QUESTIONS

Prof David Hamilton: Just a quick question to Ian, the gabion baskets around the edge of the lake, how do they compare with the natural riparian vegetation that might have been there and the habitat complexity that might bring for the kōura?

Ian Kusabs: It compares pretty well in Lake Taupō as you can see from the slides but around Rotorua Te Arawa Lakes we have not got cobbles. What else can we do? There is plenty of mud and raupo. Gabion baskets would add to the diversity of lake shore substrates and cover for kōura.

Nicky Douglas, Rotorua Te Arawa Lakes Trust: My question is for Lindsay. The Rotorua Te Arawa Lakes Trust have established Komiti Whakahaere (management committee) and written a Mahire Whakahaere (Fisheries Management Plan) which is really around our taonga ika species in the lakes and when you did your presentation on eDNA you talked about how it could be used for native fisheries. I wonder how we might apply that technology in protecting and restoring our native fishery in the Rotorua Te Arawa Lakes?

Lindsay Chadderton: Essentially eDNA is used as a presence tool. There is a rough relationship between the number of detections and the amount of DNA in abundance but certainly there is no reason why you could not use the tool. It is probably most useful as an inventory tool to work out where the taonga species are. It can be used for any aquatic species. It comes down to what your goal is as inventory on the landscape.

Elizabeth Miller, Te Weta Bay: I know Te Weta Bay gives you a wonderful opportunity for research on catfish but I want to know is why not rotenone? If finance is the main reason how does this compare with the costs of ongoing management for decades to come?

Prof Brendan Hicks: We could use Rotenone. In fact we had an incursion response workshop on Tuesday where we discussed this. Rotenone is usually considered a whole lake solution which is completely out of the question for Rotoiti. In the US they did Lake Gallivant, which is 157 hectares, and cornered the entire world supply of rotenone which caused a massive spike. But it has been used in what they call cove operations doing a small part of the shoreline by netting off to stop the fish from escaping. Then rotenone can be applied on the shoreline and catfish would be good for this because they are in shallow zones.

The idea is to mix the toxin through the water and if there are weeds or raupo the bi-kill would be a second problem, catching a bunch of unintended species as well, anything that requires oxygen and water which includes kōura, smelt, trout and goldfish. The goldfish would not matter but there are species we do care about. The last problem is public perception of toxins in the water. It could be managed but it takes a lot of careful discussion.

Rotenone breaks down quickly if applied at high temperatures and is gone mostly within 5-10 days. It does break down and people use it in their gardens. It is derris dust after all. I do not know how wide spread its use is now. People used to put it on by the bucket load and ten times the concentration needed to kill fish. It is certainly an option and on the table, but not one of the first given that they are already out of Te Weta Bay.

What are the options with the cordon in place? Shane has a good handle on the site and if catfish are identifiable with water temperature then they could be spot treated. But it is

hard to know how effective it would be and there might be some community opposition to poisons in the water.

Elizabeth Miller: We have already got a cordon across the bay. I am not sure whether part of the research could be a biodiversity survey in Te Weta Bay? Is it a good kōura habitat? It is a bit muddy. I don't know. The kōura people could investigate that as a wonderful part of the research.

Natasha Grainger: There is one note of caution and that is that catfish are incredibly tolerant. Of all the species that can be taken out by rotenone, catfish are one of the tough species.

Gary Coker, a local conservator and keen fisherman: My question is regarding catfish in Lake Rotorua. We have seen it widespread in Rotoiti and in significant numbers in Te Weta Bay. What is the likelihood that they will spread through the channel and into the warmer waters of Lake Rotorua? Is the climate better for them there? Is there a food supply? Are we likely to see that in the future?

Prof Brendan Hicks: Certainly we considered that when we did our boat electrofishing survey. We went into Lake Rotorua specifically around the Ohau Channel entrance to see if there were any fish. We did not find them but it was not an effective tool considering that we only caught one in Te Weta Bay where there were plenty at the time. They do migrate and they do use flying water. It is probably not their preferred habitat to get to by fighting up against the current. But it does not mean they won't and that is the big fear, getting into Rotorua and finding a considerably better habitat.

Gary Coker: Is there any monitoring of catfish under way within Rotorua considering the fact that they are difficult to find?

Prof Brendan Hicks: No that we also discussed on Tuesday. It is a reasonable concern but costly to do the netting. They are of such low abundance around Rotoiti with nil on a number of sites. We are monitoring Okere Inlet and getting low numbers there.

Cr *Tipene Marr - Rotorua Te Arawa Lakes and Toi Moana, BOPRC:* How has the eradication gone? The burning question. We hear a lot about how to monitor and all that. Are you on top of them?

Michel Dedual: We did not make any attempt to eradicate them. We have been approached by people who wanted to get rid of them but with the size of Lake Taupō it is a biblical exercise that nobody could achieve. Because the concern was the predation of kōura by larger catfish we have suggested establishing a 2 or 3 people job to target the larger fish with a programme of netting, adjusting the mesh size accordingly. I think that controlled catfish in a system has to be one that pays for itself. Putting money in all the time is not going to work. On the other hand a few people can make a living by marketing the catfish which are popular with the Asian population in Auckland and Wellington. To me that seems an eminently sensible approach.

Cr Tipene Marr: Just taking the big ones and leaving little ones would be a job for life too. A bit like farming.

Michel Dedual: Yes but you get rid of the problem that you identified.

Cr Tipene Marr: I was also interested to hear about the protocol for bird diving. Thanks.

Natasha Grainger: Years ago we did national surveys and had problems catching dabchick particularly in this region. We developed some protocols for the regional wide surveys and it is about sitting on nets, setting them away from bird areas. But I know that Shane Grayling had more trouble doing an intensive survey and he would be the best to answer this.

Ian McLean: My question is for Lindsay. We know we have catfish in one of the 12 lakes and have not seen them in any of the others. What would a surveillance programme to detect catfish or any other species look like?

Lindsay Chadderton: That is a valid question and on Tuesday we talked about the need for broad delimitation surveys across the lakes. We have a set of tools that are reliable. Natasha talked about protocols with standard nets. The method is there and we could move relatively quickly towards a high throughput sequencing type of approach taking multiple water samples across the lakes. That is where to head which is probably more cost effective and sensitive. Catfish are one of the easier fish to catch. Council is considering undertaking surveys across the lake and I would encourage them to keep it up. The key is to look at lake habitat as well as likely points of introduction and targeting the sampling around those.