
Session 4 : WHOLE-OF-LAKE WEED STRATEGIES

SESSION CHAIR - John Gifford, LWQS

STRATEGIES TO MANAGE AQUATIC PLANTS: TOWARDS SHARED UNDERSTANDING

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Mary is a Freshwater Ecologist at NIWA, Hamilton, with more than 30 years of research experience on management of submerged vegetation. During this time Mary has worked on (and in) over 155 New Zealand lakes. Research interests include the biosecurity management of invasive water weeds, the enhancement and restoration of native submerged plants, resource survey, management of aquatic plant data and its application to research questions, and the taxonomy of New Zealand charophytes (freshwater algae akin to seaweeds).

TRANSCRIPT

Tena koutou katoa.

I am the first of three presenters this afternoon who are going to focus on aquatic weed management. I have the title *Strategies to Manage Aquatic Plants - Towards Shared Understanding* and I know what you are all thinking, 'Strategies' is not the kind of buzz word of the century but I am hoping to convey why we need agreed strategies, specifically an articulated strategy for lake weed management.

What is a strategy? It is a plan of action designed to achieve a long-term or overall aim. To me it is an important mechanism for communication between different parties towards a shared understanding, and it is essential where there is a shared resource or a 'commons'. I will introduce the strategy landscape for the Rotorua Te Arawa Lakes and answer why a specific strategy for managing aquatic weeds is needed (Slide 1). I want to introduce the important components of a strategy and summarise the progress on strategies for aquatic weed management plans in these lakes, which are being put together by the Bay of Plenty Regional Council and Land Information New Zealand. (LINZ).

The 12 Rotorua Te Arawa Lakes face the usual consequences of a 'commons', a shared resource for communities, Iwi and individuals, regulated by agencies acting in their interests. It is also a group of lakes which have a number of different management agencies working on various issues and sometimes these responsibilities are quite fragmented. There is definitely a requirement for a shared vision and plan of action for these lakes and I want to consider one for the aquatic weeds.

What is the strategic landscape for building a strategy for aquatic weed management? They say, 'Think globally, act locally', and New Zealand has an international responsibility to meet commitments as a member nation for a number of agreements on biodiversity and biosecurity. These include being signatory to the Convention on Biological Diversity which

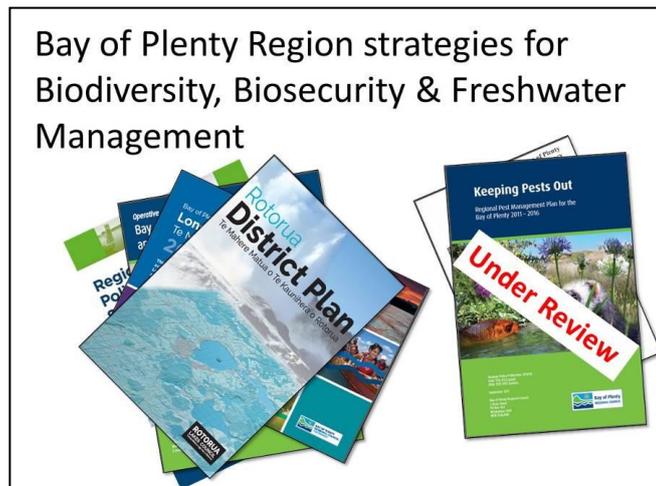
is a response to global biodiversity decline. There are other conventions too, looking at protecting our indigenous biodiversity through effective pest control: the International Plant Protection Convention 1951 and the Plant Protection Agreement for the South-East Asia and Pacific Region. Last year New Zealand became a signatory to the Honolulu Challenge on Invasive Alien Species.



All these international strategies and plans filter through to New Zealand and cause us to devise our own strategies and policies (Slide 3). There is recognition that our unique flora and fauna needs protection, which has led to our national biodiversity and biosecurity strategies. There is also a draft strategy for threatened species, which is under review at the moment. The National Policy Statement for Freshwater Management, recently amended, regulates the way our natural resources will be managed.



These policies and strategies all drive through to another layer of local management in the form of regional and district plans and strategies.



- The Bay of Plenty Regional Policy Statement preserves the natural character of lakes and their margins and protects areas of significant indigenous vegetation.
- The Bay of Plenty Regional Water and Land Plan states that aquatic plant pests are not to be introduced into the beds of streams, rivers and lakes.
- The Bay of Plenty Regional Long term Plan includes Rotorua lakes activity where focus is on nutrient management.
- The Rotorua District Plan manages the recreational use of the Rotorua lakes and rivers to avoid, remedy or mitigate adverse effects on visual, cultural, social and environmental values of water bodies.

Probably the regulations which are most relevant to aquatic weeds are these two, both of which are under review:-

- The Conservation Management Strategy for the Bay of Plenty
- Rotorua Pest Management Plan which states that the control of *Egeria densa*, lagarosiphon and hornwort is required in certain of the lakes and LINZ is the responsible agency.

Of primary consideration is co-governance by Te Arawa as owners of the lake beds, or tribal entities as private owners of two lakes. While pest plants are recognized as impacting on the health and wellbeing of the lakes in the Te Arawa Cultural Values Framework, management of aquatic pests is the responsibility of the Crown under the Te Arawa Lakes Deed of Settlement.

Strategies are also focussed on the lakes themselves. There is an overall strategy document for the lakes, and 9 of the 12 Rotorua Te Arawa Lakes have action plans to put strategy into action (not Rerewhakaaitu, Rotokakahi, Rotomahana). These plans justifiably have focused on water quality, with mentions of lake vegetation management being few, restricted to biosecurity considerations for Ōkataina and Ōkareka, and Rotoehu as a weed source. The recreational strategy acknowledges the impact of weed on recreational activities, the role of lake users in spreading of new weeds, and potential for weed management activities to influence recreational use.

Rotorua Te Arawa Lakes strategies for Biodiversity, Biosecurity & Freshwater Management



The Ōkātina Action Plan refers to implementation of a plan to eradicate hornwort and annual progress updates, with encouragement of boat checks for weed before launching. The Ōkāreka Plan gives consideration to submerged weeds through surveillance requirements. The Rotoehu Plan gives consideration to the lake as a potential source of hornwort.

A pile of strategies have been developed and available online, but do they address aquatic weed management or provide a plan of action to deal with lake weeds? I do not think they do by themselves.

Obviously reducing elevated water nutrient concentrations will not prevent weed problems. We only need to look at our pristine South Island lakes. The photo below of Lake Wanaka showing a big bed of lagrosiphon yet it is a pristine lake with clear water and low nutrients. In fact elevated nutrients may reduce weed problems. The other photo is a picture of hornwort growing in an algal dominated lake. The light limitation is quite severe for this plant and could restrict where the bed is growing. If we alleviate those algal blooms by controlling nutrients, the weed beds could grow deeper, bigger, faster than ever before.

So these strategies sort it?

Reducing elevated water nutrient concentrations will not prevent aquatic weed problems



There has been a recent emphasis on swimmability with a public outcry about the condition of lakes and rivers in New Zealand and the demand for better defined standards based on the risk to bathers from bacterial infection or toxic algae. But add weeds like hornwort in thick beds and you do not have swimmable water, you have hornwater. Obviously something like this is not going to be swimmable and in fact could pose a hazard to swimmers and users of that resource.

So these strategies sort it?

‘Swimmability’ targets ?
Consider human health risks from bacteria and toxic algal blooms



In 2015, the Lakes Water Quality Society symposium identified the need for a strategic approach for weed management. In response, the Bay of Plenty Regional Council and LINZ are developing the Rotorua Te Arawa Lakes Aquatic Plant Management Plans, which are being prepared by Boffa Miskell with technical input from NIWA. It is still a draft ‘living’ document and going through the feedback process from stakeholders so it is not a done deal yet. This plan suggests medium-term goals to guide objectives and outcomes, to act as signposts on the way to a desired destination. We do not have all the answers so it will be important to stage this work.

Rotorua Te Arawa Lakes Aquatic Plant Management

Lake Weed Management Plans being developed by BOPRC joint with LINZ, prepared by Boffa Miskell with NIWA technical input

Draft document for stakeholder input

Medium term goals guide objectives & outcomes, as signposts on way to desired destination



For aquatic weed control we have a limited toolbox of control tools. We need new ways of applying those tools and at the moment there is uncertainty about what we can achieve with our current tools. Aspirations may be fine but can we get there with the toolbox we have? It is really important that those management plans for aquatic weeds are kept as living documents, updated as progress is made or as new initiatives and weed control options become available.

Rotorua Te Arawa Lakes Aquatic Plant Management

Limited tool box of control tools

Need new control tools & new ways of using them

Uncertainty over what can be currently be achieved

Management plans as 'living' documents



The management plans reflect a number of different strategies depending on the water body and the situation. These strategies represent a spectrum and start off with biosecurity at one end. We can protect water bodies by preventing weed invasion using such things as the weed cordons (see Lake Biosecurity – local actions and results). There is also a need for those lakes already invaded by bad weeds to prevent weed being exported and introduced to other water bodies. It is important to keep boat ramps and jetties clear of weed which is the main point of contact for boats being hauled out of lakes. There is also a need to minimise the weed bed contact with lake users so that their gear does not become contaminated and then moved off to another site.

Rotorua Te Arawa Lakes Aquatic Plant Management

Spectrum of aquatic weed strategy

Biosecurity

Prevent weed invasion
Prevent weed export
Minimise weed bed contact

Amenity & utility

Minimise weed bed contact
Minimise drift on shore
Access at key sites

Biodiversity

Prevent competitive weeds
Prevent weeds from establishing
Remove high-cover weed beds



In the middle of the spectrum is amenity and utility and the first action listed, minimise weed bed contact, is shared with biosecurity. Lake users do not want to have their fishing and swimming experiences ruined by massive weed beds. It is entirely compatible for amenity and biosecurity to have the same aims. Amenity and utility aim to minimise drift on shore and this might be to treat a weed bed which is the source of material coming to shore or maintaining access to key areas such as popular beaches or jetties. No one wants to fight through a weed bed to use that facility or utility area.

Biodiversity takes everything to a new level, trying to achieve what cannot be achieved with just an amenity and utility focus. This is about preventing new competitive weeds

from establishing in lakes. It is also about removing high cover weed beds allowing native plants and a diverse array of native plants to recover. This spectrum of aquatic weed strategies applies across all the Rotorua Te Arawa Lakes depending on their situation.

Looking at the medium-term goals of the draft weed management plan for the lakes starting off with Rotorua and Rotoiti. This goal is recognising that the shoreline strandings of weeds that have occurred in the past are something we want to avoid for both lakes. There are big weed beds which interfere with enjoyment of the lakes and should be controlled in some way. These lakes are also a source of weeds for other lakes as they contain the worst weeds already. The picture on the bottom right shows three of the four aquatic weeds in Rotoiti.



For Rotoehu it is important that the weed management strategy does not interfere with current nutrient mitigation works in the form of hornwort harvesting. Instead the focus would be in the northern arms of Lake Rotoehu to see what could be achieved from weed management and how far weed management can take those systems.



It is important that hornwort is kept out of Lake Rerewhakaaitu. It does have weed issues which need to be managed for visitor and lake user enjoyment.

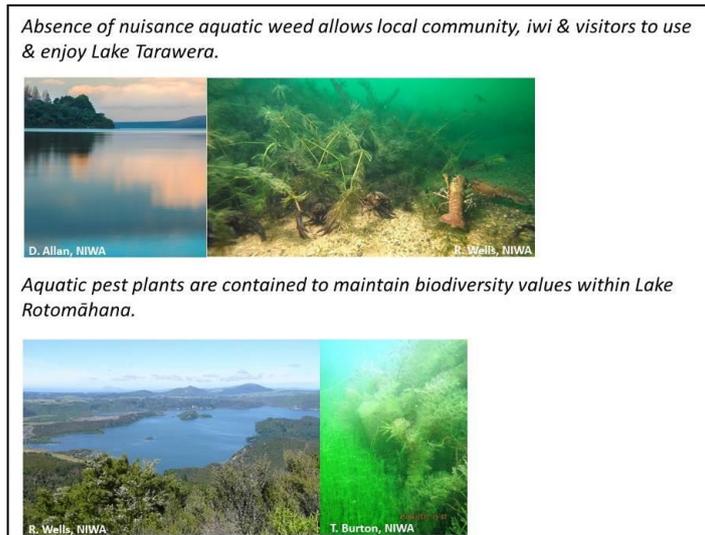
Ōkātaina and Ōkāreka lakes both have the incursion response for hornwort so it is important that this work continues. Eradication of hornwort and suppression of other aquatic pest plants and improved biodiversity allows the local community, iwi and visitors to use and enjoy these lakes.



Lake Tikitapu is recognised as a national venue for water sports and it is important to keep it in that condition. At the moment we are very fortunate that the weeds that grow there do not have a big impact. The unusual water chemistry of that lake actually reduces the impact of weed so we want to keep it that way. The benign weed elodea is present in Lake Okaro and it is important to prevent other weeds, especially hornwort from establishing there.



For Lake Tarawera it is important that the big beds of hornwort and their impact on lake users is minimised. Lake Rotomahana is a less utilised lake and there may be scope for focussing more on biodiversity values.



Lake Rotokakahi is privately owned by Iwi and is a real gem. It does not have the same weed issues as there has been less use and less transfer of weeds to this lake and it is important it is protected in its current state. Lake Rotoma is probably in the best condition of all the lakes and is least impacted by weeds. It is important that hornwort is kept out of that lake and it is preserved for the future.



How do we achieve these goals? Over the last few years I have been fortunate to be involved with designing and developing management plans for weeds in a number of lakes around New Zealand, work initiated by LINZ. There are some commonalities and I want to share with you the key elements for an aquatic weed management strategy.

Firstly, it is important that lake communities and their users see what kind of benefits can be achieved by undertaking weed management in a strategic way. There needs to be clarity around the costs and actions to control weeds. It is imperative that the best and safest tools are used, with no concerns over their use. All control works must be advised and any inconvenience to lake users minimised. It is really important the community is engaged and informed.



Proactive steps taken to prevent weed transfer depends on the community being on board. They are the ones who need to check their boat and make sure they are not transporting weeds and other pests. Finally the progress must be communicated back to lake users to keep them engaged.

Once benefits can be seen to be delivered for lake users and they are on board, there is little more to delivering on a strategy. Below is a set of components for strategic weed management plans for the agencies who must have freedom to operate. It is important that any weed strategies are aligned with existing strategies, such as the Rotorua Pest Management Plan and that plans are kept updated in a 3 to 5 year review. There must be annual planning and reporting undertaken and monitoring of the outcomes, which is often a step forgotten about. It becomes too hard or expensive but without knowing what the outcomes are, there is no feedback on how successful the programme is.



The Bay of Plenty Regional Council carries out efficient and effective surveillance for new weeds, which is great to see. The plan needs to be responsive to detection of new weeds, not only do they need to be looked for but the response must be ready to jump on them in the early stage to make progress. The last point is the need for research to improve the surveillance monitoring and control works because without that continual improvement, we are quite limited in what we can achieve in a weed control strategy.

In conclusion, my main messages are:-

Main messages

Lakes, as 'commons' require shared vision, articulated in strategies/plans

Existing strategies for lakes did not address aquatic plant management adequately

Management plans for lake weeds need to be 'living', updated as progress is made, long term gains made

Current tools and unknown outcomes may limit aspirations for lakes

Research advances needed for more effective tools

I would like to thank my NIWA colleagues for input and all the photos that I have stolen off them. I would like to acknowledge Kieran Miller at Boffa Miskell, who has been the main writer architect of the management plans and Greg Corbett at Bay of Plenty Regional Council for his input and approval to use this information in this talk. Also the Bay of Plenty Regional Council and LINZ as the lead agencies for the aquatic weed strategies now underway and funding for our Freshwater Biosecurity Programme and also NIWA's SSIF funding.

Thank you.