

DOLMANT (INTERREG) Project and Lough Neagh fish stock assessment

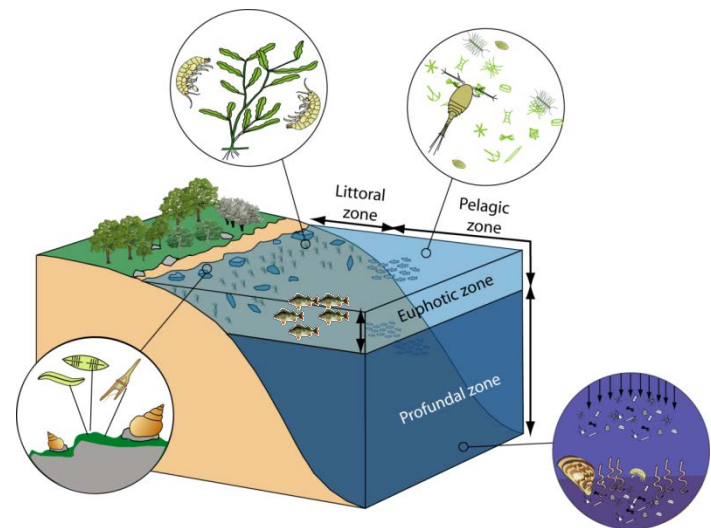
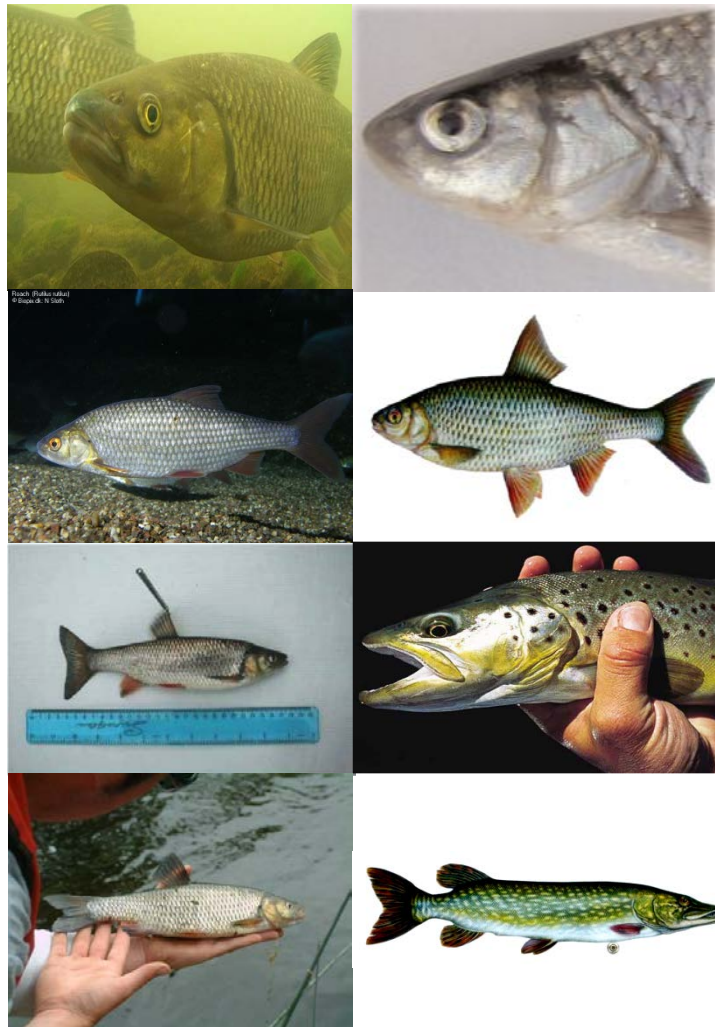


DOLMANT - Aims

Development Of Lake **MAN**agement Tools

Aims

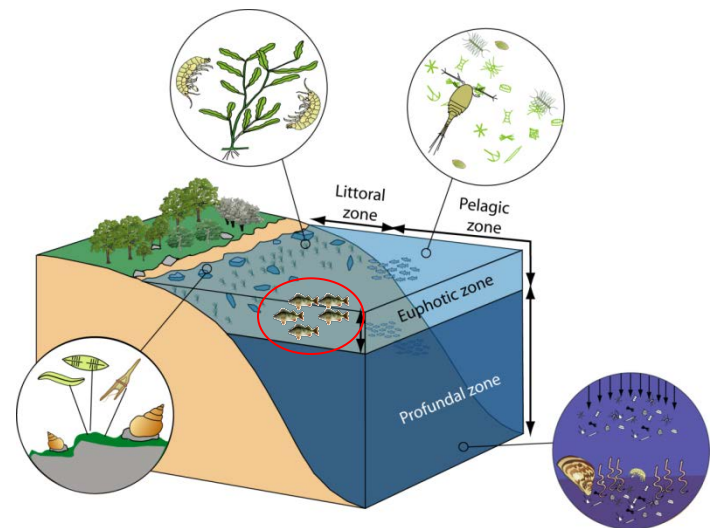
- Develop lake management tools integrating multidisciplinary properties of lakes.
- Provide framework to improve or retain ecological status of lakes.
- Help meet requirements of EU Water Framework Directive.



Aims – Fish Component



- Assess fish stocks at a range of selected study lakes in NI & ROI.
 - Small lakes – approx 50 selected
 - Counties: Antrim, Armagh, Cavan, Derry, Donegal, Down, Fermanagh, Leitrim, Monaghan and Tyrone.
 - Large Lakes – Lough Neagh



Lough Neagh Survey Aims

1. Characterise the current status of the fish community of Lough Neagh to:

- Provide a base-line data set, enabling future comparisons
- Develop long-term monitoring methodology
- Investigate current and future status of fisheries
- Allow science-informed management

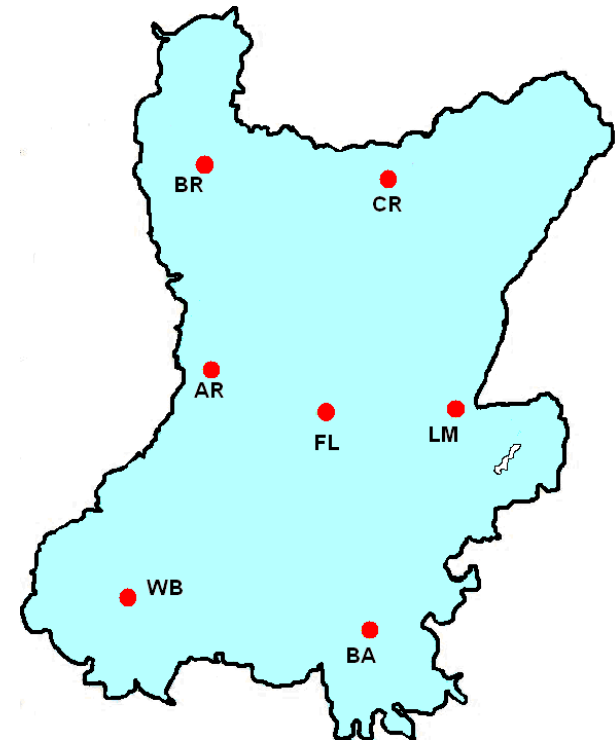
2. Identify alternative fisheries to that of the declining eel fishery

- Inform diversification to support rural economy and a traditional way of life



Methodology

- Gill netting- European CEN standard multimesh
 - 30 metres long
 - 1.5 metres deep
 - 12 mesh sizes – 43, 19.5, 6.25, 10, 55, 8, 12.5, 24, 15.5, 5, 35 and 29 mm
- Draft netting - encircling of fish with a net of known size - a semi quantitative method (63 draught nets / season).
- Both completed every 7 weeks at 7 sites.



Lough Neagh sampling sites

BR - Ballyronan Bay

AR - Ardboe

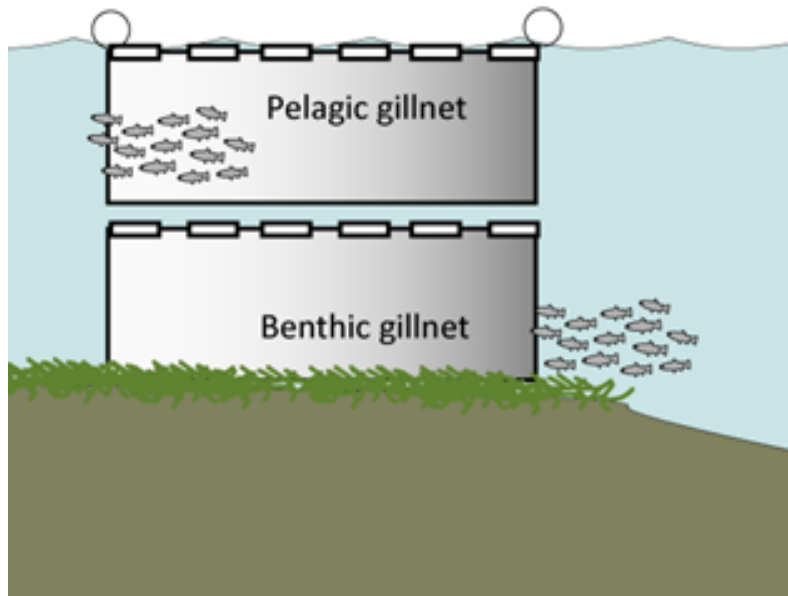
WB - Washing Bay

CR - Cranfield Bay

FL - Flats

BA - Bartins Bay

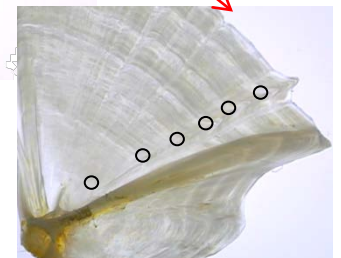
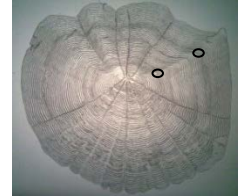
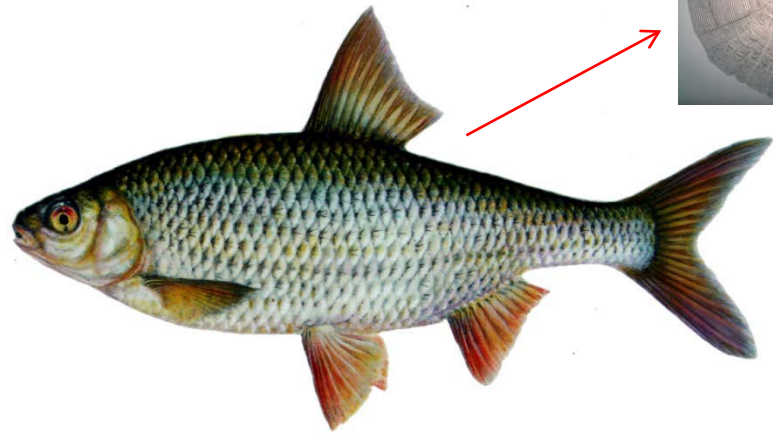
LM - Lennymore Bay



Assessing ecological effects:

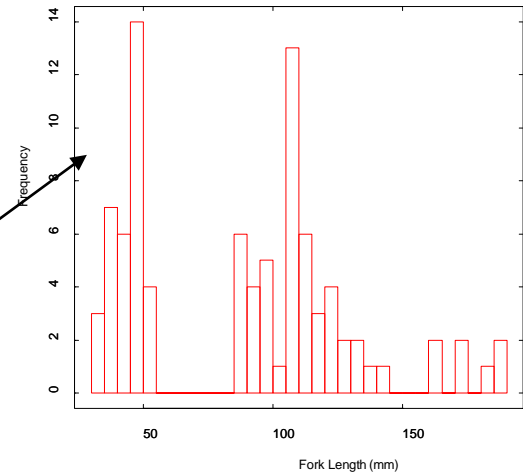
Fish ecology

- Fish captured and processed
- Identified to species
- Size
 - Length ($\pm 1\text{mm}$) & Mass ($\pm 0.1\text{g}$)
- Sex
- Age & growth
 - Scales & operculae
- Diet & habitat use
 - Gut contents (subsample)

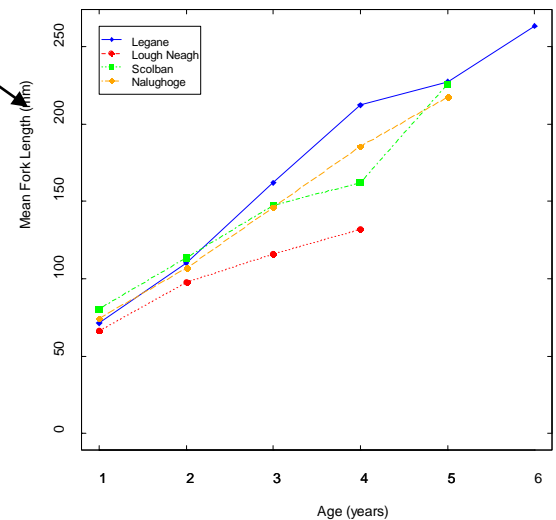


Fish Metrics – Consistent with DOLMANT small lakes programme and IFI’s rolling WFD programme

- List of species caught
- Total number of fish caught
- Total biomass caught
- Number of catch per unit effort (CPUE / BPUE)
- Length at age (back-calculated at 1, 2 & 3)



Data from these metrics will be inputted into new and existing models, which will in turn classify the fish community.



Bad ← Poor Moderate Good → High

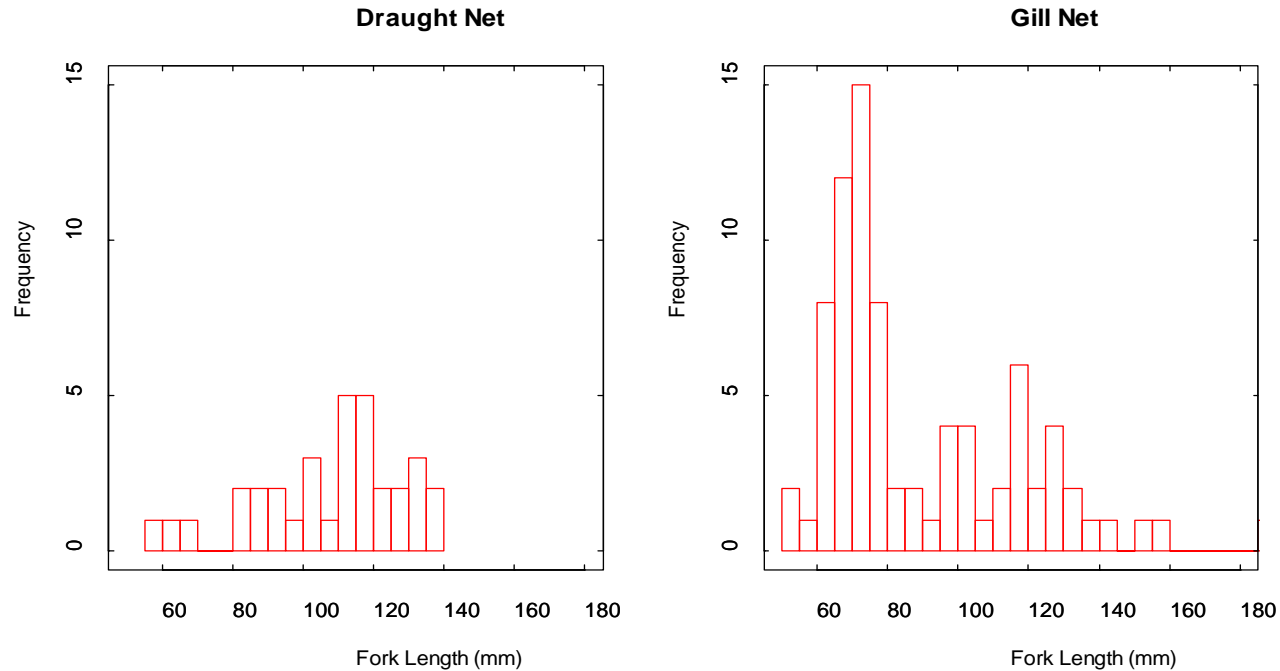


Non-Native fish community

Native fish community

Methods for a long term monitoring programme?

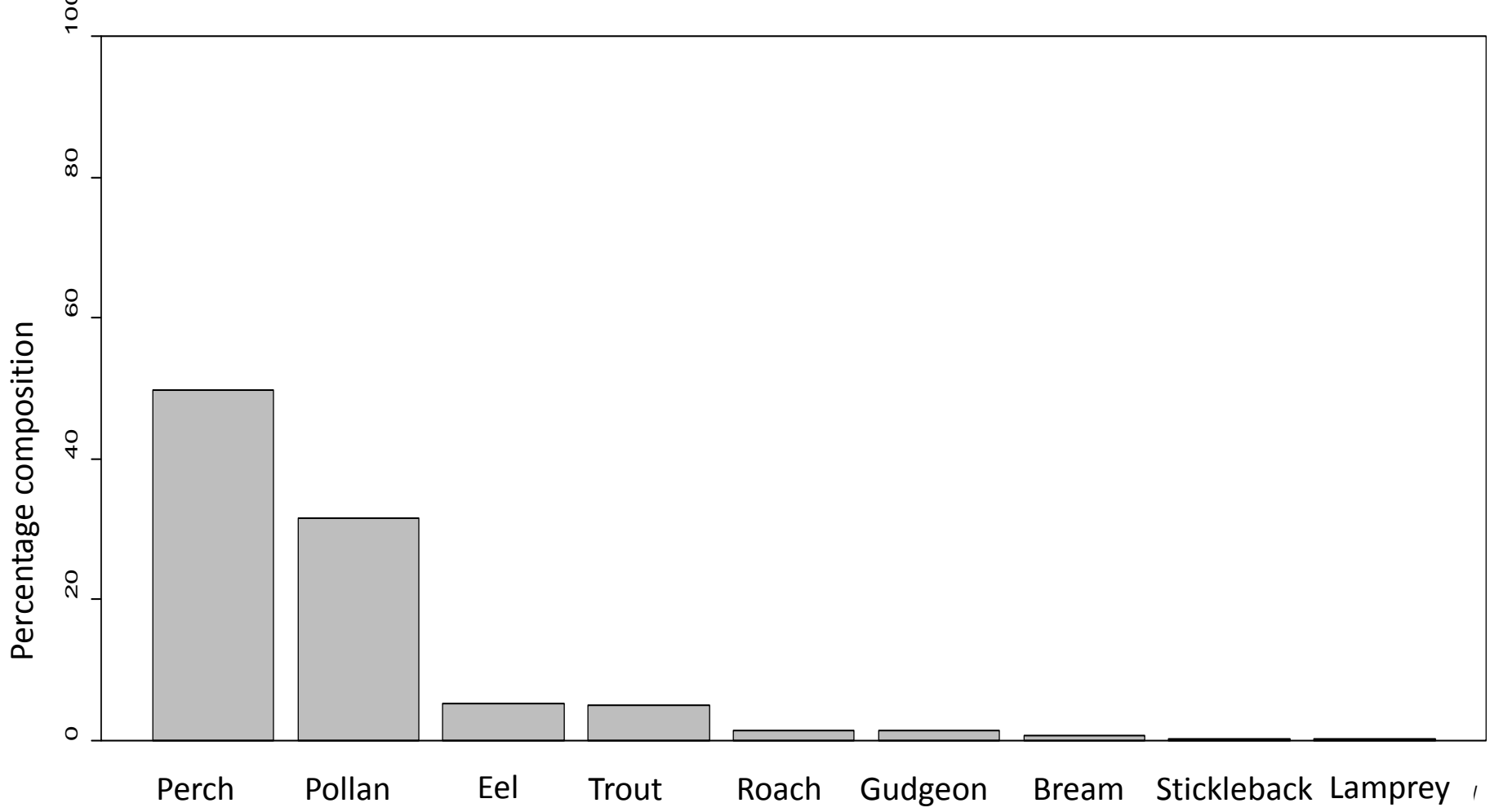
Challenges to monitoring a large lake – Gill or Draught nets



Comparison of length frequency of perch taken by draught and gill nets (2 sample K-S: $D = 0.489$; $P < 0.001$)

- Perch <80mm under-represented by draft netting
- However, draft netting is good for providing fish density data (semi-quantitative)
- Therefore, must create a correction.

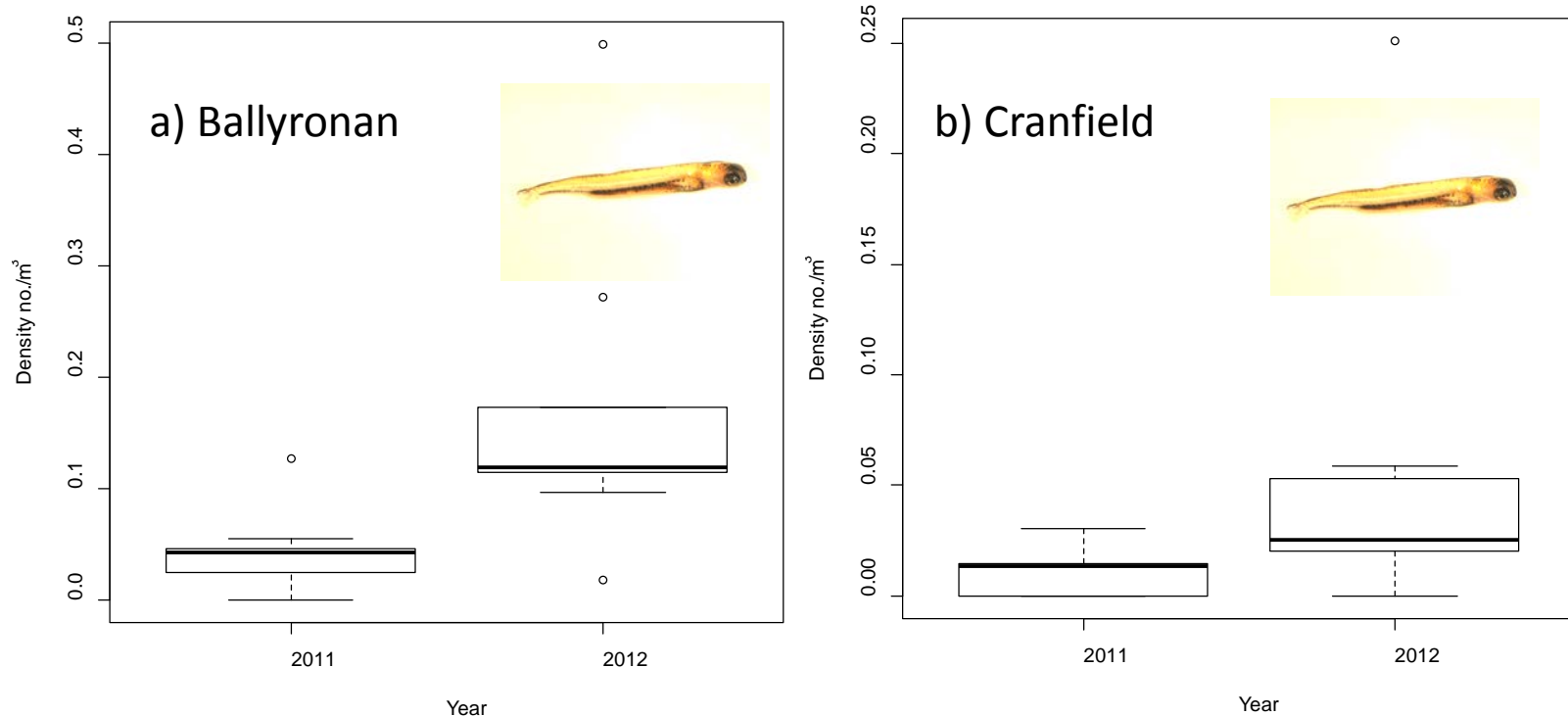
Current status



Bar graph showing percentage composition by species in Lough Neagh, summer 2011

Similar will be completed for 2012 data upon completion of processing.

Temporal changes in pollan recruitment

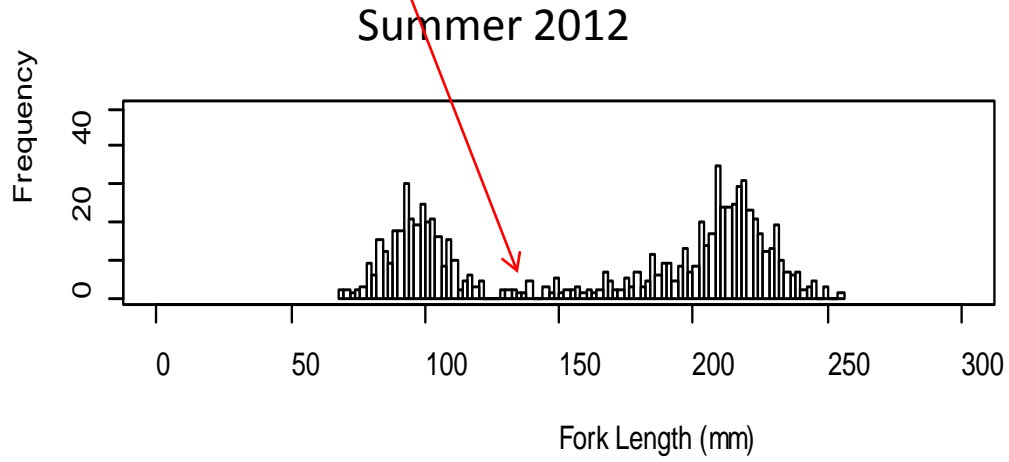
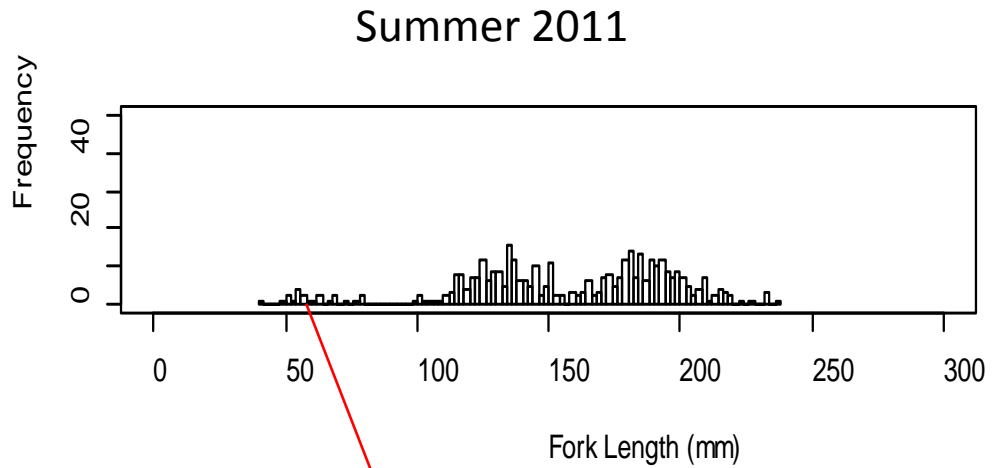


Comparison of pollan larvae density at c. 30 days post first hatching in 2011 & 2012 in a) Ballyronan (Mann-Whitney U test: $W=11$, $p=0.0078$) & b) Cranfield (Mann-Whitney U test: $W=18$, $p=0.049$)

- 2012 massive increase in pollan recruitment when compared to the previous year.

Predicting Pollan stock levels

- Short lived & Fast Growing
 - Therefore recruitment determines year class strength

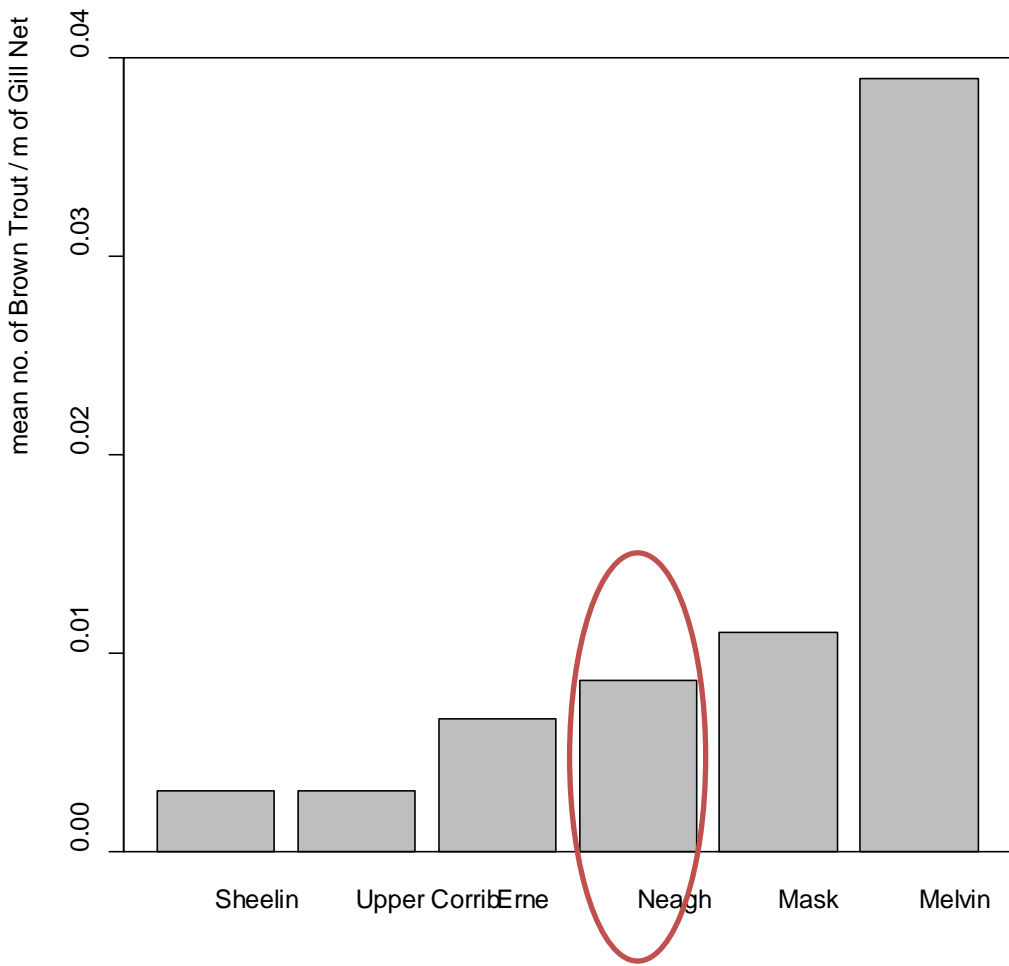


Require a fluid management strategy

Brown trout – preliminary results



- Abundance
 - CEN gill nets
 - 2012- 0.0086 trout/m of net.
 - Other examples:
 - Lough Erne 2010 – 0.0067 trout / m of net (Robert Rosell, pers. comms).



Additional References: Kelly *et al* (www.wfdfish.ie)

Implications for management so far (1)

- **Control needs to be taken of non-anguillid (non eel) fish species**
 - Fishermen currently sell to independent fish dealers - cannot accurately quantify fish catches - Fishery anarchy!
 - Fishing rights owners show little interest in these potentially lucrative species.
- **Pollan**
 - Fishermen currently given c. £1.10/kg by fish merchant.
 - Eventually sold as pike deadbait at £5.50/kg
 - A 400% mark up that could be taken advantage of by fishery managers!
 - Pollan sold for human consumption will reach a better price, the only extra cost being filleting, at c. 5p/kg.



Implications for management so far (2)

- **Brown Trout**
 - Now have the makings of base-line data for trout abundance
 - Enables future comparisons
 - A starting point for fisheries management and long term monitoring of the resource
 - Lough Neagh's best chance of a successful recreational fishery – **preliminary** results are showing abundance figures similar to Loughs Erne and Mask.
- **Management in this manner could mean**
 - Easier monitoring of fish stocks by conservation agencies such as AFBI.
 - A better price gained by commercial fishermen for fewer fish and less fishing effort.
 - A win-win for the fish, fishermen and anglers.



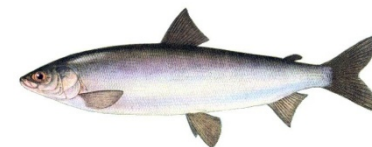
Take home message

- Uncontrolled fishery – a potential **threat**.
- Sustainably managed fishery- **conservation benefit**.
- Good management, propagated from sound scientific advice, based on a robust, cost-effective monitoring programme.
- First baseline of Lough Neagh fish stocks is in the final stages of completion but provides **little use without long term follow up and repetition**.



Future Work

- Complete 2013 pollan larvae survey
- Laboratory processing of stored samples.
- Age and growth analyses for all fish species.
- Stomach content analyses
- Statistical analyses.
- Input data into models.



Acknowledgements

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