Steve,
In response to the question posed as to the % of optimum for torrentfish at the proposed minimum flow of 850 L/s It would be between 70-80% at the site measured upstream that has 20% less flow (Jowett 2014). Habitat declines sharply at a level below 900 L/s Jowett 2014 (see table 5.1 below). I was also asked to estimate the length of planting to compensate for the unknown temperature increase due to the abstraction just to show that is possible to do if the effects are know I have included a figure from the STREAMLINE model that shows the heating of 1st-3rd order streams with both 50% and 70% shade (Rutherford et al. 2010; https://www.tandfonline.com/doi/pdf/10.1080/00288330.1997.9516801). This is the technique I would recommend for determining the length of planting required based on the stream size and could be applied to the applicants existing planting to determine its impact if any.

Adam Daniel, PhD
Fisheries Manager
Fish & Game New Zealand
Auckland/Waikato Region
156 Brymer Rd.
RD 9
Hamilton 3289
Cell (022) 030 9033
Office (07) 849 1666

Table 5.1: Suggested flow requirements for fish habitat in the study rivers.

Ohinemuri Golden Cross Valley Road	Habitat	Flow (m^3/s) that provides:				Flow (m^3/s) below which habitat declines sharply
		optimum	90% of optimum	80% of optimum	70% of optimum	
Estimated 5 year 7-day low flow:	Rainbow trout spawning	1.4	0.75	0.55	0.35	0.6
0.26 m^3/s	Rainbow trout rearing	1.0	0.7	0.55	0.45	0.65
	Longfin eel	0.3	<0.1	<0.1	<0.1	<0.1
	Shortfin eel	0.5	<0.1	<0.1	<0.1	<0.1
	Common bully	0.3	0.18	0.12	0.1	0.25
	Redfin bully	0.3	<0.1	<0.1	<0.1	<0.1
	Torrentfish	1.8	1.1	0.9	0.65	0.9

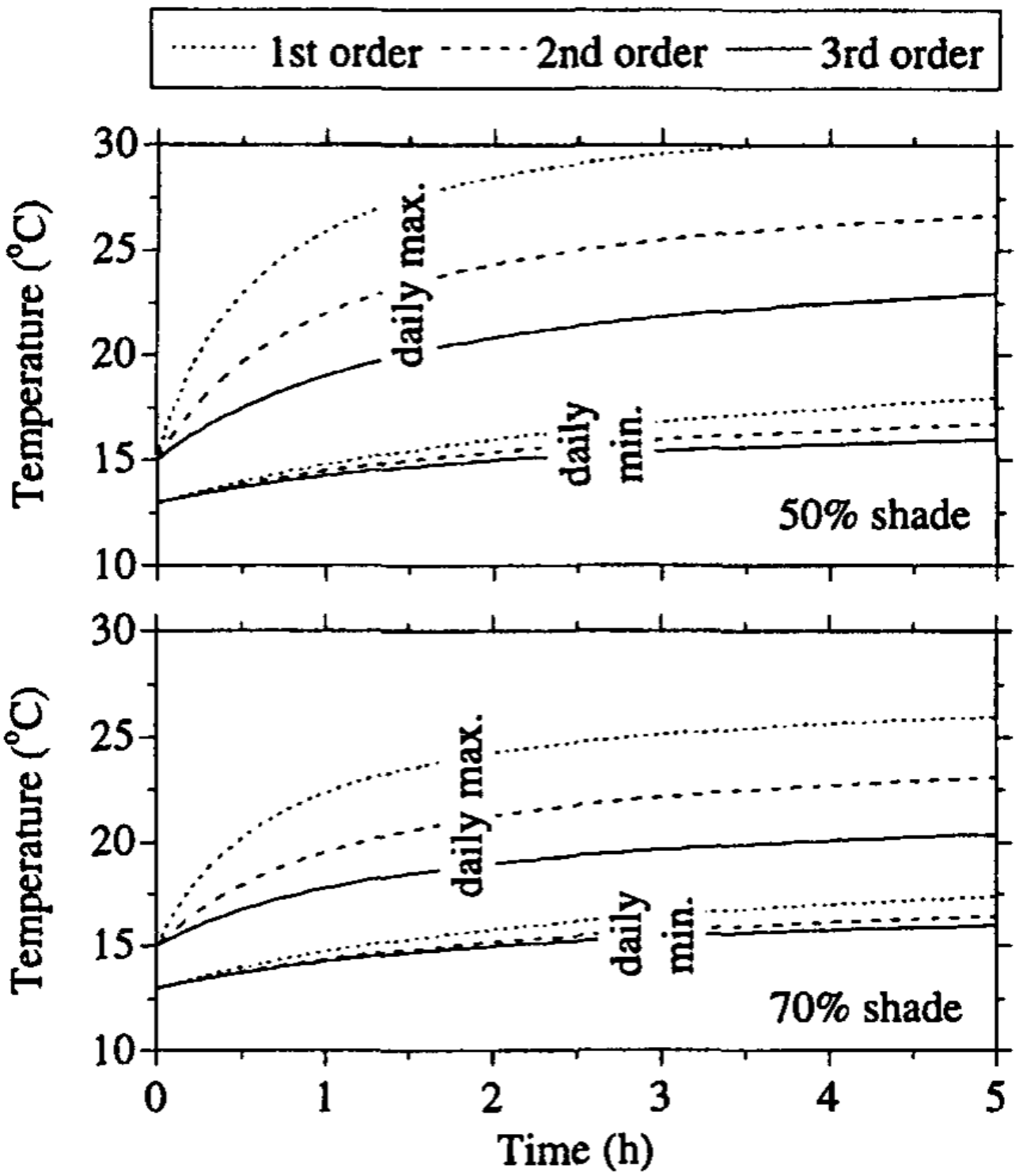

Fig. 9 Changes of daily maximum and minimum water temperatures in 1st-, 2nd-, and 3rd-order streams flowing out of native bush into pasture predicted using the STREAMLINE model.