



LOCH RESTORATION

- SEPA's perspective

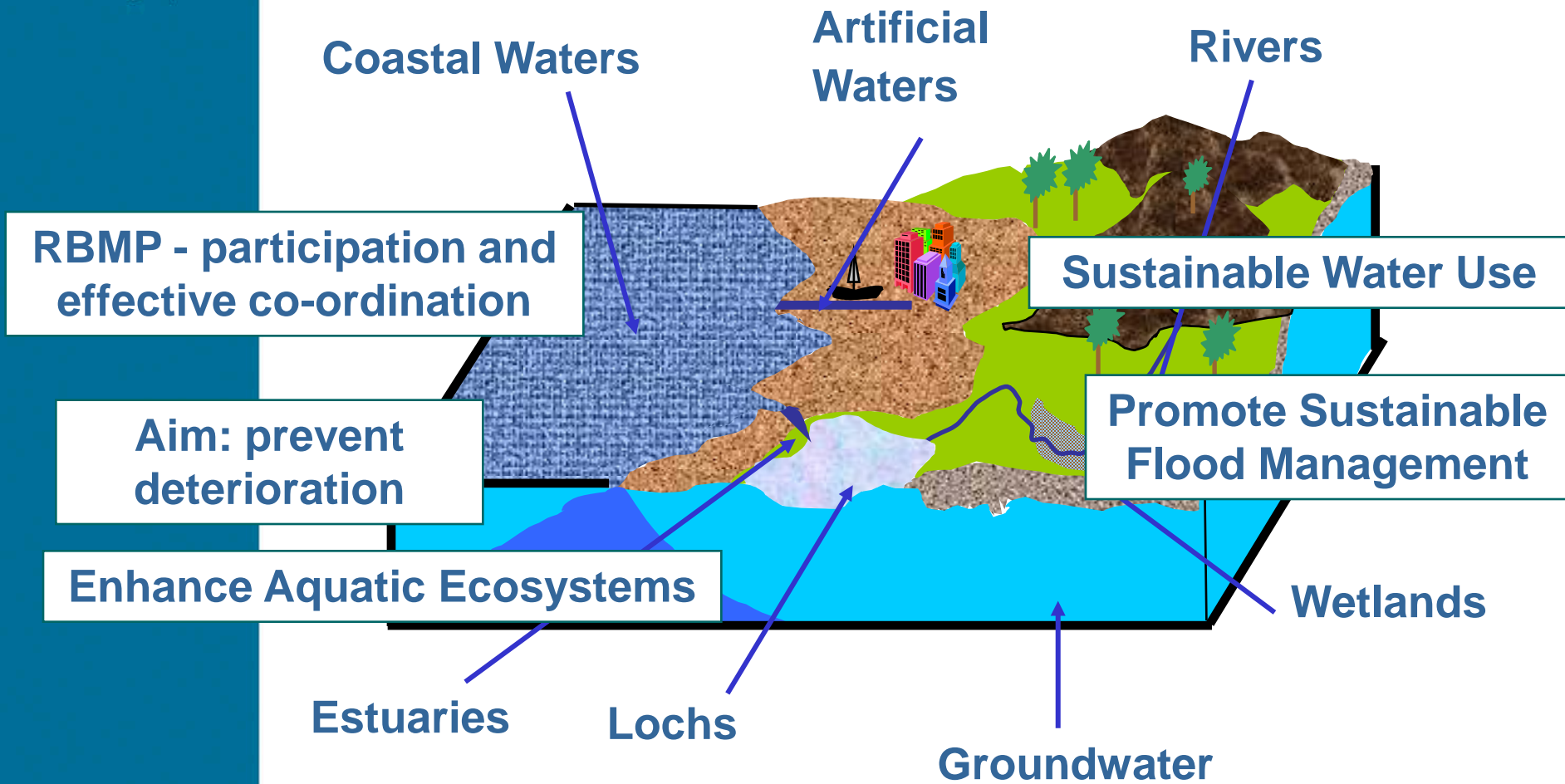
Louise Bond, SEPA

8th April 2010

Outline

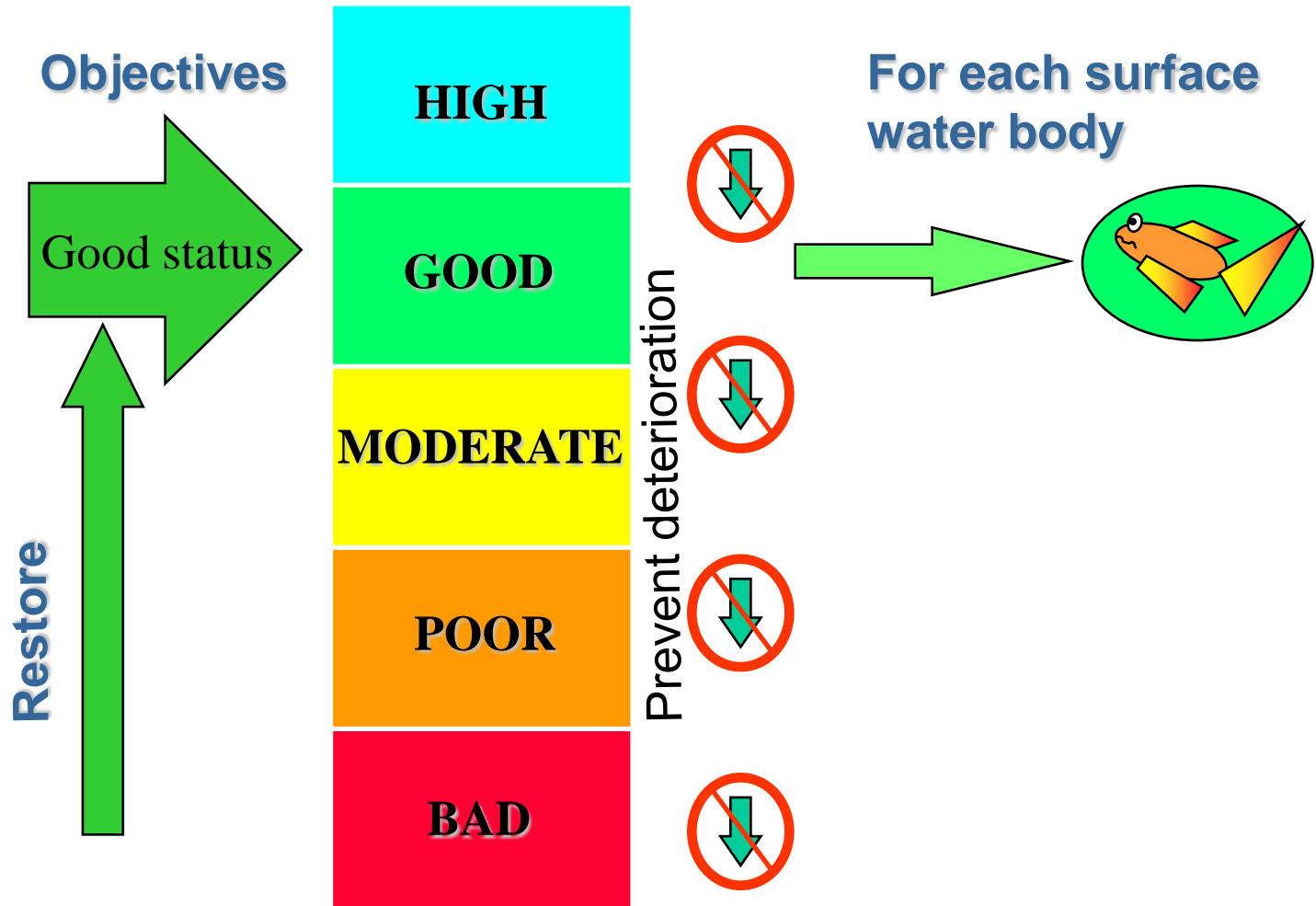
- Regulatory drivers for loch restoration:
 - Water Framework Directive
 - RBMP
 - Diffuse Pollution mitigation strategy
- Biodiversity drivers:
 - Lakes Habitat Action Plan/ Scottish FWEG
 - SEPA's Environmental Improvement Action Plan
- Next steps/future opportunities for restoration

The Water Framework Directive



Legislation – Water Environment and Water Services (Scotland) Act 2003;
 Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR);
 The Water Environment (Diffuse Pollution) (Scotland) Regulations 2008

Good Ecological Status by 2015; 2021



Pressures on Scottish Lochs

- Diffuse/point source pollution – nutrient enrichment
- Acidification
- Morphological changes
- Non-native invasive species



NZ Pygmyweed (*Crassula helmsii*)



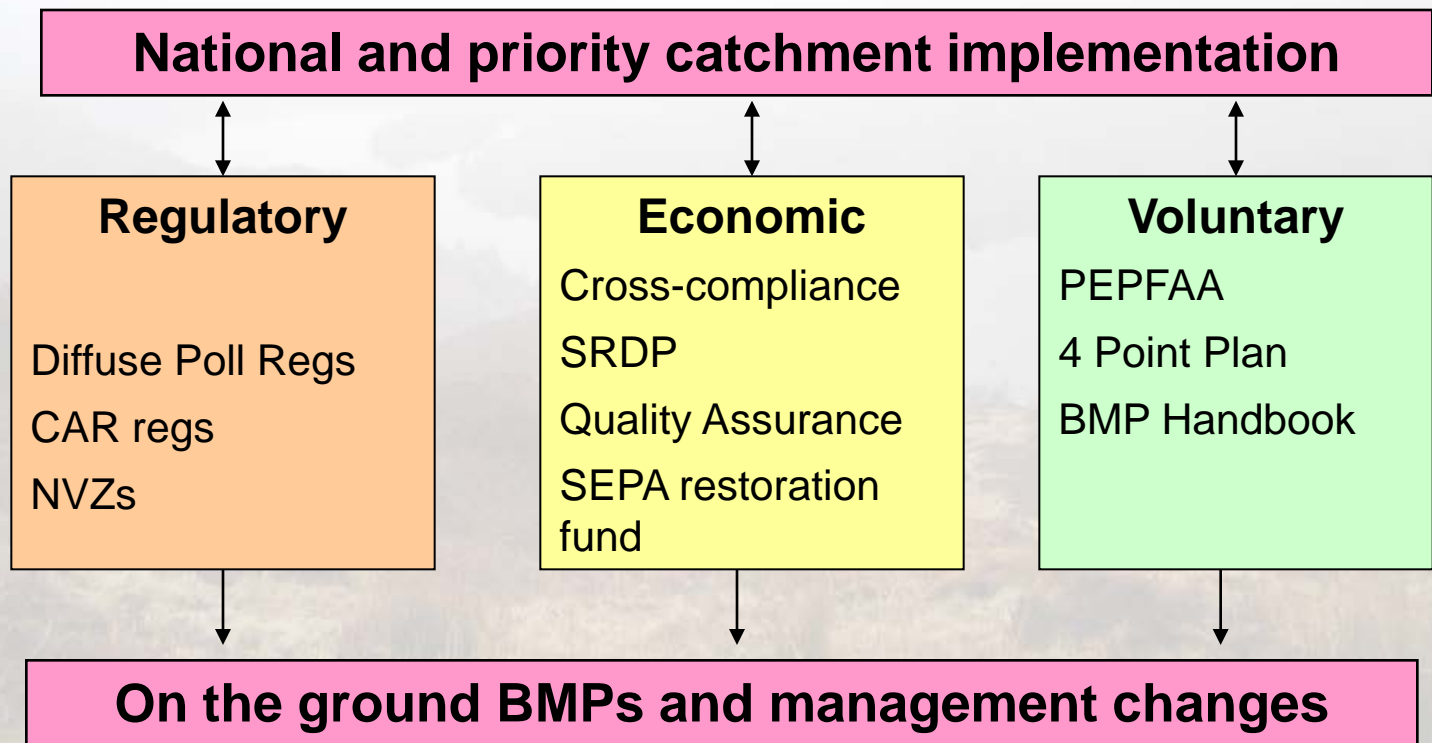
WFD: Assessing loch status

WFD Monitoring Activities:

- Chemistry
 - Total Phosphorus
 - Dissolved oxygen
- Ecological
 - Phytoplankton - chlorophyll, cyanobacteria
 - Phytobenthos – littoral diatoms
 - Macrophytes
 - Invertebrates
- Hydrology/morphology – fish barriers

Diffuse pollution control

- Combination of regulatory, economic and voluntary measures
- Partnership approach through RBMP, priority catchment work
- One to one advice for land managers

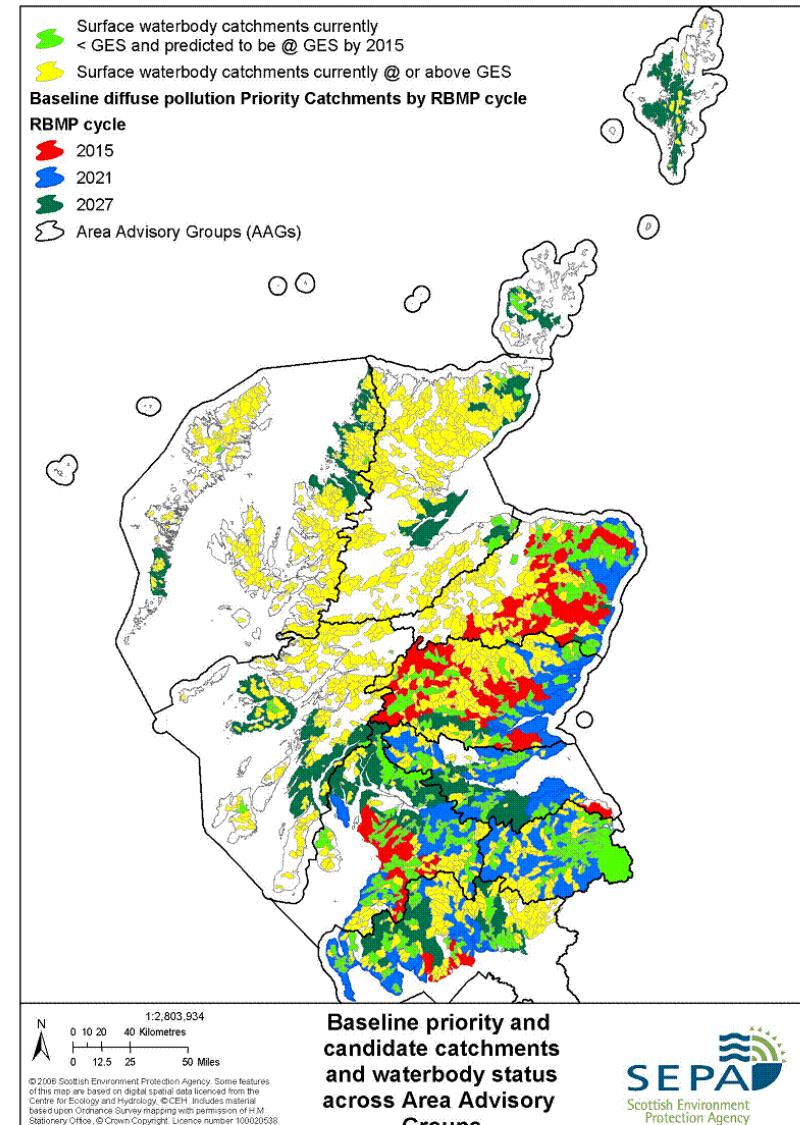


Diffuse Pollution Priority Catchments

National campaign – to maintain good status & prevent deterioration

Proposal is:

- Awareness raising of rural diffuse pollution, particularly re DP GBR's with land managers, stakeholders etc
- Production of guidance and training on rural diffuse pollution for land managers, advisors & consultants
- GBR compliance checks (SEARS inspections)

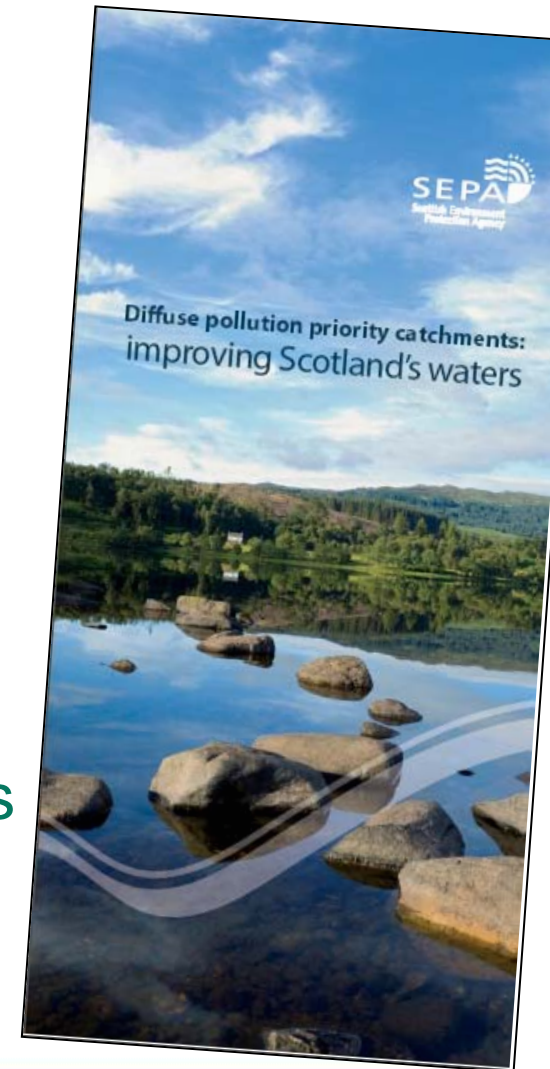


Priority Catchment approach

- Catchment-wide approach required to reduce diffuse pollution
- Addressing morphology and invasive non-native species are also key to improving water quality status
- 3 stage approach:
 1. **Catchment walks**
 2. **Awareness Raising**
 3. **1:1 Site visits**

Step 1 – Catchment Walks

- Letter & PC leaflet to all land managers
- Important ‘ground truthing’ exercise, recording:
 - GBR breaches
 - Point sources of pollution
 - Good and bad practice
 - Land use
 - Morphology pressures
 - Invasive non-native species
- Info gathered will feed into characterisation report



Step 2 – Awareness raising

- Catchment meetings: present findings to land owners in catchment
 - Compliance with regulation?
 - Demonstrate impact in catchment
 - Suggest mitigation measures
 - Advise of site visits



Step 3 – 1:1 Site visits

- Carry out diffuse pollution farm audit
 - Approx 2 days per farm
 - Will assess compliance with DP GBR's, plus: SSAFO, Oil Storage Regs, CAR, WML
 - Identify good/poor practice and suggest improvements where appropriate
 - Report back to land manager



Loch Restoration

Environmental Improvement Action Plan

- Drivers: UK Lakes HAP targets – maintaining good condition, restoration, monitoring; SBS Freshwater & Wetland ecosystem plan; LBAP targets; Nature Conservation (Scotland) Act 2004.
- SEPA produces loch EIAPs to support partnership projects to restore lochs complimentary to regulatory work.
- Biodiversity lochs EIAP – 31 lochs, recorded presence of BAP priority species (slender naiad, Shetland pondweed, pillwort) which are under threat of decline.

Loch Restoration

Environmental Improvement Action Plan

EIAP Objectives

- To work in partnership to pursue local biodiversity projects to address pressures to improve the lochs ecological status and to safeguard the populations of priority native plant assemblages
- To deliver UK Lakes HAP targets
- Contribute to WFD targets of achieving 'good ecological condition'

(see posters)

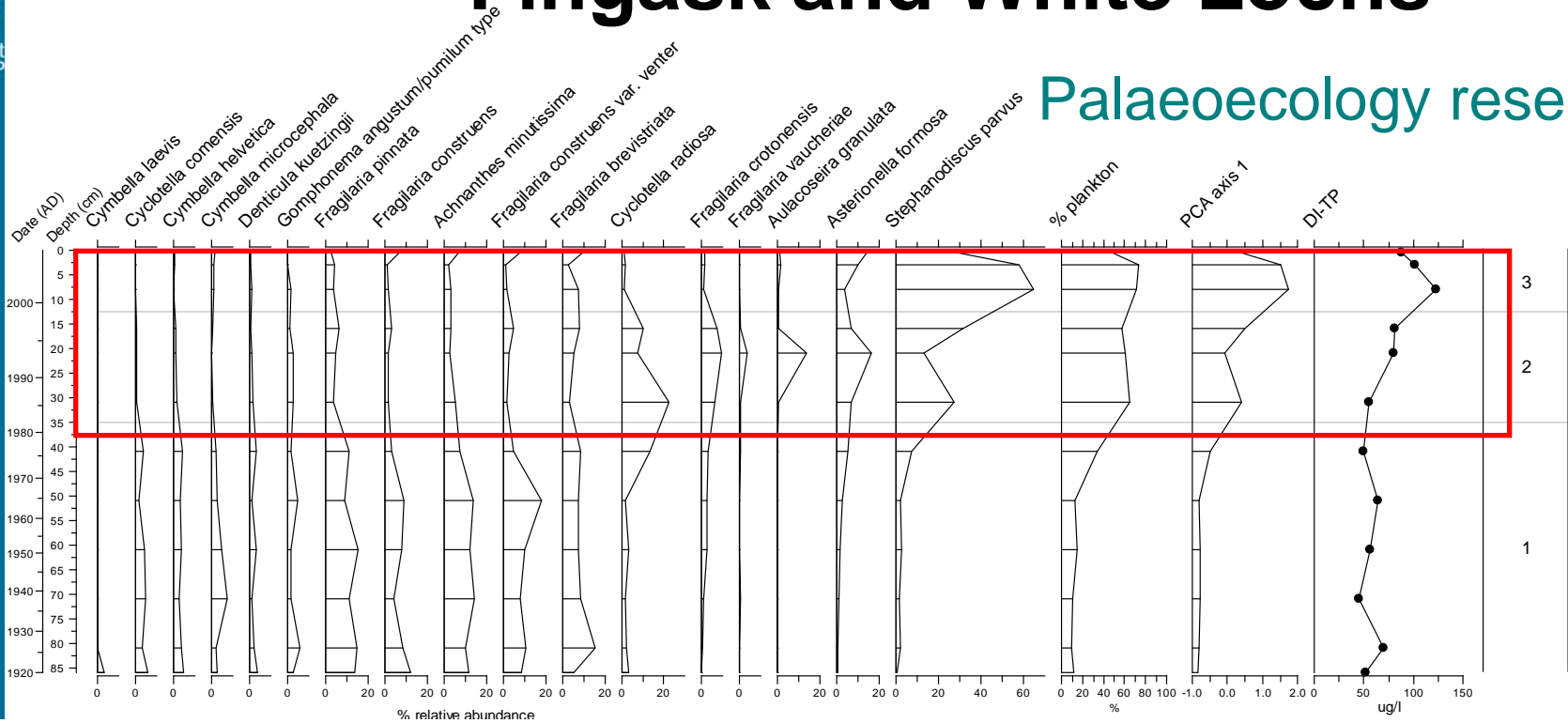
Fingask & White Lochs, Tayside



- Small lochs <12 ha, flora indicative of mesotrophic status
- Records biodiversity priority species: slender naiad (*Najas flexilis*) 2008/09, Shetland pondweed (*Potamogeton rutilis*) Fingask 2005. Rough stonewort (*Chara aspera*) and bristly stonewort (*C. hispida*) 1999
- V small populations, nutrient enrichment, cyanobacterial blooms in recent years
- WFD TP classification = moderate status

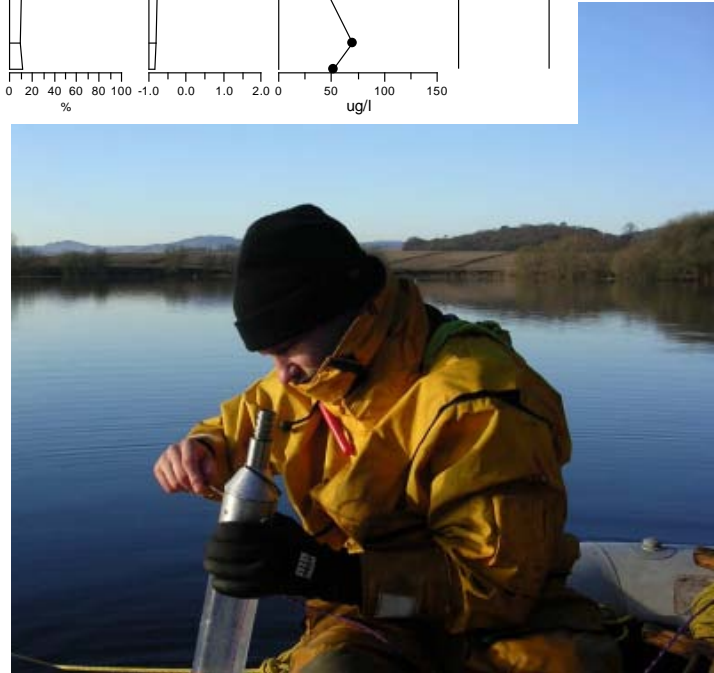
Fingask and White Lochs

Palaeoecology research



White Loch formerly supported diatom and Cladocera communities typical of a mesotrophic loch

These have both undergone changes associated with enrichment most notably since ~1970.



Fingask and White Lochs



Tayside lochs partnership established 2008

Tayside biodiversity funding (SITA) – diffuse pollution audit of farms, soil nutrient budgets, advice to landowners, buffer strips around both lochs.

Partners – FWAG, Tayside LBAP, Blairgowrie Angling Association, Kindrogan Field Studies Centre, Rosemount Golf Club, SNH, SEPA.



Lindores Loch EIAP



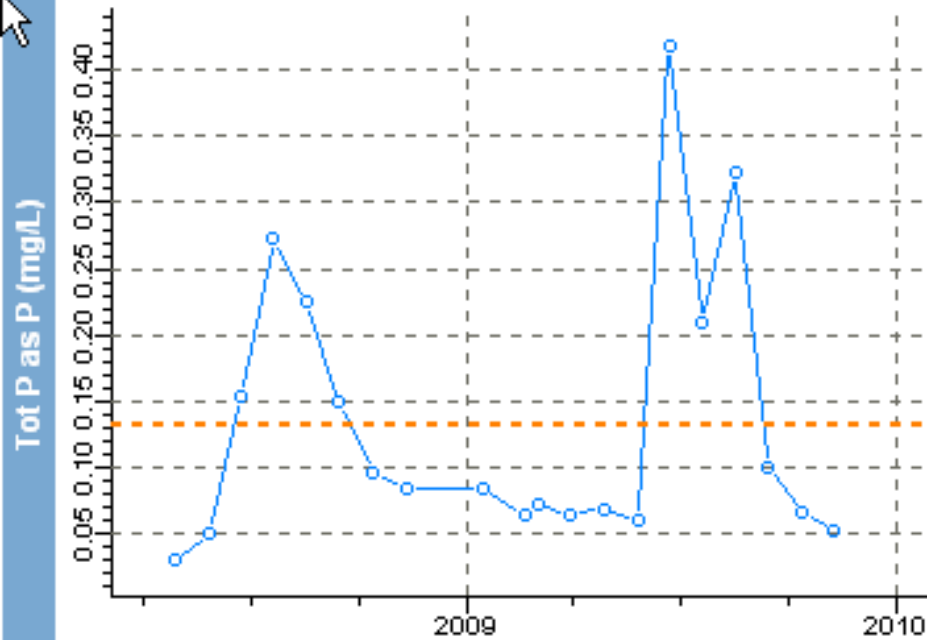
40.5 ha, shallow lowland mesotrophic loch, near Newburgh

Extensive charophyte beds, largest number of *Potamogeton* species of any open water site in Fife (historical macrophyte records - Fife loch survey)

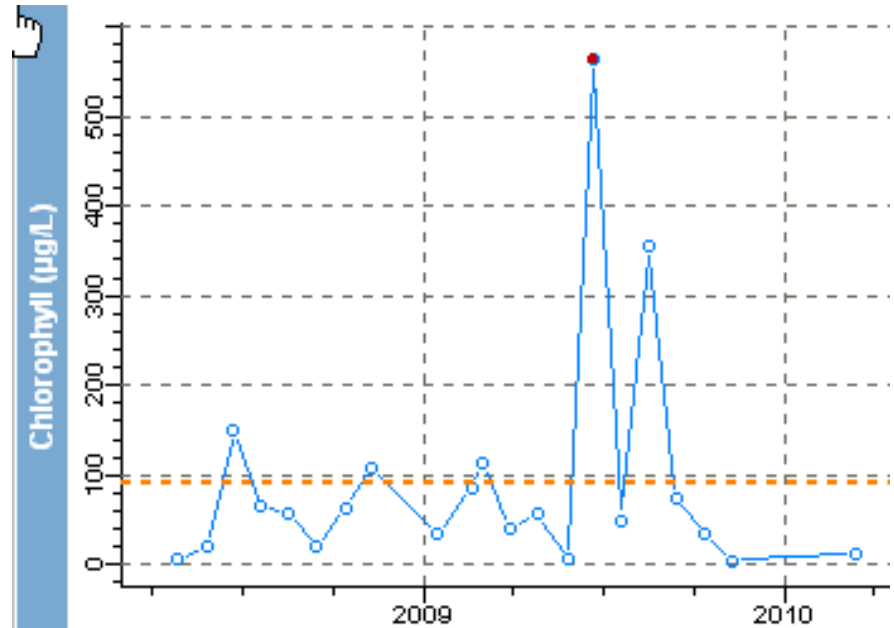
Formerly support BAP priority spp *Najas flexilis* (slender naiad) - 2000

Extensive freshwater mire, adjoining rich-fen and alder willow carr

Lindores Loch

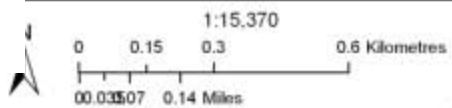
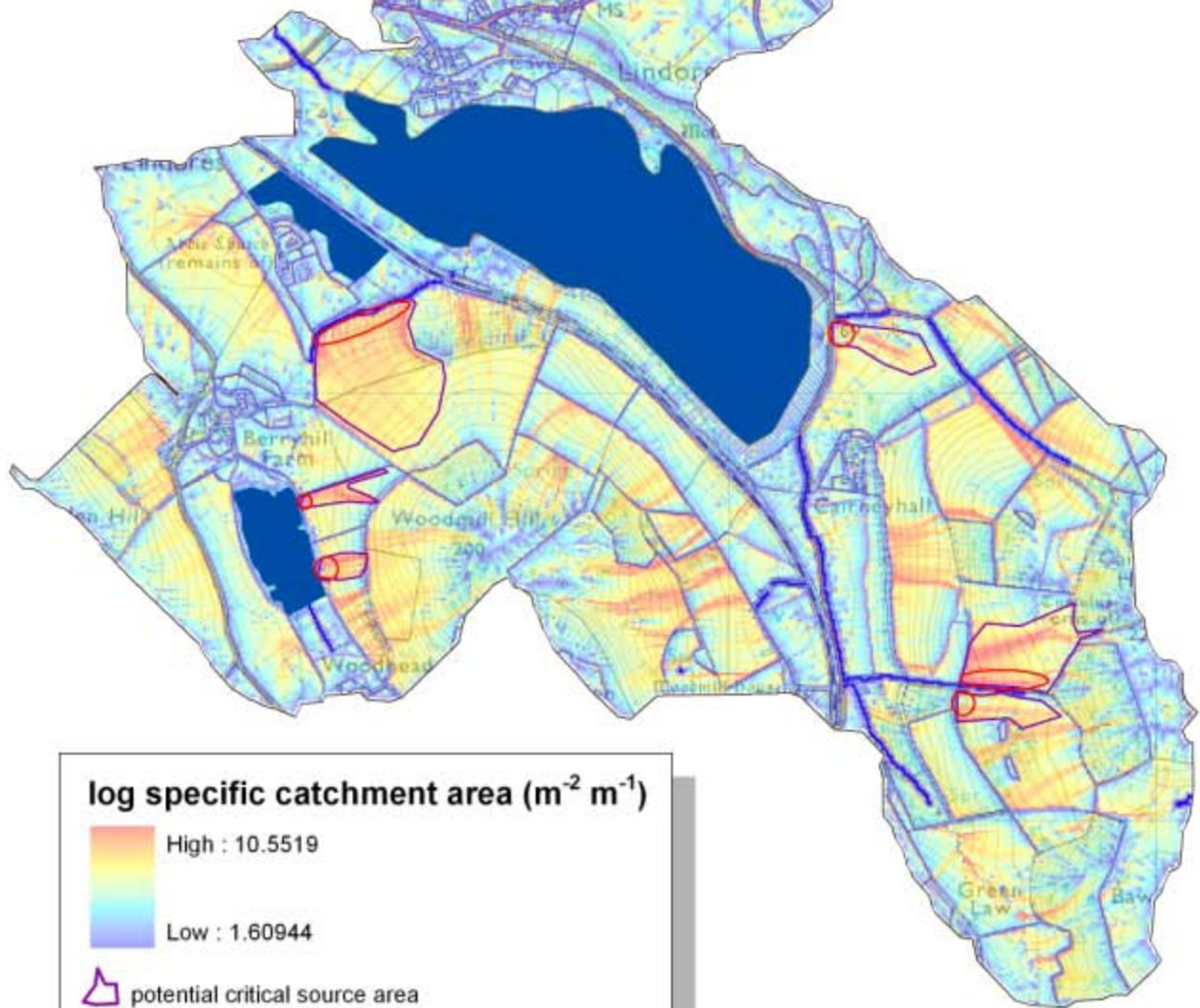


Start Date	End Date	Samples	Mean	Stdev	Min	Max
28/04/2008	09/11/2009	20	0.132	0.105	0.03	0.419



Lindores, Fife

- Palaeoecological evidence of enrichment of Lindores most notably ~1970, increase in plankton, decline in plant communities. Loch far removed from its reference.
- Zooplankton records suggest that top down influences (fish predation) may have played a role in maintaining high productivity. Further fish stocking not recommended.
- Lindores Partnership established 2008 – aim to prevent further enrichment and reduce nutrient loading.
- SEPA currently investigating loch siltation, diffuse pollution sources. Initiating catchment management plan, and continuing to monitor water quality.



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Produced 29/03/2010

Modelled surface flow pathways in the Lindores Loch catchment

DP modelling

Indicates likely diffuse pollution sources and hotspots.

Uses:

Land use/cover

Topography

Drainage network

boundaries

Argyll lochs EIAP

Biodiversity priority species – SEPA loch macrophyte surveys



Slender naiad (*Najas flexilis*)

- Loch a'chclair (3.1ha, Olig, Tiree) - July 2009
Potamogeton rutilus abundant, Nationally scarce *Chara aspera* was also recorded.
- Loch Gorm (271ha, meso, Islay) - September 2009
Slender naiad (*Najas flexilis*) was present in great abundance in the shore line. *Nitella confervacea* was found during the 2008 survey, this species is Nationally Scarce and very sparsely recorded in northern and western Scotland. Nearest records are from Coll (new record).
- Loch nan Gad (9.7ha, meso, Kennacraig) Macrophyte data 2008- *Elodea canadensis* found and *Najas flexilis* confined to the west shore of the loch, where it was deeper and less silty. *Elatine hexandra* and the Nationally Scarce *Chara aspera* were also recorded.
2009 slender naiad recorded

Loch of Lintrathen



- 169 Ha - SSSI, SPA, Ramsar site, SWT Reserve, drinking water supply
- Partnership group - Scottish Water, Bell Ingram, SEPA, SWT, local angling club, SNH, SEPA, Littlewood Landcare, Tayside LBAP
- DP catchment walks (July 2010), farm audits autumn

Future opportunities for loch restoration

- WFD classification drives objective setting
- RBMP process will prioritise restoration (loch selection and measures)
- Decisions likely to be made at local level (Area Advisory Group), pressures often responsibility of several partners
- Diffuse pollution priority catchment work
- SEPA Restoration Fund
- Partnership projects e.g. EIAP, CMP, LBAPs
- **Need to share information on best practice – internally in SEPA and with external partners**