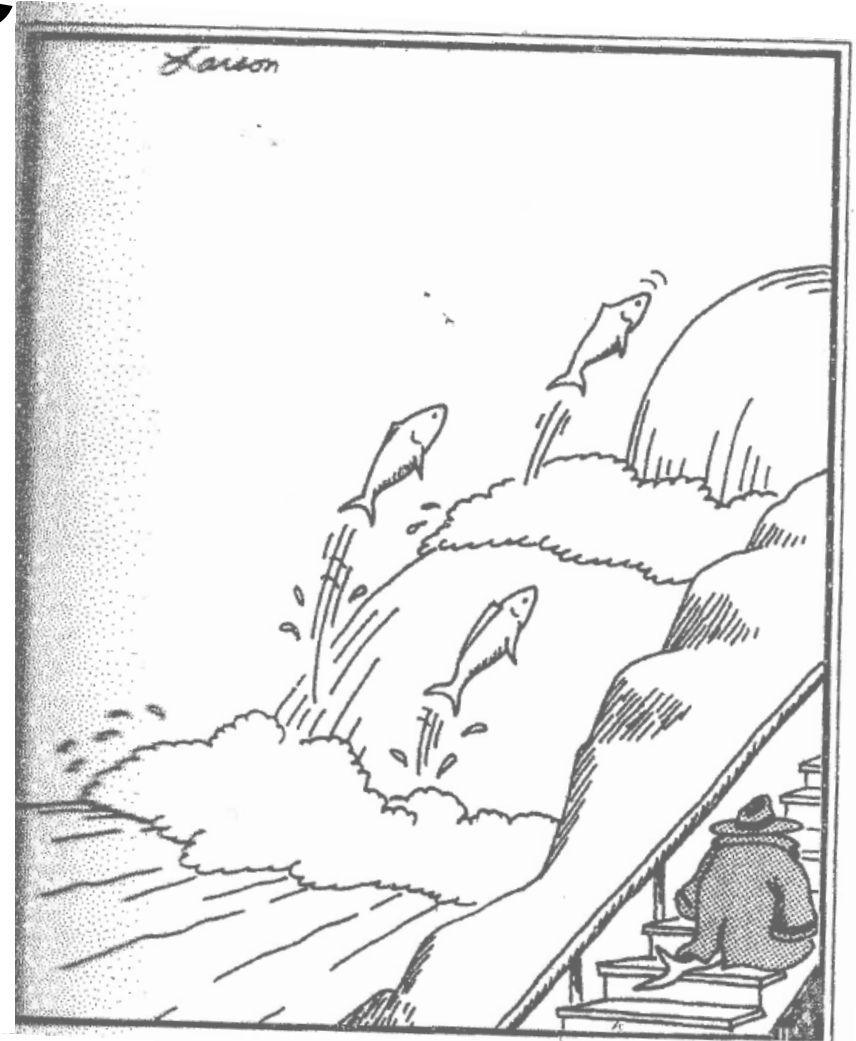


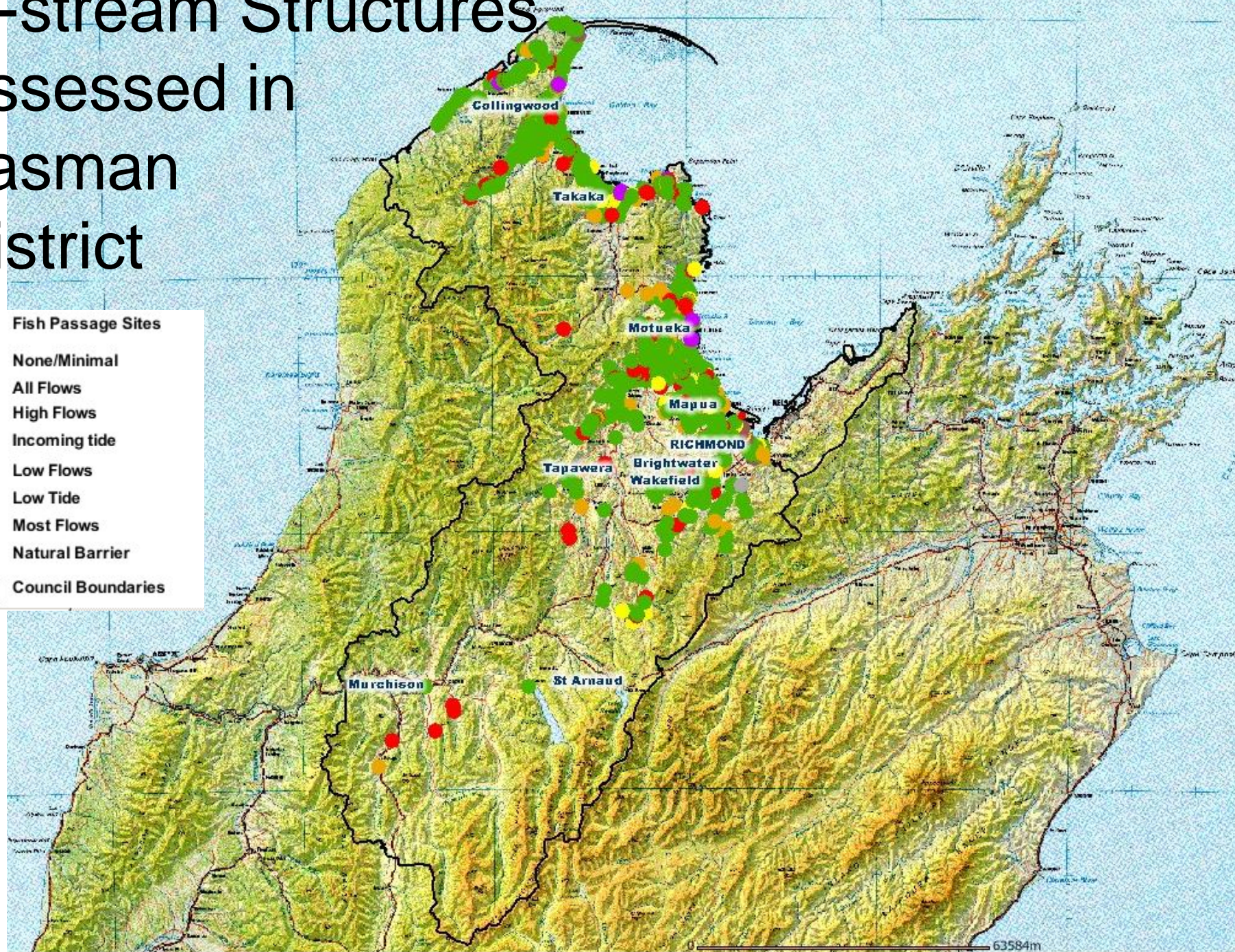
# Strategies for Restoring Fish Passage

- Assessment
- Remediation
- Resources
- OSH considerations
- Prioritisation





# In-stream Structures Assessed in Tasman District





# Efficiency

- Efficiency
  - ‘Campaigns’ of several days or a week
  - Complete catchments
  - “2 workers in a ute”
  - Mushroom spikes
  - Cordless power tools

# Materials

- Conveyor belts
- Mussel spat ropes
- Stainless fixings (all 316)
- Sealant to reduce potential for corrosion of culvert reinforcing
- For concrete - used mooring chain & fibreglass reinforcing (eg: [www.forta-ferro.com/](http://www.forta-ferro.com/))

# OSH - Safe Operation Plans

## Hazards

- Flash floods
- Falling (steep banks)
- Slipping (slimy stream beds)
- Traffic hazards
- Electrocution (electric drills)
- Cuts
- Toxic vapour (petrol generator or epoxy glue)



# OSH - Confined Space (TDC's Def<sup>n</sup>)

## Culverts:

- >50m long when culvert <1.5m diameter
- >100m long when culvert >1.5m
- <500mm diameter
- significant amount of bioactive organic matter (>1cm deposited) eg sewage, effluent, milk waste, sawdust
- any significant odour
- using glues that produce hazardous gases
- it is completely dark (even with a headlamp)

# Prioritisation - Your Feedback

Focus on:

- Catchments with higher fish diversity (x12)
- Barriers closest to the sea (x9)
- As required by condition of consent (x8)
- Our own barriers (x7)
- Interest from community groups (x7)
- In conjunction with other works (x6)
- High profile barriers (x3)

# Prioritising FPB's for Restoration in Tasman District

Criteria used:

- Quantity of habitat upstream
- Quality of habitat upstream
- Fish community value – using 'proximity to coast' (didn't have a fish IBI at that stage)
- Severity of fish passage restriction

Other factors dismissed:

- Proximity to other barriers on same waterway
- Stream gradient



# Other major factors:

- Council leading by example
- Work efficiency – travel time
- Work from bottom of the catchment & work upstream
- \$\$\$\$
- Keen community group or project
- Reticent or difficult landowners

# Post-remediation monitoring

- Electro-fishing (x6)
- Visual sighting of fish upstream (x4)
- Return to clear debris (x1)

# Summary of the Key Success Factors in Tasman

- Keeping costs low:
  - Using summer students
  - Concentrated restoration campaigns
  - Using low or no-cost materials
- Teamwork with roading & stormwater engineers
- Getting budget set aside
- Having a good database (including links to photo archive)

The End



# Considerations when Installing Aprons

## Issues:

- Cement is very toxic to fish
- Fine sediment causes adverse effects (*but you have to crack some eggs!*)
- Flow on the surface, not into a rock sieve
- 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

# In Tasman

## Culverts are permitted if:

- no impedance of fish passage (existing structures (at plan notification) 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 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

# Advocacy



World Fish Migration Day 2014, on the **24<sup>th</sup> May**, calls attention to the need to restore the connections in rivers and the sea for migratory fish, to achieve healthy fish stocks and productive rivers. Migratory fish (like salmon, sea trout, dorado, shad, giant catfish, sturgeon and eel) are threatened by barriers such as weirs, dams and sluices; built for water management, hydropower and land drainage. Around the world people rely on these fishes as their primary source of protein. Water and resource managers and conservationists are striving to improve migration routes between and within rivers, deltas and the oceans; all of which fish need to survive.

World Fish Migration Day is held to improve the public's understanding of the importance of migratory fish and their needs, as well as healthy rivers. Raising awareness, sharing ideas, securing commitments and building communities around river basins are essential aspects of fish passage and river restoration. On this day, we will connect celebrations and events that start in New Zealand, and follow the sun; ending as the sun sets on the west coast of North America. To date we have more than 40 locations worldwide and are looking for more organizations that want to join us. A map with event locations can be found at: [www.wanningenwaterconsult.nl/en/products/world-fish-migration-day-2014](http://www.wanningenwaterconsult.nl/en/products/world-fish-migration-day-2014)

#### Would you like to organize an event?

Participating organizations will organize their own event and outreach communication under the umbrella of the World Fish Migration Day. Wanningen Water Consult & LINKIT Consult, partnering with WWF, The Nature Conservancy and the FFSG, will take care of the central coordination, international publicity, and maintain the main website ([www.worldfishmigrationday.com](http://www.worldfishmigrationday.com) - online in October 2013). All projects will be highlighted on this website, social media and in the press.

For more information or to organize an event:

E-mail [herman@wanningenwaterconsult.nl](mailto:herman@wanningenwaterconsult.nl) or call 00 31 6 18 27 25 72

#### Supported by:





# Wrap up - where to from here?

- Finalise FP assessment sheets
- Develop a research strategy (and an Envirolink Tools proposal)
- Produce proceedings document
- Continue progress on the FP guidelines and develop website
- World fish migration day
- What else

**The End**

# 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

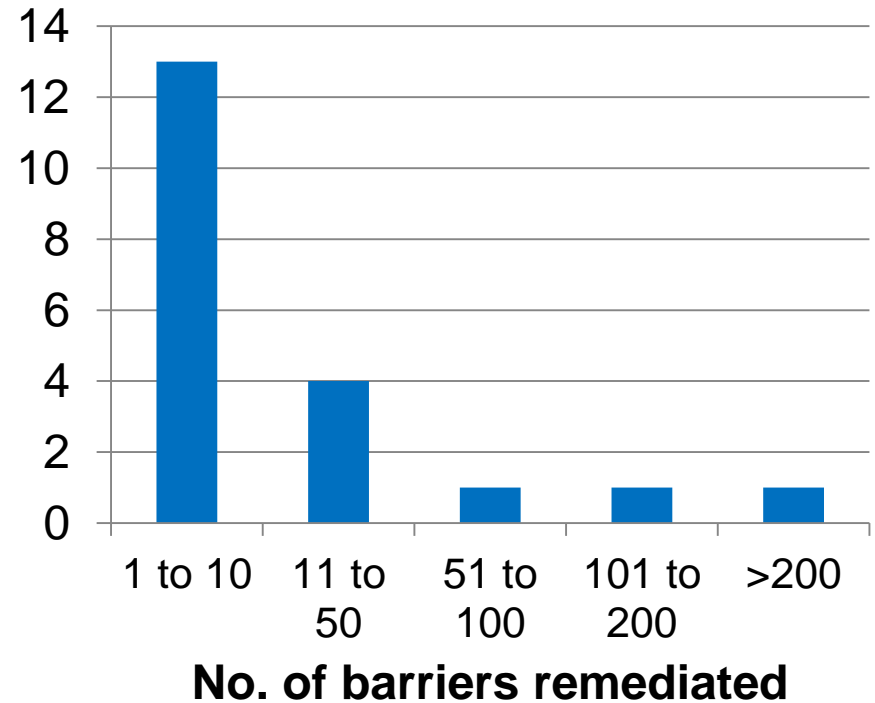
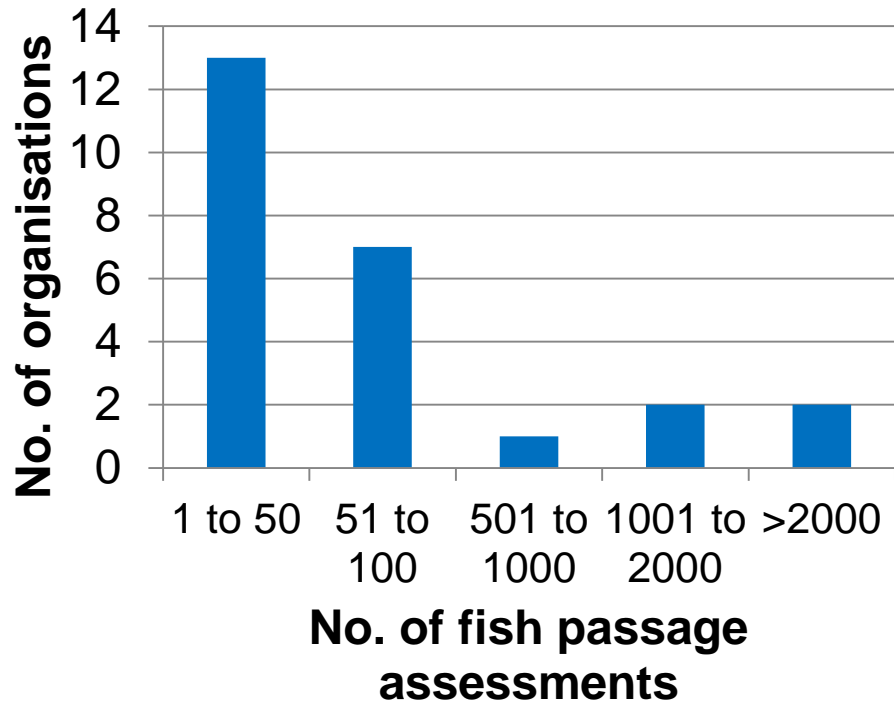
- Wider than stream
- Height (<300mm vertical wall)
- Climbing medium (rough + continuous wetted margin)
- Water velocity (0.3m/sec)
- Shallow water (50cm for larger native fish)
- Culvert floor is below stream bed level
- Resting eddies/pools in the culvert floor
- Erosion protection (particularly at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



To install a fish passage barrier for excluding predatory fish, Department of Conservation and Fish and Game must be Consulted.

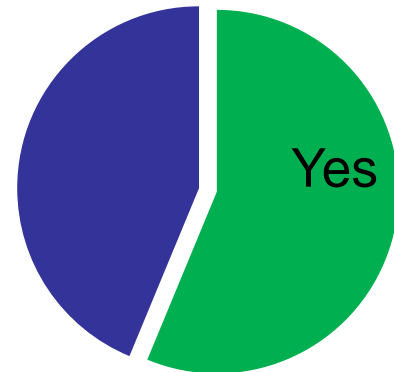
- Signalled in Sports Fish and Game Plans (F&G)
- Could be signalled in Freshwater Fish Management Plans (DOC)

# State of Play: Assessments of Structures & Barriers Remediated



# Fish passage rules

- For new structures: All Regional councils
- For existing structures: 9 Regional councils



# Strategies for Restoring Fish Passage



Trevor James