



MEMO

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Indigenous fish spawning and migration calendar for the Wellington region: Background documentation for Schedule F1a of the draft Natural Resources Plan

This memorandum summarises the technical background information behind the indigenous fish spawning and migration calendar listed in Schedule F1a of the draft Natural Resources Plan for the Wellington region (dNRP) (GWRC 2014). Schedule F1a of the dNRP is reproduced in Appendix 1.

Knowing the spawning and migration periods of native freshwater fish allows for these periods to be avoided when undertaking instream activities, or activities near waterways, that may have an adverse impact on these key/sensitive periods. The spawning and migration periods for the majority of native freshwater fish found in the Wellington region are well summarised in Hamer (2007): The freshwater fish spawning and migration calendar report (<http://www.waikatoregion.govt.nz/PageFiles/5021/tr0711.pdf>). However, the summary provided in Hamer (2007) focused specifically on the timing of spawning and migrations of native fish in the Waikato region, and as such, where available, data collected from the Waikato region was given preference over more generic data applicable to the rest of New Zealand. Thus there was some uncertainty around how appropriate the periods provided in Hamer (2007) were to the Wellington region.

Given this uncertainty, Greater Wellington Regional Council commissioned a review of the spawning and migration periods provided in Hamer (2007)¹. The review was undertaken by Dr David Rowe (NIWA) and focused on the three main aspects:

- Assessing the suitability of the spawning and migration times listed in Hamer (2007) for their suitability in the Wellington region;
- Documenting any new information relevant to the spawning and migration periods since Hamer (2007) was completed; and,
- Providing spawning and migration periods, where available, for species which occur in the Wellington region that were not included in Hamer (2007).

¹ This review was undertaken with permission from Waikato Regional Council (Hamer, pers comm. 2013).

In summary, the review undertaken by Rowe (2013) indicated that the spawning and migration periods listed in Hamer (2007) were generally applicable to the Wellington region. Dr Rowe did provide several recommendations for changes to some periods listed in Hamer (2007) based on more up-to-date information and also provided spawning and migration periods, where available, for species not covered in Hamer (2007). These recommendations are summarised below.

Species not covered by Hamer (2007)

- Brown mudfish: Peak spawning between March and April with supplementary spawning between May to September.
- Grey mullet: Juvenile upstream migration period is October to December (based on a best estimate and no peak known).
- Black flounder: Juvenile upstream migrations range from September to December with a peak in October and November.

Recommended changes to periods provided in Hamer (2007)

- Shortjaw kokopu: Extend spawning range from April to June with a peak in May and June.
- Banded kokopu: Extend peak upstream migration of juveniles to include September to November.
- Koaro: Extend peak upstream migration of juveniles to include September to November.
- Lamprey: Extend adult upstream migration period from June to December with likely peak in June to August.

Additional notes provided by Dr Rowe that should be considered in the application of the calendar of spawning and migration periods in the Wellington region

- Spawning and migration times for species that form land-locked populations are likely to be different from the diadromous populations that migrate to and from the sea. For land-locked common smelt, the spawning period is likely to range from September to December (cf. March to May for diadromous stocks) and for koaro, banded kokopu and giant kokopu, spawning of land-locked populations is likely to occur in December to February (cf. April to June for diadromous stocks).
- As noted in Hamer (2007), the periods provided for upstream migrations are based on river entry, and in large rivers these upstream migrations can continue upriver for one to two months after the calendar times.
- There are still many unknowns in regards to spawning sites and associated migrations for a number of freshwater species found in the Wellington region (eg, spawning locations for torrentfish and lamprey have yet to be discovered).
- An exclusion period of August to December is still the most appropriate period if a 'one size fits all approach' is required to exclude instream works because this period protects a range of species' juvenile upstream migrations and also some of the spring-summer spawning by bullies.

References

GWRC. 2013. *Regional Plan: Working document for discussion*. Greater Wellington Regional Council, August 2013.

GWRC. 2014. *Draft Natural Resources Plan for the Wellington region – Te Tikanga Taiao o Te Upoko o Te Ikaa a Maui*. Greater Wellington Regional Council, Publication No. GW/EP-G-14/87, Wellington.

Hamer M. 2007. *The freshwater fish spawning and migration calendar report*. Environment Waikato Publication, Document # 1105573.

Rowe D. 2013. *Review of migration/spawning times for indigenous freshwater fish in the Wellington region*. Letter report prepared for Greater Wellington Regional Council (GWRC Document No. #1238188).

Appendix 1: Schedule F1a of the draft Natural Resource Plan – known spawning and migration times for indigenous fish species

Species	Migration direction	Life stage	Migration time range (peak)	Spawning habitat (where known)	Spawning time range (peak)
Lamprey	Upstream	Adult	Jun-Dec (Jun-Aug)	Upper catchment	Sept-Dec (peak unknown)
	Downstream	Juvenile	Apr-Aug (peak unknown)		
Longfin eel	To estuary	Glass eel	Jul-Nov (Aug-Oct)		
	Upstream	Juvenile	mid Nov-Apr (Dec-Apr)		
	Downstream	Adult	Apr-May (peak unknown)		
Shortfin eel	To estuary	Glass eel	Aug-Dec (Sep-Nov)		
	Upstream	Juvenile	mid Nov-Apr (Dec-Apr)		
	Downstream	Adult	Feb-Apr (peak unknown)		
Common Smelt	Upstream	Juvenile	mid Aug-Nov (Sep-Oct)	Sand banks of rivers	Dec-Jul (Mar-May)
	Downstream	Larvae	Mar-Jun (peak unknown)		
Inanga	Upstream	Juvenile	May-mid Nov (Aug-Oct)	Tidal estuary edge vegetation	Feb-Jul (Mar-May)
	Downstream	Larvae	Sep-Jun (Feb-Apr)		
Giant Kokopu	Upstream	Juvenile	Oct-Dec (Oct-Dec)		Apr-mid Aug (Jun-mid Aug)
	Downstream	Larvae	May-Aug (Jun-Jul)		
Banded Kokopu	Upstream	Juvenile	Aug-Nov (Sep-Nov)	Stream margins at flood among vegetation and debris	mid Apr-Jun (May-Jun)
	Downstream	Larvae	May-Jul (peak unknown)		

Species	Migration direction	Life stage	Migration time range (peak)	Spawning habitat (where known)	Spawning time range (peak)
Shortjaw Kokopu	Upstream	Juvenile	Sep-Nov (peak unknown)	Stream bank rocks, debris and vegetation during flood	Apr-Jun (May-Jun)
	Downstream	Larvae	mid May-Jun (Jun-mid Jun)		
Koaro	Upstream	Juvenile	Sep-Nov (Sep-Nov)	Cobbles at stream edge	Apr-Jun (Apr-mid Jun)
	Downstream	Larvae	Apr-Jun (May-Jun)		
Torrentfish	Upstream	Juvenile	Nov-Feb (Nov-Feb)	Lowland rivers/estuaries	Sep-May (Jan-Apr)
	Downstream	Larvae	Feb-May (peak unknown)		
Redfinned bully	Upstream	Juvenile	Nov-Dec (Nov-Dec)	Flowing water under rocks	Jul-Nov (peak unknown)
	Downstream	Larvae	Aug-Nov (Aug-Nov)		
Common bully	Upstream	Juvenile	Oct-Feb (Dec-Feb)	Under firm flat surfaces	Oct-Feb (peak unknown)
	Downstream	Larvae	Oct-Nov (peak unknown)		
Bluegilled bully	Upstream	Juvenile	Nov-Dec (Nov-Dec)	Similar to other bullies	Sep-Feb (peak unknown)
	Downstream	Larvae	Sep-Feb (peak unknown)		
Giant bully	Upstream	Juvenile	Nov-Feb (peak unknown)	Estuaries (unconfirmed)	Dec-Feb (peak unknown)
	Downstream	Larvae	Nov-Dec (peak unknown)		
Grey mullet	Upstream	Juvenile	Oct-Nov (peak unknown)		
Black flounder	Upstream	Juvenile	Sep-Dec (Oct-Nov)		
Cran's bully				Under large rocks	Oct-Feb (peak unknown)

Species	Migration direction	Life stage	Migration time range (peak)	Spawning habitat (where known)	Spawning time range (peak)
Upland bully				Under large flat rocks	Oct-Feb (Oct-Dec)
Brown mudfish				Wetlands	Mar-Sept (Mar-Apr)
Dwarf galaxias				Small stones instream	Sep-Dec (Sep-Dec)