How much ecological integrity does a lake need? Managing the shores of a peri-urban lake (Lorenz et al 2017) [1]

Physical modifications leading to a homogenization of previously diverse littoral habitats increasingly affect the ecological integrity of lake shores in urban landscapes. The European Water Framework Directive (EU WFD) requires integrative assessment of the ecological status of lake ecosystems including lake shore assessment aimed at reaching good ecological status (GES). The ecological consequences of lake shore modifications can be assessed site-specifically by ecological assessment tools based on benthic invertebrates in compliance with the EU WFD. However, it still remains unclear which percentage of the lake shore may be morphologically altered until whole-lake ecological status is affected. We studied a peri-urban lake with ~50% of the shoreline altered by urban developments and recreational facilities and the other 50% still remaining in a near-natural, undeveloped state. We assessed the ecological status of each shore type using the Littoral Invertebrate Multimetric Index based on Composite Sampling (LIMCO).

Additionally, we used data of a physical habitat survey conducted for each 100-m section within the 12-km long shoreline. We extrapolated site-specific biological assessments to the whole shore length based on pressure-response regressions using physical survey data. Our results showed an overall ‘moderate’ whole-lake ecological status and consequently the present share of near-natural shoreline is not sufficient to reach GES as required by the EU WFD. GES may be obtained by either further improving existing near-natural shorelines, or by revitalizing developed shorelines. Thus, our approach allows for the quantification of the amount of restoration necessary to derive EU WFD-compliant management objectives for lake shores subjected to human use.

Keywords: Ecological status, LIMCO, Littoral zone, Multimetric assessment tools, Lake restoration, EU water framework directive

Highlights

- Pressure-response relationships enable lakeshore assessment at whole-lake level.
- Habitat variability affects interpolation of site-specific biological scores.
- Good ecological status requires a minimum percentage of natural lakeshore sections.
- Good ecological status can be reached by several lakeshore restoration strategies.

Publication Date:

Wednesday, 31 May 2017

Full reference:

Lorenz, S., Pusch, M. T., Miler, O., & Blaschke, U. (2017). How much ecological integrity does a lake need? Managing the shores of a peri-urban lake. Landscape and Urban Planning, 164, 91-98.

Link to DOI:

https://doi.org/10.1016/j.landurbplan.2017.04.007 [2]

Links
[1] https://www.reformrivers.eu/how-much-ecological-integrity-does-lake-need-managing-shores-peri-urban-lake-lorenz-et-al-2017
[2] https://doi.org/10.1016/j.landurbplan.2017.04.007

REFORM has received funding from the European Union's Seventh Programme for Research, Technological