



Key elements of this research are:

Captured species assessments

In the past, fisheries science focused on assessing the sustainability of major fish species caught by commercial fisheries.

Research now covers other areas that are important for ensuring ecological sustainability: the side-effects of fishing on non-target species (by-catch and by-product), the effect of spatial management such as fishing closures and sanctuary areas, and the relative impact of recreational and charter fishing.

Projects include:

- an examination of the impact of fishing on protected, endangered and threatened species;
- the contribution of closed areas to healthy population structures; and
- developing methods to precisely determine the recreational catch.

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Social and economic effects of changes to marine resource management

The social and economic effects of management are an important factor in government policy setting and decision-making.

These may include effects on regional and local economies, the impact on local businesses, and changes in recreational fishing behaviour and tourism visitation.

Projects in this area will develop specific methods to assess the social and economic impacts of marine and fisheries management policy changes using the West Coast bioregion as a case study.

The Western Australian Marine Science Institution (WAMSI) is a consortium of 15 State and Commonwealth government, academic and private partners undertaking multi-disciplinary marine research. It is Australia's first collaborative research facility dedicated to understanding the marine environment and resources, and to contributing to policy and management decisions on the future use of oceans.

WA State Government provided a \$21 million five-year investment with a \$60 million co-investment by member partners. WAMSI's strategic projects address climate change, its likely impacts, how marine and coastal ecosystems function and how science can be used to understand the impacts of human activity in the marine environment.

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Healthy marine ecosystems are a prerequisite for healthy marine biological communities and healthy fisheries.

A new frontier for marine science is to take a holistic view of the complex relationships between habitat, environmental change, marine biological systems and communities along with the demands and needs of human society.

This area received little scientific attention in the past because few monitoring programs existed to predict changes to marine biological systems and human society.

More than \$4.6 million has been allocated by the Western Australian Marine Science Institution (WAMSI) to identify the key factors affecting our marine ecosystems and how to best monitor them.

Results of this research will ensure Western Australia's marine communities and fisheries are sustained, hand in hand with social and economic use.

Key elements of this research are:

Ecosystem-based fisheries management

Understanding the effect of human activities on an ecosystem means understanding what the ecosystem consists of and what critical ecological, economic and social issues are relevant. Research now taking place in the Gascoyne and West Coast bioregions will:

- develop an ecosystem-based science and management concept to identify the state of ecosystems, economic pressures and social issues; and
- link the outcomes of the research to provide a holistic view of how human activities should be managed to ensure ecological sustainability.

Change and marine ecosystems

WA's marine and estuarine ecosystems are in a constant state of change. Some of these changes are cyclical and caused by natural environmental variables such as ocean currents and rainfall. Some are long-term and caused by global warming and climate change while some are caused by human activities, including fishing.

This project area seeks to identify the factors driving these biological changes.

Projects include:

- a review of the use of commercial fisheries datasets as a way of monitoring ecosystem change (with a study of independent survey methods where this information is not adequate);
- identifying sites to monitor long-term changes in ecosystems, comparing areas both open and closed to fishing;
- assessing data on the settlement of rock lobster puerulus which may be useful for measuring climate change and its effects; and
- developing cost-effective methods to monitor community structure, biodiversity and ecosystem habitats.

Ecosystems and food-webs

Many estuaries and nearshore embayments are under intense pressure from human activity and climate change – pressures that cause significant changes in biological communities.

Changes are driven by factors other than fishing including onshore development, fertiliser run-off and habitat destruction.

Research will build a comprehensive picture of the extent of these changes in the Swan River, Peel-Harvey and Leschenault Estuaries and Cockburn Sound.

It is difficult to predict the impact of removing a significant proportion of a species or range of species on marine food chains. Projects in this area aim to develop ways of examining this using the Western Rock Lobster Fishery as a case study.