
QUESTIONS

Cr Tipene Marr, Bay of Plenty Regional Council: A question for you Deborah, are you taking seeds from the bottom of the lakes in case it does end up like Waikato?

Deborah Hofstra: No we are not. From work that Mary de Winton and John Clayton have done in the past, we know that native seed banks will decline under those invasive weed species. The treatment of invasive weeds that temporarily reduces that weed biomass, or gets rid of it, even for a couple of seasons, still provides the opportunity for native plants to replenish their seed banks. As long as that is happening there is no need for seedbank sampling. I think that keeping everything in situ with less disturbance is the better way forward.

Cr Tipene Marr: One more thing what is the Maori name for those things? It is great having a scientific name, but there were a few basic weeds that it would be nice to know the Maori name.

Deborah Hofstra: Thank you, yes I will take that on board and change that for the next time, thank you.

Nicki Douglas, Te Arawa Lakes Trust: We know that kākahi, the native mussel, are a good filtration system for water. We also know they cannot survive on sludgy lake beds, could they survive on top of a hessian layer?

Deborah Hofstra:

That is a very good question and something we have thought about as well. There is a desire to look at other ways of dealing with invasive weeds and one of the questions is - What would happen when covering large areas? What kind of macro invertebrates, including kākahi, would survive with that? We have also noticed when dealing with weed beds for other reasons (projects not described in this presentation) that weedbed removal can improve the habitat for kākahi. I agree with you, they do not like mud, they prefer sandy open substrates, the kind you saw under those native plant communities, that is where kākahi will be. Under the dense mounds of invasive weeds we saw earlier in the day (presentation by Tracey Burton) will be dead kākahi. We would love to get together for some further testing of biodegradable benthic barriers and figure out how they would work for kākahi.

Craig Morley, Te Ohomai: Apart from people, what other vectors may be spreading these invasive aquatic weeds? Birds, for example, or any other non-human ways to spread these weeds?

Deborah Hofstra:

For those major weeds we have talked about like the *Ceratophyllum demersum*, (hornwort), *Lagrosiphon major*, *Egeria densa*, it is simple, people.

Cr Dave Donaldson, Rotorua Lakes Council: Deborah you talked about lake drawdown being a management tool for the enhancement of native species. I wondered how important fluctuating lake levels are. We have sustained high lake levels this year with many wet weather events, is that a good thing or a bad thing for native plants?

Deborah Hofstra:

Management techniques, whatever they are, be it herbicides, drawdowns, hessian benthic barriers, all need to be assessed on a case by case basis. Lakes are all different

depending on water depth, species compositions, what is going on in each lake, so lakes need to be assessed individually.

Don Atkinson, LWQS: Question for Max, I would like to dig down further into your answer in respect to Lake Rotoiti and the oxygen demands, I would like you to consider the consequences to western arm, west of the pylons. What would your answer be where we have got the large rafts of weed in bays where the weed cover is not of 6%, but probably in excess of 60%. And then consider periods of relatively quiet hot warm conditions of summer when we have not got any mixing from the greater lake. How would that impact your answer for those particular sections of the lake?

Max Gibbs: Different set of conditions, it is not stratified, it is not a hypolimnion, but the weed collapse in these shallow arms, Okawa Bay, Te Weta Bay and so forth will consume all the oxygen, the lake will go anoxic and that will have a major effect locally. You have another situation in Lake Rotoiti which is not common in many of the other lakes in the Rotorua area and that is that you have an internal seiche on the Thermocline in the lake.

The seiche sets up an oscillation of the water column as an internal wave on the thermocline whereby the surface water flows in one direction above the thermocline while the bottom water flows in the opposite direction below the thermocline. This means that there is a very large volume of oxygenated water pushed into the western basin and associated bays on the east-west cycle. This flushes the water from the bays back into the eastern basin. On the west-east cycle, oxygen depleted water from just below the thermocline in the eastern basin flows into the western basin displacing the surface water back into the eastern basin.

With respect to the effect on the oxygen concentrations in the western basin and bays, the seiche will cause a fluctuation between fully oxid (saturated) to about 70% saturated (from memory of my measurements in the 1980s) locally. The oxygen loss from the weed decomposition in the bays off the western basin (including Te Weta and Okawa Bays) is included in my calculation for the whole lake. It will be a greater effect locally, say, up to 15% rather than the average of 10% or less across the whole lake. The seiche effect is very complex in this lake and needs modelling.