



Landcare Research
Manaaki Whenua

River-Groundwater modelling in the Upper Motueka

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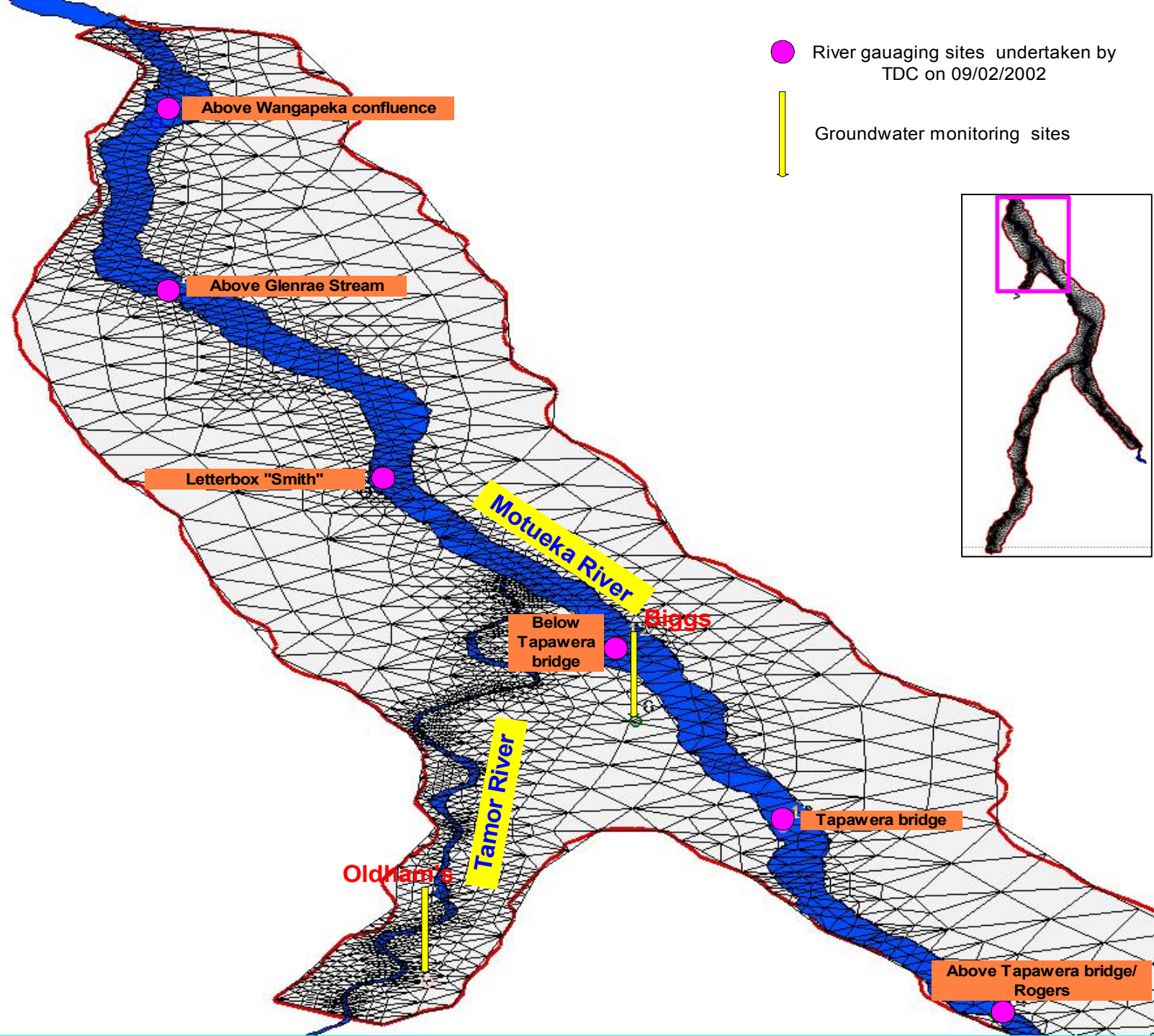
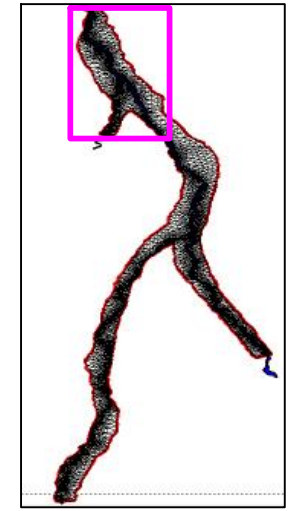


Background

- Part of FRST funded *Motueka Integrated Catchment Management* research programme
 - Providing: *tools for managing the cumulative effects of land and water use*
 - \$220k per annum (TDC contribution of \$25k)
- Developing a 3d groundwater flow model to analyse the effects of groundwater abstraction on river flows and groundwater levels

● River gauging sites undertaken by TDC on 09/02/2002

↓ Groundwater monitoring sites



The model

- Finite element model of groundwater and river
- Korere to Wangapeka junction,
 - also short section of Tadmor and
 - Motueka above Kohatu (to Gold Pine)
- Currently in steady state and being developed into dynamic version
- Using all information on geology etc from previous report

Research criteria

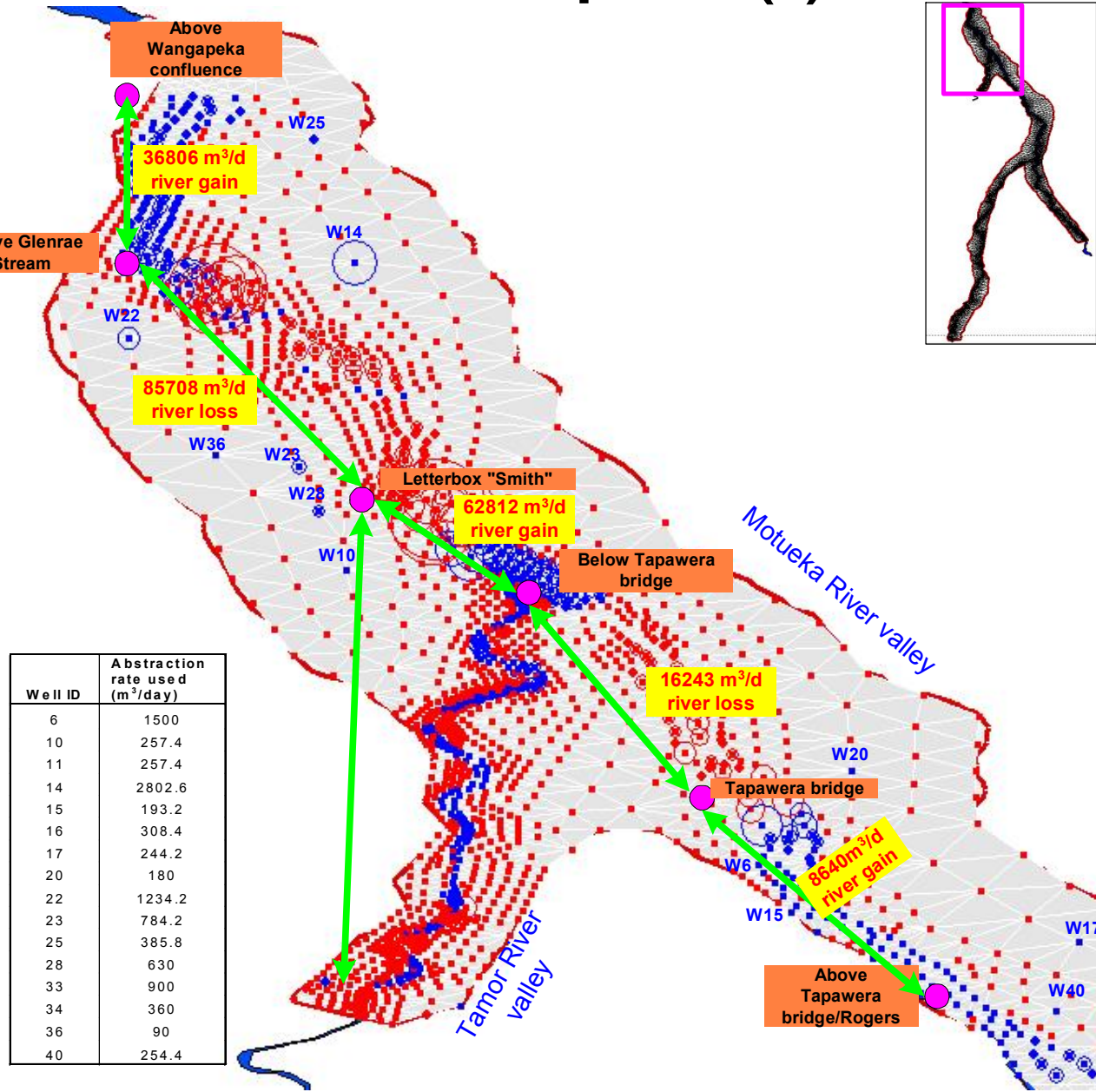
- Management requirement:
 - Tool for investigating specific groundwater extraction effects on groundwater levels and river flows
- Science challenge:
 - Developing groundwater model for long thin valley
 - Significant hillslope contribution
 - River a significant art of surface
 - Integration with freshwater ecology



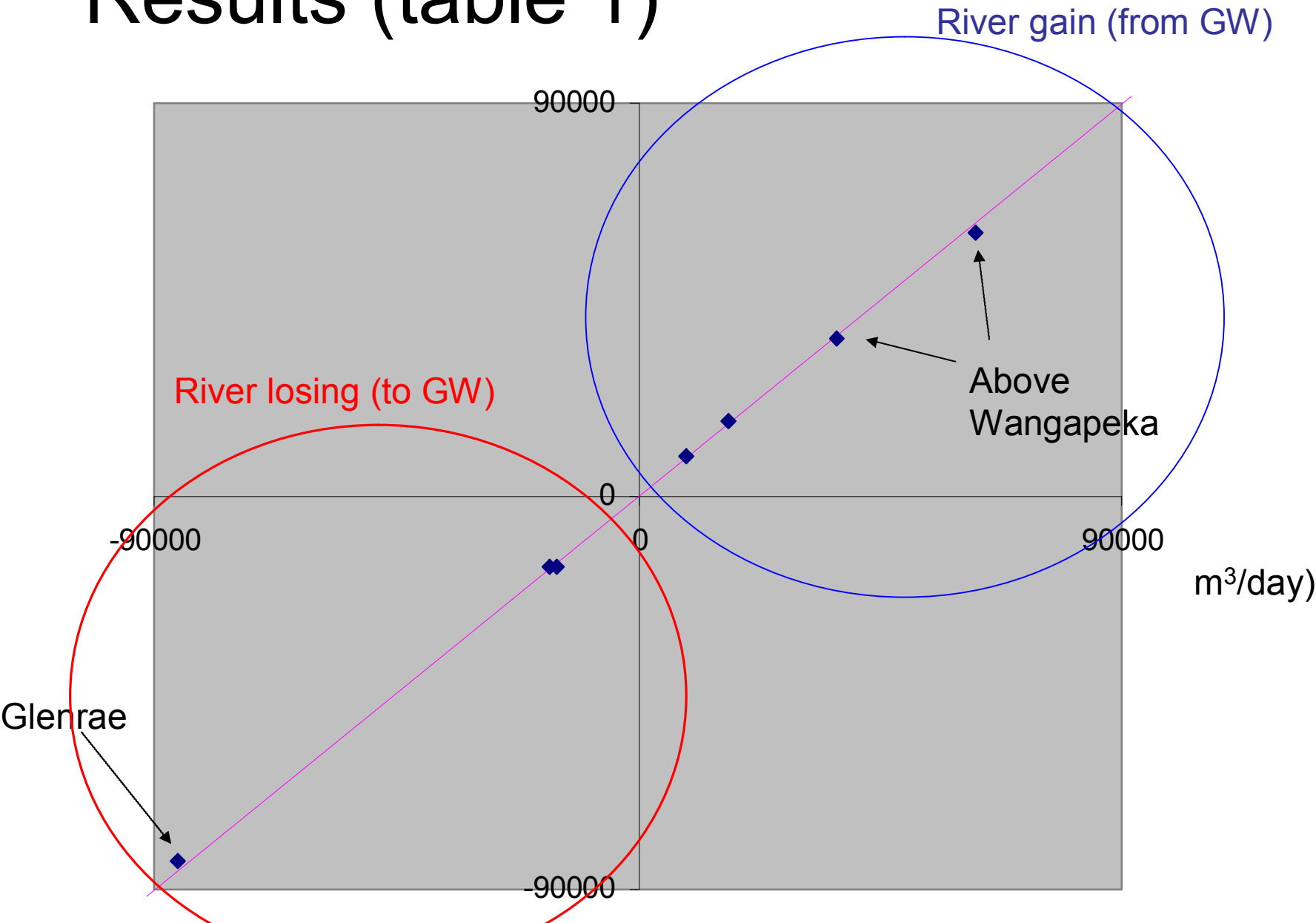


Model output (i)

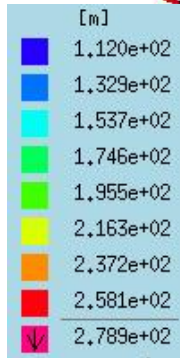
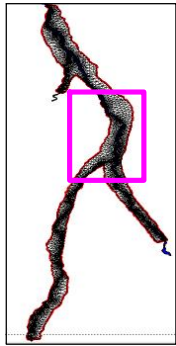
River loss
River gain



Results (table 1)

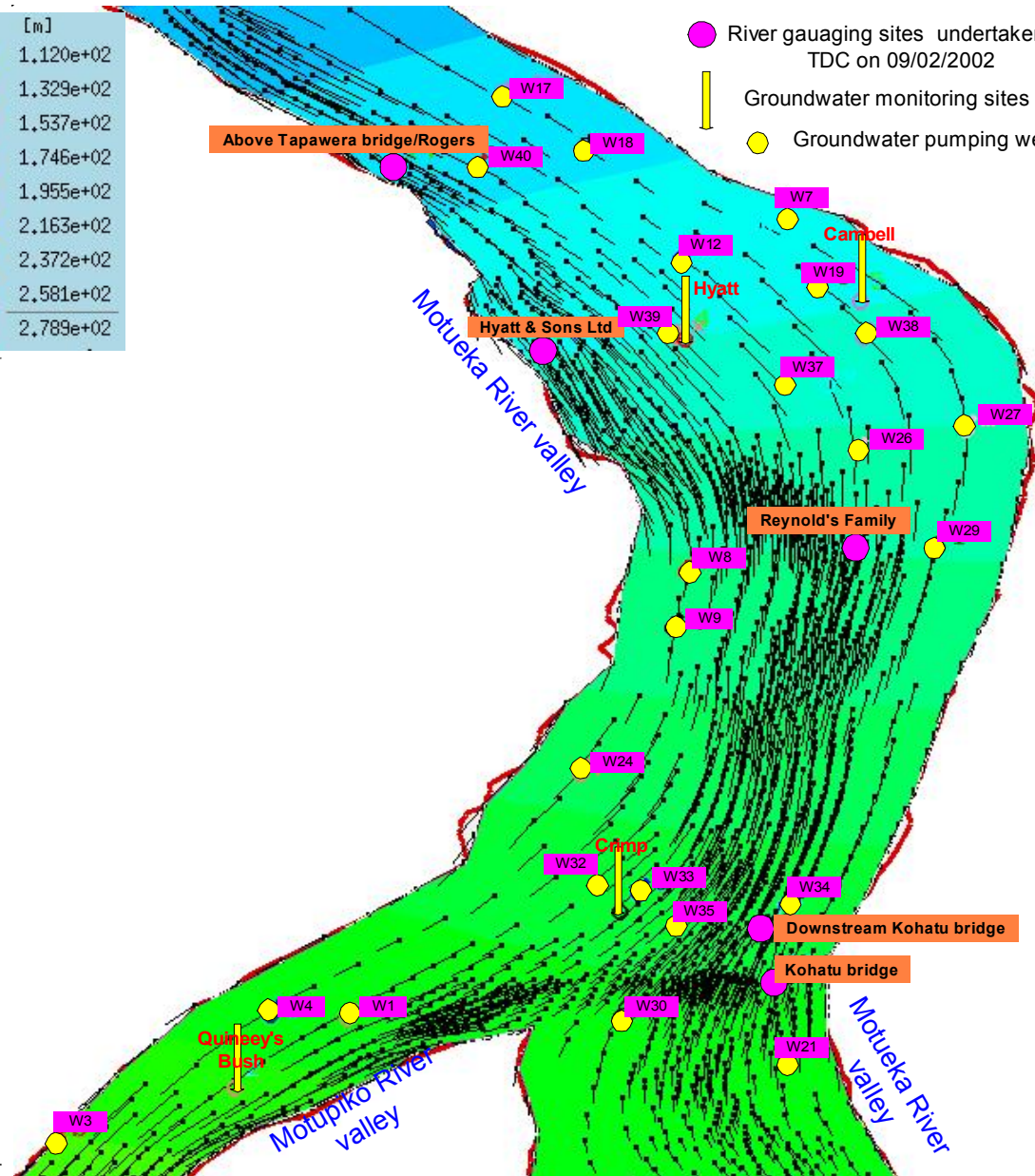


Model output (ii)



- River gauging sites undertaken by TDC on 09/02/2002
- | Groundwater monitoring sites
- Groundwater pumping well

Well ID	Abstraction rate used (m ³ /d)
W1	103.2
W3	223.8
W4	77.4
W7	120
W8	258
W9	154.2
W12	128.4
W17	244.2
W18	244.2
W19	254.2
W21	150
W24	308.4
W26	771.6
W27	257.4
W29	385.8
W30	771.6
W32	771.6
W33	900
W34	360
W35	900
W37	848.4
W38	463.2
W39	496.2
W40	254.2



Steady state to dynamic

- Annual average to daily
 - Rainfall recharge through soil (separate model)
 - Hillslope contribution (from field experiment)
 - Groundwater extraction (from model of crop requirements)
 - Side valley inputs (separate model)
- Concentrating on 2001-2003
- Work in progress

Conclusions

- Model being developed for groundwater and river management in Upper Motueka
- Steady state model working well
- Dynamic version currently being worked on
- Will provide tool to look at different land use scenarios
- Will provide tool to look at groundwater upwelling for fish refuge...