

GMEP streams, small rivers and ponds

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Freshwaters: What do we monitor?

- **One headwater stream** in each survey square
- **One pond** in each survey square
- The freshwater work takes place once the whole square has been surveyed
- Delivered by a dedicated specialist team
- Plus analysis of NRW data for small rivers



Freshwater: Why do we monitor?

- **Headwater streams** have unique biodiversity and influence the water quality of the whole catchment
- **Ponds** provide unique habitats with characteristic species, and provides important water 'islands' in the landscape
- Both habitats are sensitive to surrounding land use and are **under threat** from pollution and habitat loss
- They are ***priority habitats*** of conservation value and under EU **legislation** must ultimately be of a 'good' status



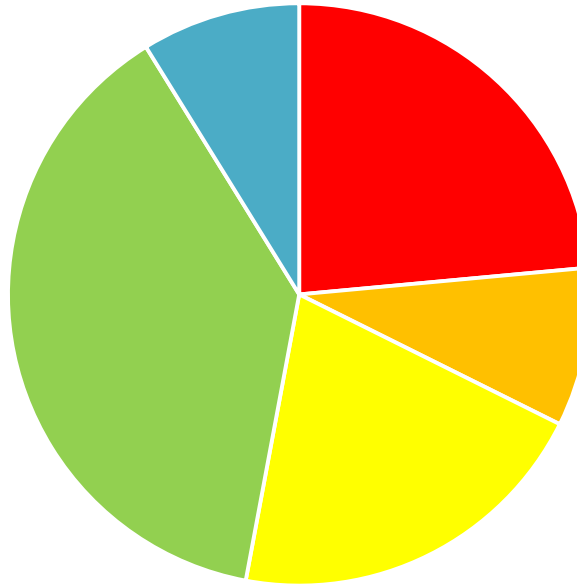
Freshwaters: How do we monitor?

- We examine existing relevant datasets for trends e.g. NRW
- We use standard survey techniques to increase comparability of results
- We survey the physical habitat and water chemistry
- We survey the ecology because it reflects habitat quality
 - Streams: invertebrates, algae
 - Ponds: invertebrates, plants



Findings (1): Habitat quality of stream

- ~60% of squares had a headwater streams
- ~ 90% of stream sites were modified in some way (e.g. straightening, deepening, structures, etc)



■ Severely modified

■ Significantly modified

■ Obviously modified

■ Predominantly unmodified

■ Pristine/near natural



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Freshwaters: Ecological quality of streams

Assessing microalgae (diatoms), 90% of sites were of good or high ecological quality. This indicator describes the extent of nutrient enrichment

Assessing macroinvertebrates, 60% of sites were of good or ecological quality. This indicator reflects a wider range of stressors (nutrient enrichment, sedimentation, low flows etc)



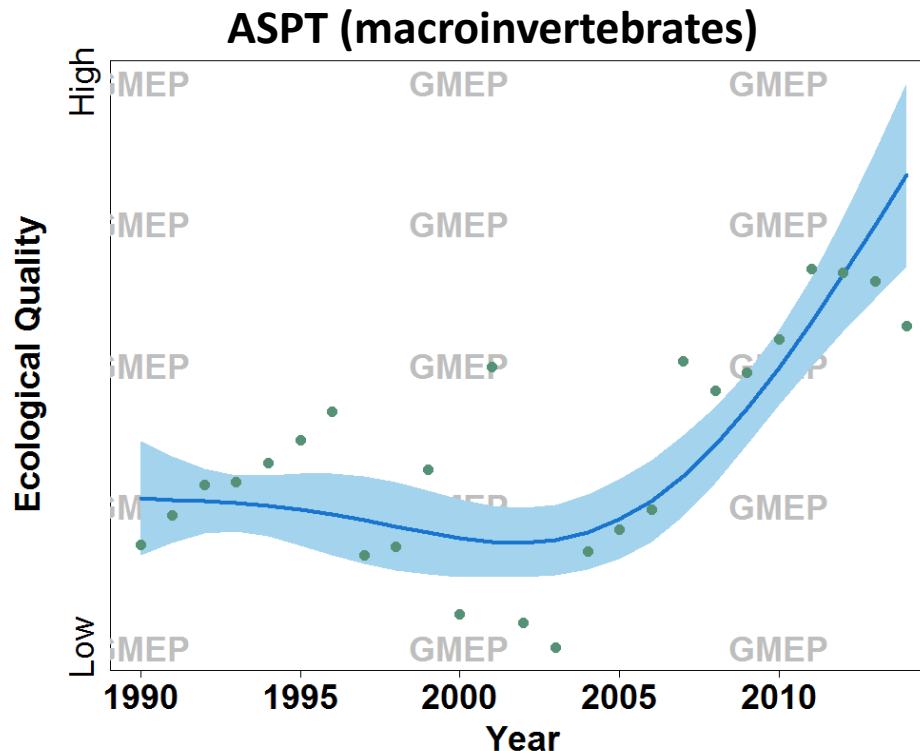
Findings (2): Stream chemistry

- 85% of sites had phosphorous concentrations consistent with supporting good/high ecological status
- No streams exceeded the drinking water limits for nitrogen. There is no ecological standard but 52% of streams exceeded nitrogen concentrations that would be considered pristine.
- Only a few sites (5 so far) were more acidic than the recommended threshold.



Findings (3): Trend in ecological quality of small rivers

- Long term trends: improvement over past 25 years due to strict controls on organic pollution



Freshwaters: Pond habitat and water quality

Ponds: habitat quality

- 48% of squares had at least one pond
- 28% of squares had more than one pond
- Only 3 pond sites so far appeared to be recently created (<5 years)

Ponds: water quality

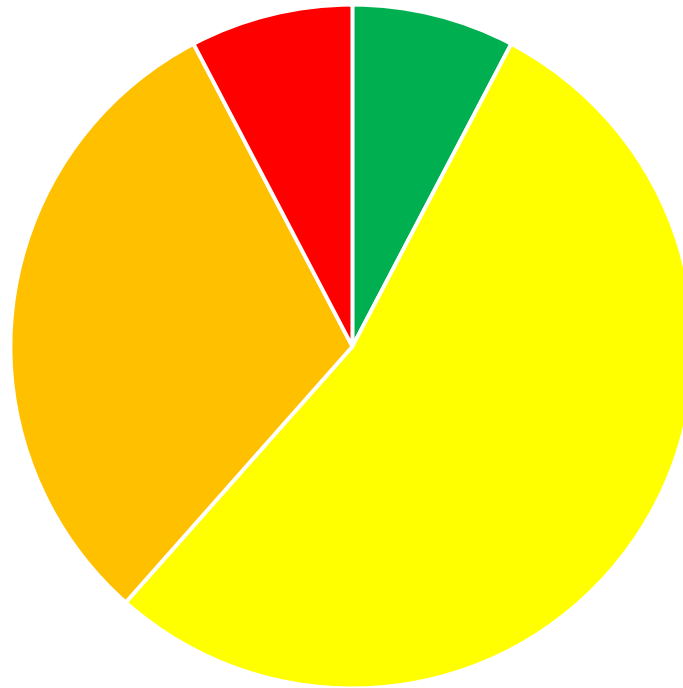
- Results are harder to interpret as no standards or thresholds exist!
- Lowland ponds were more nutrient enriched than upland ponds



Freshwaters: Ecological quality of ponds

Only 8% of ponds qualify as at good status as required under EU and UKBAP legislation

Multimetric approach: plants, invertebrates



■ Good ■ Moderate ■ Poor ■ Very Poor

Freshwaters: Quality of freshwaters in and out of Glastir

No *statistically* significant differences as yet but some trends emerge:

Headwater sites that are on land **in** Glastir:

- Show more habitat modification
- Have lower phosphorous concentrations
- Have better ecological quality (invertebrates assessment)

Ponds sites that are on land **in** Glastir:

- Have better ecological quality (all indicators)



Next steps

- Work with NRW to develop WFD metrics for headwater streams and ponds
- Attribute changes from survey square and upstream catchment through modelling
- Analysis to assess potential co-benefits of change in vegetation and soil quality for waters quality. Analysis possible due to co-location of measurements.

Thank You

Questions?