. For example, the movement of salmon cages contaminated with *Undaria* is believed to have been responsible for the spread of this seaweed into New Zealand's Marlborough Sounds. In Australia, measures are in place to address risks that pest species such as the northern Pacific seastar (*Asterias amurensis*), *Undaria* and *Sabella* could be transferred on mussel ropes from Port Phillip Bay to grow-out areas in Western Port.

Managing the Problem

- Preventing the introduction and spread of exotic species as fouling on vessels requires that effective hull cleaning and anti-fouling programs are adhered to and seachests and seawater systems are examined and cleaned on a regular basis. This applies to all vessels and in particular those that have been berthed or laid up for long periods.
- Education programs are required to make boat operators and owners aware of the potential for their vessels to transport exotic fouling organisms and the steps they should take to minimise the risk of this occurring.
- Codes of practice are required to ensure that fishing and marine farming operations do not facilitate the spread of exotic organisms through the movement of stock or equipment between areas. This will involve industry awareness programs and the development of treatment ('sterilisation') protocols for gear and equipment. In Victoria for example, research is currently underway to develop ways of treating mussel grow-out lines to kill exotic species before lines are moved between coastal waters.

(Last updated January 2001)