

Fish Barrier issues and the Water Framework Directive



Jake Gibson
RESTORE Conference
Dublin April 2013



An Agency within the Department of the
Environment
www.doeni.gov.uk

NIEA Northern Ireland
Environment
Agency
www.ni-environment.gov.uk

Or - Don't forget the eels and lamprey!



This presentation

- Primarily concerned with the WFD
- WFD and river continuity classification
- Continuity classification criteria
- River continuity in NI
- WFD 111 field methodology and the Ballinderry study
- The Six Mile Water study
- Structures of concern
- The future approach going forward

WFD and river continuity



- River continuity has two separate, but linked, roles in WFD classification.
- Knowledge of barriers is necessary for accurate fish classification. For example, fish could be at High status upstream of a natural barrier although no salmon present.
- Continuity is a constituent part of the hydromorphological quality element.
- It therefore has a higher statutory weighting for the former as hydromorphology itself cannot cause a water body to fail.
- However, the EC have already commented on the lack of continuity classification in our RBPs.
- It applies to all native species, so includes eels and lampreys.

UKTAG continuity classification criteria

Standards for the hydromorphological quality element, 'river continuity' to be used in assessing impacts on the movement of fish species in river systems		
Column 1	Column 2	Column 3
High	Good	Moderate
Severe loss of fish access to rivers draining less than 1 % of catchment area of the water body	Severe loss of fish access to rivers draining less than 5 % of catchment area of the water body	Severe loss of fish access to rivers draining less than 20 % of the catchment area of the water body
<p>Notes on Table</p> <p>(a) The condition limits refer to lost access by fish to the catchment areas during that part of the year in which fish movement to those areas would normally be expected to occur in the absence of man-made barriers to fish movements.</p> <p>(b) Catchment areas known to be naturally inaccessible to the fish species should be disregarded when applying the condition limits.</p> <p>(c) Where a loss of access to waters draining smaller catchment areas than those referred to in Column 1, 2 or 3 is assessed as having, respectively, more than a very minor, slight or moderate adverse impact on fish, the criteria in Column 1, 2 or 3, as the case may be, shall not apply and the water body will be classed according to the estimated impact on fish populations. This may be the case where the waters are particularly important in the lifecycle of the fish species concerned.</p> <p>(d) A severe loss of access means that more than 80 % of fish that would otherwise access the catchment areas concerned are judged unable to do so because of man-made barriers to their movements.</p>		

Classification criteria from Kemp *et al* 2008 (Sniffer WFD 111 Phase 1 report)

Class	Ecological status for fish	Technical criteria regarding a fish pass for a barrier	Technical criteria regarding a fish pass
A High	Unimpaired Upstream migration of fish	No barrier exists.	
B Good	The passability of the site is only slightly impaired and possible on at least 300 days per year.	The slope of the barrier is gradual, has a rough surface, and has reasonable water depth (reflects conditions similar to the natural river channel)	Fish pass is state-of-the-art for multiple species / life-stages / and body dimensions.
C Moderate	The barrier is passable at least 240 days per year and is impaired for several species and/or sizes.	The barrier is so steep and high that the hydraulic condition limit values are only moderately exceeded, even at higher backwater.	Moderate deviations of limit values for maximal velocity, drop difference and power input.
D Poor	The passability of the site is strongly restricted and only passable for a reduced diversity of species and sizes	The barrier is so steep and high that the hydraulic limit values are strongly exceeded, even at higher backwater.	Deviations of limit values.
E Bad	The site is also not passable by floodwater.	The barrier is not impounded at high water so the hydraulic limit values are exceeded	Strong deviations of limit values.

Overall site classification is based on consideration of assessment values obtained for both upstream and downstream movement

Classification proposals - full details on www.wfduk.org

Expert judgement required on whether self-sustaining populations of target species be expected in particular catchment.

Critical physical set limits for barriers to the main species from the relevant tables in the WFD 111 manual. If dimensions of a barrier are greater than any of these limits, it should be considered to be a "severe impairment" to the species.

It is recommended that if a barrier is failing the criteria identified for **either** salmon, trout, or lamprey, it should be considered as potentially impassable for that species.

May consider river length instead of catchment area as basis.

Only downgrading for eels and lamprey when there is supporting evidence to show that the species is absent from areas where it would normally be expected to be present. This may be achieved by incorporating an additional rule in the fish ecology classification tool to downgrade to less than good if either species is absent from areas that they would otherwise be expected to be present.

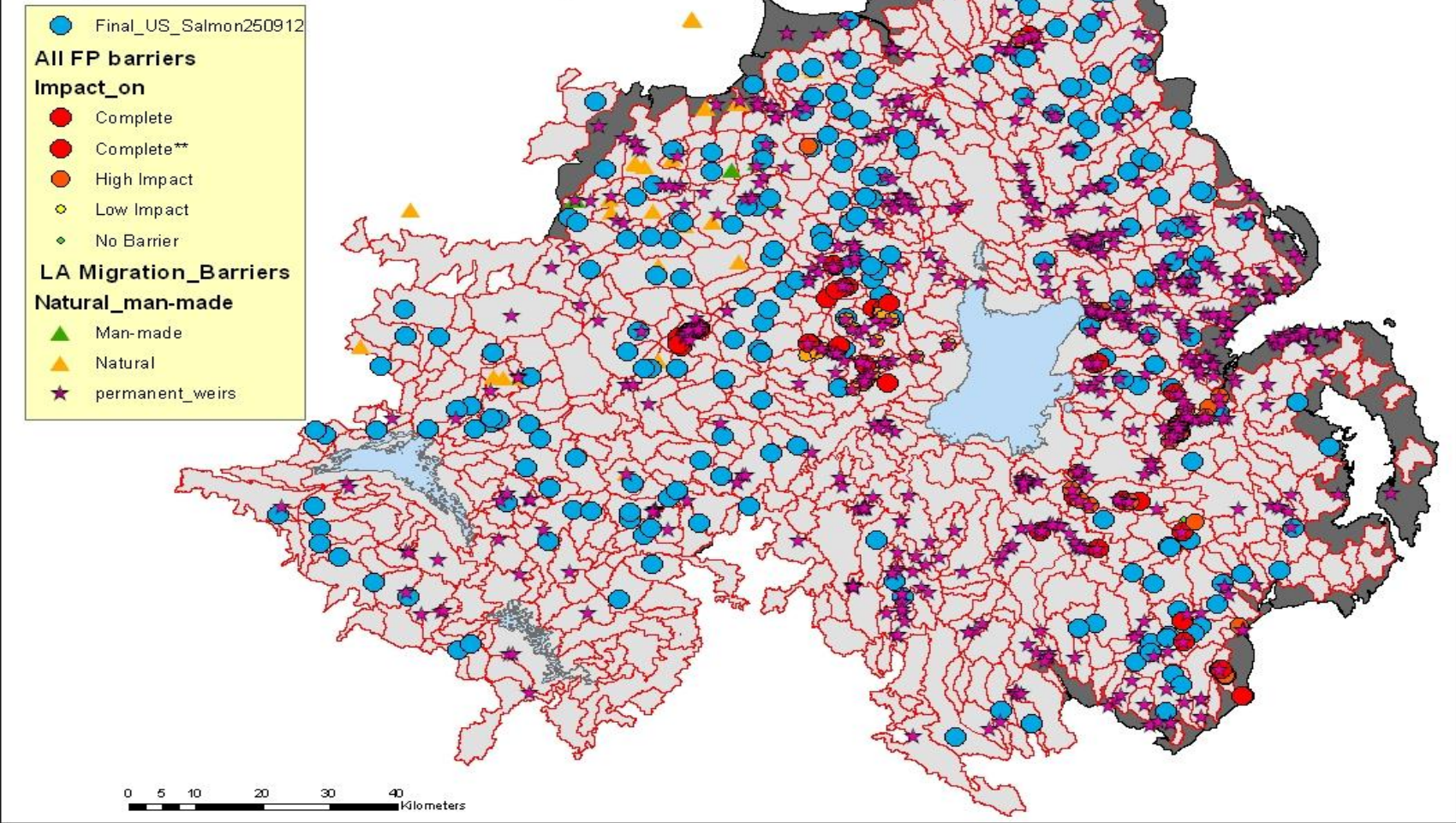
Sources of info on river continuity in Northern Ireland

- NASCO fishing data – most upstream site that salmon are found
- AFBI/LA WFD fishing data
- Eel management plan fishing data
- River Lagan
- Loughs Agency river walks
- WFD 111 obstacle assessment methodology
- Info from other bodies such as BREA and UAF
- Info from NIEA hydromorphology and other surveys



River continuity in Northern Ireland

Upstream Salmon record locations and barrier locations
(Fish passability and LA including old Weir file)



WFD 111 obstacle assessment methodology

- Compares obstacle size and flow characteristics against swimming capabilities of various species, including juveniles.
- Assesses obstacle passability including whether it could be passed with difficulty.
- Allows for eels to 'climb'.
- But work can only be done under low flow conditions.
- An estimation of passability under higher flow conditions needs to be made.
- More validation work required, but overall the methodology has been accepted as robust.



The Ballinderry - WFD 111 and flows

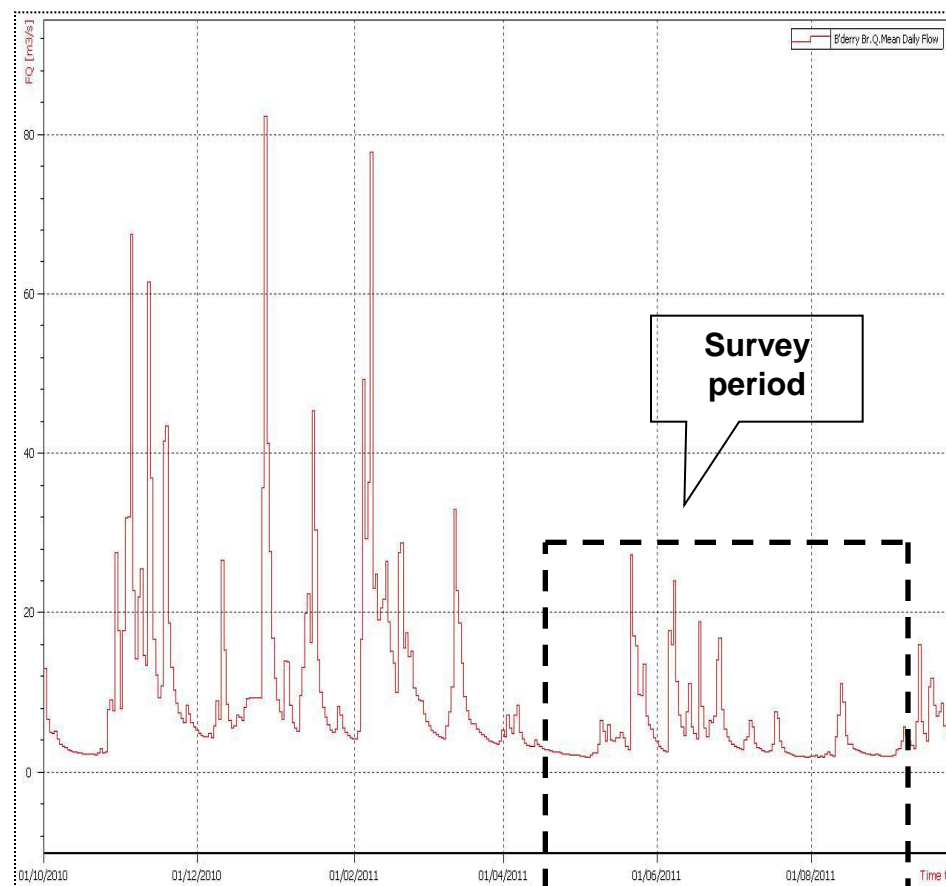
Passability is assessed when flows at or near low flow conditions (when safe to do so).

Surveys were done when flows were around 4 cumecs or less, these conditions occurred for approx 35% of the year.

Therefore obstacles deemed impassable under survey conditions **may** be passable under higher flow conditions, e.g. when they are drowned.

How often do these conditions occur when salmon are migrating upstream?

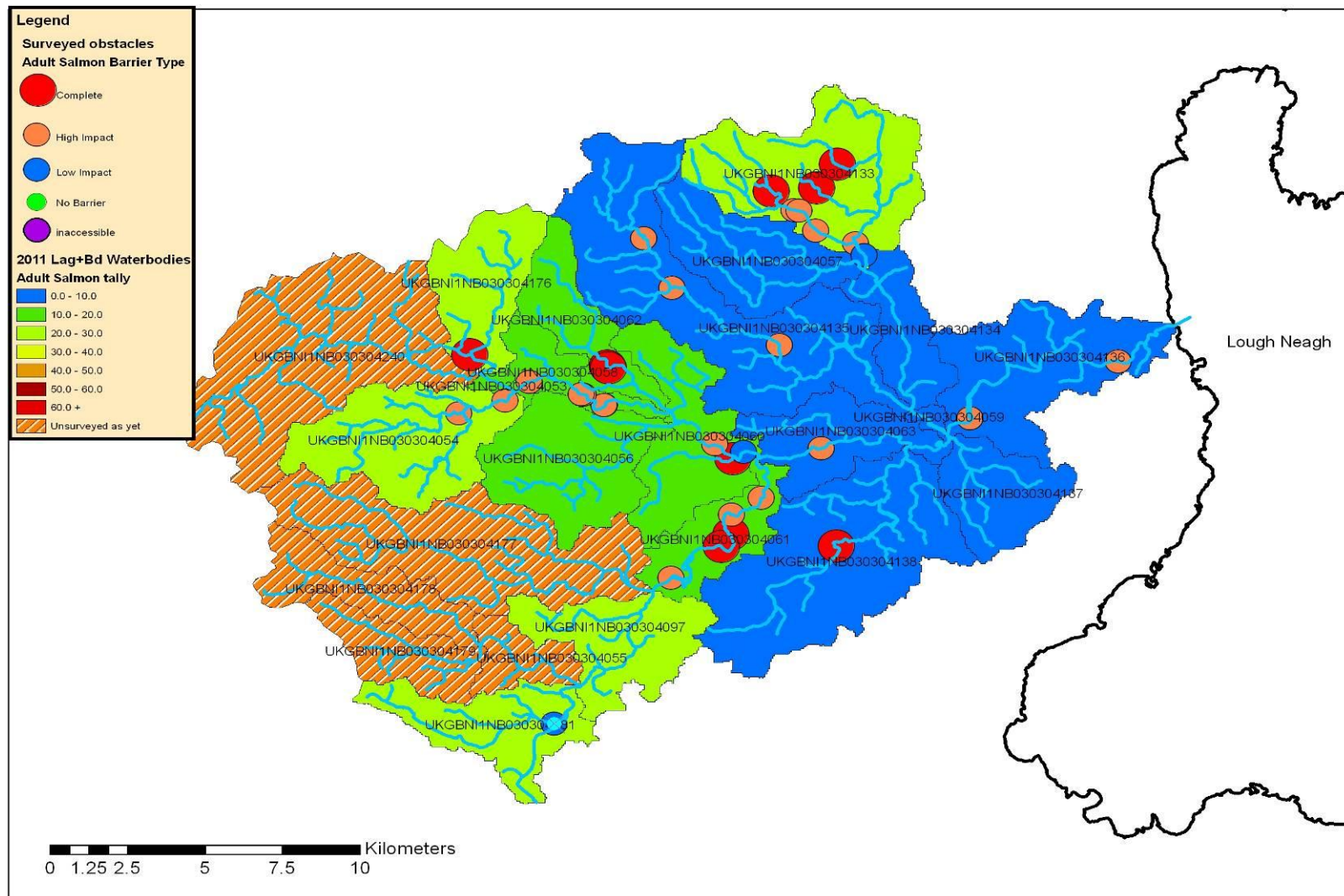
However, there will always be trout in-river movement.



Cumulative effects

- As well as individually, obstacles should be investigated as a cumulative effect.
- Whilst opinion is that WFD 111 produces robust data it does appear to be a bit on the conservative side.
- However, being conservative may be more realistic when considering cumulative effects, i.e. when capabilities are potentially reduced as fish move upstream over a succession of obstacles.

Results from WFD 111 – River Ballinderry



Eels and lamprey

Most upstream lakes on the Lagan have been fished for presence of eels. As they're not stocked, this is therefore indicative of access.

Of the 33 structures surveyed in the Ballinderry 26 were found to be complete barriers and 7 high impact barriers to adult lamprey passage.

A desktop study found many other potential obstacles such as culverts and bridges.

This has led to a detailed study of another catchment, the Six Mile Water.



The Six Mile Water Study

- Initial suggestions were that there weren't too many serious barriers to salmonids in the Six Mile Water.
- WFD 111 surveys progressing upstream on readily identifiable obstacles.
- However, a desk top survey has identified over 600 potential others.
- These include culverts, bridge aprons, hydraulic rams and sluices.
- Each one has been photographed and has had basic measurements taken.
- Further WFD 111 work planned on culverts as part of a road scheme.
- When complete the data can be analysed, discussed with fish experts and will inform future work.

15 • This will be the most in-depth survey in NI to date.

The Six Mile Water study – examples of smaller obstacles



Structures of concern

- Potential initial approach to identify remedial measures for significant *man-made* obstacles.
- From expert information and local knowledge could draw up a 'shortlist' of significant barriers.
- What is the definition of significance and where do you stop?
- Could then consider what remedial action would be and how feasible.
- But barriers can also have positive effects, such as stopping the spread of cyprinids.
- Would only work for salmonids.



For WFD classification in 2015 and going forward

- An inter-agency river restoration and continuity group has been set up in NI.
- We will only have detailed data for a few catchments by the end of 2014 but will have limited upstream limit information for many others.
- A detailed obstacles database will be compiled.
- Natural barriers will be left alone and should not be altered or removed.
- It certainly looks like further refinement of the classification criteria is required.
- Taking into account where species would be expected if man-made barriers weren't there is necessary.
- WFD includes all species, for NI continuity realistically salmonids, eels and lamprey.
- Ideally, WFD 111 surveys should be backed up by electrofishing.
- Alignment where possible of continuity and hydromorphology work in the same catchment.
- This should all lead to proposals for remedial measures, in WFD terms Programmes of Measures.



Our aim is to protect, conserve
and promote our natural and built
environment for the benefit of
present and future generations.

