

Appendix 5: Record of the first meeting of the Whitebait Working Group.

# Whitebait Working Group: Minutes of Meeting 1

20-21 September 2018

Monro State Building, 186 Bridge St, Nelson

**Attendees:** \*\*\*\* (NZCA), \*\*\*\* (DOC), \*\*\*\* (West Coast Whitebaiter's Association), \*\*\*\* (F&B), \*\*\*\* and \*\*\*\* (Commercial Whitebaiters), \*\*\*\* (WRC), \*\*\*\* (Whitebait Connection), \*\*\*\* (recreational whitebaiter, Southland F&G council), \*\*\*\* (MfE), \*\*\*\* (DOC), \*\*\*\* (DOC, via Skype on 20<sup>th</sup>), \*\*\*\* (UoC, via Skype on 20<sup>th</sup>), \*\*\*\* (DOC, 20<sup>th</sup> am and 21<sup>st</sup> pm\*\*\*\* (NIWA), \*\*\*\* (DOC, minutes), Johanna Pierre (facilitator)

## 20 September

### Mihi and introductions

Everyone introduced themselves and interests and background in whitebait and whitebaiting.

\*\*\*\* noted that the protection of cultural rights is a key area of interest and importance for the local iwi he has talked to.

Group member	Whitebait interests
****	New Zealand Conservation Authority member with diverse interests in research, science and conservation.
****	Undertakes broad range of freshwater and whitebait related work as part of role with DOC, including compliance and enforcement.
****	Former President: West Coast Whitebaiter's Association, recreational whitebaiter, long interest in whitebaiting, involved West Coast Sustainable Wild Whitebait Fishery project.
****	Freshwater Advocate at Forest & Bird
****	Shareholders in a company with long term familial history of commercial whitebait fishing on the South Islands West Coast. Involved in West Coast Sustainable Wild Whitebait Fishery project.
****	Freshwater ecologist, broad research and management interests in fish (including fish passage, whitebait, noxious species, habitat)
****	Conservation education for schools and communities, focused on streams, rivers and wetlands, and including whitebait and freshwater fish
****	Long-term whitebaiter, interested in the fishery, management and habitat
****	Freshwater policy and management
****	Research biologist with expertise in whitebait especially inanga, recreational whitebaiter from an early age
****	Technical expert and scientist specialising in freshwater fish
****	Technical expert and scientist specialising in freshwater fish
****	Matauranga Māori, freshwater scientist (including fish)
****	Pou Tairangahau for DOC, deep whakapapa and whanau connections to South Island (and top-of-the-south region)

## Context and purpose

Johanna outlined background to and the purpose of the Whitebait Working Group (the Group):

- Minister of Conservation (MOC) has decided whitebait is one of her priorities – her vision/purpose for this is to “ensure healthy and restored whitebait populations and provide for a sustainable fishery”.
- Noted that the MOC has dual hats, and dual purposes for this work – she is the Minister of Conservation, but also the Minister responsible for the whitebait regulations.
- MOC asked the Group to provide her with information from a collective body of expertise – objective and useful information for her to use to inform any decisions she makes on whitebait management.
- The Group is not a representative or stakeholder group – it is based on knowledge and experience. It is not the place for voicing stakeholder positions – there will be other avenues for that: there will be an online survey, and 11 drop-in sessions around the country. The purpose of the Group is all about information – gathering knowledge and expertise and identifying issues and options for the future from all perspectives.
- There is no requirement for the Group to reach consensus – if we can’t, that’s okay, and that will be documented.
- Have planned for a maximum of three meetings.
- The Group can invite others (and seek specific external expertise) if it feels there is a need for that at any stage.

Outputs and timeframes of the Group are:

- Johanna will pull together the knowledge and advice of the Group into an issues and options paper, to be provided to the MOC by Feb 2019.
- The paper will be circulated to the Group for review to ensure that it fully captures all views. Any disagreements/differences of opinion will be noted.
- DOC will provide the paper to the MOC, who will make her decision on any next steps.

There were questions and discussions on:

- Overlaps between the Conservation (Freshwater Fisheries) Amendment Bill and the Whitebait Working Group process. \*\*\*\* noted that there is considerable community discussion and emotion around this. \*\*\*\* and \*\*\*\* also noted there is a lot of misinformation, and a lot of interest from whitebaiters/community throughout the country. Clarification was requested around how these two separate processes link together – e.g. very short timeframe for submitting on the Bill, compared to outputs from the Working Group process – which may affect issues relating to the Bill. Johanna noted that the intent is to move the Bill and the Working Group along broadly in parallel. However, the nature of the two processes is very different (the former is legislative, the latter is advisory only).
- In accordance with the Terms of Reference, Working Group members will refrain from passing on any info about the Group, or the Group’s work. However, involvement in the Group does not preclude anyone from submitting on the Bill as an individual. The Working Group process is not a formal consultation process in relation to whitebait – if any changes are proposed as result of work of the group, there would be a consultation process on this in 2019.
- In the media, members of the Group may identify themselves as part of the Group, but will not comment on the work or progress of the Group. \*\*\*\* noted that given

high interest in this area, and knowledge that he is on the Group, there may be an expectation that some comment is provided – and that this could be helpful to help clear up misinformation. It was questioned whether there would be a press release from DOC/MOC to outline the group, process, etc. Johanna noted that DOC is unsure at this stage, but that info will be made available on the DOC website in due course. Any questions from media to members of the Group should be referred to Johanna, who will arrange provision of a response. It was suggested by \*\*\*\* that we request clarification from the team dealing with the Bill – identify that there is confusion/misinformation between the Bill and Working Group process, and see if they can address and clarify this overlap – ask them to put out media to address this.

- It was noted that a TV programme will be coming out on Sunday, and this may be inflammatory. Aim of the Sunday programme – to give a balanced view after some of the comments that had been made by others. \*\*\*\* noted that based on what their discussions were, it wasn't necessarily hugely conflicting.
- Johanna outlined how iwi engagement is being undertaken. Iwi engagement will be running in parallel with stakeholder engagement and the Group process over time. Separate processes were considered necessary because it was not possible to have representative iwi engagement as part of this Group. DOC will be going out to regions to engage with iwi. Feedback from iwi engagement will be provided to the Group as it comes to hand, and will also go to MOC directly. \*\*\*\* noted that there are 3 categories of interest for iwi – iwi cultural fishing, iwi commercial fishing and iwi recreational fishers. The cultural side is likely to be of most interest to iwi. The timeframe for engagement by the end of the calendar year is very tight – it could take 1.5 years to undertake iwi engagement well. Johanna noted that MOC has been very clear that she doesn't want DOC to slip on our timeframes, but we are also aware there is risk associated with that in terms of being able to provide for engagement with iwi to the extent they consider satisfactory. We will see where we get to by end of year, and when we provide our advice to MOC, we can highlight the iwi engagement we have been able to undertake and associated feedback from iwi on the adequacy of that – MOC can then factor that in to her thinking and any decisions made.
- How will we ensure that everyone has a chance to get a voice in the working group? Will be divided into mixed groups of interest for discussions. Johanna has tried to ensure that for each discussion there is a mix of expertise/backgrounds working together to ensure a good spread of knowledge.

### **Current issues: national, regional, local**

The Group broke into three subgroups to identify current issues for whitebait populations, the fishery and management. Subgroups also prioritised these issues in terms of importance and urgency, in the context of the vision of ensuring healthy and restored whitebait populations and providing for a sustainable fishery. Groups then reviewed each other's work, considered points of agreement and where views differed. Subgroup discussions were recorded on flipcharts, and are tabulated in raw form below.

*Whitebait populations*

Current issue	Scale (National, Regional, Local)	Priority	
		Importance	Urgency
“Restore” whitebait – to what? What is the benchmark? Need to clarify/define what the goal is.	National	High	High
Impact of marine environment on larval fish, juveniles unknown	National	High	Medium
How to access/retrieve information that does exist, e.g. local information about harvest, habitat, pressures	National	High	High
Usability (reliability) of information that exists	National	High	High
Unlimited harvest <ul style="list-style-type: none"> <li>- impact varies by species, time, space</li> <li>- low levels of catch data</li> <li>- no licensing</li> </ul>	National	High	High
Closed areas <ul style="list-style-type: none"> <li>- Unknown effect on wider population (i.e. beyond the river they are applied to)</li> </ul>	National, Regional	High	High
Lack of data and scientific knowledge <ul style="list-style-type: none"> <li>- on populations</li> <li>- on population structure (“stocks”)</li> <li>- on species</li> <li>- dispersal and recruitment around different parts of the country <ul style="list-style-type: none"> <li>o e.g. how does coastal geomorphology affect these species?</li> </ul> </li> <li>- how much redundancy in the population?</li> <li>- different population trends in different parts of the country??</li> <li>- unknown predation by introduced species</li> <li>- density dependence – how much habitat do species (populations) need throughout their life cycle?</li> <li>- composition of catch varies year to year</li> <li>- longer term research (&gt;1 year) necessary</li> </ul>	National, Regional, Local	High	High

<p>Need targeted management</p> <ul style="list-style-type: none"> <li>- local effects, sub-regional boundaries</li> <li>- management tools and actions (reg and non-reg) effective at the scale of stocks</li> <li>- landlocked populations compared to migratory?</li> <li>- management that can respond to interannual variability in whitebait/populations</li> </ul>	Local	Medium	Medium
<p>Five species being managed as one currently</p> <ul style="list-style-type: none"> <li>- different issues for different species, one size issue/solution doesn't fit all</li> <li>- different life spans (short-lived inanga vs longer lived species)</li> </ul>	National	High	High - Medium
<p>Pests and introduced species</p> <ul style="list-style-type: none"> <li>- e.g. predation</li> <li>- trout, gambusia</li> </ul>	National Regional	Medium	High – Low (depending on location)
<p>Climate change</p> <ul style="list-style-type: none"> <li>- temperature, acidity, flow, sea level changes, coastal currents, ingress</li> <li>- resilience?</li> <li>- what impacts on species that have very defined habitats (e.g. inanga)?</li> </ul>	National	High	Medium <sup>1</sup>
<p>Conservation status</p> <ul style="list-style-type: none"> <li>- relationship between juvenile and adult population (abundance) not clear</li> </ul>	Regional	High	High
<p>Water quality</p> <ul style="list-style-type: none"> <li>- nutrients, algae, macrophytes, sedimentation, pollution</li> </ul>	National Regional	High	High
<p>Altered hydrology</p> <ul style="list-style-type: none"> <li>- abstraction</li> </ul>	National	High	High
<p>Land use (-&gt; habitat loss)</p> <ul style="list-style-type: none"> <li>- excess sediment (small-scale studies show sediment detrimental to egg survival)</li> </ul>	National	High	High
<p>Other multi-stressors</p> <ul style="list-style-type: none"> <li>- habitat and passage barriers (culverts, dams, weirs)</li> </ul>	National	High	High

<sup>1</sup> The group discussed the potential ramifications of climate change for whitebait, while noting that whitebait practitioners themselves could not address the source issue. Therefore, activity should focus on ensuring resilience is facilitated through the availability of appropriate habitat, and that effects of climate change on the marine phase may be more acute. The Medium urgency links to an inability of the group to address the source issue of climate change.

Habitat damage - loss of wetlands - loss of instream habitat	National	High	High
Habitat connectivity disrupted, e.g. pathways between source and adult populations (and to sea for larvae)	National	High	High
Loss/degradation of breeding and spawning habitat (e.g. 93% loss of spawning habitat in Waikato River) (e.g. grazing, mowing, trampling by stock, drainage etc etc etc)	National	High	High
Complex multi-agency responsibilities for habitat issues	National, Regional, Local	High	High
Cumulative effects due to multiple stressors - Variation amongst regions on the nature and extent of these	National, Regional, Local	High – Medium (location dependent)	High – Low (location dependent)
Identification of spawning sites for species other than īnanga	National	Medium (priority may vary around country)	Medium (priority may vary around country)
Compliance with consent conditions	National	High	High

*The fishery*

Current issue	Scale (National, Regional, Local)	Priority	
		Importance	Urgency
Two sets of regulations that are inconsistent with each other: - e.g. make both sets align with the approach taken in the current West Coast regulations - e.g. implement a back peg regulation nationally across rivers.	National	High	High
Increased number of participants in fishery (and increase is ongoing)	National	High	High
Unlimited harvest and no licensing	National	High	High

Increase in the efficiency of fishing (i.e. better gear, tech support, road access, vehicle transport, remote monitoring of fishing conditions)	Regional, Local	Medium	Medium
Stands are not mobile. In contrast, pot netters can move around to catch, and so can follow where the fish are. - West Coast South Island: regional council designates where on the riverbank a stand can be built. Stands cannot be moved. Must reapply to council to change the location of a stand. Stands must be removed every year and rebuilt following year.	National	Low	Low
Reduced opportunities for fish escapement with increasing intensity of fishing activity	National	High	High
Data not available to characterise link between whitebait catch and adult population	National	High	Medium
Evidence exists linking spawning habitat loss and reduced adult population	National	High	High
Actually multiple “fisheries” not one	National	High	Medium
How to ensure compliance covers fishery effectively? - Currently DOC is responsible for compliance. Other agencies (MPI) could be involved as well / instead.	National	High	High
Two sets of regulations: - creates opportunity for illegal activity	National	Medium - Low	Medium - Low
Lack of information on take among sectors (customary, commercial, recreational)	National	High	Medium
What underpins the current regulations? - What makes them effective? - What is the rationale for gear specifications, distance across river, types of nets, stands, etc. Local conditions may differ and ‘one size fits all’ may not apply to regulations	National, Regional	High	High
Length of season not responsive to data: - when are fish running - differences between years - peak timing for each species	National, Regional, Local	High	High
What is the definition of commercial (e.g. sell fish 2 x / year)?	National	High	High
DOC administers regulations not MPI	National	Medium	Low
Need source of funds to support fishery management – licence one way to provide this	National	High	High

- compliance, data collection, research			
Food safety issues associated with selling food (e.g. may be from polluted water, not stored hygienically, etc)	National	High	High

### Management issues

Current issue	Scale (National, Regional, Local)	Priority	
		Importance	Urgency
Management work is constrained by (lack of) funding	National	High	High
A licence to fish for whitebait could provide a fund to help support management of the species and the fishery, and data collection.	National	High	High
Gear does not enable targeting of catch by species	National	Low	Low
Lack of data on catch and catch patterns, no monitoring, and minimal or no evidence to support management (fishers, catch size, fishing locations)	National	High	High
Perceived NZ birthright to a 'a feed' but the size of 'a feed' is not defined	National		
Unknown how much fish is taken by any of the customary, commercial and recreational sectors	National	High - Medium	High
Resource consent issues for stands <ul style="list-style-type: none"> <li>- assess effects of the structure, not the activity</li> <li>- a monitoring cost is charged, but it is unclear if this money goes to monitoring the fishery</li> </ul>	Regional	High	High
Lack of integrated management between DOC (biodiversity), regional councils (stands), district councils (huts next to rivers)	National, Regional, Local	High	High
Social rules vary on some rivers <ul style="list-style-type: none"> <li>- precedent and peer pressure about fishing norms [(n)etiquette]</li> </ul>	Regional, Local	Medium	Medium
Food safety regulations are minimal, which opens ability for all catchers to sell	National	Medium	Medium
Quick fixes vs the most effective lever for management	National, Regional, Local	Medium	Medium

Regional councils consider their role is habitat and species management, not 'life' (despite RMA s 5, 30)	Regional	High	Medium
DOC under-resourced to do compliance - Other avenues to do compliance monitoring (e.g. MPI?)	National, Regional	High	High
'Giving back' to whitebait, i.e. involving those who harvest in habitat restoration, planting, etc.	National, Regional, Local	Medium	Medium
Rāhui, reserves - Should there be more and where should they be?	National, Regional, Local	High	High
Consenting of structures (and activities) that impact habitat e.g. - drain clearance - pumps → Alternatives to management, for lesser impacts? - enforcing funds/mitigation/duration of consents e.g. 35 year consents - non-notifiable consents	National, Regional, Local	High	High
Consistency amongst freshwater fisheries, e.g. trout vs whitebait - inconsistency in fines applied vs level of offending - inconsistency in licensing requirements - technical infringements vs out of season catch Nets do not have to be named	National	High	High
Traceability of stand holders but not individual fishers	National	Medium	Low
No set legal distance between fishers	National	Medium	Low
Ownership arrangements of stands vary Confrontations between fishers especially where money is involved	National, Regional, Local	High	Medium
Tax evasion (whitebait sold and not declared)	National	High	High
Unregulated sale	National	High	
Impact of fishers on the places they fish and compliance with local rules - e.g. camping bylaws, pollution	Regional, Local	Low	Low
Safety of compliance staff	Regional, Local	High	High
No food safety regulations for whitebait	National	Medium	Medium

No national monitoring in place (status and trends over time)	National	High	High
Capacity of management agencies limited - lack of funding to support management, research, fixing weirs, culverts, fencing etc.	National	High	High
Knowledge gaps e.g. larval fish, life history of some species	National	High	High
Reducing barriers to restoration initiatives (e.g. straw bales need consent)	National	High	Medium
Enabling / increasing support for education / restoration	National	High	High
Whitebait regulations don't mention weirs, so you can fish just below a weir	National	Medium	Medium
Lack of knowledge about economic, social and cultural values	National	High	High
Lack of coordination in management by individuals, organisations, groups	National	Medium	Medium
Better restoration guidelines needed for whitebait species to ensure people are doing the right thing (make sure guidelines are best practice)	National	High	Medium
Regulations established with recreational fishing in mind – has always been a commercial aspect to the fishery, but the regulations weren't designed for this	National	High	High
Compliance and law enforcement needs improvement - stands (regional councils), including debris from stands left in place and not maintained/used - fishers (DOC)	National	High	High

### Future issues: national, regional, local

#### *Whitebait populations*

Future issue	Scale (National, Regional, Local)	Priority	
		Importance	Urgency
Impact of hydro power on an ongoing basis (e.g. passage barriers, reduced flows)	National	High	Low
Climate change - reducing available habitat - increased frequency of extreme events - flow regimes - tidal influence	National Regional Local	High – Medium	High – Low

<ul style="list-style-type: none"> <li>- erosion</li> <li>- effective available habitat?</li> <li>- speed of adaptation for each whitebait species?</li> <li>- temperature (e.g. egg desiccation)</li> <li>- sea level</li> <li>- tides</li> <li>- food</li> <li>- temperature</li> <li>- pH (acidity)</li> <li>- changing currents</li> </ul>			
Potential for increase in diseases <ul style="list-style-type: none"> <li>- fungi, spread, emergence of new species (issue for schooling fish)</li> </ul>	National	High	Low
Water quality	National	High	High
Water quantity <ul style="list-style-type: none"> <li>- flows reduced and regulated</li> </ul>	National Local	High - Medium	High
Fish passage	National Local	High	High
Habitat loss and degradation <ul style="list-style-type: none"> <li>- breeding sites</li> <li>- sedimentation</li> <li>- urban development</li> <li>- pollution</li> </ul>	National Regional Local	High	High
Harvesting	Regional Local	High - Medium	High – Low (depending on location – localised urgency)
Fish population change over time? (records??)	National	High	High
Land use change (and urban development)	Regional	High - Medium	Medium

<p>Biosecurity</p> <ul style="list-style-type: none"> <li>- diseases</li> <li>- pests (of all types)</li> <li>- predators</li> <li>- fresh and saltwater habitat</li> </ul>	<p>National Local</p>	<p>High</p>	<p>Medium</p>
<p>Range shifts for whitebait species (e.g. new introduced species and exotics)</p>	<p>National</p>	<p>High - Medium</p>	<p>Medium</p>
<p>Potential for new contaminants to reduce water quality</p> <ul style="list-style-type: none"> <li>- microbeads and other microplastics</li> <li>- pesticides</li> </ul>	<p>National Local</p>	<p>High - Medium</p>	<p>High – Medium</p>
<p>Cumulative impacts</p> <ul style="list-style-type: none"> <li>- genetic bottlenecks</li> <li>- rare species with specific habitat might not disperse/recruit -&gt; range contraction <ul style="list-style-type: none"> <li>o kōaro temperature-sensitive so might contract to south</li> <li>o banded kōkopu may spread inland</li> <li>o interspecific competition as range contracts?</li> </ul> </li> </ul>	<p>National but regionally driven</p>	<p>Medium</p>	<p>Medium</p>
<p>Changing hydrology e.g. loss of peat, subsidence</p>	<p>Regional</p>	<p>High</p>	<p>High</p>
<p>Aging infrastructure</p> <ul style="list-style-type: none"> <li>- waste water</li> <li>- flood control</li> <li>- roading</li> </ul>	<p>National</p>	<p>Medium</p>	<p>Medium</p>
<p>Faster decline if management is not changed and habitat is not maintained or restored</p>	<p>National</p>	<p>High</p>	<p>High</p>

*The fishery*

Future issue	Scale (National, Regional, Local)	Priority	
		Importance	Urgency
Fishing tourists – more intensive fishing	National	Medium	Medium
Increased population pressure on fishery <ul style="list-style-type: none"> <li>- more people fishing</li> <li>- cultural differences e.g. maximising take as first principle of fishing</li> <li>- increased urbanisation could drive demand to purchase whitebait</li> <li>- potential for black market if remove commercial sale</li> <li>- no licensing requirement</li> </ul>	National	High – Medium	High – Medium
Aquaculture – whitebait as an export commodity	National Local	Medium	Medium - Low
Challenges balancing all types of take over time (customary, recreational, commercial) and by location	National	Medium - Low	Medium - Low
Loss of habitat (-> fewer places to fish) <ul style="list-style-type: none"> <li>- declining water quality and quantity</li> <li>- sediment</li> </ul>	National	High – Medium	High – Medium
Management solutions need to be brought into <ul style="list-style-type: none"> <li>- present in positive light</li> <li>- invest in education/awareness</li> </ul>	National	Medium	Medium
Decline or increase in demand	National	Medium - Low	Low
Scarcity of supply (due to population decline/collapse) <ul style="list-style-type: none"> <li>- rarity creates higher dollar value?</li> </ul>	National Local	High	High - Medium
Biosecurity <ul style="list-style-type: none"> <li>- e.g. pest fish (Gambusia, trout)</li> <li>- trout aquaculture -&gt; escapees?</li> </ul>	National Local	High – Medium	High – Medium
Physical access to fishing locations <ul style="list-style-type: none"> <li>- ability to access previously inaccessible regions increasing on an ongoing basis</li> <li>- may have access to older fish, not just whitebait</li> </ul>	National Local	High	High - Low

- areas out of reach/unaffected by harvest are reducing			
Research results are unexpected/surprising	National Regional Local	Medium	Low
Major geological event	National Regional Local	High	Low
Technology increasing catch (i.e. more efficient capture methods) - drones, robots, apps	National	High - Low	Medium - Low
Food safety (health risks) - risk to brand integrity	National	Medium	Medium
Need fairness in any permit/fishery access system	National	High	High
New fisheries may catch whitebait as bycatch if out of season (glass eels)	National	Medium	Low
Gang associations - illegal money laundering - compliance enforcers in danger - whitebait as a tradeable commodity	National	High	High
Emerging contaminants (-> food safety issues)	National	Medium	Medium
Lack of licensing, catch monitoring or long-term population datasets creates challenges for management	National	High	High

## Management

Future issue	Scale (National, Regional, Local)	Priority	
		Importance	Urgency
Lack of action by Government <ul style="list-style-type: none"> <li>- political interference/uncertainty (changing governments)</li> <li>- need cross-party agreement</li> </ul>	National	High - Medium	High - Low
What happens after this process? <ul style="list-style-type: none"> <li>- need to be successful or risk being parked for another 20 years</li> <li>- backlash if we don't get this right</li> </ul>	National	High	High
Increasing conflict nationally <ul style="list-style-type: none"> <li>- between environmental and economic interests</li> <li>- patch protection as resource gets smaller</li> </ul>	National	High - Medium	High - Medium
Capacity for agencies to engage with fishers and farmers	National	High	High
Forest collapse <ul style="list-style-type: none"> <li>- kauri dieback?</li> </ul>	National	Medium	Low
Intensification of land use activities <ul style="list-style-type: none"> <li>- decreasing amount of habitat, increasing amount of pollution</li> </ul>	National	High	Medium
Legal habitat destruction/degradation <ul style="list-style-type: none"> <li>- e.g. dams, dredging, draining, river works</li> </ul>	Regional	High - Medium	High
Regional consenting processes affecting rivers, habitat	Regional	High - Medium	High
Vigilantes counterproductive for overall management <ul style="list-style-type: none"> <li>- need local/regional regulations/restrictions</li> </ul>	National	Medium	High
Push-back by people displaced by new rules <ul style="list-style-type: none"> <li>- potential for increase in illegal activity</li> </ul>	National	High	High
Fishing tourists	National	Medium	Medium
Overseas markets?	National	Low	Low
Build positive relationships between organisations, landowners, communities <ul style="list-style-type: none"> <li>- communicate effectively</li> <li>- use social media</li> <li>- counter misinformation</li> </ul>	National	High	High

Co-governance	National Regional	Medium - Low	Medium – Low
Disconnect within and between government agencies / regional councils	National Regional	High	High
Compliance, monitoring of existing and any future regulations	National Regional	High - Medium	High - Medium
Feeling of marginalised population/stakeholders	Regional	Medium - Low	Medium
Tourism - can increase and decrease revenue in regions - creates increasing pressure on habitats in some cases	National Local	Medium	Medium
International market opens increasing demand	National	Low	Low
Unrelated industry has impacts of economic consequence to small/local/rural communities	Local	Medium	Medium
Funding - research - monitoring - data (on species and fishery catch) - basic government operations	National	High	High
Ability to manage cumulative effects	National	Medium	Medium
Lack of protection for whitebait species	National	High	High
Changing ethnic make-up of fishers	National	Medium	Medium
New technology might assist with compliance and enforcement	National	High	High

### Current management options

Issue	What is current management option?	How should/would it work?
Need goal for management - “Restore” to what state?	Identify community aspirations Link to National Policy Statement (Freshwater Management) (NPS-FM)	NPS-FM should trigger regional planning to identify fisheries values and policy and methods to achieve these

Introduced species	Biosecurity Act? (invasives, pests) Link to National Policy Statement (Freshwater Management)	
Two sets of regulations	Use West Coast regulations as a model	Adapt West Coast regulations to other areas <ul style="list-style-type: none"> <li>- address black market</li> <li>- closed rivers</li> <li>- back pegs</li> <li>- increase escapement</li> <li>- schedules for different rivers</li> </ul>
Unlimited catch	Create limits Use licensing as a tool to broadly reflect the amount of interest and effort in fishery and collect revenue to enable better management	Better control on sales Total allowable catch
Compliance with requirements poor in some areas	Existing regulations Co-management Honorary rangers? 5-year plans for compliance activities Could create whitebait special-interest groups within councils	Increase funding to support monitoring and compliance Increase outreach to build cooperation Utilise social peer networks to build cooperation
Lack of catch information/data	Existing regulations	Fishers provide data by <ul style="list-style-type: none"> <li>- implementing licensing system</li> <li>- inputting catch data recording catch and site</li> <li>- providing data to a survey (e.g. random sample run by DOC of who, when, what, how much, where)</li> </ul> Would need positive engagement and education Could help understand fisher demographics
	Science funding	Licensing system provides funding stream

Habitat	DOC regs Local body regs	Buy-in and collaborative work by regional, district councils and DOC to improve fishery habitat Education of consenting officers NPS-FM should also work on cumulative effects
Sale of whitebait	<ol style="list-style-type: none"> <li>1. ban the sale OR</li> <li>2. divide the fishery (commercial, recreational, customary) OR</li> <li>3. quota system</li> </ol>	Can only sell commercial catch to registered sellers  Same approach as other freshwater species
New technology and greater fisher mobility means fishing efficiency increases and increases pressure on fishery/fish	Restrict technology in regulations, by locality Implement a catch limit/quota	Cohesive regulatory and non-regulatory approaches
Inconsistency in management <ul style="list-style-type: none"> <li>- DOC: whitebait</li> <li>- MPI: eels</li> <li>- Fish and Game, DOC: Trout</li> </ul>	Range of management approaches: <ul style="list-style-type: none"> <li>- Quota Management System for eels versus regulations for whitebait, trout</li> </ul> Rationale for differences unclear	Improve consistency in management approach with other recreational fisheries Consider licensing for whitebait
Inconsistent direction in freshwater management and lack of coordination amongst agencies <ul style="list-style-type: none"> <li>- DOC, regional councils and Ministry for the Environment, other authorities</li> </ul>	Better connectivity amongst agencies and initiatives	
Fish passage	RMA NPS-FM	Need to work on new structures Need to aggregate existing information on known barriers (Envirolink project)
Existing harvesting pressure (perceived or actual)	Enforce regulations (Freshwater Fish Regulations 1983) Population management plan Whitebaiters record catch (per unit effort)	

	Temporary or permanent closures	
Poor fishing experience from social conflict, aesthetics		
Regulations established with recreational fishing in mind	Update regulations	Account for increased fishing pressure, habitat pressure and number of people
Unregulated sales <ul style="list-style-type: none"> <li>- food safety issues</li> <li>- tax evasion</li> </ul>	Create new legislation to address sales including food safety	Source, date of catch, fresh or frozen Require a licence to sell?
Quick fix vs long term and effective solution	Conduct process with stakeholders	
Can't identify fishers or link catch to fishers in any way		
Research project on the industry (cost benefit) and stocktake on community engagement	Socio-economic, cultural and environmental elements of fishery considered	
Enabling/increasing support for education/restoration	Led by government, create list of all funding options and a funding coordinator role -> prioritise funds annually	Reduce bureaucracy and increase awareness of support opportunities available Have centralised leadership, working group Joint initiatives better supported (i.e. community, central/regional government) Annual planning cycle that is structured and known
Specific regulation changes	Update regulations to address weirs (generic in regulation – in-stream barrier) Define commercial, recreational, cultural Require license to catch and sell (with checks and balances to monitor people selling) Remove use of screens (not supported by whitebaiters) Reduce screen size Test potential regulations by developing a predictive model Ban sock nets and traps	One national set of regulations More restrictions on how people catch fish Science, economic and social findings to support changes in regulations Each Council should have a Whitebait Management Plan Need compliance, and community support to facilitate compliance

	Require name to be on nets Link licence to net name tag Introduce set distances between fishers Just have scoop nets not set nets	Enforce with tools that support timely and efficient compliance interventions (drones, helicopters) – tools that ideally see activity before they are detected
Unrestricted take	Quota management system to limit harvest (noting that whitebaiters won't support this) Need baseline information to support management decisions	Could address with effort / method controls (nets, distances) Use Australian model of daily and seasonal limit and a total allowable commercial catch Compliance monitoring will be difficult Underlying principle: everyone wants a sustainable fishery

## 21<sup>st</sup> September

### Management options continued

#### Future management options

Issue	What is future management option?	How would it work?
Specific regulation changes: Licensing regulations (of fishing activity and sale)	Define commercial, recreational, cultural Require license to sell (with checks and balances to monitor people selling) Require name to be on nets Link licence to net name tag	Need compliance, and community support to facilitate compliance Enforce with tools that support timely and efficient compliance interventions
Specific regulation changes: Fishing regulations	Define commercial, recreational, cultural Remove use of screens Reduce screen size Test potential regulations by developing a predictive model	One national set of regulations More restrictions on how people catch fish

	<p>Ban sock nets and traps          Require name to be on nets          Link licence to net name tag          Introduce set distances between fishers          Just have scoop nets not set nets</p>	<p>Science, economic and social findings to support changes in regulations          Need compliance, and community support to facilitate compliance          Enforce with tools that support timely and efficient compliance interventions (drones, helicopters) – tools that ideally see activity before they are detected</p>
<p>Specific regulation changes:          Regulations relating to habitat</p>	<p>Update regulations to address weirs (generic in regulation – in-stream barrier)          Test potential regulations by developing a predictive model</p>	<p>Science, economic and social findings to support changes in regulations          Each council should have a whitebait management plan          Need compliance, and community support to facilitate compliance</p>
<p>Biosecurity</p>	<p>Border control and movement within the country restricted, increased fines, education and awareness</p>	<p>MPI: increased public profile, education, improved control, more funding for research and control methods</p>
	<p>Invasive species and diseases          Control</p>	<p>Define and risk-profile ‘invasive’ and ‘disease’ in general terms          Create a protocol and action plan and have that in place          Proactively build defences</p>
<p>Manage using harvest model + licence + enforcement</p>	<p>Commercial harvest vs recreational harvest based on catch data          Licensing model: everyone has one licence, different rules apply to commercial take (e.g. quota management system)          Improved compliance monitoring</p>	<p>Managed harvest + habitat = sustainable fishery          Profit from licensing used to fund research and restoration          Could include whitebait in existing QMS          Set commercial licence fee at a higher cost than \$ received from selling a small amount of whitebait (this would reduce small scale sales)</p>

		MPI or other body to police on DOC's behalf
Decreasing amount of habitat over time Decreasing water quality Increasing human population Increasing urbanisation	Whole of catchment management Mountains to sea approach Environmental impact assessments on all developments	Government led, regional council implementation
Protection	Closing rivers or river systems Catch limits per river or river system Legislative protection for adult fish	Close strategic location(s) Engaging and informing iwi and communities to facilitate buy-in Cultural, science and educational considerations
Water quality	National regulations (e.g. National Policy Statement Freshwater; regulations need to include sediment) Increase ecological health Improve "limits" to require fish and habitat viability, including for juvenile fish (pH, sediment, N, etc.)	Improve national regulations Encourage performance that is better than a minimum or "bottom lines" approach Manage pressures better e.g. stocking limits with respect to soil types
Changing fishery and evolving new technologies / loop holes in old regulations	Review regulations more frequently Implement a governance group and structure for self-governing (e.g. Fish and Game model) Utilise honorary rangers	Update regulations regularly

#### \*\*\*\* – joined via Skype

\*\*\*\* is part of DOC's national compliance team (along with three colleagues and national manager) based in \*\*\*\*. Background: has been DOC for 16 years, all in some sort of compliance role. Prior to that was a Police prosecutor. While not an expert in the whitebait fishery, can offer advice around compliance. \*\*\*\* shared some of his personal observations, and posed some questions:

- 'Whitebaiters' cover a whole cross section of society, from 'mum and dad'/recreational whitebaiters, who are generally very compliant, there to fish for enjoyment, to catch a feed for family and friends – to whitebaiters who are generally compliant, but want a level playing field (i.e. if others aren't following the regs, they might occasionally break them as well) – to others with no compunction about sometimes breaching regs/rules, and some repeat offenders. Then there are commercial whitebaiters, including syndicates and others operating on a commercial basis, with large whitebait catches and significant annual incomes.
- \*\*\*\* noted that there is no mention of 'commercial' whitebaiting anywhere in the regulations. Wonders whether a commercial element was considered when the whitebait fishing regulations were put together? However, either way, commercial whitebaiting now exists.
- Questions that the current regulations are fit for purpose. Unclear why there are two sets of regulations. Noted that the West Coast regulations are more specific (eg fishing from bank, specific rules for some rivers, back pegging of rivers). From his read of the regulations, thinks the West Coast regulations are perhaps clearer and more workable. Is it time for a formal review of the regulations? If yes, will be a large body of work. All whitebaiters have a view on the regulations, and which aspects of them are right and wrong. There will be huge interest from the whitebaiting community who will want to be heard in any review.
- Noted the lack of any catch limits for whitebait – e.g. in comparison to trout, which have a limit on catch and sale prohibited. Outside of restrictions around net size, etc in the Whitebait regulations, there is no limit on take. Noted that from his experience, people will always catch what they can (e.g. in comparison to blue cod, limit is 30, people want to catch their 30).
- Policing of the regulations is variable for DOC from a compliance point of view – e.g. West Coast has dedicated whitebait compliance each season, with a number of files referred for decisions each season (warnings through to prosecutions), but compliance work is more ad hoc in other regions. Noted that DOC is not a full time compliance organisation, and (apart from the one dedicated team) it is one of many roles for rangers. Noted that there is a lack of consistency around how the rules are interpreted and policed around the country – e.g. in relation to the '6 m' rule<sup>2</sup>: what is fishing gear, what is not fishing gear?
- Offending is often difficult to detect. There are two main reasons for this:
  - 1) The open nature of rivers means that people are aware of DOC staff presence within a few minutes of them arriving – those that are not compliant become compliant quickly (though in some ways this is a good thing).
  - 2) DOC staff are often unable to get to the river quickly when they receive reports of non-compliance. By the time they do arrive, the offending has often stopped.

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<sup>2</sup> That is – regulation 6(2)(c) of the Whitebait Fishing Regulations 1994: *'no person shall set or use any fishing gear that...exceeds 6 m in total length'*. This rule is different (2.5 m ?) for the West Coast Regulations.

The Group discussed:

- \*\*\*\* commented on the commercial history of whitebaiting – has been around for c. 130 years, and was part of the original regulations in 1870, which stipulated that a whitebaiter could only use one net. This regulation was included not for conservation of whitebait, but in relation to concern for the impacts of whitebaiting on trout, which had recently been seeded into rivers. This regulation was removed within a year under pressure from whitebait canneries, as the one net rule meant a decrease in the supply of whitebait. \*\*\*\* commented that if there is a commercial element to a fishery, there should be some measures in place regarding how that is policed. As currently stands, it is difficult to do, e.g., a recent court case relating to the ‘6 m’ rule and not fishing more than 1/3 of the waterway – ‘ghost nets’ on a rope and pulley system used to fish 40–50 m into the river, to be able to fish at different tides. Rope and pulley were considered to be part of the fishing gear (i.e. therefore exceeding 6 m total length), as nets could not be used without them. Has caused some angst amongst fishers, as poles can often be more than 6 m in length. Discussed that the West Coast regulations specify that there must be no water between bank and edge of screens. If all fishing had to be from the bank, this might alleviate some of the issues? However, currently people use all sorts of methods to get their nets out further into the river. In \*\*\*\* opinion, review of the regulations is needed to enable better compliance and enforcement.
- \*\*\*\* noted that an issue people often raise is that the ‘6 m’ rule gives unfair advantage for people who have stands, as 6 m starts from where stand is positioned.
- \*\*\*\* questioned where compliance funding comes from. The responsibility for compliance in regions sits with Director, but budget sits with District Office Manager. Compliance budget must compete with other priorities.
- Is there more/less compliance now than 10 years ago? Last year, Lou (DOC Director-General) signed off a new compliance strategy – each district must develop a compliance plan that sets out what compliance they aim to achieve over the next 12 months. E.g. how many whitebait compliance hours over the year? Aiming for better coordination of compliance, ability to monitor, more formal compliance. But, early days – only in the first year of that.
- Re compliance and resources to do that well – \*\*\*\* questioned whether there a need for more resources to do properly, and could MPI be involved? \*\*\*\* noted that MPI have suite of dedicated fisheries compliance officers. They undergo a course at the start of their employment, and their role is solely to carry out compliance. DOC rangers are warranted, but compliance is only part of their role, and sometimes this may drop off due to other work priorities. Always keen to consider interagency options, and it is worthwhile exploring joint opportunities, e.g. DOC works closely with MPI and Environment Southland to carry out joint controls.
- \*\*\*\* asked whether \*\*\*\* has had any experience with compliance regarding damage to spawning sites under the Conservation Act, or barriers to fish passage under the Freshwater Fisheries regulations? \*\*\*\* commented that possibly some in relation to marginal strips and waterways and land incursions, but these aren’t related to fish spawning per se, rather access to public conservation land. \*\*\*\* commented that he thinks this is something that DOC hasn’t really enforced. Discussion around overlapping jurisdiction between DOC and regional councils. DOC has used these provisions (e.g. preventing instream work in a lamprey spawning site identified in Christchurch), but not from a compliance/prosecution perspective.
- \*\*\*\* asked whether there is any compliance and enforcement around structures/stands? \*\*\*\* noted that there is overlapping jurisdiction here – DOC is responsible for the whitebait fishery, but stands are managed by regional councils. If there is an associated hut nearby, that may be district council. If he saw a clearly

unsafe structure or stand while out doing whitebait compliance, would bring to attention of the regional council. But not everyone would necessarily do that.

- Health and safety is an issue in relation to compliance and staffing. Whitebait compliance is now required to be a 2-person minimum job. At times there are some H&S issues – possibly more prevalent in some areas than others? This can impact on ability of staff to be able to get out to do compliance. E.g. requires availability of two staff. \*\*\*\* queried whether body-worn cameras have been considered. \*\*\*\* noted that DOC hasn't formed a view on the use of body cameras yet, though he thinks some staff in Canterbury are using them as a trial. They can be used as a tool to help reduce confrontations, but do have some limitations in terms of admissibility of evidence etc. DOC would need to do a lot more work in relation to this issue before forming a view.
- \*\*\*\* commented that there is a disconnect between DOC monitoring and control of fishing compliance, whereas stands have varying rules around the country – various rules or none at all. Perhaps there should be more review about the state of stands? However, all DOC can do is report unsafe or non-compliant stands if CLE rangers come across them.

### Round table discussion

Everyone around the table to highlight top 3 methods they think will help to achieve MOC's purpose.

- \*\*\*\* – it's a complex issue and it is obvious there is no silver bullet. A lot of the conversation has been directed at reducing fishing pressure, but this is not necessarily the main pressure. This is the opportunity to ask the Minister to put focus on other main pressures (e.g. habitat, recruitment, etc), and provide an example of managing a fishery through drivers, not fishing pressure.
- \*\*\*\* – 1) it's agreed by all that there is a lack of unified research into the fishery; 2) review of the fishing regs – they don't need to be uniform, but the current regime of West Coast regs being different from everywhere else means there is too much differentiation – view is that West Coast regs are probably the better model, but wouldn't like to see national carte blanche consistency – local variation is needed; 3) address habitat and fish passage – this is not simple, and is currently disjointed through regional councils, government agencies, etc. No quick fix – some of the regs could be tweaked, and any review needs to aim for enduring regs (but still do regular review to ensure they are working properly).
- \*\*\*\* – concern about lack of: information on whitebait fishery, monitoring of catch, and consistent plan for restoration around the country. Need: monitoring of catch; more research in a planned and unified way over a period of time; licencing system (that is complied with); compliance and proper enforcing of regs. Unsure if whitebait should be managed as with trout (i.e. no commercial fishing), but aware that there are wider issues. If commercial, need proper licencing and monitoring programme.
- \*\*\*\* – 1) need to secure a funding stream for habitat, compliance work, research, etc. 2) the regs need rejig to make more responsive – it is a fishery characterised by variability between years, etc. 3) compliance would be better dealt with by MPI. Noted that the comparison to trout is not analogous – the species, populations, pressures etc. are not the same (e.g. trout are a stocked fishery) – eel analogy would be a better one.
- \*\*\*\* – whatever comes out of this forum needs to be effective, long term and address the core issues. Core issues we know need to be addressed are: spawning sites, fish passage, water quality. Need funding to enable that to happen. If don't address core issues, anything else won't be effective. In summary: get the basics right, put in place, and make sure they're long term.

- \*\*\*\* – 1) need to be thinking about adult habitat and spawning; 2) one size won't fit all for regulations (e.g. West Coast regs wouldn't work in Waikato).
- \*\*\*\* – 1) agreement that funding is an issue. Fundamental step is to create licencing system, which would create a funding system to go forward. Can't address other issues with no funding; 2) need to focus on harvest plus habitat, as will better achieve a sustainable fishery going forward than working on either on isolation; 3) agreed with \*\*\*\* comments that current regs are in need of review, but can't be addressed with broad brush.
- \*\*\*\* – agrees with other comments so far. 1) licencing is a good idea to generate funding, feed into research, etc; 2) regs need to be tightened. This needs to be led by central government; 3) a mountains to sea / holistic view is needed – if no adult habitat, young won't survive, etc. Need buy in from everybody – whitebaiters, conservationists, etc. to ensure that it will work.
- \*\*\*\* – 1) recreational catch limit with licencing; 2) moratorium on commercial sale until population is thriving; 3) need more funding for compliance, proper training of staff, regs need to be policed. Better and more compliance is necessary for whatever regs we land on.
- \*\*\*\* – thinks there are possibilities for a sustainable fishery – e.g. \*\*\*\* is commercial fishery because puts a bunch of people's catches into one bucket – if regs change, this may not be possible. Families that have whitebaited for generations should have ability to continue.
- \*\*\*\* – from MfE's point of view, interest is in biodiversity and habitat – DOC has other tools in toolbox than just whitebait regs – should think more broadly about the tools available.
- \*\*\*\* – 1) starting a representative and open discussion around whitebait (which we are starting); 2) taking a whole of government approach – DOC, regional councils, other central government; 3) address resourcing/funding issue – to direct money directly to whitebait.
- \*\*\*\* – 1) licencing system, to know where and when people are fishing, possibly with a catch limit like Tasmania; 2) review regs, West Coast vs all New Zealand, e.g. should the closed river network be extended; 3) habitat important. Doesn't seem like there is a silver bullet fix.
- \*\*\*\* – 1) review of the regs, to ensure they are fit for purpose and address underlying issues for whitebait population; 2) investigate licencing system; 3) multi-agency approach to address drivers of impacts on fishery – habitat, etc.
- \*\*\*\* – 1) whether commercial, recreational or customary (or combination) a fisher licencing/permitting system to generate funds to police and improve general understanding of the fishery and adults of juveniles is absolutely essential; 2) recognising that to address the range of cumulative pressures on the five species that there is reliance on multiple organisations to uphold their responsibilities under other legislation (e.g. RCs & DOC on fish passage etc) – and that in many cases these responsibilities are not being upheld (for various reasons); 3) that the goal/objective for this group is more clearly defined by the MOC.

### **Science, research and monitoring (population, management and compliance)**

Discussion on what the holes in our science and research around whitebait are, based on experience.

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- For īnanga, one of the biggest holes is a lack of knowledge about connectivity, linkages between different life stages, linkages within and between rivers, etc. – e.g. don't know where whitebait come from for each river. Some of these gaps can be researched, but other aspects are beyond our control and ability to predict.
- Monitoring catch of whitebait around New Zealand. It is not within the capabilities of scientists to undertake that aspect of work – need for buy in from whitebaiters themselves to contribute back, because otherwise not achievable.

\*\*\*\*

List of information gaps included in 2018 report (p31)<sup>3</sup>. This was an update to Bob McDowall's 1991 report<sup>4</sup>. \*\*\*\* tried to stick to what is known/not known when writing the report, not opinion. Knowledge gaps include recruitment and spawning.

- Spawning: a lot is known about īnanga, but not much about the other species. Information for the other four species is based on a handful of sites and observations. There are lots of things we don't know, and it is hard to manage when we don't know. E.g. previous research indicated that kōaro spawn on stream banks, however, \*\*\*\* et al. recently found a kōaro spawning site in a riffle area in Brook Stream, which shows kōaro spawn in-stream as well as on banks.
- Larval life stage: there is very little known about whitebait larvae while they're in the marine environment. Matt Jarvis is about to start some work on this through his PhD at Otago.
- Whitebait stocks: a focus of \*\*\*\* PhD is trying to figure out how much mixing there is of larvae from different rivers/how separate stocks are. From analysis to date, it is looking like there is quite a bit of structure between the North Island vs South Island for giant kōkopu, and even between some river catchments.
- Habitat restoration: this is easier for īnanga where spawning habitat is well known and defined, but for the other species it is hard to restore their habitat if we don't know where they spawn.
- Fish passage: e.g. what is the impact of impingement and escapement around water intakes on all species? What are the swimming abilities and capabilities to get past barriers for all species?
- Climate change.
- The whitebait fishery: e.g. how many fishers are there, where they fish? It is hard to get good info on this, and then figure out which of the pressures are most affecting the fish (e.g. habitat vs harvest vs fish passage, etc.)
- Monitoring: there is no national monitoring system for the five species, including adults. Know how to do it, but don't have the funding. Monitoring is needed for many reasons.

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We haven't yet figured out how to best manage the fishery, so in some ways, not really sure what the key knowledge gaps are yet – this will depend on the management. Until we work

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<sup>3</sup> Goodman, J. 2018: Conservation, ecology and management of migratory galaxiids and the whitebait fishery – a summary of current knowledge and information gaps. Department of Conservation, Nelson. 39 p. <https://www.doc.govt.nz/about-us/science-publications/conservation-publications/land-and-freshwater/freshwater/conservation-ecology-and-management-of-migratory-galaxiids-and-the-whitebait-fishery/>

<sup>4</sup> McDowall, R.M. 1991: Conservation and management of the whitebait fishery. *Science and Research Series 38*, Department of Conservation, Wellington. 18 p. <https://www.doc.govt.nz/globalassets/documents/science-and-technical/sr38.pdf>

out how best to manage the fishery, we won't be able to work out what the gaps in knowledge needed to inform that management are.

- Climate change: e.g. galaxiids like cool temperatures, so removing riparian vegetation from lakes, rivers, streams etc. has had a big impact. But, this is a sub-lethal impact, not an immediate response, i.e. slow increase in temperatures over time. A couple of degrees difference in temperature is a lot for a fish. Climate change will also impact weather patterns, etc. E.g. frequency of high intensity storms, changes in rain patterns.
- Social science: there is a big social science gap, and we need this information to inform how to manage the fishery. Some of this is being touched on as part of the West Coast sustainable whitebait fishery project.
- Economic valuation: including human use, customary use, etc. It is more than just the fish; there is a lot that fishers need for a good experience. E.g. access to the river.
- Ecology and stock structure: to manage a fishery you need to know whether you are managing one stock or many. This is especially critical for a fishery driven by larvae at sea.
- Recruitment: how much recruitment is there?

\*\*\*\*

- Flow: there is a lot that we don't know about flow requirements (across all five species and all life stages). E.g. ki uta ki tai – mountains to the sea connection important; flow changes temporally; flow variability important, but unsure how reliant whitebait populations are on peaks and troughs in flow.
- Impacts of pest fish, pest plants and algal blooms.
- Parasites and diseases.
- Understanding cumulative effects including: differences for different species and life stages and impacts on lakes.

\*\*\*\* and \*\*\*\* from Fisheries New Zealand joined

\*\*\*\* background is population dynamics modelling for finfish in the marine environment. Now manages the stock assessment team at Fisheries New Zealand/MPI, which has oversight of all marine fisheries harvested, plus freshwater eels. \*\*\*\* is a stock assessment scientist, specialising in inshore marine species and freshwater eels.

\*\*\*\* and \*\*\*\* outlined key issues/info gaps relating to management of whitebait from their perspective:

- \*\*\*\* – need to understand life cycle points, pressure points, environment and cumulative impacts. Need to undertake a semi-qualitative/quantitative risk assessment, to help with a prioritisation process. Within the whitebait fishery there are five species, with different niches, life histories and impacts.
- \*\*\*\* – to be able to model population, need an index of abundance of the adult population, and information on variables that might be affecting that (e.g. fishing, habitat loss). E.g. are impacts expanding over time? Much of the information needed is held by regional councils.

There were questions and discussion on:

- \*\*\*\* asked about population modelling and how that is done. \*\*\*\* – currently trying to come up with a spatial stock assessment for eels. Includes looking at elver recruitment at dams, catch per unit effort (CPUE) to develop index of abundance,

mapped longfin habitat and looked at proportion that is commercially fished (generally only c. 30% – so CPUE data is only from this area).

- There is a high mortality of juveniles for the whitebait species, so would need to look at a range of data e.g. CPUE of juveniles, and survivability through to adulthood.
- The link between juvenile recruitment and adult numbers is often not linear. Unknown for whitebait. In marine species there is almost no clear relationship between eggs, larvae and recruitment into adult populations.
- Question on marine harvest of adults. Fisheries models are demographic population dynamics models – can overlay maximum sustainable yield over that, to look at how to maximise yield – then can ask what sort of management can be imposed and what the consequences of that would be (e.g. what if we took the big ones, vs the little ones?).
- Noted that there is no perfect model – need to start somewhere and tweak as we go. All models are wrong – need to ask ‘what if’ at each stage – i.e. if  $x$  changed, how much impact would it have? If only a small impact, then probably not a big concern in terms of model accuracy, but if big impact, then highlights a problem.
- Demographic models are difficult to generate for many species. Instead, are moving to a framework for some species – spatially explicit risk assessment. This aims to add risks up and identify where the pressure points are (or are not). Allows us to identify what sort of risks are important, where and when they’re important.
- \*\*\*\* noted that we have some good predictive models for native fish, which could be a starting point for spatially explicit modelling.
- \*\*\*\* asked – what about the problems associated with a multi-species fishery? Means it’s complex!
- Question about what Tasmania have done in relation to their whitebait fishery – could we look at what they did to manage? It is managed by Inland Fisheries Service.

**Action** – \*\*\*\* to send Inland Fisheries Service contact person to \*\*\*\*.

- Suggestion from \*\*\*\* – perhaps should start with inanga first? \*\*\*\* noted that when modelling, you do need to pick the high information species first, because if you can’t make it work there, then there is no hope with others. Would suggest focussing on the species that we have a lot of info for to start, and collect information about the others as we can, but don’t worry about analysing that just yet. May not be able to achieve the MOC’s purpose as there are different values for different species, and these are not just focused on the whitebait life stage.
- \*\*\*\* asked about flatfish management/modelling, as they are another mixed species fishery? \*\*\*\* noted that this isn’t a great model, and they are short-lived species.
- \*\*\*\* asked: how much effort it would take to get a benchmark of where the fishery is at today? Including adult populations, amount of habitat, connection, fish passage, etc. – are there possibilities to do that? \*\*\*\* – first answer would be impossible, but maybe... It is hard to back-project from the information that we have today, but could use information from reserves etc. as a way to extrapolate.
- There is a need for monitoring programmes.
- \*\*\*\* asked: do we have an idea of whether there has been population change in protected areas? No – we need a good monitoring programme to be able to do this.
- \*\*\*\* noted that there is information available, e.g. \*\*\*\* and \*\*\*\* have data from many years of fishing on the Cascade. \*\*\*\* commented that if we could provide like data from other areas, then we could develop a comparison. \*\*\*\* noted that the West Coast Whitebaiters Association is asking members for voluntary catch data. E.g. records exist of 30 years catch around Whataroa. It would be best to have a

comparison for impacted system. \*\*\*\* noted that data will exist for the country, but needs to be asked for the right reasons, and in the right way. Whitebaiters need to trust that information will not be used against them.

- \*\*\*\* asked: what contribution could a good set of reserves around the country make to sustainability? \*\*\*\* – difficult question to answer – if recruitment to a catchment is predominantly from fish that were hatched in that catchment, then would be important for that catchment, but less so for wider fishery (i.e. minimal impact on populations in other catchments). However, if many catchments contribute, would be different. Important to ensure that there are enough protected areas and reserves that contribute eggs and larvae widely (i.e. not just into one catchment). The number of reserves needed would depend on rates of dispersal and life history of species – e.g. inanga have a smaller buffer as are predominantly annual species.
- If more closed rivers were to be established, need to know that they will be effective.
- If fishing isn't the major bottleneck in life history, then closed areas may have little effect. Need more information.
- Does a reserve work for species that live only for c. 1 year and spawn once? This means that it is a highly productive species, and can have a much lower buffer.
- Is it likely that the proportions of species (i.e., catch composition) in whitebait catches were different in the past? There is very little longitudinal data on species composition in the whitebait catch. The current (2017) nationwide species composition, as recorded by Yungnickel, is very similar to that recorded by McDowall in 1965, but there is little information available between these two points in time.
- How long a time frame would you need to collect data for? Longer term data needed – i.e. at least 10 years. Recruitment is driven largely by environmental variables, so need to go through at least two [environmental/weather] cycles. NZ tends to operate on decadal fluctuations. But management can be put in place in a shorter timeframe.
- Would a quota be a useful management tool for whitebait? \*\*\*\* – most useful would be temporal and spatial closure of rivers, to allow populations time to adapt. \*\*\*\* noted that could place greater pressure on other rivers though. \*\*\*\* noted the importance of recruitment dispersal among the different species in this context.

### *Monitoring*

- \*\*\*\* – understanding risks and drivers tells you what to monitor and where. Tools for whitebait are limited. Electrofishing is effective for count and location, but would be a high cost if implemented nationwide. A lot of habitat is not wadeable, which makes electrofishing difficult. DOC did look at widespread species monitoring of indicator species.
- Monitoring for stock assessment, or monitoring or survey to answer some of the questions – e.g. what species are coming in?
- Planned sampling programme using whitebaiting methodology? There is merit in this – e.g. to obtain data on input, species composition.
- Best to work with fisherman? Not either or. Can be both – separate, planned monitoring system, in conjunction with gaining data from fishers.
- Also need to work out what adult populations are doing.
- Other organisations are likely to have robust data that would help to fill gaps. Can we inventory data that does exist as starting point?
- Close kin genetic analyses are one method that can be used to determine population size – relate relationship between juveniles with genetic fingerprints to adults, then use ratios to calculate population size by linkages between juveniles with the adult population.

- Environmental-DNA (e-DNA) another option – cells sloughed off by fish in a waterway can be picked up in a water sample. The science isn't quite there yet, but Cawthron Institute is developing a tool. This would give species composition, but unsure if it could tell you about genetics??
- \*\*\*\* noted that could link monitoring into fishers who are out there every day – e.g. tie into licencing. \*\*\*\* noted that it has been tried before, several times, but didn't work. \*\*\*\* – could ask for volunteers from licence holders to provide data/samples. It has to be voluntary, otherwise unlikely to receive good data. \*\*\*\* – there is an atmosphere of awareness of issues with species, and many people would be happy to assist – but there needs to be good publicity/communication.
- \*\*\*\* raised question about whether mātauranga knowledge be used along with other science here. \*\*\*\* – mātauranga Māori has to be part of a risk assessment system. There is a need to provide examples of what information mātauranga can contribute – e.g. mātauranga may highlight when/where a big event was, which may aid interpretation of results around catch and recruitment, etc. There is a need for all to be involved at all steps of analysis. Mātauranga is an important knowledge layer.

### Next steps

- Next meeting tentatively scheduled for 25–26<sup>th</sup> October in Wellington. Will decide at that meeting whether or not a 3<sup>rd</sup> meeting is needed. Location of 3<sup>rd</sup> meeting if happens would be in Christchurch.
- Johanna will send out the draft meeting record out for review. Group to review and add track changes or email comments to Johanna if any corrections etc. required. Will then finalise to end up with one record that everyone agrees with.

## **Attachments**

- 1) Whitebait Working Group agenda
- 2) Whitebait Working Group background
- 3) Whitebait Working Group Terms of Reference

FINAL 12 Feb 2019