


### Population structure and genetic stock identification of brown trout (*S. trutta*) from Lough Corrib and Lough Ramor

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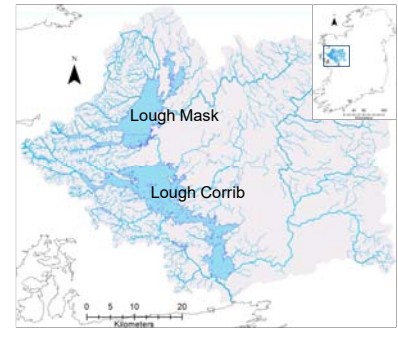


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### Area of study: Lough Corrib

- Area 176km<sup>2</sup>
- It is renowned for its brown trout populations
- Including the long-lived, late maturing, piscivorous and highly prized "ferox" trout
- Target for a number of habitat enhancement programmes over past 20 years → repair & improve degraded riverine habitats
- Target of previous genetic study Massa-Galluci *et al.* (2010)



### Key Aims & Questions

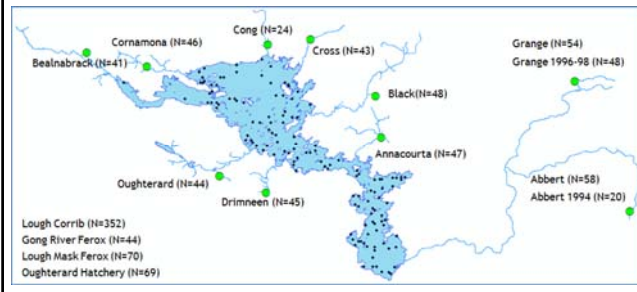
- Verify results of previous study, in particular with reference to contributions to mixed lake brown trout stock
- To investigate possible correlation between location of adults in the lake in relation to population of origin. Is there evidence for biased distribution of adults in the lake?



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### Baseline river and adult lake sampling



Bealanabrack (N=41)    Cornamona (N=46)    Cong (N=24)    Cross (N=43)    Grange (N=54)    Grange 1996-98 (N=48)

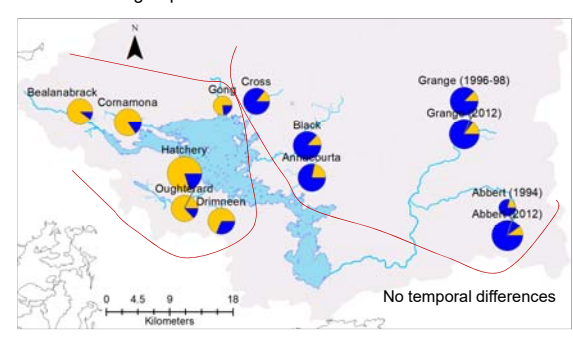
Black (N=48)    Annacourta (N=47)    Abbert (N=58)    Abbert 1994 (N=20)

Oughterard (N=44)    Drimneen (N=45)

Lough Corrib (N=352)  
Gong River Ferox (N=44)  
Lough Mask Ferox (N=70)  
Oughterard Hatchery (N=69)

### STRUCTURE: Level 0

- 2 well defined groups

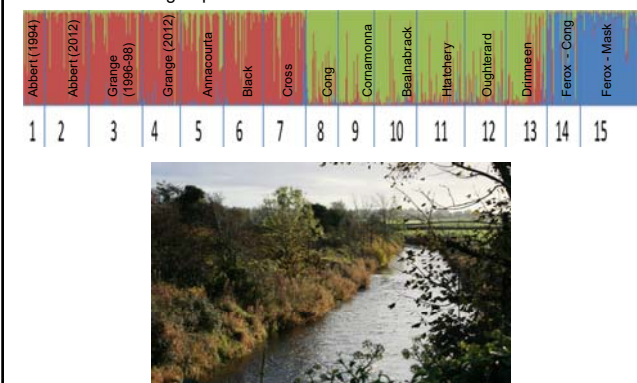


No temporal differences

- No differences between Hatchery and Oughterard

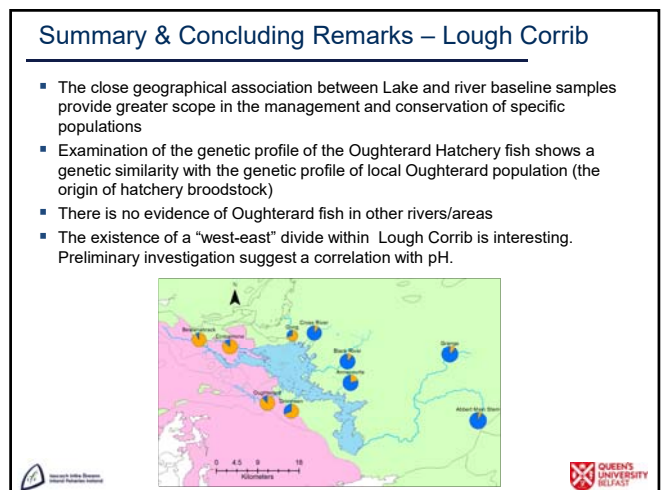
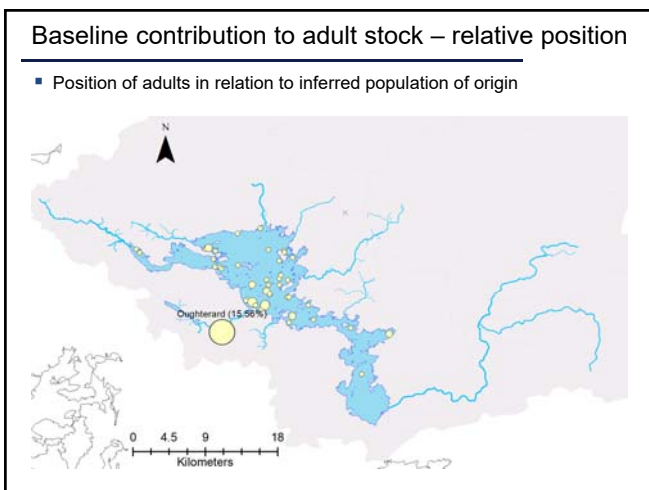
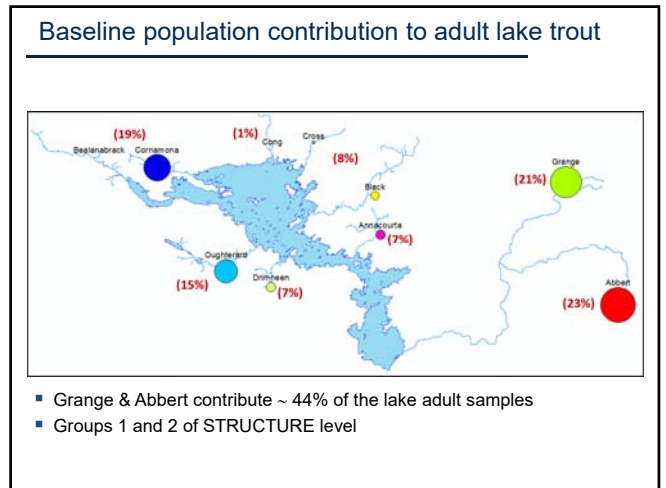
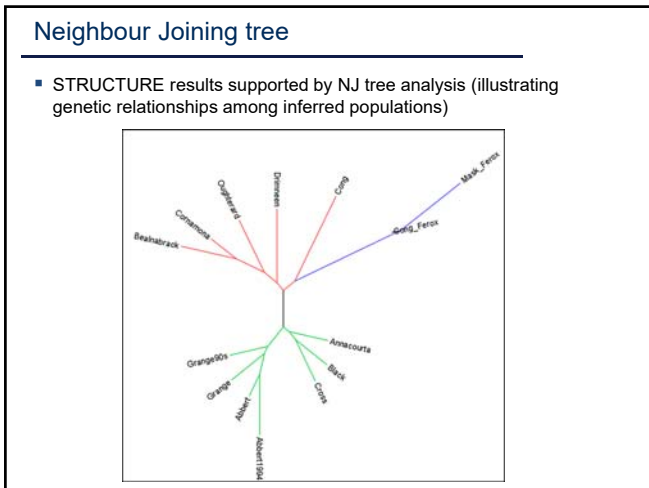
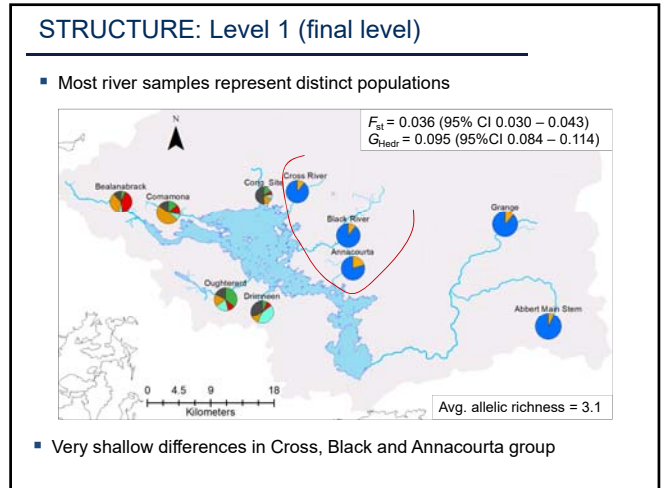
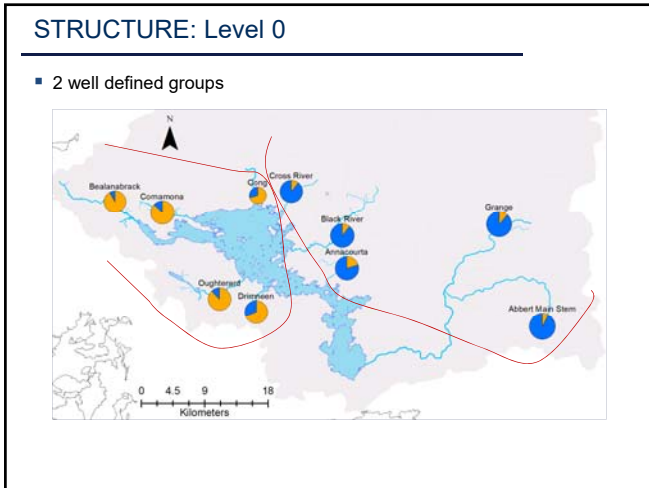
### STRUCTURE: Level 0

- 3 well defined groups



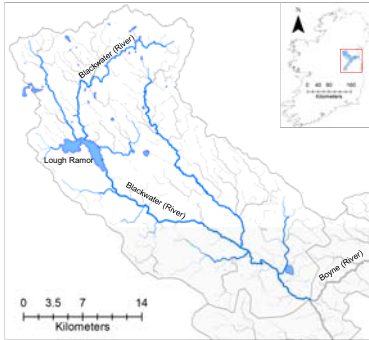
Abbert (1994)    Abbert (2012)    Grange (1996-98)    Grange (2012)    Annacourta    Black    Cross    Cong    Cornamona    Bealanabrack    Hatchery    Oughterard    Drimneen    Ferox - Cong    Ferox - Mask

1    2    3    4    5    6    7    8    9    10    11    12    13    14    15



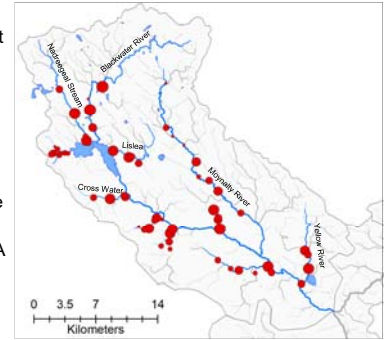
Area of study: Lough Ramor

- Lough Ramor catchment
- County Cavan
- Area: 7.41km<sup>2</sup>
- Highly eutrophic
- Average depth: 3m
- The lough flows into the Blackwater River (a tributary of River Boyne)
- Designated as a Special Area of Conservation under the Natura 2000 wildlife habitat conservation programme



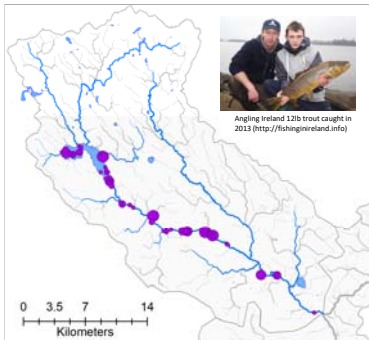
Baseline river and adult lake sampling

- Electrofishing
- 518 juvenile brown trout (0+ and 1+) caught between July and September 2014
- 59 sites: 11 streams & tributary rivers
- GPS for all samples
- 1-19 specimens per site (avg. 9/site)
- Scales retained for DNA analysis



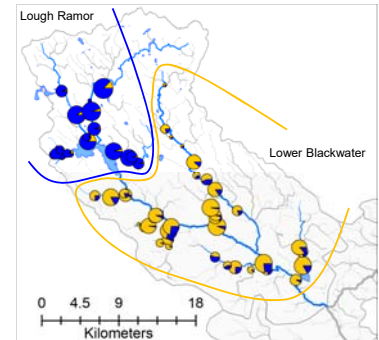
Adult brown trout lake sampling

- Angling
- 202 adult brown trout caught between April and August 2012, 2013 and 2014
- GPS for 78%
- 1-8 specimens per site
- Scales retained for DNA analysis



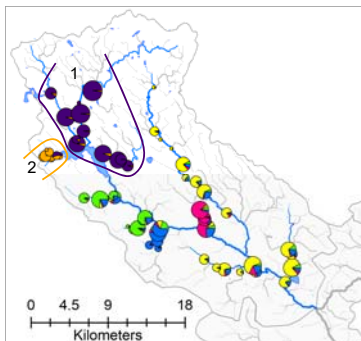
STRUCTURE: Level 0

- Two clear groups:
  1. Lough Ramor
  2. Lower Blackwater

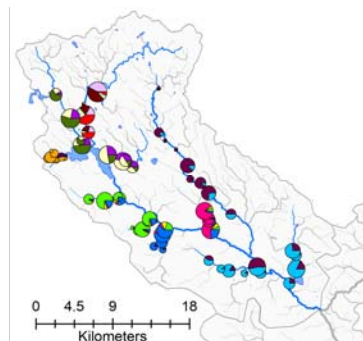


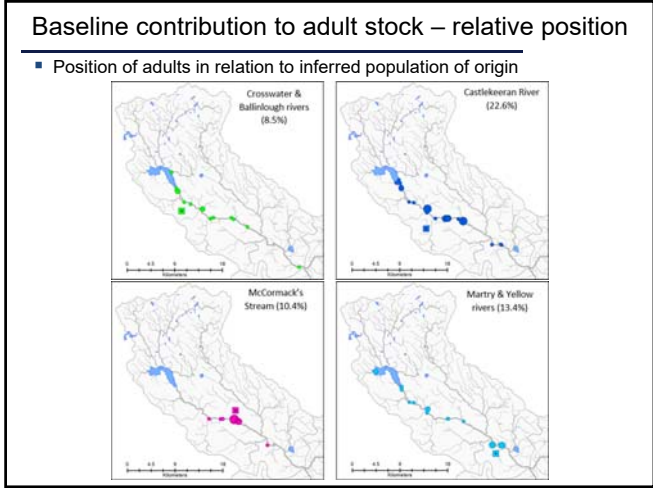
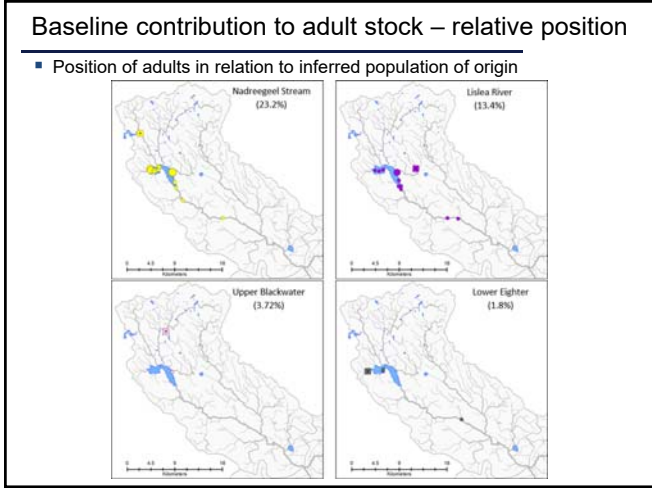
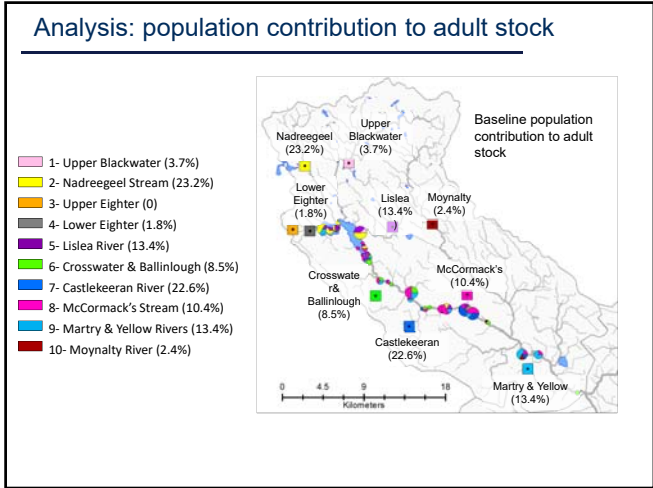
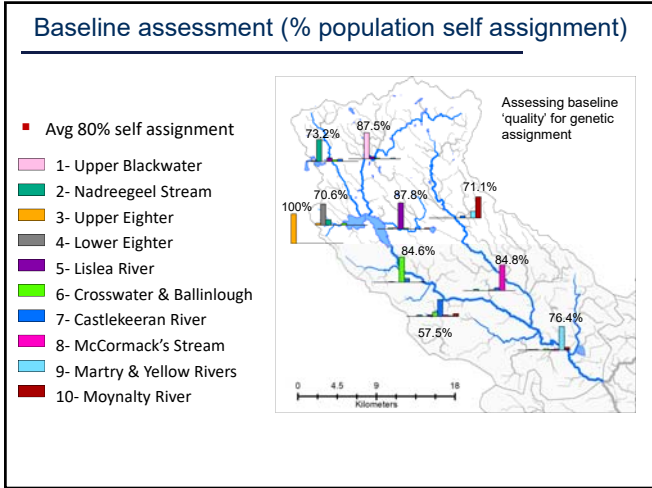
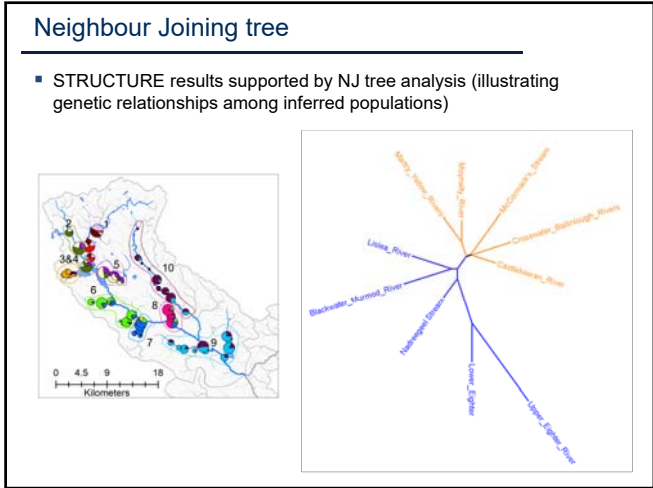
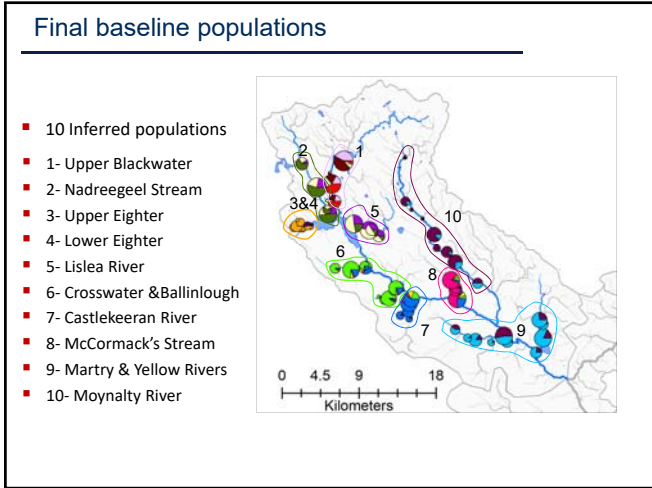
STRUCTURE: Level 1

- 4 subgroups within Lower Blackwater group
- 2 subgroups within Lough Ramor group



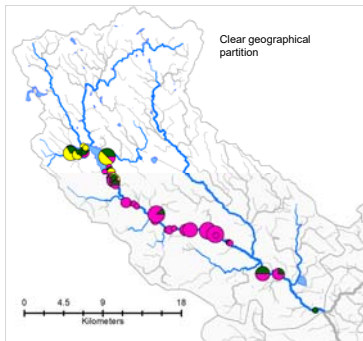
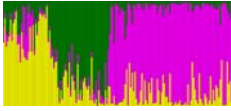
STRUCTURE: Level 2 and 3





### STRUCTURE analysis of adult samples

- Adult fish
- How many genetic distinct groups are represented by the adult fish (i.e. mixture)?
- 3 clear distinct genetic groups



### Summary & Concluding Remarks – Lough Sheelin

- Low contribution from Upper Blackwater population in comparison to other geographically near populations
- It may be worth investigating putative barriers to access to Lough Ramor
- There is a close association between adult movement and population of origin
- Many adult fish appear to spent time in the main Lower Blackwater River channel rather than moving to Lough Ramor
- Likewise, adult fish linked to Lough Ramor inflowing rivers do not appear to move in great number down to the Lower Blackwater River main channel
- This seems to reflect different life history strategies for populations inhabiting inflowing rivers to Lough Ramor and those flowing into the Blackwater main channel
- A limitation of the study was the absence of temporal baseline samples. This should be a recommendation for future work
- It is important to note, however, the adult samples were caught over three years and their assignment patterns to baseline population was consistent



### Acknowledgements

- To all the many people that made this possible..... many thanks!

