Establishing Environmental Flows for Northern Ireland

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Northern Ireland Environment Agency

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

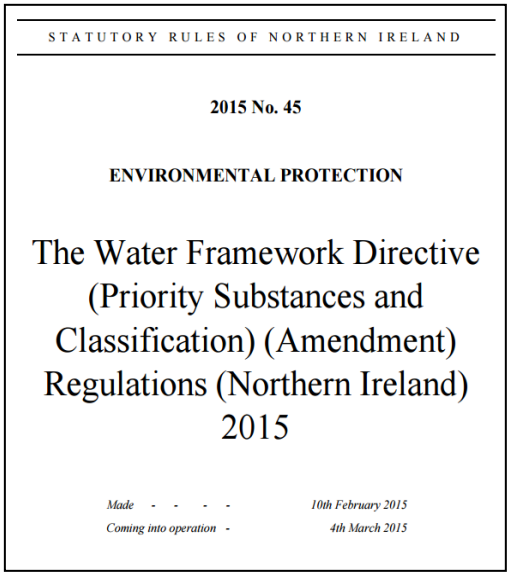
An Agency within the Department of
Agriculture, Environment and Rural Affairs
www.daera-ni.gov.uk

Overview

- Where do we start?
- Are all rivers the same?
- Drawing the line – establishing eFlows!
- How do we make it work?
- Focus on the big stuff!
- Adapting our approach

How did we get here?

- developed progressively 2006 – 2013 for all of UK
- regional typology (sensitivity to abstraction)
- consumptive abstraction pressure ONLY
- proportional to natural river flow
- dependant on WFD objective
- apply at water body scale
- enshrined in legislation
- can be developed and refined



STATUTORY RULES OF NORTHERN IRELAND

2015 No. 45

ENVIRONMENTAL PROTECTION

The Water Framework Directive (Priority Substances and Classification) (Amendment) Regulations (Northern Ireland) 2015

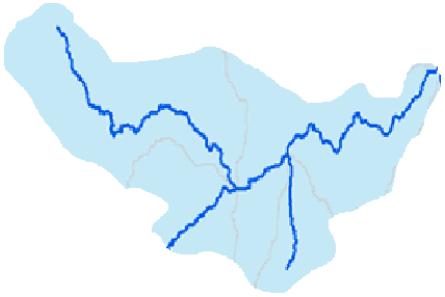
Made - - - - 10th February 2015
Coming into operation - 4th March 2015

Environmental Standards (eFlows)

What do they need to deliver?

- Easy to apply
- Consistent
- Universal
- Ecologically meaningful

Typology – Sensitivity to Abstraction

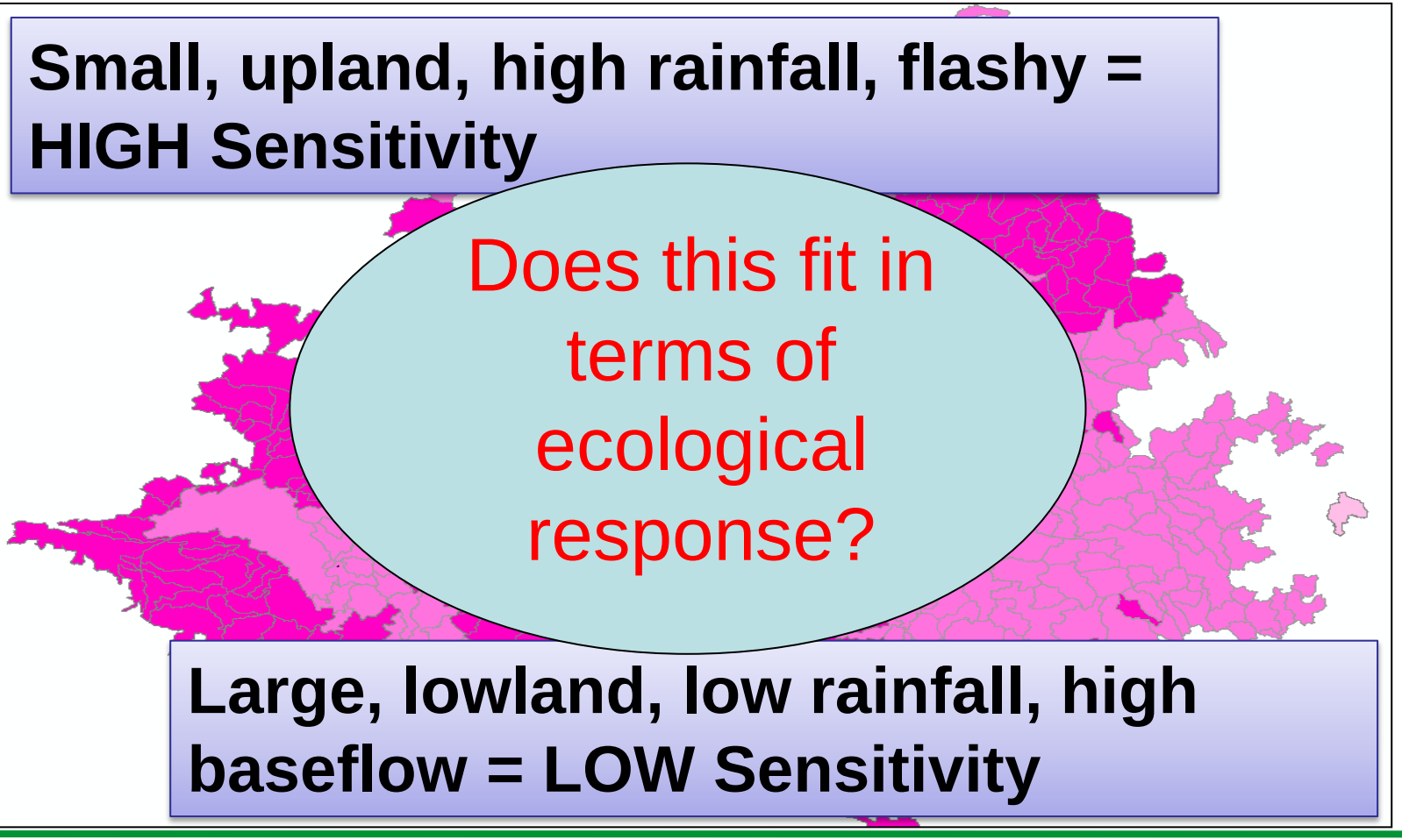


Criteria for identifying types of river to which the river flow standards apply

Column 1	Column 2	Column 3	Column 4	
Type	*Standard Average Annual Rainfall mm (period 1961-1990)*	*Base Flow Index (BFI)*	*Catchment area (km^2)*	
A1	< 810.5	< 0.715	Any	
		≥ 0.715	≥ 251.8	
A2	< 810.5	≥ 0.715	< 251.8	≤ 100 (A2 headwaters) > 100 (A2 downstream)
	≥ 810.5 and < 1413	≥ 0.7495	Any	≤ 100 (A2 headwaters) > 100 (A2 downstream)
B1	≥ 810.5 and < 1155	≥ 0.3615 and < 0.7495	< 267.4	
B2	≥ 810.5 and < 1413	≥ 0.3615 and < 0.7495	< 267.4	
C2	≥ 1155 and < 1413	≥ 0.3615 and < 0.7495	< 267.4	
	≥ 1413	≥ 0.3615	≥ 32.33	
D2	≥ 1413	≥ 0.3615	< 32.33	
	≥ 810.5	< 0.3615	Any	

Sensitive to Abstraction?

Small, upland, high rainfall, flashy = HIGH Sensitivity



Large, lowland, low rainfall, high baseflow = LOW Sensitivity

eFlows – The Principles!

- related to natural flows
- apply across all river flow conditions
- more stringent for low flow conditions
- more stringent for flow sensitive rivers
- reflect the scale of impact with ecological effect
- reflect all types of flow impact?
- **reflect consumptive abstraction only**

Water Resource Standards

TO MAINTAIN HIGH STATUS HYDROLOGY	allowable abstraction as % of mean daily flow			
River Types	**<Q_n95**	**>Q_n95**	**>Q_n70**	**>Q_n60**
All River Types	5	10	10	10

TO MAINTAIN GOOD STATUS HYDROLOGY	allowable abstraction as % of mean daily flow			
River Types	**<Q_n95**	**>Q_n95**	**>Q_n70**	**>Q_n60**
High Sensivity - A2(hw),C2,D2	10	15	20	25
Medium Sensitivity - A2(ds),B1,B2	15	20	25	30
Low Sensitivity - A1	20	25	30	35

MODERATE

POOR

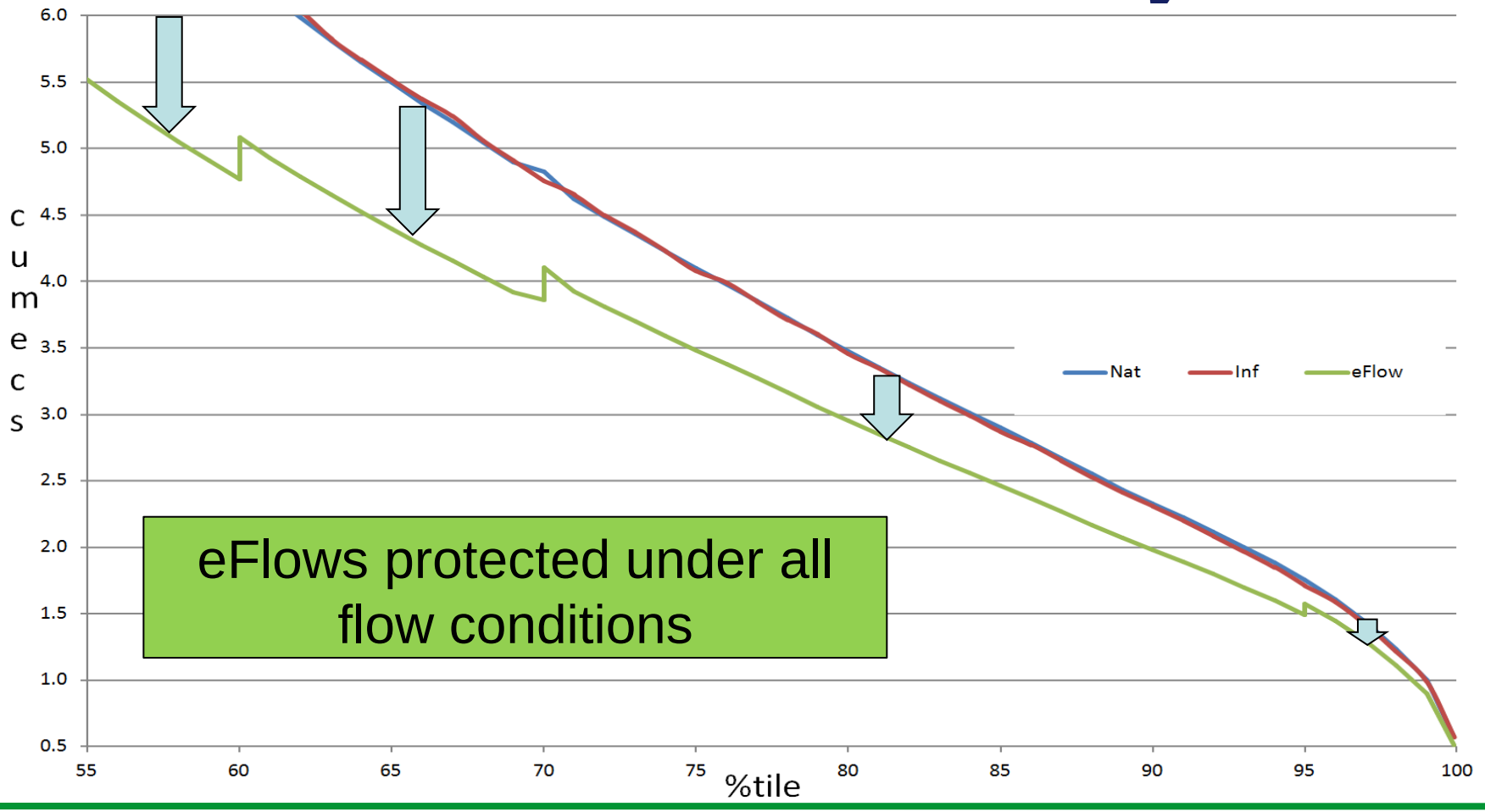
Where did the numbers come from?

- expert opinion on scale of impact
- high standards  favourable conditions?
- 95 – 80% protection at low flow conditions
- coverall for ecological parameters
- no contrary evidence
- PRECAUTIONARY!

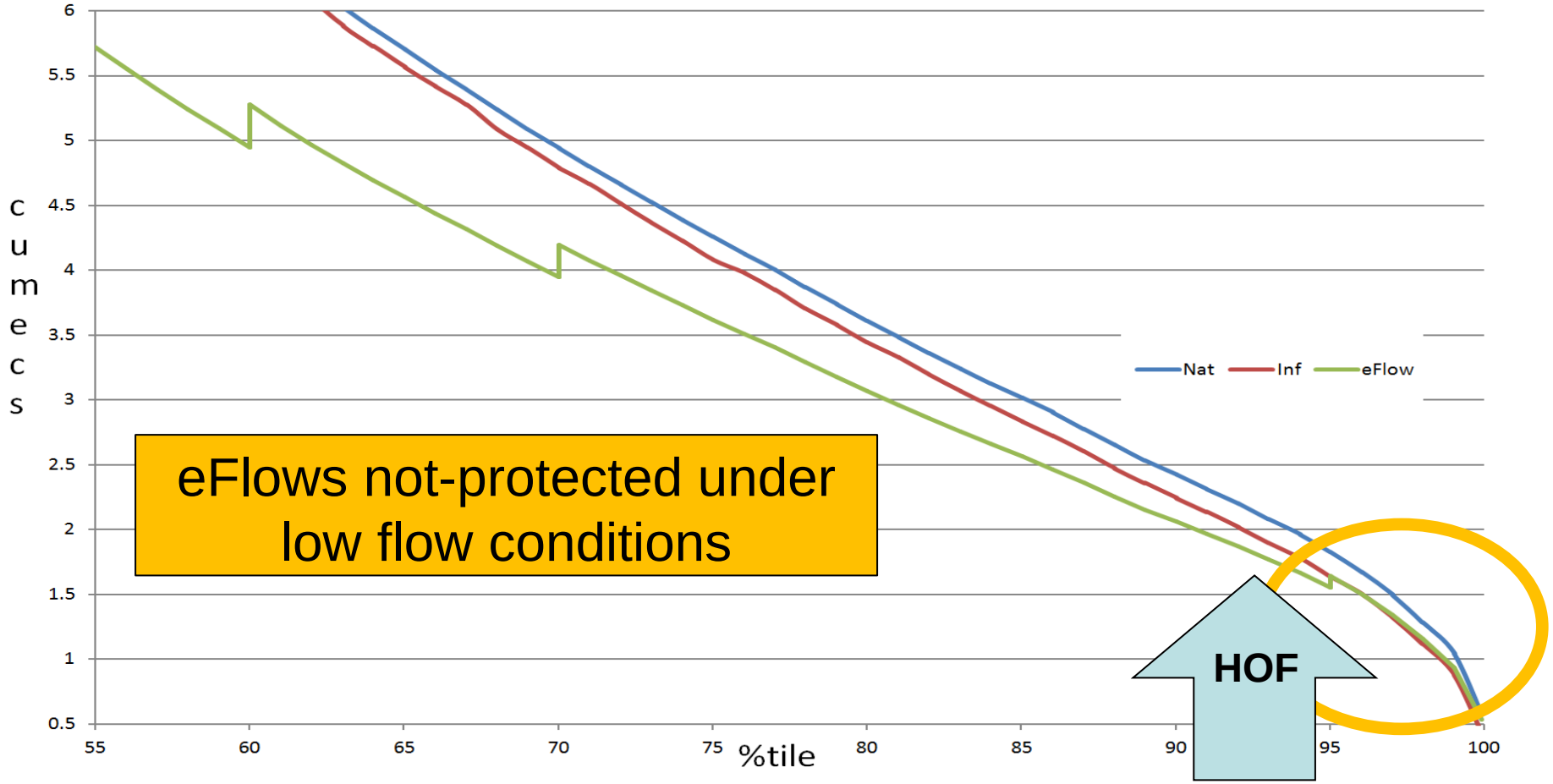
Why use flow duration?

- “back-casting”
- good indicator of river response
- easier to establish natural(ised) flows
- significant river gauging record
- representative of climate – 30 years!
- less volatile to temporal variation
- favours sustainable decision making

What's it look like in reality?



Abstraction Pressure Effect



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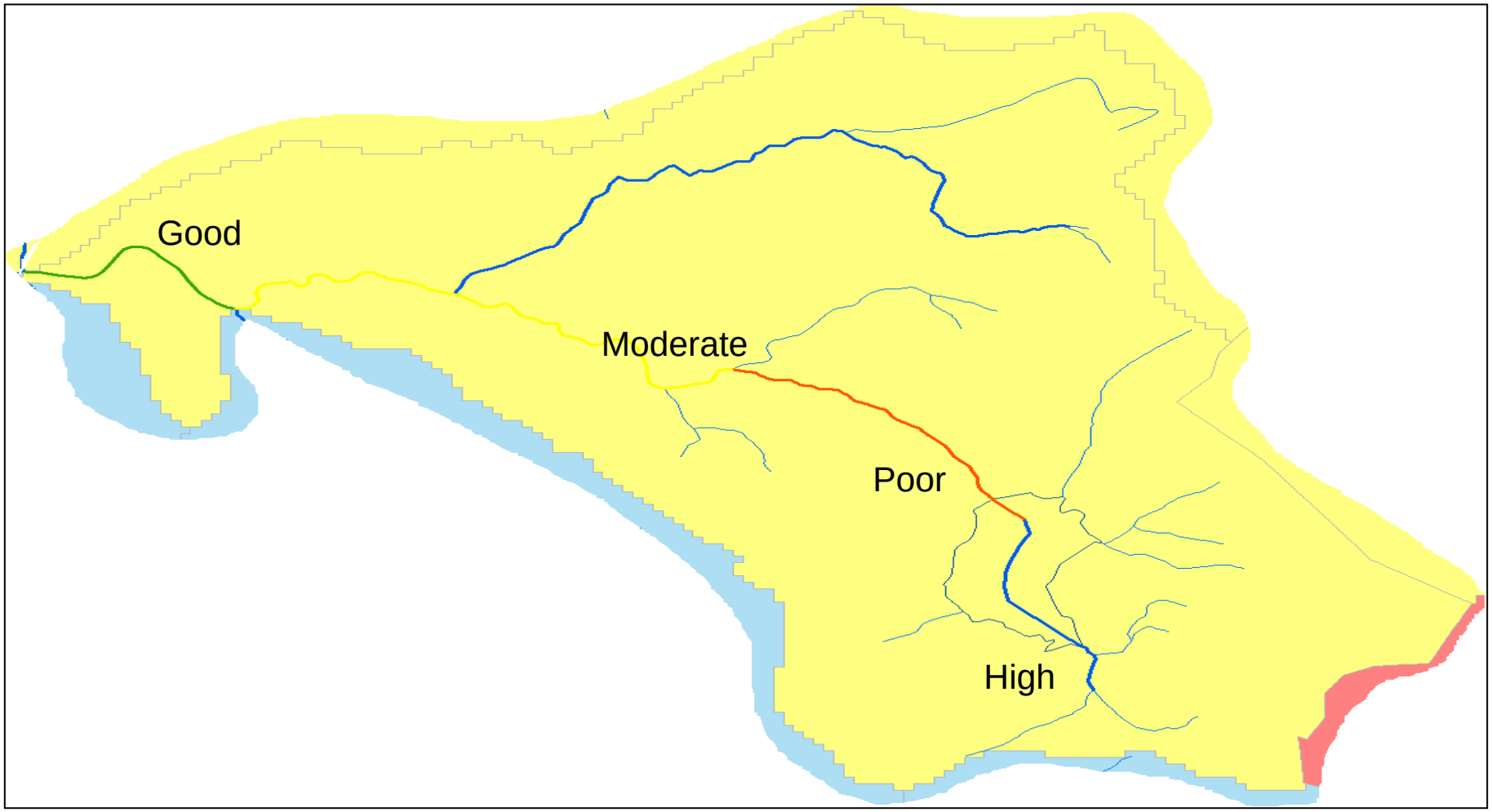
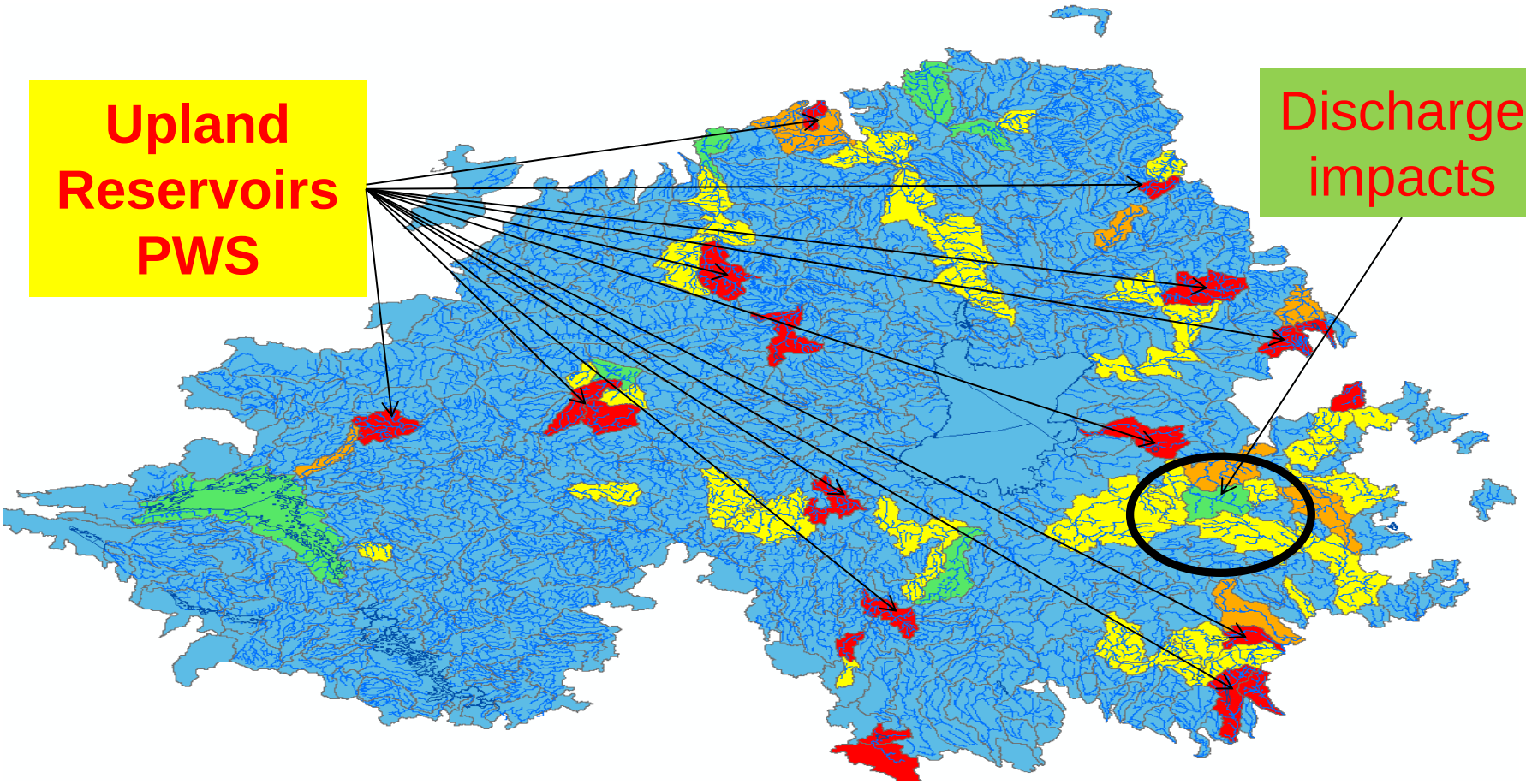
What tools do we need?

- means of estimating long term flow duration curves
- routed river network (GIS)
- abstraction pressure data
- impounded catchments
- discharges are important too!
- consumptive and non-consumptive mechanism

Routed network approach



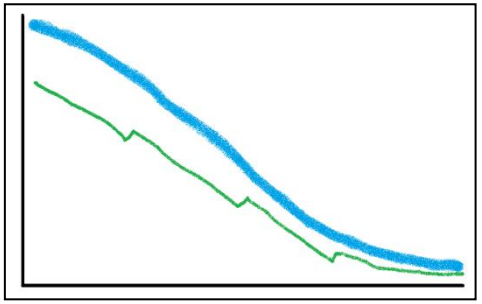
Mapping the pressures



What data do we really need?

- Robust baseline natural flow durations

CONFIDENCE



- Abstraction licence max data

NOT OVER LICENCED

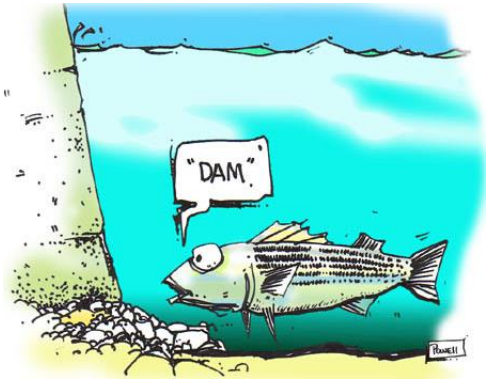
- Abstraction licence compliance data

CLASSIFICATION

What data do we really need?

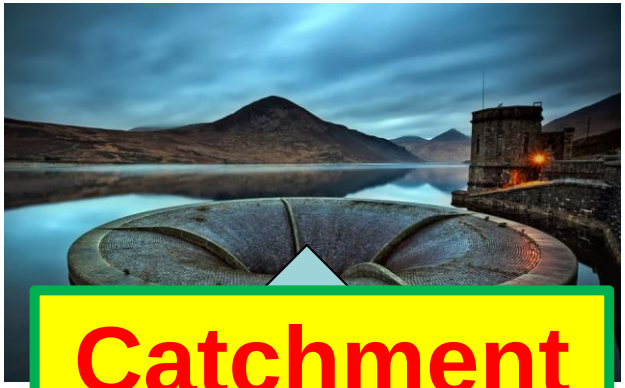
- Also need discharge maximum / monitored data

- Monitored flows downstream of impoundments – great!



The Big Stuff!

- What are the big hitters in terms of impact?



Catchment Transfer

>93%

<5%

>95%

<5%

Focusing on the pressures

- most abstractions < 20 m^3/day
- most discharges < 10m^3/day
- public utility accounts for 90%+ of pressures
- apply a threshold for impacts to consider?
- groundwater abstraction may be important locally
- are impacts measureable at water body scale?

Developing a way forward

- Layered approach to setting eFlows

Local agreements

CSM – Protected Areas

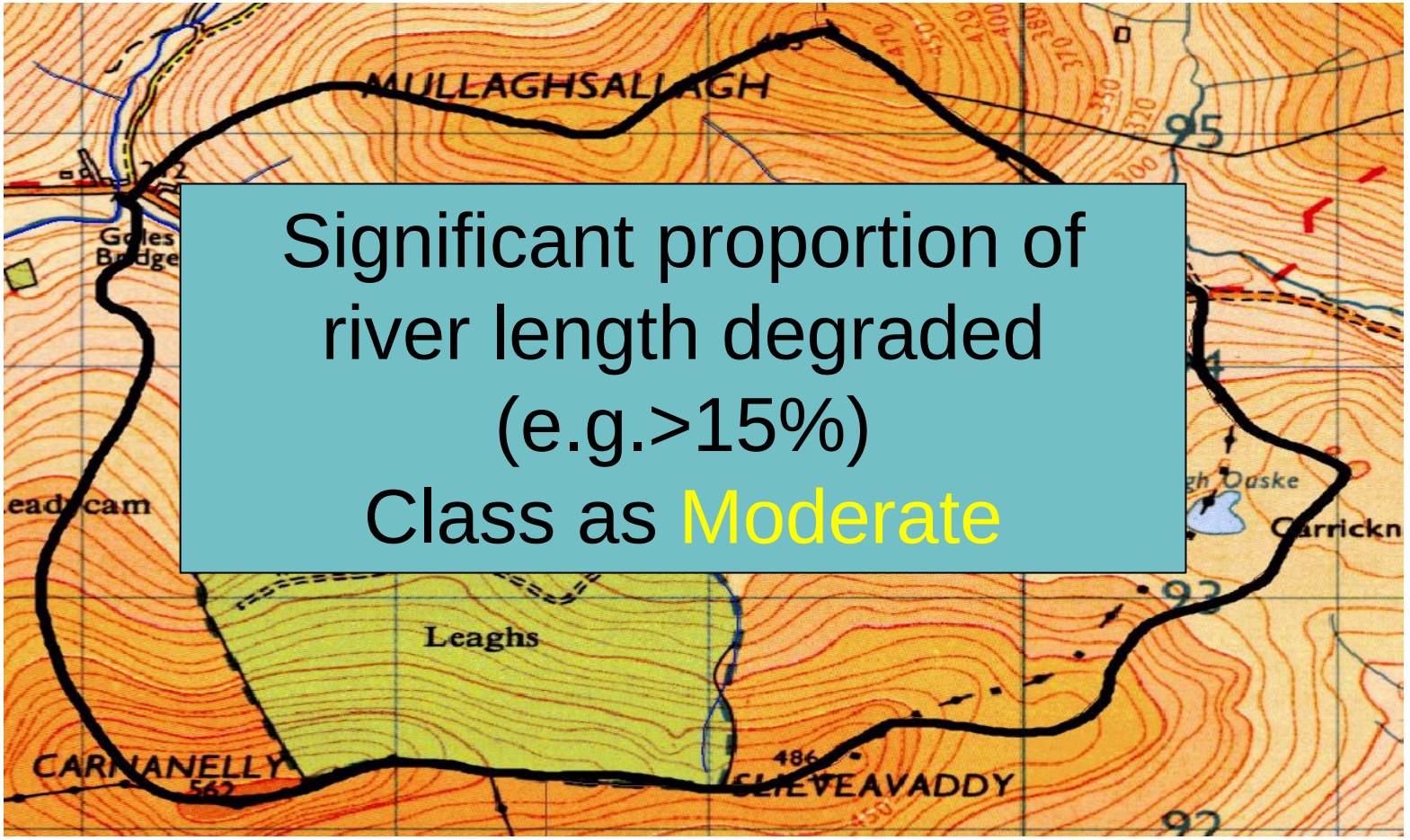
Discretionary – HOF, residual flows, freshets

Water Resources Standards – classification

What if they put the water back?

- standards account for net losses to water body
- HEP scheme or fish farms?
- degraded river stretches
- no effect at outflow
- only parts of water body impacted
- need to assess the spatial scale of impact

Non-consumptive



Significant proportion of river length degraded (e.g.>15%)
Class as Moderate

Simplicity is ultimately a matter of focus

- Ann Voskamp

Thank you!