

CSIRO research has shown that seagrass is an important nursery habitat for tiger prawns in the northern prawn fishery.



## Mapping the meadows

TWICE a year for the past 17 years, on the beach below CSIRO's Marmion laboratories in Western Australia, Dr Hugh Kirkman has donned his wetsuit and scuba gear and waded into the Indian Ocean. He then swims for two hours, observing and measuring the growth of Marmion Lagoon's seagrasses along several 300 m transect lines pegged across the ocean floor.

What he has learned from those swims, and from countless other dives around Australia's coastline, has helped establish Kirkman as an international authority on seagrasses. He even has a seagrass named after him: *Posidonia kirkmanii*.

Seagrasses are flowering plants that originated on land and adapted to life underwater about 100 million years ago. They grow in 'meadows' found along the temperate WA coast, in the gulfs of South Australia and Torres Strait, and in the waters off Queensland, north of Fraser Island.

Seagrasses provide nursery areas for juvenile fish and crustaceans. They support Australia's northern tiger prawns, and the \$300 million harvest of WA's western rock lobsters, Australia's most valuable fishery.

The biggest killers of seagrass are algal blooms which block out the light required for photosynthesis. Excessive nutrient inputs leading to eutrophication and algal blooms commonly enter the oceans in waste water from sewage works, and in run-off from farm land or urban streets.

In some areas where seagrass decline has been dramatic, remedial steps are being taken. At Cockburn Sound near Perth, 90% (3300 hectares) of seagrass beds have been lost in the past 40 years. The Cockburn Cement company which mines shellsand from the nearby seafloor is sponsoring a \$6 million restoration project testing a machine for transplanting mature seagrass.

Some seagrass meadows, once destroyed, can take decades to grow back. Others may never grow back because the young plants need the shelter of more established ones to survive the ravages of underwater swells and wave action. Others will not return because the sediment in which they grew has changed significantly.

In 1910, *Posidonia* beds were mined for fibre in South Australia's Gulf St Vincent. The scars are still visible and have remained the same size and shape since the earliest

aerial photographs taken in 1949. 'The important lesson from these legacies of past ignorance is that seagrasses are very slow to recover, so care must be taken to prevent further damage,' Kirkman says.

'We can all help by using garden fertilisers sparingly; lobbying for alternatives to ocean dumping of waste water; not using drains and toilets for disposal of toxic chemicals, oils, paints and pesticides; anchoring boats in sand, not in seagrass meadows; and through careful farm fertiliser use and cultivation.'

During the past four years Kirkman has successfully rallied state government support for an ambitious project to map the underwater features, including seagrasses, of the entire Australian coast.

He has prepared maps of near coastal waters from Exmouth clockwise to, and including, Tasmania. The data have been drawn from satellite imagery, aerial photographs and even the charts of Matthew Flinders – who circumnavigated and mapped the 36 735 km Australian coastline almost 200 years ago – plus thousands of dives to the ocean floor.

'The bank of information contained in our maps will help preserve our marine heritage,' Kirkman says. 'We can draw on them for the establishment of marine parks, laying contingency plans for marine disasters such as oil spills, or deciding locations for ports, marinas, aquaculture projects and waste water outfalls.'

Location	Seagrasses lost	Cause
Cockburn Sound, WA	3300 ha	nutrients from factories, sewage and abattoirs
Holdfast Bay, SA	7000 ha	sewage and stormwater; coastal works
Westernport Bay, Vic.	17 800 ha	siltation
Norfolk Bay, Tas.	2148 ha	
Tuggerah Lakes and Lake Macquarie, NSW	2000 ha	increased turbidity
Hervey Bay, Qld	100 000 ha	high turbidity due to flooding
Torres Strait	10 000 ha	floods 1991-92
West Island/Limmen Bight, NT	18 300 ha	Cyclone Sandy, 1985



Dr Hugh Kirkman.