Identifying sources of phosphorus immission into the lake Mondsee from the catchment of the Fuschler Ache

Purpose of the work

Risk

Temporarily critical Phosphorus-Input from the catchment

Target

Identifying the main sources in order to prepare targeted mitigation measures

Source: www.irisporsche.at

Research Area



Sources: ESII, HERE, DeLorme, Intermap, Increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, ESII Zagreb Zagreb Zagreb Delorment P Corp., Geobase, IGN, Kadaster NL, Ordnance Survey, ESII Zagreb Zagreb Zagreb Delorment P Corp., Geobase, IGN, Kadaster NL, Ordnance Survey, ESII P Corp., Geobase, IGN, Kadaster NL, Ordnance Sur

Catchment - Fuschler Ache



Catchment - Fuschler Ache



Threshold oligotroph/mesotroph

- Input limit for the lake Mondsee = 12 t P/a
- Limit for river load of the Fuschler Ache = 5.5 t P/a

Measurement based P-river loads (INTERREG)

- Tight time resolution
- Significant role of event loads
- Mean annual P-load = 6 t P/a
- High variability = 3-11 t P/a



Source: BAW, 2007

1. STEP Identifying the main sources

MONERIS

MOdelling Nutrient Emissions in RIver Systems

- developed by the Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB Berlin)
- adapted to Austrian watersheds (STOBIMO)
- calculates nutrient emissions separately for different pathways



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MONERIS - Results

Contribution of the immission sources



groundwater

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- erosion from non agricultural areas
- atmospheric deposition
- surface runoff
- agriculture, erosion
- agriculture, drainage
- urban point sources
- urban diffuse sources

Total P-load = 3.3 t/a

First Conclusion

- Main part of the immissions resulting from diffuse agricultural sources
- Additional event loads leading to total annual P-loads exceeding the critical limit

focus on erosion and runoff





9%

57%

19%

8%

2%

18%

12%

2. STEP Identifying emission hot-spots

PhosFate

- developed by the Technical University of Vienna
- Spatial distributed parameter model based on grid cells
- Simulates the transportation of phosphorus through terrestrial and instream pathways



PhosFate - Results



3. STEP Field Survey

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Field Survey

Modelled areas of emission risk

- steep, concave or long slopes
- connection to river system
- visible erosion marks

Additional detected influences

- secondary pathways
- dense network of drainage ditches and tiles







Convential measures to avoid nutrient input are not suitable for grassland

Vegetated filter strips, reduction of arable land,...



local measures for hot-spots

- reduction of use intensity
- omitting manure on steep slopes
- adapted distribution of manure

global measures

- improvement of awareness
- extended investigation of drainage tiles and ditches

Thank you for your attention!

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