

Working with Stakeholders to Manage Extreme Flows

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Messages

Background:

- Climate change is having an impact and likely to continue

Needs:

- 1) Adaptation (both biophysical and socio-economic)
- 2) Integrated approach
 - Connectedness - catchment and policy
 - Scale appropriate to cause and effect
 - Multiple benefit
- 3) Partnership
 - Understand and raise awareness
 - Ownership and involvement
- 4) Into practice
 - Monitor - Intervene – Evaluate - Share



Climatic variability and change

- spatial and temporal

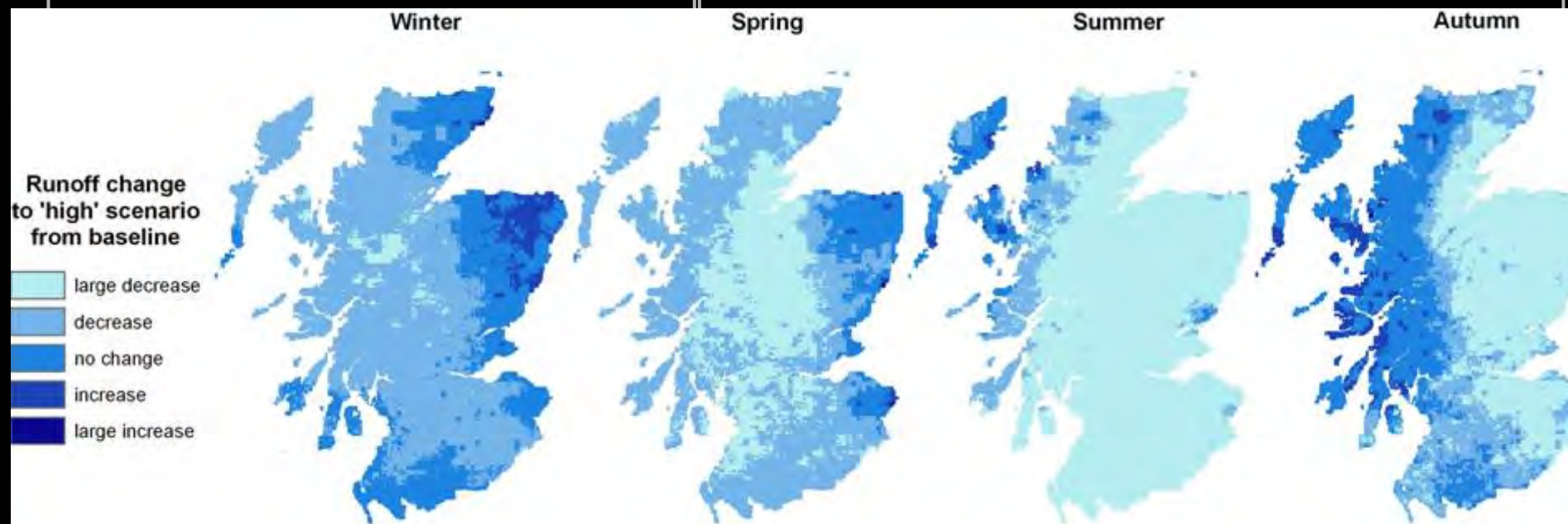
- Evidence - scientific projection of future change- spatial scenarios
- Existing example: River Dee longest flow record in Scotland 1930's- evidence of change over time
- Anecdotal local knowledge also suggest river flow extremes more common and time from onset to peak flow faster



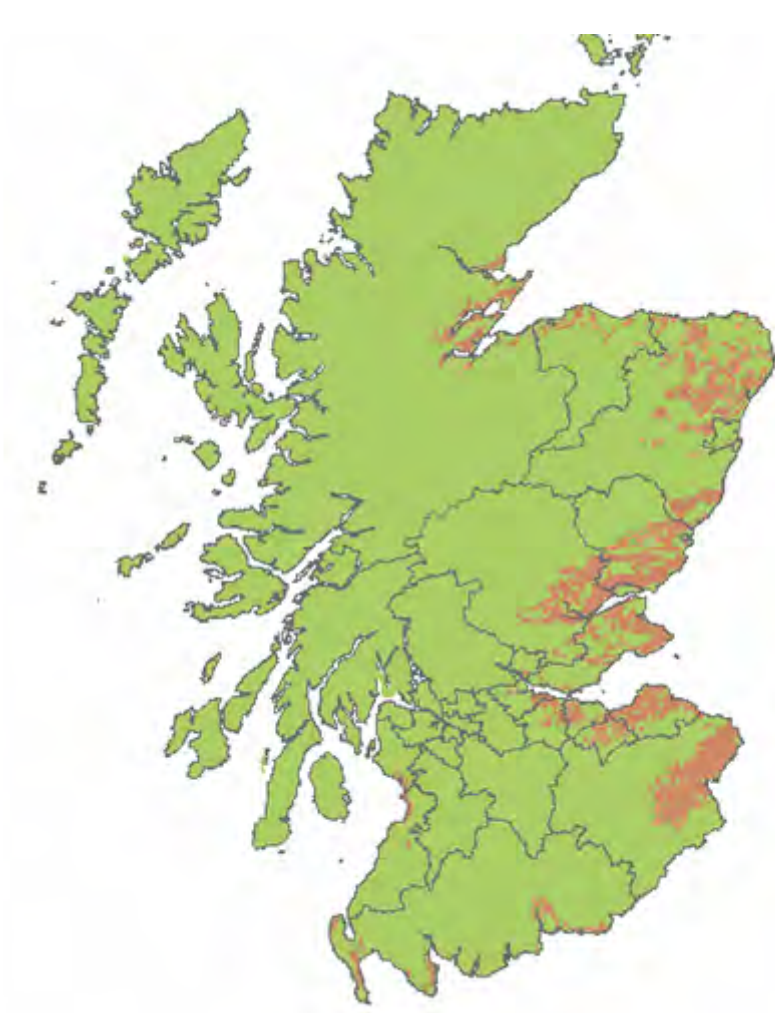
Simulated national runoff patterns (UKCIP 02 scenarios)

Annual, seasonal and spatial effects of climate change on runoff

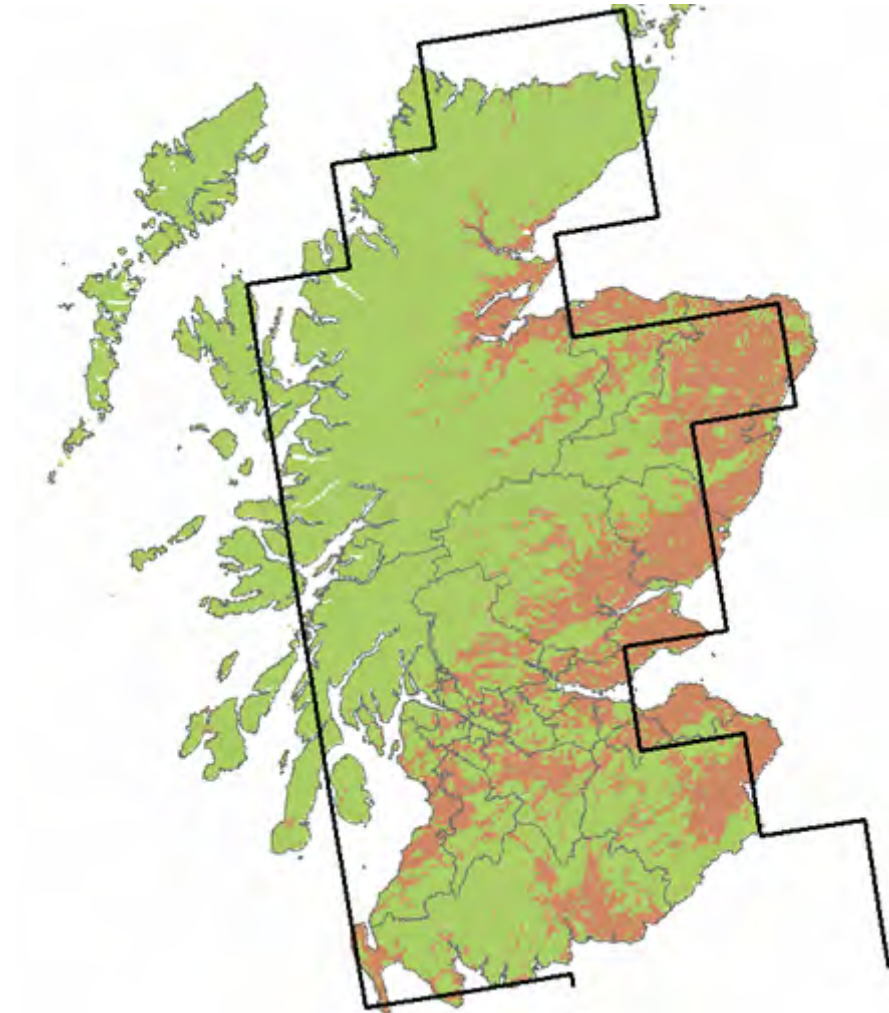
<i>Mean annual effects</i>		<i>Seasonal effects</i>	
Precipitation	Decreases	Precipitation	Drier spring / summer Wetter autumn in W / winter in NE
Runoff	Decreases more	Runoff	Reduced in spring / summer Increased in some areas in autumn / winter



Results: Future Climate Change (Med-High Scenario)



1981-2000

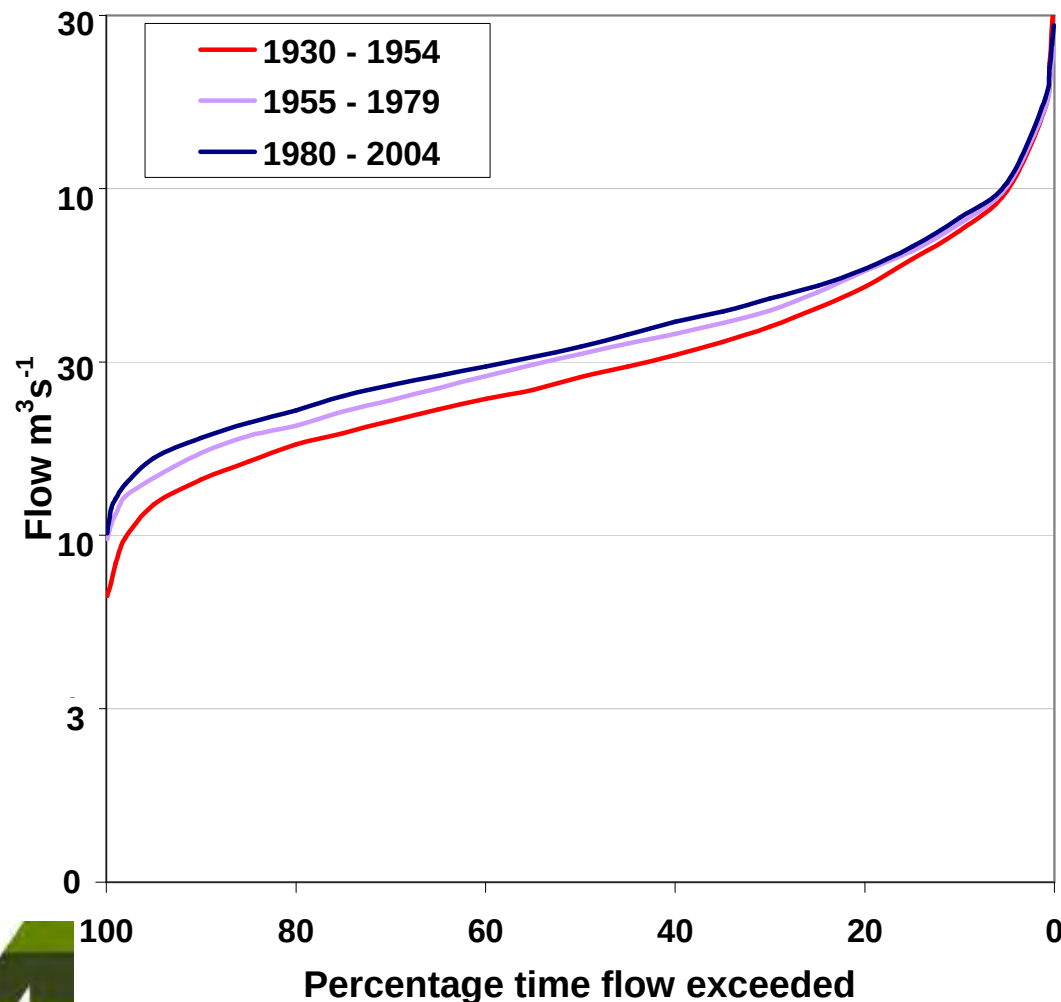


2050s – UKCIP02 Med High Emissions

Potential large gains in Prime Land !



Long term flow analysis for the River Dee



Flow duration curves for spring:

Show a significant increase in flows between all three 25 year periods

Some Policy considerations- not single problem and solution

- Flood Bill
- Water Framework Directive
 - Pressures including: abstraction, morphology and pollution
- Habitats Directive
 - favourable/unfavourable
- Needs multi functional Natural Flood Management

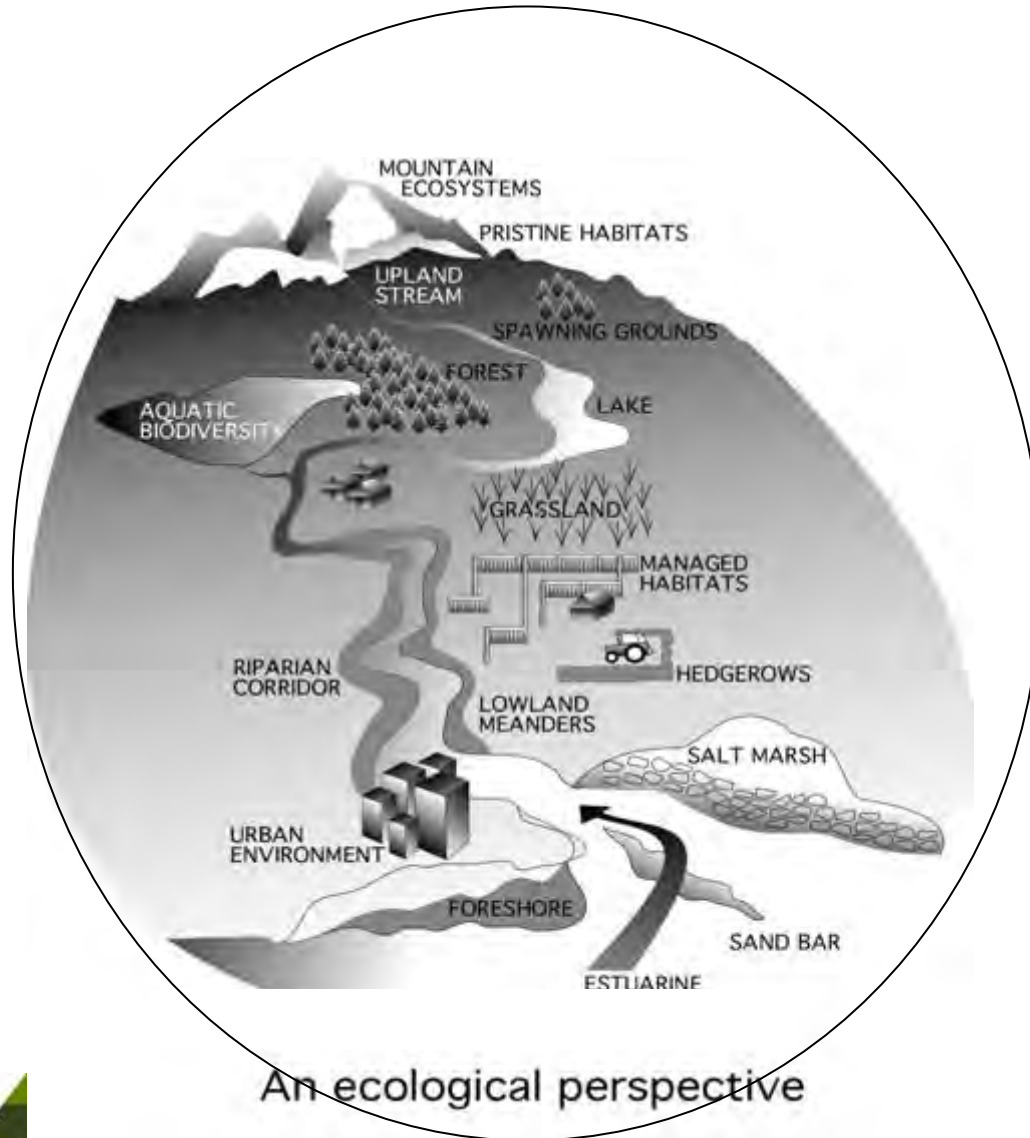


Why work with Stakeholders?

- Extreme flows are 'wicked problems' requiring societal changes
- Mitigating, and adapting to, extreme flows will require improved understanding and changed behaviour
- Awareness raising and voluntary action are important aspects of the better regulation agenda
- Opportunity to manage the ecosystem and maximise the services provided for public and private gain



Who are the Stakeholders?



Business
Conservation
Emergency services
Farmers
Fishing interests
Housing
Hydro
Insurance companies
Policy makers
Recreational Users
Residents
Responsible authorities
Tourists & Suppliers

Societal perspective

Connectedness



Working with Residents

- **Residents don't always understand flood risk communications**
- **Residents have tacit local knowledge about flows**
 - Rule of thumb about when at risk from flooding or drought
- **Residents have complex reasons for 'irrational' behaviour**
 - e.g. living on flood plain, insufficient insurance
- **Public have preferences for management**
 - Determined by attitudes to governance of measures (their sustainability; implications for social justice; naturalness; safety and efficiency)
 - Less likely to act if feel that others (e.g. utilities) are responsible



Sources: Dundee; Collingwood; Fisher & Glenck

Implications

- Assumptions by Emergency Services and Planners might not match how residents think
- Adapt communications to respond to 'triggers' that make sense to their audiences
- Explore how working with local knowledge can improve response to extreme flows
- Improve understanding of how public respond to potential measures



Working with Farmers

- **How do we persuade farmers to store flood waters on their land?**
- **Need to know:**
 - Technical aspects (how much, where, when, how often, how long, impact on water quality)
 - Economic aspects (impact on crop; restrictions on land management)
 - Institutional aspects (adoption issues; land ownership; health & safety; grants/insurance; impact on designations)
 - Other benefits (amenity value; conservation values; sporting/shooting benefits; eco-tourism)
- **Who benefits, who loses, and how to balance these**
 - E.g. will crop insurance be more cost-effective than hard engineering downstream?
 - Will residents prefer NFM? Will farmers be willing to try?



Integrated Approach

- to provide data, understanding and demonstration

PARTNERS

- Aberdeenshire Council
- Macaulay Institute
- SEPA
- SNH
- Land Managers
- Communities

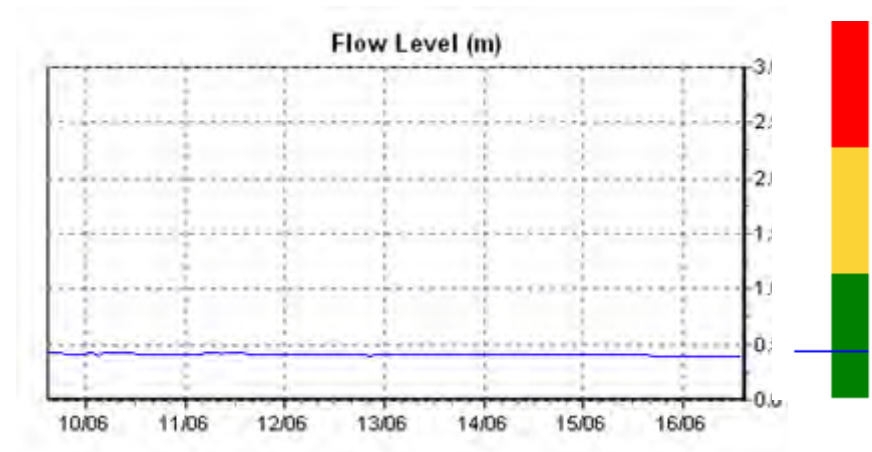
PROJECTS

- Tarland Catchment
- Aquarius
- River Dee CMP
- UR Flood





Evaluate and inform



www.macauley.ac.uk/tarland/data

Initial flood alleviation





Demonstration wetland

Network and demonstration, What is in it for:-

Land Managers ?

- Problems and solutions are generic for much of rural, agricultural Scotland
- Learning experience: How to engage and utilise community involvement

Scientists and Policy ?

- Provide objective data to assess effectiveness of different improvements
- Demonstration of joined up thinking
- Demonstrate natural flood management



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