Port Phillip Bay

New models for management

Port Phillip Bay has for decades received the waste products of Melbourne's industrial and urban developments. Interest in the effect this has on the bay has prompted a new project likely to promote Australia's multidisciplinary research capabilities.

The Port Phillip Bay Environmental study was commissioned by Melbourne Water. It is monitored by Melbourne Water, the Port of Melbourne Authority, the Victorian Environmental Protection Authority and the Victorian Department of Conservation and Natural Resources. The latter agency chairs the committee.

Under the management of the CSIRO Institute of Natural Resources and Environment (INRE) scientists are unravelling the complex relationships between the biological, chemical and physical factors of Port Phillip Bay. The cost of the three-year project is $11 million.

The Port Phillip Bay Environmental Study will produce models to help manage the bay for the next 20 years.

Port Phillip Bay has been the subject of scientific study since the 1950s. Much of this study has been *ad hoc* and has been focused within a particular discipline. The Port Phillip Bay Environmental Study will cross disciplines and seek to identify their interdependencies. For the first time, the relationships between tidal movements, aquatic life, nutrients and toxicants will be investigated.

A major outcome of the study will be a series of computer models of the bay. The models will serve as powerful predictive tools to assist the various authorities, and other bodies, in managing the bay for the next 20 years. For example, the models could predict the effect of a hypothetical increase or decrease of sewage output on the ecology of the bay.

'It's a scientific and intellectual challenge, integrating the biological with the physical in a model,' manager of the INRE project office, Dr Graham Harris, says.

'The physics, chemistry and geology side of the model is not a great problem area; the laws of physics are largely known and therefore readily modelled.

'It's the impact on ecological communities and the feedback of ecological communities on the way the bay operates that's tricky.'

Harris says the computer models will be kept to a reasonable size. This will involve identifying key variables. For example, the organisms that eat the sediment on the floor of the bay and the suspended matter near the bed are important to the ecology of the bay, but very little is yet known about them.

Under way at the moment is a mapping of the bottom of the bay to determine its ecology. It is likely a number of models will result, each addressing a specific area of environmental impact.

Practical research and data collection began in January 1993. Before this there were months of planning. This included summarising the research literature already compiled for the bay.

Change over time

Harris says this historical data is also being used to help in the early stages of synthesising the computer models. The historical data might also reveal if the ecology of the bay has changed over the years, he says.

The projects, most of which have begun, have been contracted to organisations selected for their expertise in the particular area of research. They include private companies and federal and state government bodies, including museums and universities.

'Boats are out everywhere collecting phytoplankton data, toxicant samples and so on. Some of the data is already being analysed,' Harris says.

The Port Phillip Bay Environmental Study will ensure there is informed decision-making regarding the management of the bay for the next 20 years. Further, it will stand as an advertisement to the world that Australia is ready and able to export its expertise in the field of multidisciplinary, integrated studies.

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