Background

- *Galaxias maculatus* is amphidromous (Figure 1)
- Juveniles form the basis of New Zealand’s whitebait fishery (Figure 2)
- Marine larval development is poorly understood
- Consequently populations are managed as homogeneous entities
- Growing concern of population decline
- Population dynamics must be understood for conservation and management

Otolith Shape

- Product of genetics + environment (temperature, feeding history, growth rates)
- Stock discrimination tool (e.g. Baltic cod, herring)
- Geometric approach:
  1. Shape indices (ratio of otolith dimensions)
  2. Elliptical Fourier coefficients (EFcs)

Hypotheses

H$_0$: Populations of *Galaxias maculatus* are homogeneous
H$_1$: Otolith shape is not different between populations

Methods

- Whitebait collected September 2013
- 3 sites in both Bay of Plenty and Buller (Figure 4)
- 45-55mm TL fish used in analysis (n=52)
- Left sagitta photographed using dark field microscopy
- Sagitta measured and shape indices corrected for otolith length (Table 1)
- 10 EF harmonics generated in SHAPE v1.3

Results

1. Shape indices

2. Elliptical Fourier coefficients

Conclusions

- Otolith shape indices are different between populations, but EFcs are not
- Greater spatial and temporal resolution needed
- Differences may reflect genetic or environmental history
- Shape differences may be related to growth rates at sea (Figure 7)
- Ontogeny must be accounted for
- Potentially a valuable tool for discrimination of *Galaxias maculatus* populations

References