• Achieving ecological continuity at hydro sites in high energy rivers.

• Gerry Mc Cafferty (Inspector)
• Donegal's Natural Resources
• Coastline
• Lakes
• Rivers
Hydro Applications on Donegal Rivers, Issues for consideration

- Location within catchment
- Species present
- Species requirements
- Identify Possible impacts
- Continuity of river dynamics
- Problems with technology ‘guaranteed’ compensation flows
Mountain lakes & rivers

- Spawning in many cases is in the upper reaches of catchment
- Important to maintain unhindered access for all species
Remote mountain streams & Rivers

• Very high gradient
• Subject to huge fluctuations in volume
• Most lacking verifiable flow data
• Majority with best spawning/juvenile habitat in the system
Glenveagh National Park

- SALMON
- SEA TROUT
- BROWN TROUT
- CHAR
- Eels
Gweebarra River

- Salmon
- Sea trout
- Brown trout
- Eel
Lowerymore Fish Pass/Compensation Flow

- INSUFFICIENT COMPENSATION FLOW
- TURBINE STILL OPERATING
Mink damage (caused when insufficient compensation flow left fish stranded in shallow pools)
Damaged weir on Mill River with a proposed hydro scheme
NATIONAL GUIDELINES
RIVER / SITE CATEGORIES

• **Category 1 Rivers:** Where there is no upstream migration in the river channel in the depleted stretch due to an impassable natural barrier.

• **Category 2 Rivers:** River channel sections that include an impassable barrier but within which fish movement is possible.

• **Category 3 Rivers:** River channel sections where there is internal movement within the depleted stretch, where there is spawning and nursery potential and where there is also fish movement through the stretch.

• **Category 4 Rivers:** River channel sections of high fisheries value where the impacts of the proposed hydro scheme development would be unacceptable from a fisheries perspective.
Typical volumes/lengths at abstraction weir

Typical abstraction Weir
with a 12.5% or 50% (whichever is greater) compensation requirement
elevation at annual average flow

N.T.S.

<table>
<thead>
<tr>
<th>Total annual average river flow</th>
<th>100% Total average annual flow</th>
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<tbody>
<tr>
<td>12.5% of total annual average flow through notch</td>
<td></td>
</tr>
<tr>
<td>37.5% of total annual average flow available to compensation/fish pass (over cill when notch is full)</td>
<td></td>
</tr>
<tr>
<td>50.0% of total annual average flow available to hydro (over cill when notch is full)</td>
<td>100% Total flow over cill</td>
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Total annual average flow over cill
87.5% of the total annual average flow runs over cill when notch is full of this
57.2% of the flow over cill gives 50% of total annual average flow to hydro
42.8% of the flow over cill gives 37.5% of total annual average flow to compensation
Category (1-2) Rivers
Minimum Compensation Requirement (12.5%)
Category (2-3) Rivers (option 1)
Minimum Compensation Requirement (12.5% or 50% whichever is greater)
Category (2-3) Rivers (option 2)
Minimum Compensation Requirement (12.5% or 50% whichever is greater)
Ballintra river hydro scheme

- Turbine intake
- Coanda type screen
- Fish pass/ compensation flow
Ballintra (2 Days Later)
Lowerymore ‘Inverted T’ with ‘splitter wall’ (looking upstream)
Lowerymore ‘inverted T’ with splitter wall (looking downstream)

Fish Pass / compensation flow

Abstraction Weir

Inverted T’ Notch plate

To Hydro Intake

Splitter Wall
Lowerymore fish pass

• Salmon on way up
• Thank you
• All questions to Alan