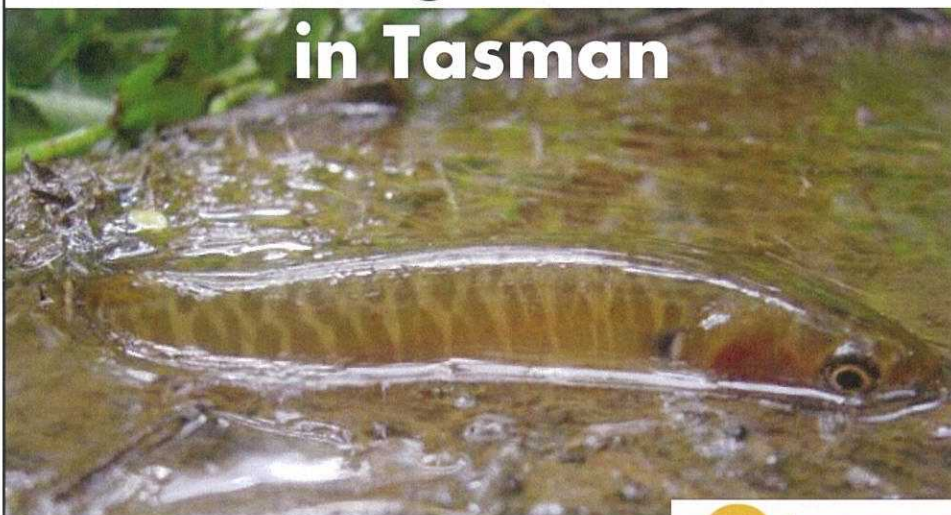


## Fish Passage Restoration in Tasman



Trevor James, 27 November 2013



## Rule regimes Culverts are permitted if:

- **no impedance of fish passage (existing structures have 5 years from the operative date of the plan to restore)**
- designed to take flood flows of an AEP of 2%
- no increase in flooding or inundation of upstream or neighbouring properties
- no diversion of water from the stream's natural flow path
- inlet and outlet designed to avoid scour of the river bed and banks
- maintained in good repair and free from obstruction by debris

Continued...

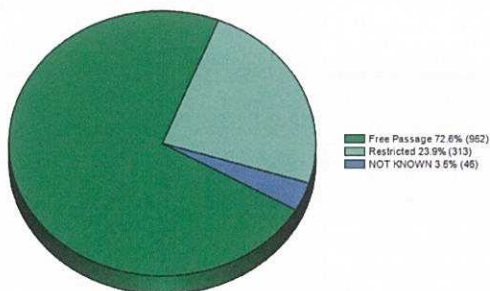
## Culverts are permitted if (continued):

- the **length of pipe is <15m**
- the **width of the river bed is <3m**
- the **fill height** above the culvert pipe is **<2m** (<0.5m in our most erodible soils)
- it is not in a WCO
- it does not disturb a cultural heritage site (listed in Schedule)
- does not cause a hazard to navigation
- sediment discharges during installation meet the required rules

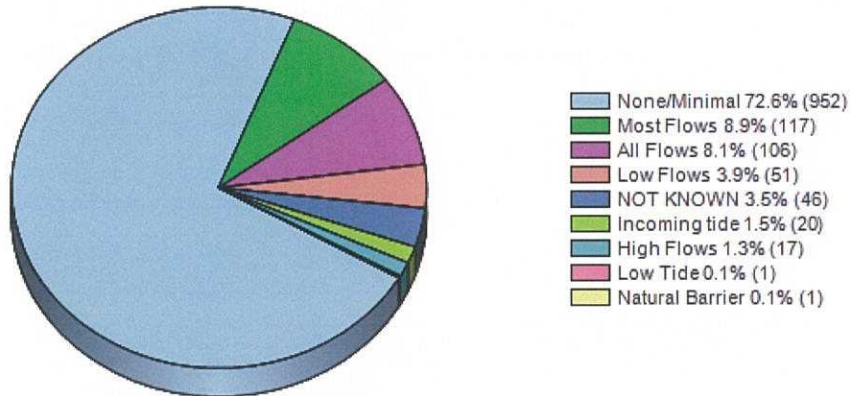
Assessed ~1300 structures, mostly in the coastal parts of the district

Restored fish passage at over **150 sites**

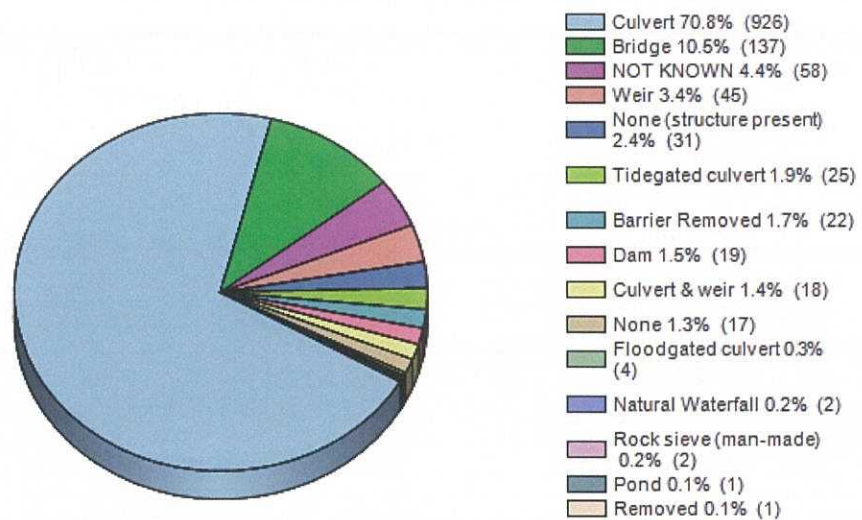
.... which opens up ~**300 km (70km<sup>2</sup>)**

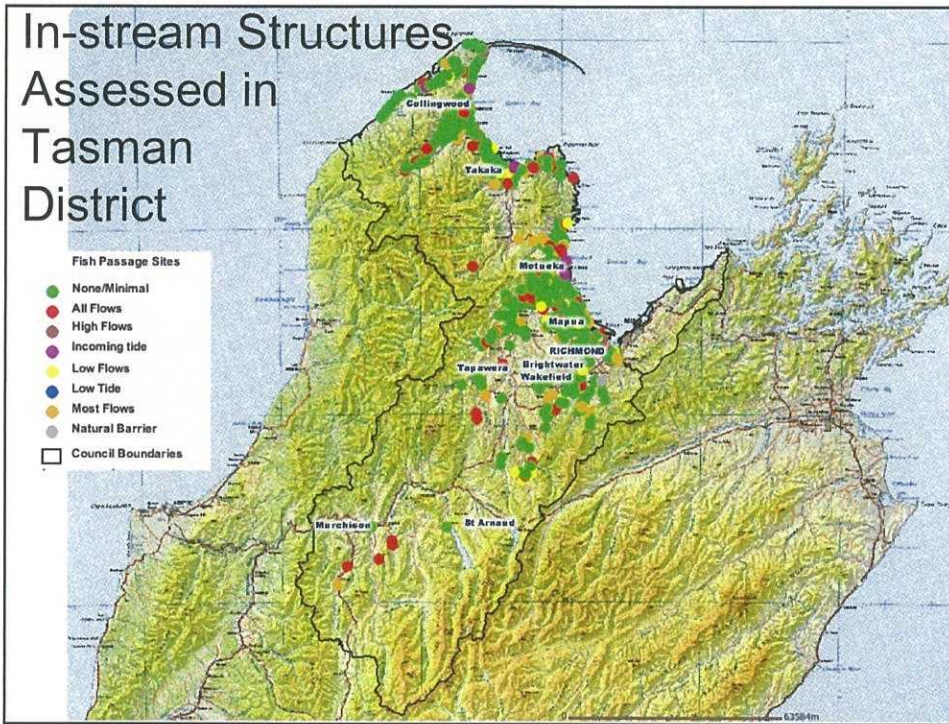


Percentage of Sites By Restriction Severity



Percentage of Sites By Barrier Type





### Aprons in highly erodible ground 1



## Considerations when Installing Aprons

### Issues:

- Cement is very toxic to fish
- Fine sediment causes adverse effects (*but you have to crack some eggs!*)
- Pay particular attention to the foundation & top and bottom ends
- Use geotextile & reinforce so it lasts

### Mitigation:

- Work in the dry → over-pump (inlet screen & outlet protection)
- Fish recovery in dried reach

... Installing a larger pipe or bridge is always best

*Aprons in highly erodible ground 2*



Now our most common fix for small drops.

Large schools of inanga upstream





### Gravel Extraction Upstream of structure



*More squabbles 'Down the road'*



Onekaka Inlet trib Shambala Rd Jan 2006



Climbing\_Galaxias\_09.wmv



Finally a landowner did something ...but!!



## Stock crossings - 200mm plastic multi-barrel

- Cheap & easy
- Increasingly-used

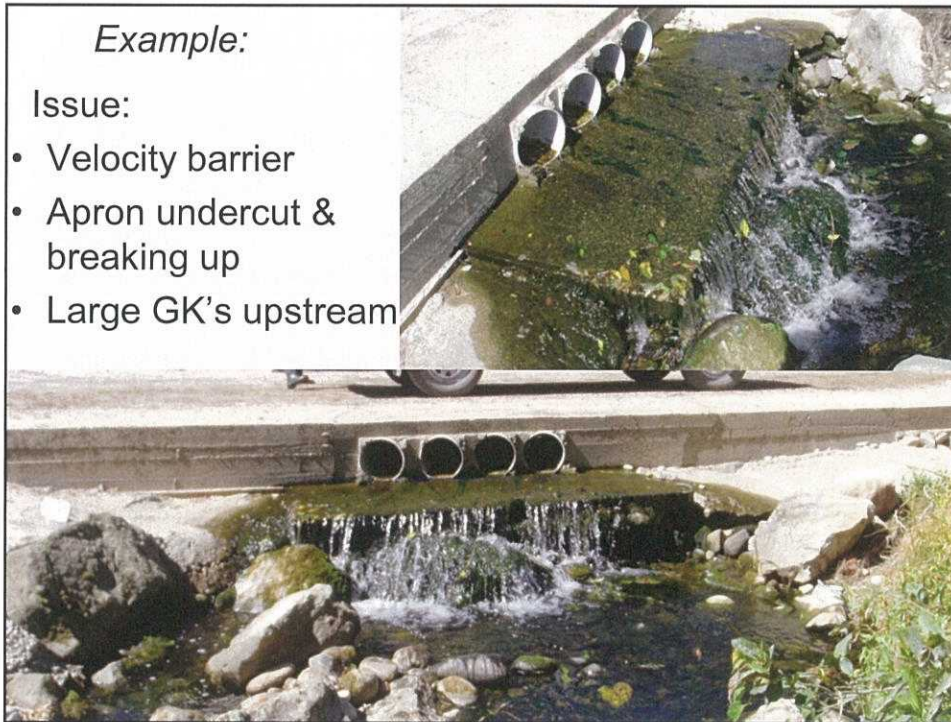
...but many are FPB's

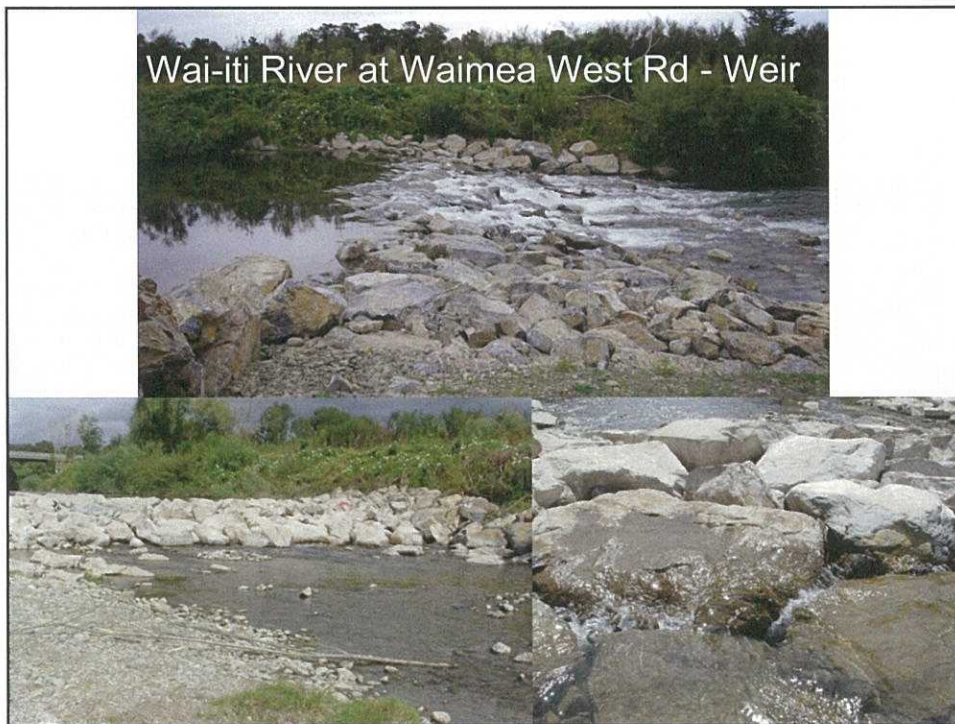


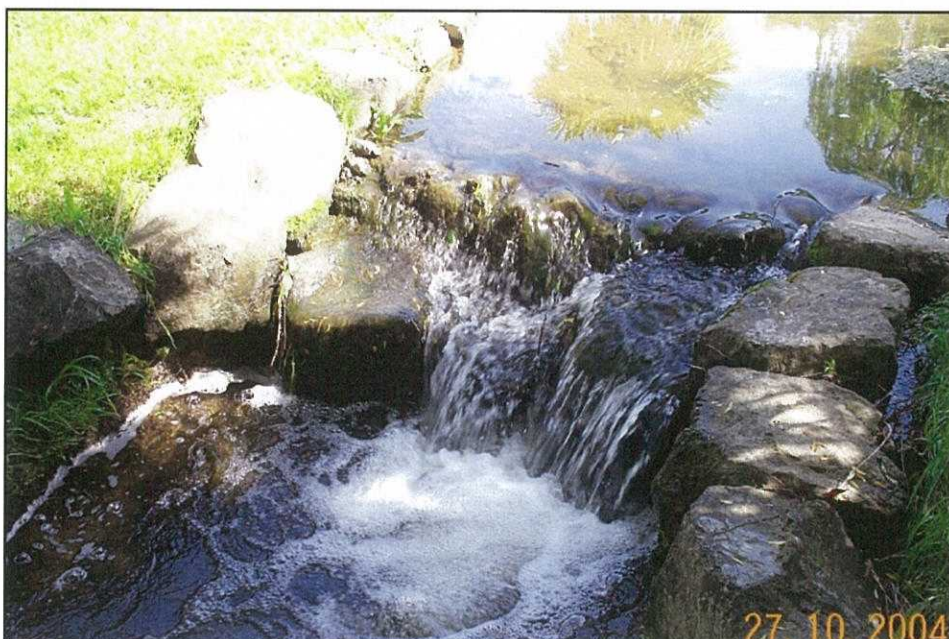
*Example:*

Issue:

- Velocity barrier
- Apron undercut & breaking up
- Large GK's upstream







Rip-rap — Reservoir Creek

## Water Takes



Wainui Bay

# Tidal flap-gates



Tributary of Jimmy Lee Creek



Waitatua Stream, Riwaka

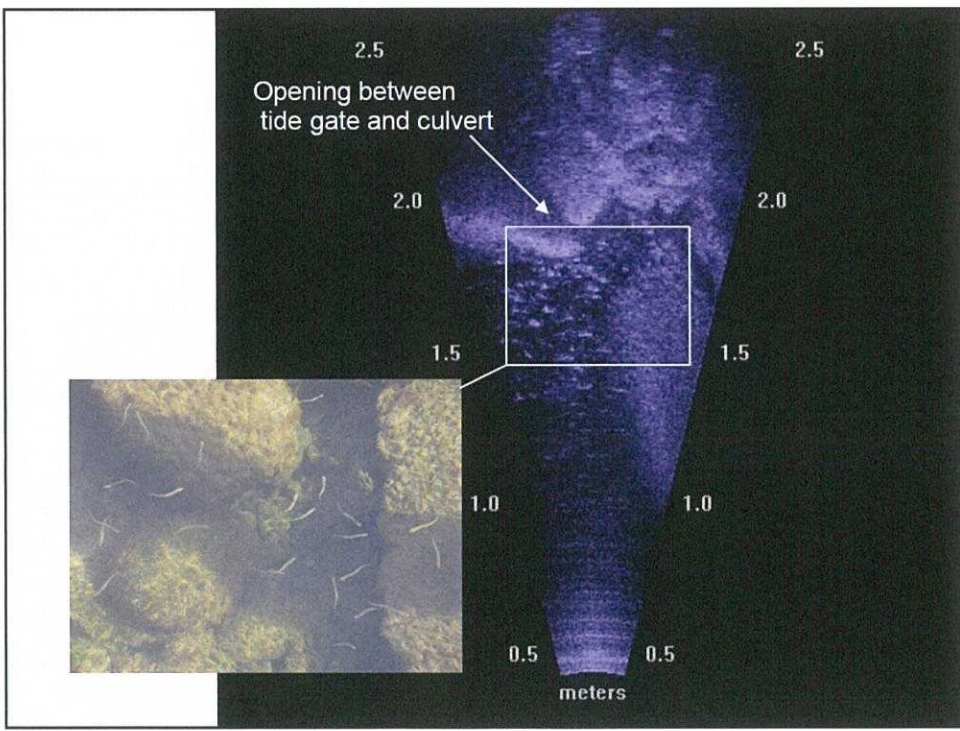


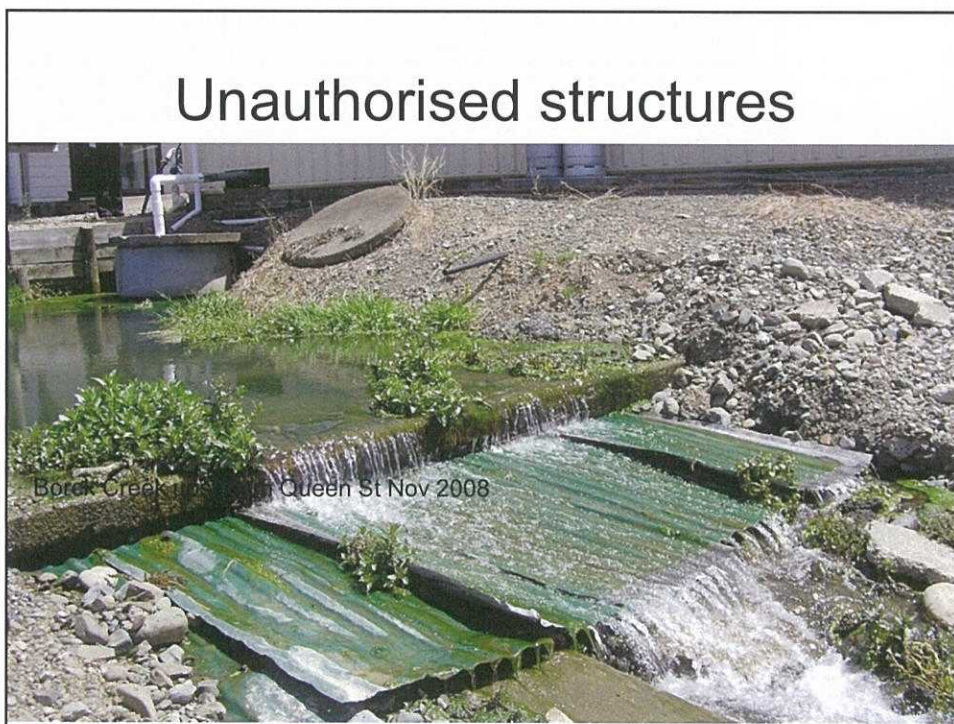
Unnamed Creek, Riwaka

Estimated number:  
40-60



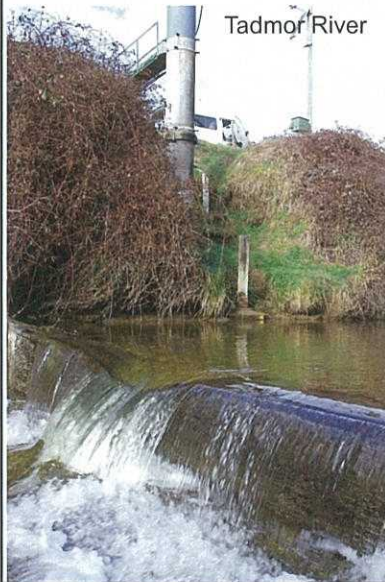
Pearl Creek, Waimea





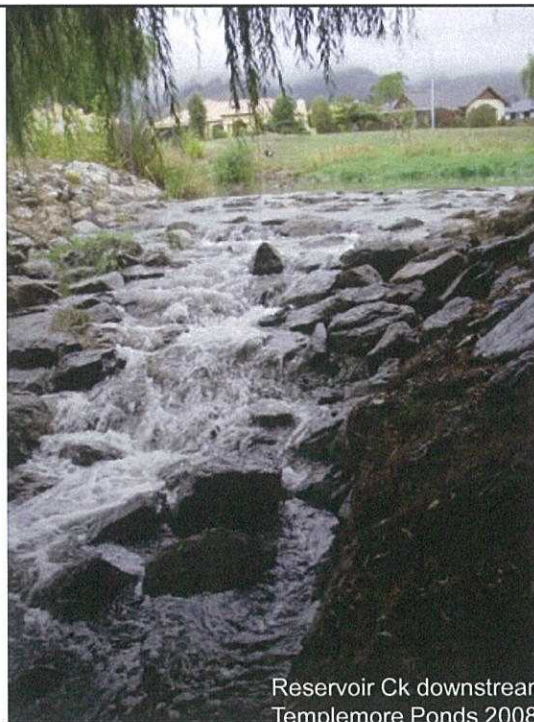
# Hydrology Weirs

Number known in District: 19



## Good Weirs

- Rough (not smooth)
- Flow continuous on surface
- No undercuts



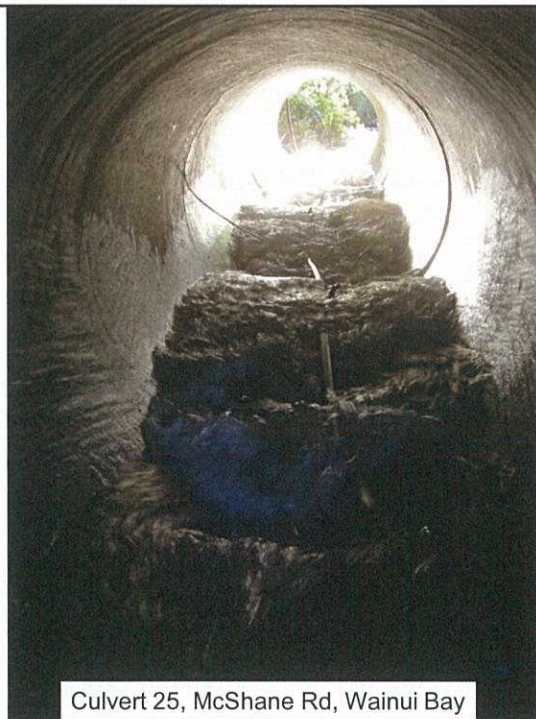
## Fish Habitat in Culverts

Short culverts (~50m) can be productive habitats if they are wide enough and contain good substrate



Kaiteriteri Stream Trib at Bethany Park Nov 2008

## Baffles



Culvert 25, McShane Rd, Wainui Bay





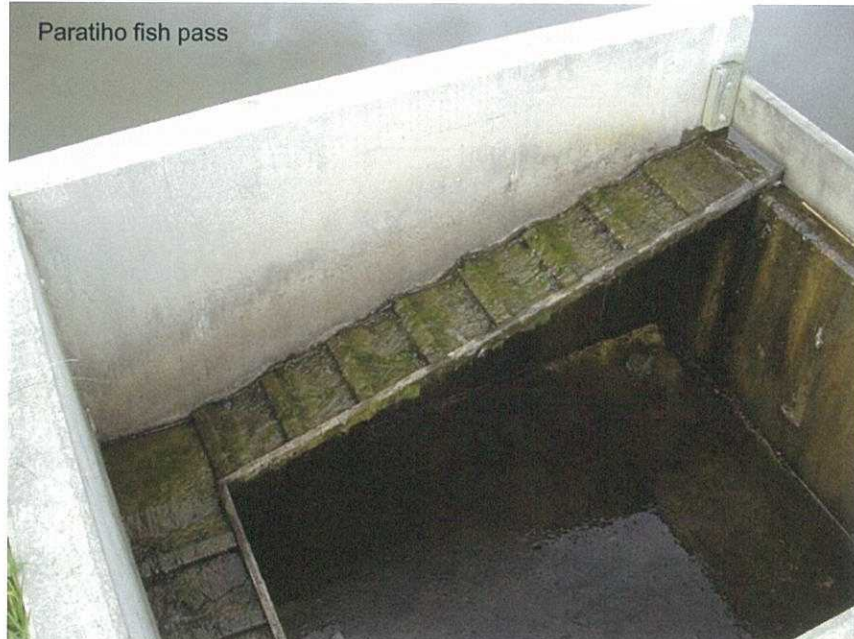
## Keys to success

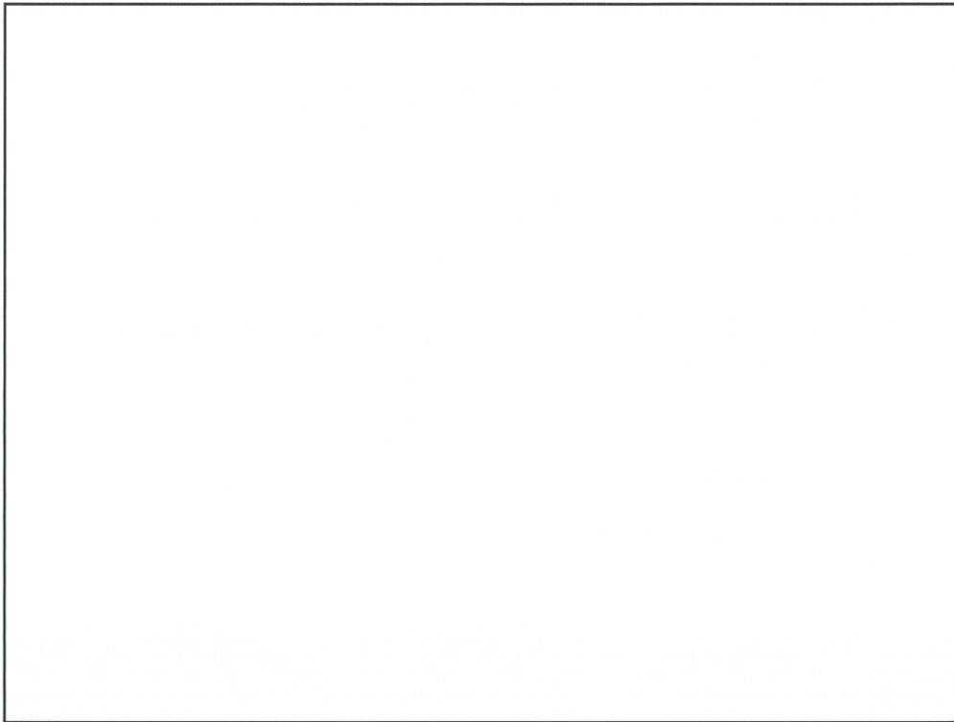
- Keeping costs low:
  - Using summer students
  - Concentrated restoration campaigns
  - Using low or no-cost materials
- Teamwork with roading and stormwater engineers
- Getting budget set aside
- Having a good database linked to the photo archive

# The End



Paratiho fish pass





## **Where to from here?**

Feedback questionnaire:

- Did we achieve the aims of the event?
- What did you want more or less of?
- Do we run an event like this again?
- Rolling these events out in the regions...

The proceedings and the guidelines...

## Why consider fish passage?

- Most native fish have juvenile migrant stage (16 of 20 native fish in Tasman)
- Life-supporting capacity and biodiversity **(terrestrial as well as aquatic)**
- Restoration usually has high bang for buck – solution often very simple & cost-effective solutions



## Good culverts – design it right first time

- Wider than stream
- Height (<300mm vertical wall)
- Climbing medium (rough + continuous wetted margin)
- Water velocity (0.3m/sec)
- Shallow water (50cm for larger native fish)
- Culvert floor is below stream bed level
- Resting eddies/pools in the culvert floor
- Erosion protection (particularly at outlet)
- Not too long (<100x wetted width)
- For box culverts: provide a deeper low flow channel