



WFD Drivers for Loch Improvements

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Outline

- Why Change
- Time-lines
- Proposed Changes-
Biological methods
+ Environmental
Standards



Why Change?

- It's as good as a rest.....
- Inter-calibration-
Comparability
Concerns from
Phase 1
- Method
Refinements-
Macro-invertebrates
- Method Gaps- Fish



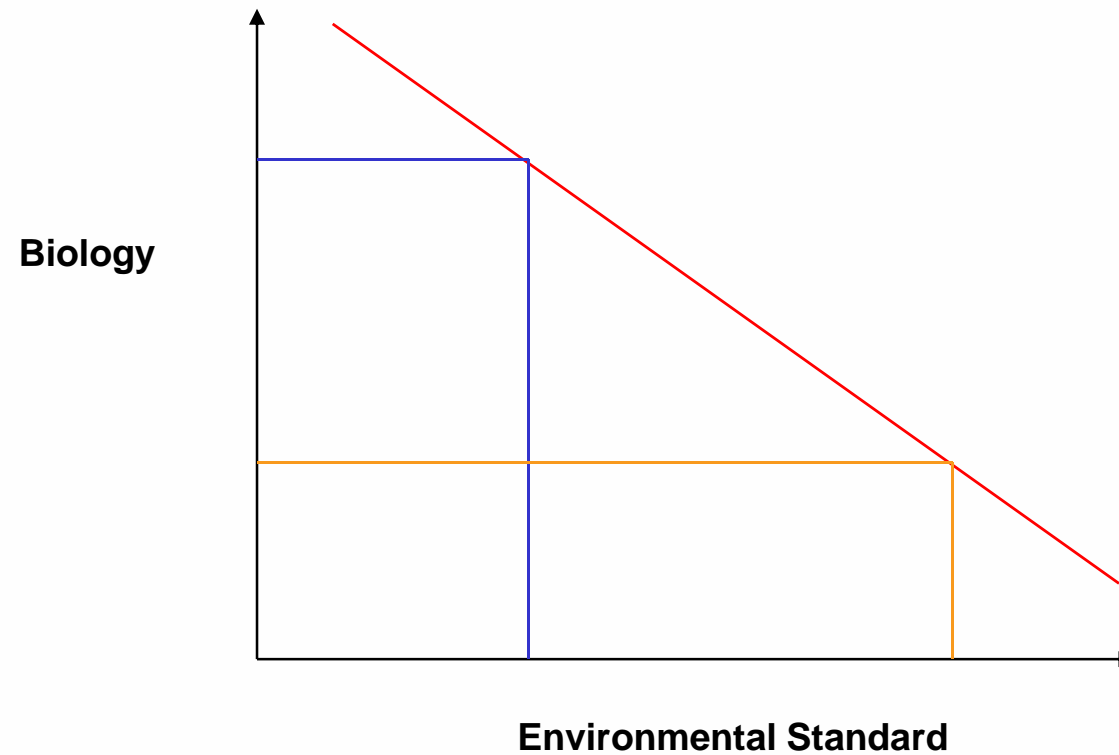
Timelines

- 2015 Publish 2nd River Basin Plan
- 2014 Consult on 2nd River Basin Plan
- 2013 Publish Characterisation Report
- 2012 Consult on new biological methods + environmental standards
- Early 2012 Finalise + Inter-calibrate new biological methods and Revise Environmental Standards
- 2011 Gather data for 2013 Characterisation Report



Biological Methods & Environmental Standards Update

Biology & Environmental Standard Relationship



Phytoplankton

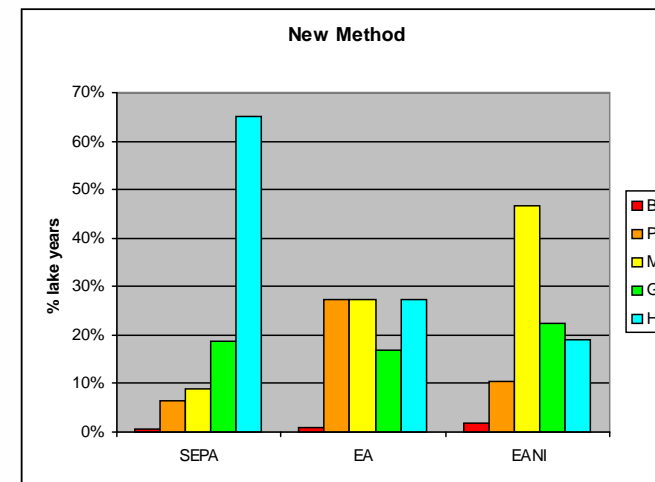
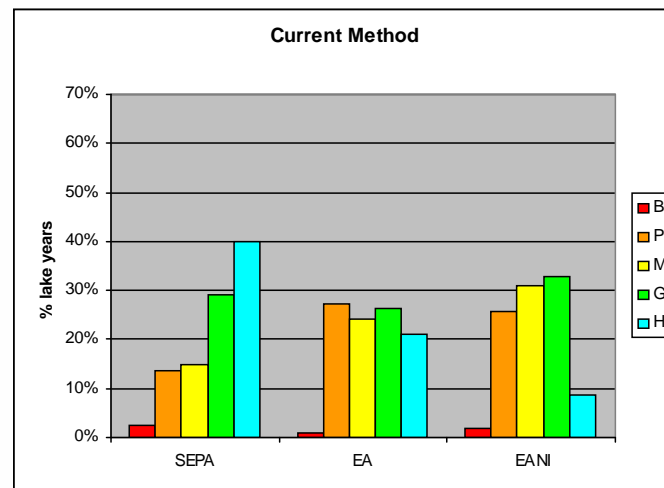
New Tool – Summary

- Site specific derived from 3 Metrics
 - Algal Biomass – Annual geometric mean Chlorophyll a
 - Taxonomy – Plankton Trophic Index (PTI)
 - Algal blooms – Total bio-volume of cyanobacteria
- Combined by Averaging normalised EQRs
 - Average all metrics
- Intercalibrated (almost !)
- Needs an uncertainty module
- Needs to be documented



Implications for classification

- HA lochs tightening of class boundaries



- Slightly more precautionary than other EU partners.
- But less precautionary than old system- Scotland.
- However, still haggling with Norwegians!!

Diatoms



Lake Diatom Changes

- Re-opened due concerns over comparability.
- Re-calibration of TP based diatom predictor model. Improved predicted reference score in the lakes model (Diatom Assessment for Lake Environmental Quality; DALES)
- Re-ran the model based on new data and ***new classification boundaries were proposed.***
- ***Less stringent than other lake tools.***
- ***Ultimately little change to classifications***



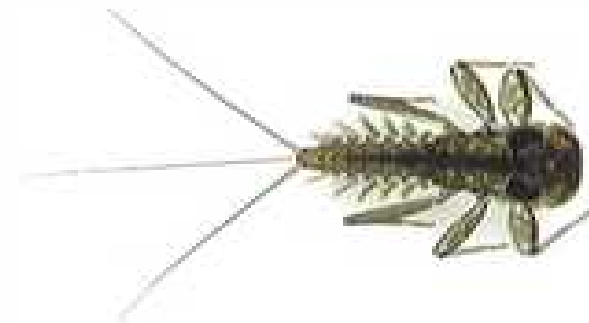
Macrophytes

- Late changes proposed by NL
- Complete re-working of UK method.
- Taxa score revision
- Removal of invasive species metric.
- Revised metric combination rules.
- CB-GIG- tight, N-GIG- lax
- 59% same classification, slightly more precautionary



Macro-invertebrates

- Chironomid Pupal Exuviae Technique-house keeping changes, might Inter-calibrate, low correlation with Common Metric
- UK lake Acid Metric-method developed, approved, inter-calibrated, no change in boundaries.



Fish

- Struggling- safety in numbers across Europe
- 31 Scottish lochs tested using Irish method
- Results not good
- Naturally low species diversity
 - Metrics based on functional guilds cause problems
 - Typology may not always be appropriate for Scotland
- Different approach to non-native species
 - Perch and roach
- No Scottish data included in model building.
- EA- no method, and issues regarding fish capture.



Ecological Indicators of Abstraction + Morphology Pressures

- Not classification metrics
- Indicators of damage, weight of evidence
- Terrestrial vegetation in draw down zone



Environmental Standards

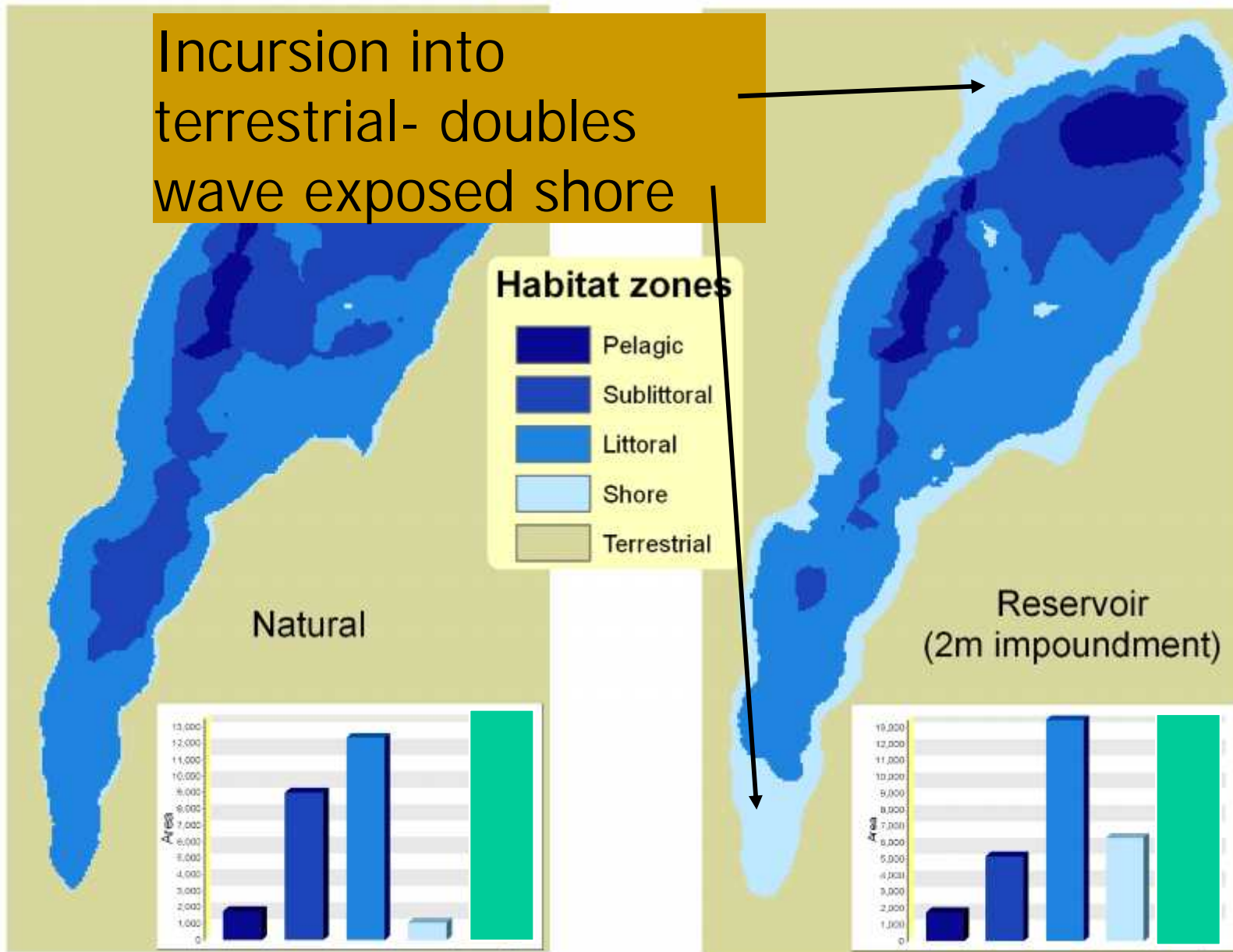
- **Total Phosphorus**
- Modelling TP and Phytoplankton classifications.
- Humic Loch issues to be resolved
- Timescale issues, Inter-calibration uncertainties
- Impacts uncertain



Loch Water Level

- Current approach too precautionary- too many bad status.
- Looking for more relaxed standards.
- Two options
 - Depth Change/% Depth Change
 - % Change +/- Loch area- requires bathymetry

Incursion into
terrestrial- doubles
wave exposed shore



Summary

Phytoplankton	↑
Diatoms	↔
Macrophytes	↓
Macro-invertebrates	↔
CPET	↔
Fish	☹️ 😊
Total Phosphorus	????
Loch Levels	↑

