

Natural flood management: a catchment approach to reducing flood risk

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Natural flood management:

- Component of sustainable flood management
- Slowing down flood flows
- Using natural processes
- Prescriptions of measures

Catchment based approach:

- Land management
- Water resources management
- Sustainable communities
- Adaptation to climate change



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EU Water Framework Directive:
River basin management plans

Water Environment Water Services (Scotland) Act:
Consideration of sustainable flood management

EU Floods Directive:
Flood risk coordinated throughout a river basin

Flood Risk Management (Scotland) Bill:
Contribution of natural features and characteristics

Sustainable flood management:

- Floods legislation driven by good science, policy and planning;
- Flood monitoring networks and warning systems;
- Flood data for investigating flood generation processes;
- Protecting, benefiting and involving communities;
- Engineered flood protection schemes;
- Economics including capital costs, maintenance costs;
- Protecting, restoring and enhancing the natural environment;
- Natural flood management in functional flood control areas

Natural flood management:

Reduces runoff rates in the upper catchment

Increases temporary storage in the lower catchment

Catchment approach:

Uses natural processes throughout a catchment

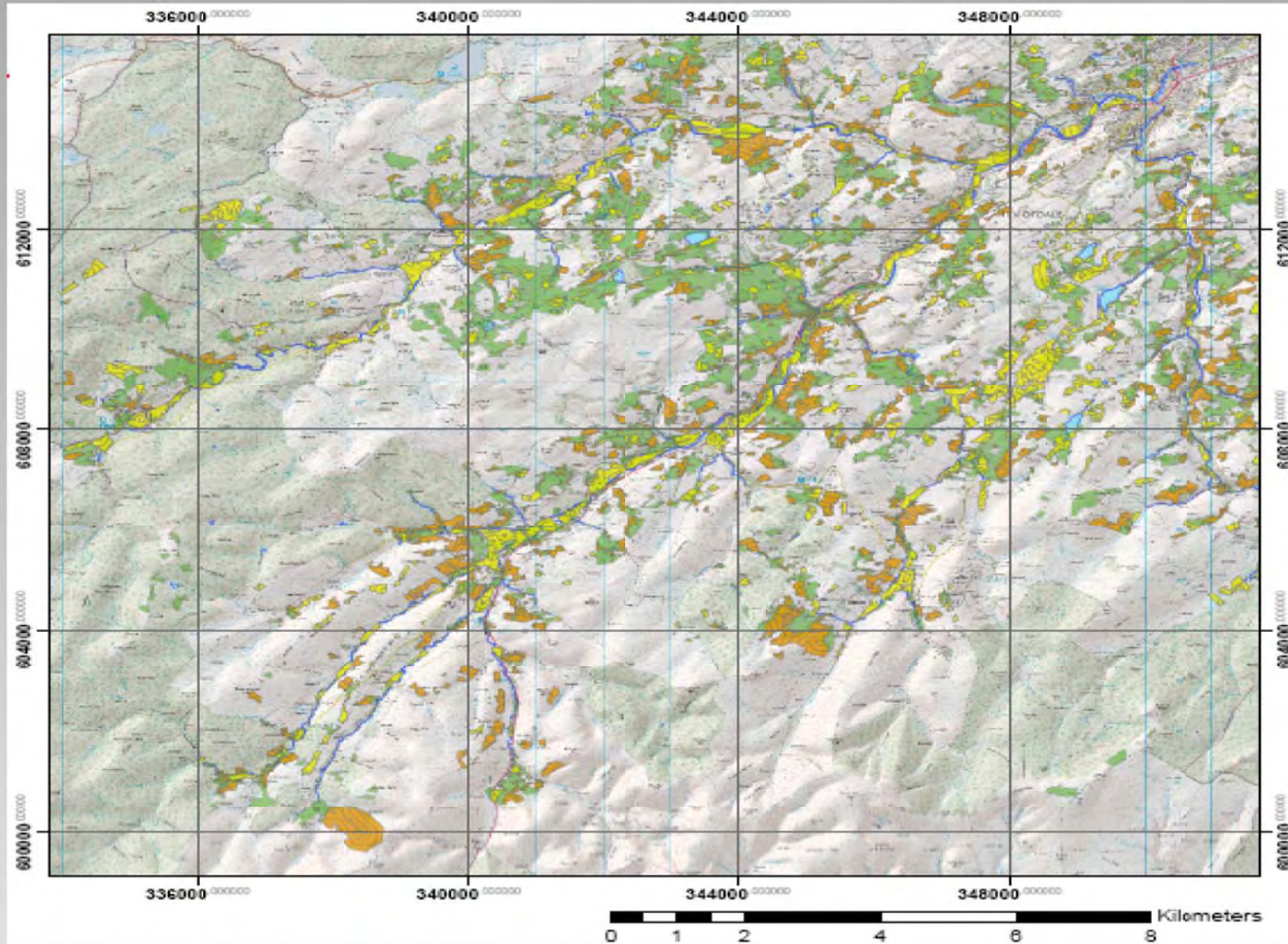
Develops a prescription of measures

Natural flood management techniques:

- Woodlands buffer intense rainfall and shelter snowpacks
- Soils store water
- Wetlands attenuate rapid runoff and store water
- River channels dissipate high energy flows
- Floodplains store water

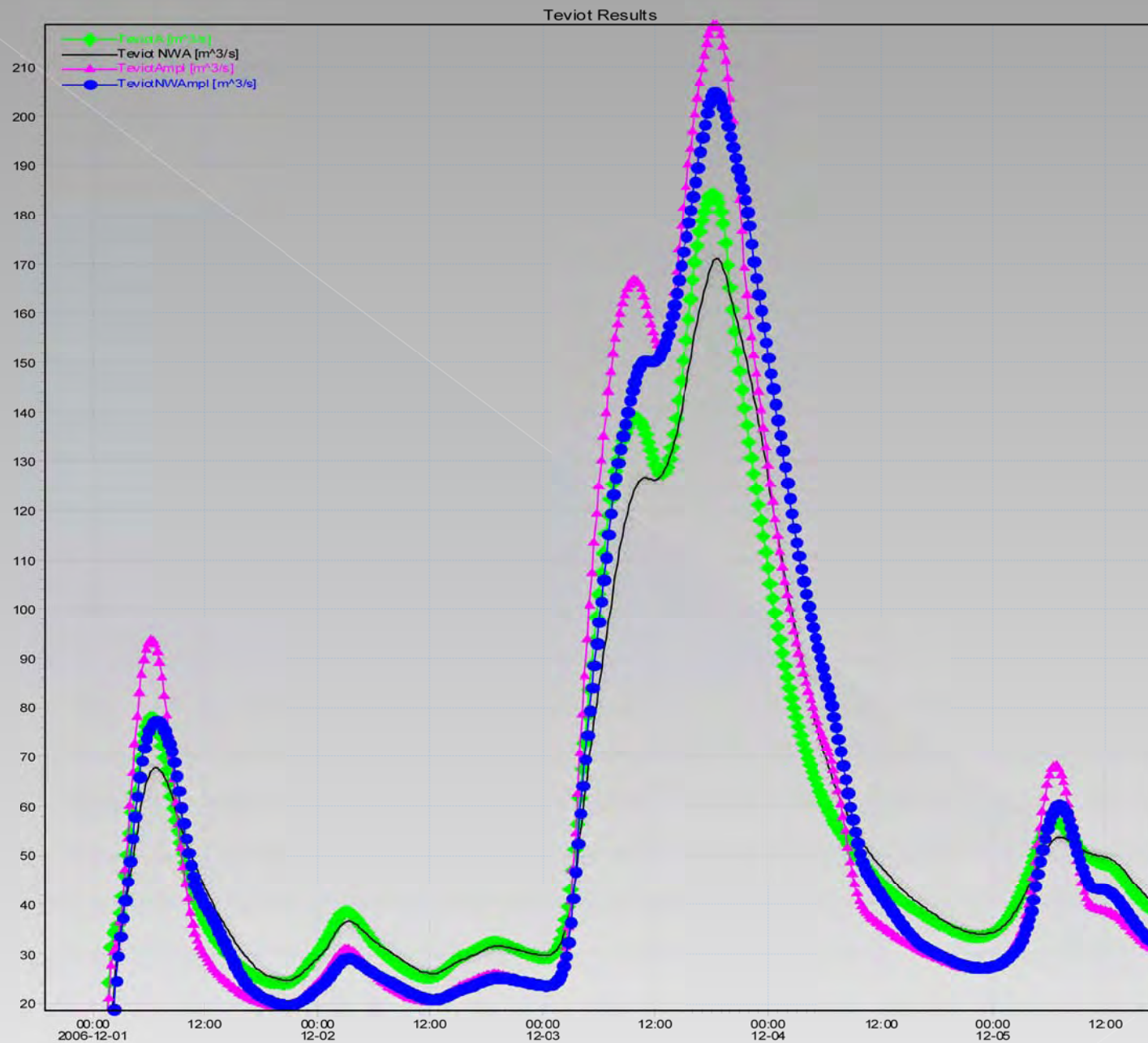


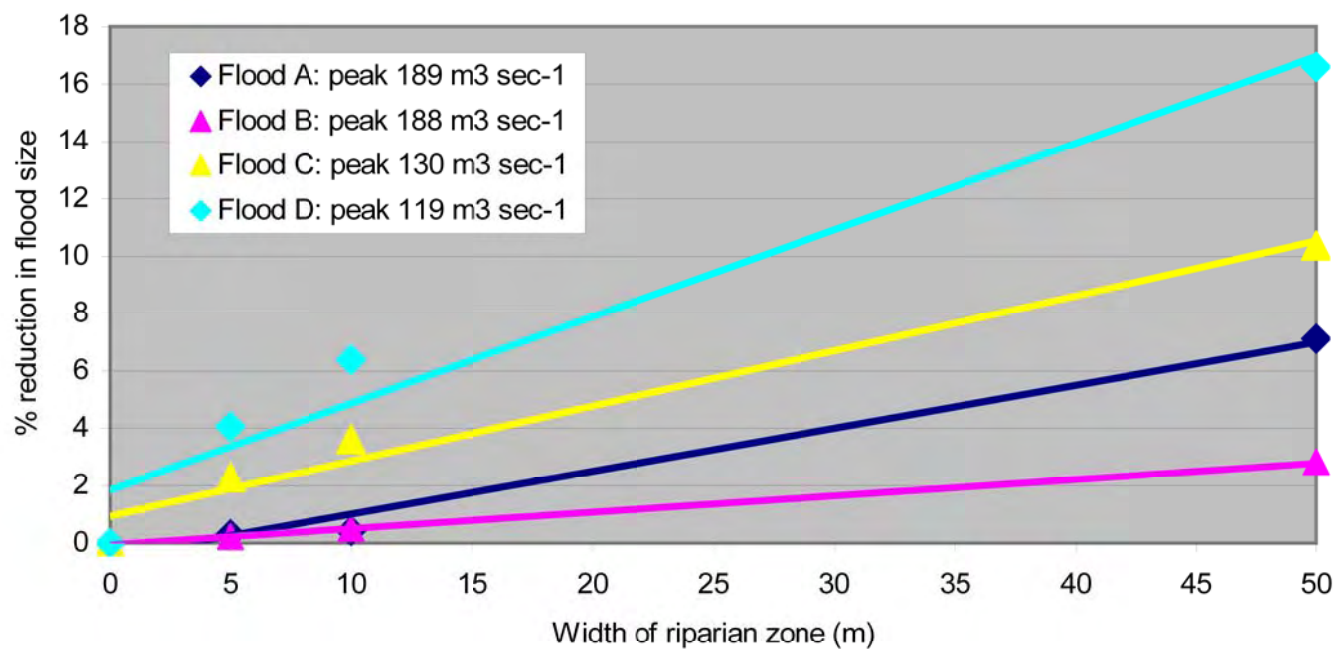
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1. Catchment based approach

Involve the community to provide local knowledge and buy into the scheme

2. Catchment based approach:

Survey the catchment to assess the flood generation processes, locate functional flood control areas and install river gauges

3. Catchment based approach:

**Collate evidence of historical land use changes,
habitat changes and past floods**

4. Catchment based approach:

Develop a catchment based hydraulic model and test scenarios of peak synchronisation, rainfall variability and flood magnitude

5. Catchment based approach:

Use the model to test all options for functional flood control areas including timing of effectiveness and reduction in flood risk

6. Catchment based approach:

Develop a prescription of measures and consult with landowners about options for implementation

7. Catchment based approach:

Consider the need for additional SFM components including flood warnings, engineered solutions, costs and additional benefits

8. Catchment based approach:

Develop a catchment based flood management plan with the community

Additional benefits:

- Sustaining low flows – river ecology, water supplies, hydropower
- Improving the quality of the rivers – turbidity, diffuse pollution, temperature, shading, habitat protection
- Adaptable to climate change – unpredictable flash floods, temperature rise, winter precipitation
- Recreation – woodland management, angling, education
- Diversity in land management – commercial links to small hydropower
- Low cost and low maintenance so flood risk can be reduced in more communities

Links with other plans:

- River basin management plans
- Strategic and local plans
- Community action plans
- Rural development plans
- Forest management plans
- Wetland visions
- Biodiversity action plans
- Etc.

Natural flood management:

Part of sustainable flood management
Effective in reducing flood risk
Many additional benefits

Catchment approach:

Develops a prescription of measures
Links to other river basin management plans
Benefits local communities

Future needs:

- Network of demonstration sites to quantify the effectiveness in different geographical and climatic locations – existing sites and SG (SNIFFER) scoping study
- Demonstration catchment to develop the integration of techniques, other plans, land owners and local community - GULUP
- Guidelines for responsible authorities to apply the Flood Risk Management (Scotland) Act – National Parks