



STAFF REPORT

TO: Environment & Planning Committee

FROM: Trevor James, Resource Scientist

REFERENCE: W416, R07005

SUBJECT: **STATE OF THE ENVIRONMENT REPORT 2006 FRESHWATER FISH SURVEY - REPORT EP07/08/15** - Report prepared for meeting of 23 August 2007

Note: If Councillors wish to see a full copy of this report (36 pages) please contact Trevor James.

1. INTRODUCTION

This report follows a collaborative investigation into how freshwater fish cope with varying degrees and types of stream habitat disturbance activities and water quality. The investigation also gathered baseline information that can be used to predict fish distribution and to measure the success of stream restoration projects.

Compared to other regions in New Zealand, Tasman District has a relative paucity of freshwater fish data and not enough data exists to accurately predict fish distribution. This is partly due to the fact that most regional councils have been running SOE freshwater fish monitoring for 5-10 years and have more-often required consent applicants who plan to undertake stream habitat disturbance activities in waterways, including water takes, to supply information about freshwater fish populations.

Once enough data is collected from surveys such as this, Council will be able to reasonably accurately predict, using modeling methods, the presence of freshwater fish species in a particular reach of a waterway. This will mean a great improvement to best practice in assessing environmental effects in all resource consent applications. Currently it is considered disproportionately expensive and onerous for applicants of resource consents for small operations to collect freshwater fish data.

TDC in carrying out functions under the RMA is to recognise the life-supporting capacity and natural character of wetlands, lakes and rivers and their margins, as well as significant habitats for indigenous fauna and introduced sports fish such as trout and salmon. Resource management organisations (including Councils) nationally and internationally are starting to realise the importance of producing 'State of the Environment' Reports for the health of waterways that integrate information about water quality, stream habitat and aquatic life.

This project involved cooperation between TDC, Department of Conservation (DoC), and Fish and Game New Zealand Nelson Marlborough Region (F&G) for survey design and implementing fieldwork. All three organisations have responsibility for monitoring fish populations under a range of legislation. Cawthron Institute and Landcare Research also assisted with field investigations in the Motueka River Catchment under the Integrated Catchment Management (ICM) project.

2. METHODS

Streams sampled were from Golden Bay to Tasman Bay, mostly within 20km of the coast, generally small (1st-3rd order), with varying types and degrees of habitat modification. A total of 48 stations were assessed on 29 individual streams in October-December 2006. Streams selected were sampled by backpack electric fishing, spotlighting and in some circumstances gee minnow traps were employed. For data analysis stream sites were divided into four disturbance classes (one being most highly modified), based on the following criteria: stream canalisation and straightening, amount of riparian vegetation that has been disturbed or removed and restriction of stock access.

3. RESULTS AND DISCUSSION

Freshwater fish were encountered in every waterbody with an average number of 3.2 fish 100 metre reach. Shortfin eels were observed most frequently (75% of stations) followed by inanga (73%) and longfin eel (71%). Eels were common in pastoral streams without riparian protection but not common in very highly disturbed streams such as those that are regularly 'cleaned' of weed and straightened. Inanga (whitebait) were migrating into freshwater at the time of this investigation (spring) and were abundant in one third of all stations sampled but like eels, they were not common in highly disturbed streams. Inanga and shortfin eel also have reasonable tolerance to poor water quality. Sensitive native fish (banded and giant kokopu and koaro) appear to favour streams with the least disturbance sites that provide in-stream and overhead cover and natural meanders. Sensitive native fish were observed in 25% of the stations surveyed. All stations where they were found were the least disturbed, having not only a natural meander (that was reasonably common on pasture streams) but also natural channel morphology, woody debris and overhanging woody vegetation (even stream-sides covered with gorse).

These results demonstrated the success of restoration projects such as that on Reservoir Creek (an urban creek in Richmond) that involved removing a weir that had previously acted as a barrier to fish passage. Migrating galaxiids were recorded for the first time in the mid reaches of Reservoir Creek following the removal of the weir and construction of a fish pass. The historical records also indicate that some results may be linked to season. For example smelt appear present in streams only in late autumn, while inanga are abundant in the spring.

Figure 1a and b show the difference between riparian management on the same stream. The pasture site is narrower and has comparatively little in-stream cover (like "hidey holes") and depth variability. Obviously there is little shade provided in the pasture stream and consequently the stream gets warmer. Insects and other invertebrate life in the stream show a lower diversity (especially mayflies, stoneflies and caddisflies) than forested streams. The location of these photos is only 300 metre apart with the pasture reach being downstream of the forested reach.



Figure 1a: Berkett Creek downstream of the wooded section (average width 0.6 metres)



Figure 1b: Berkett Creek within the wooded section (average width 1 metre)

Figure 2 below shows an example of results from a catchment that is included in the full report on this investigation.

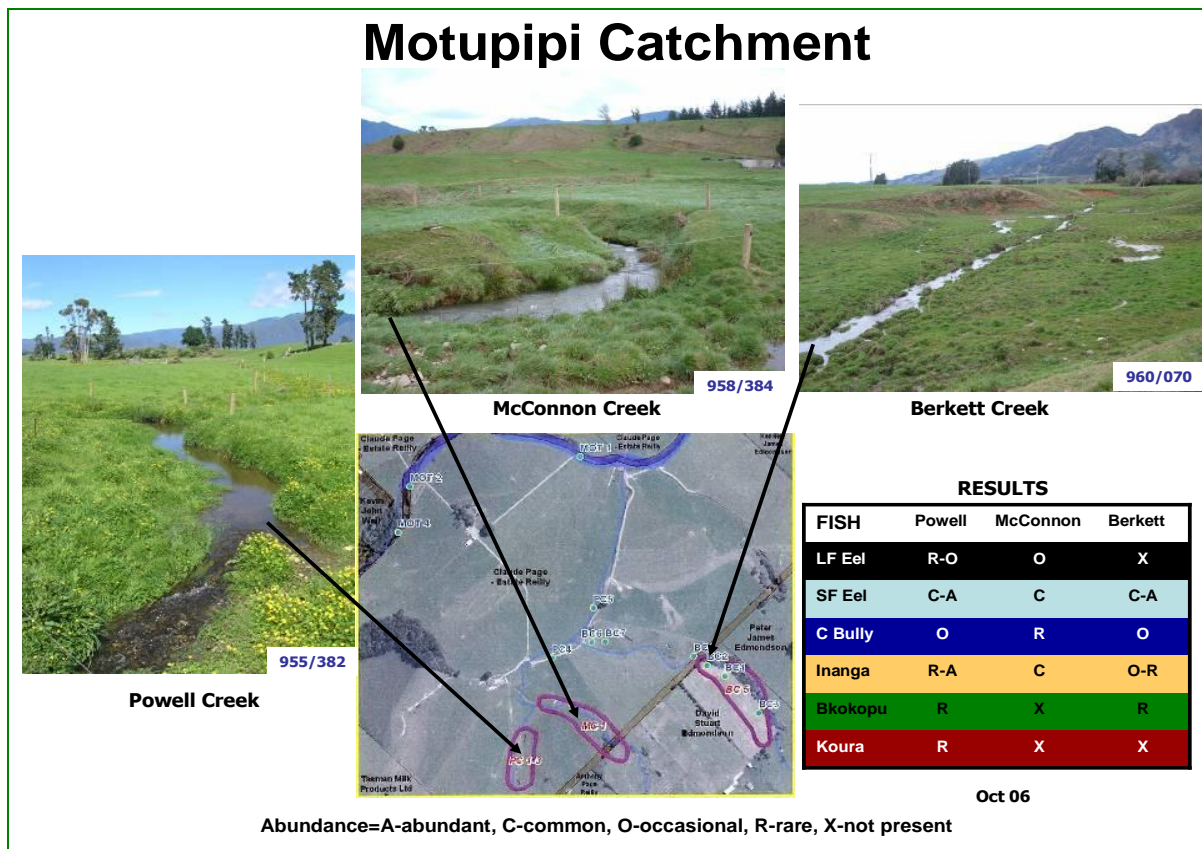


Figure 2: Results from three of the sampling stations. For full results from all sites, see Appendix 2 of the full report.

Many intermittently-flowing streams in Moutere gravel country were found to contain reasonable numbers of fish (particularly banded kokopu, a species sensitive to habitat disturbance). The presence of residual pools shaded by riparian trees is thought to be the reason for the numbers of these sensitive native fish found in this survey. These residual pools are formed in the parent Moutere Gravel sequences rather than re-worked eroded gravels. This type of habitat was found in this survey at Redwood Valley Stream, Seaton Valley Stream, Tasman Valley Stream and Horton Valley Stream and has also been found in Eves Valley Stream. It will be interesting to re-survey this site, and other additional sites like it, in summer to confirm that the pools contain water when the flow has ceased. If this is the case it would be very important to protect these types of streams from disturbance, including direct modification with machinery or from significant erosion caused by increased peak flow run-off from removal of large areas of vegetation in the catchment, as has been experienced in Eves Valley Stream.



Figure 11: A pool in Redwood Valley Stream. Pools like this contain water even when the stream stops flowing, providing essential refuges for fish.

4. CONCLUSION

In general the results show similar patterns of habitat preference to those found in other regions with highly disturbed streams containing relatively low fish diversity and abundance. One surprising result was the high biodiversity and numbers of banded kokopu in intermittently flowing streams draining undisturbed Moutere gravel geology. These results confirm the need to continue to implement measures that protect habitats of native fish from activities such as drain clearance, stream straightening, cattle trampling, fine sediment discharges, riparian vegetation removal and other land uses impacting the beds and riparian zones of small order streams in the Tasman District.

5. RECOMMENDATION:

THAT Council receive the report entitled '2006 Freshwater Fish Survey'.

Trevor James
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