

proposal to discharge waste waters into natural wetlands needs to be assessed on its own merits. The ecological costs of changes to the plant communities need to be weighed up against the benefits of lower pollutant exports, and low waste treatment costs to the community. In the Paihia situation, while considerable ecological change has taken place in the sewage impacted wetland, the area so impacted is small relative to the total amount of wetlands. We also have to consider that the huge variety of chemical and biochemical conditions found in a natural wetland is very difficult to reproduce economically in an artificial water treatment system.

The results of this study offer opportunities for ecological engineering where phosphorus removal is an important consideration. For example, we could create small areas of constructed wetland downstream of natural wetlands of the type found at Paihia. The role of the constructed wetlands would simply be to provide sites for reaction and settling. Outflow from the natural wetlands could be introduced to the constructed wetlands in order to provide a source of reactants for phosphorus removal from the wastewater. In this way natural wetlands could be used for waste treatment without themselves being ecologically degraded. ■

*Jim Cooke is a scientist at Ecosystems Division, NIWAR, Hamilton.*

### New Zealand has strong presence at international wetlands conference

AT A RECENT conference in Sydney, scientists and engineers from New Zealand demonstrated a strong commitment to research into wetlands as a vehicle for water pollution control.

Three scientist from Ecosystems Division, NIWAR, presented papers at the International Conference on Wetland Systems in Water Pollution Control in December 1992.

Jim Cooke gave a paper on "Nutrient transformations in a natural wetland receiving sewage effluent and the implications to waste treatment" which described some strategic research on a wetland system near Paihia. This research has identified processes operating which have major implications to the sustainability of nutrient removal in such systems (see the preceding article in this issue). Bryce Cooper's paper, "Coupling wetland treatment to land treatment: an innovative method for nitrogen stripping?" described some of the scientific investigations which he carried out prior to the commissioning of the Rotorua Wastewater Purification Scheme. Chris Tanner's paper, "Treatment of dairy farm wastewaters in

horizontal and up-flow gravel-bed constructed wetlands" described investigations which will eventually lead to design criteria being developed for the treatment of dairy-shed wastewaters (see pages 5-6 in this issue).

The papers illustrated the breadth and depth of knowledge on this topic available within NIWAR. Both ecological and waste treatment objectives are being addressed in the NIWAR studies, which is rare, even from an international perspective.

The increasing importance now attached to both constructed and natural wetlands in New Zealand was reflected in other New Zealand presentations to the conference. Albert van Oostrom (Meat Industry Research Institute of New Zealand) presented a paper on denitrification of meat works waste; Brian Duncan (Bruce Wallace Partners) reviewed New Zealand's experience with constructed wetlands; Gary Venus (Tonkin & Taylor Ltd) described the Whangarei City wetland project and in particular identified the aesthetic and amenity benefits of the scheme, and Judy van Rossem (Environment Waikato) presented a poster paper showing the future directions for management of wetlands in the Waikato.

### A workshop on the Hamilton Lake problem

AN ITEM in *Water & Atmosphere* 1(1) (pages 18-19) described why some Hamilton residents are worried about what is happening to the town's lake. It outlined the reasons, put forward by Dr John Clayton of Ecosystems Division, NIWAR, Hamilton, for the lake's changing ecosystem.

In response to the current public concern, scientists, including Dr Clayton, met at a technical workshop on 23 November 1992. As a result of the workshop, much valuable information about the lake and some of the changes that have happened is now being summarised into a report. As well as reviewing past research, the workshop identified future research requirements and discussed the best management methods for helping to avoid algal blooms. The participants also agreed that Hamilton Lake is an ideal study site for researching issues of national importance, such as:

- What causes submerged plants to die and algae to take over?
- What other changes occur in a lake



Weeds fouling Hamilton Lake (Lake Rotorua) in 1959.

ecosystem when submerged plants are lost?

- Can desirable submerged plants be restored?

All this interest in Hamilton Lake is by no means new! The photograph above was taken in the 1950s after introduced oxygen weed had become a major problem. For over 30 years both mechanical and chemical methods had to be used to

control it. At one stage even the army was called in to assist, as the weed was preventing both people and boats from using the lake. Today, oxygen weed has all but died out – but unfortunately has been succeeded by a different kind of problem. So we are now looking at new research into both old and new problems. Progress will be reported in future issues of *Water & Atmosphere*.