



Assess ecological risks of toxicants

UP-DOWN

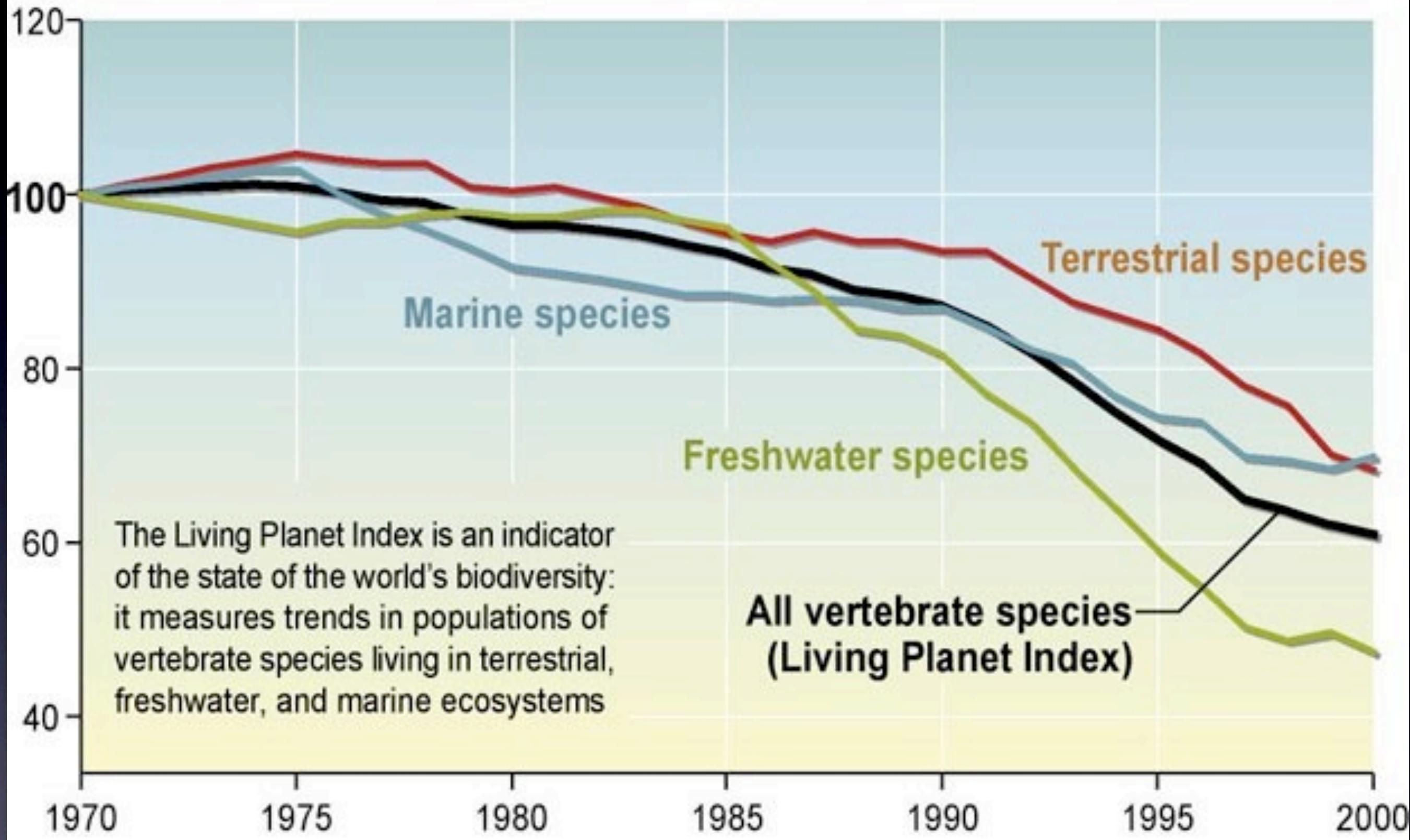
risk assessment approach

Matthias Liess



HELMHOLTZ
ZENTRUM FÜR
UMWELTFORSCHUNG
UFZ

Population Index = 100 in 1970

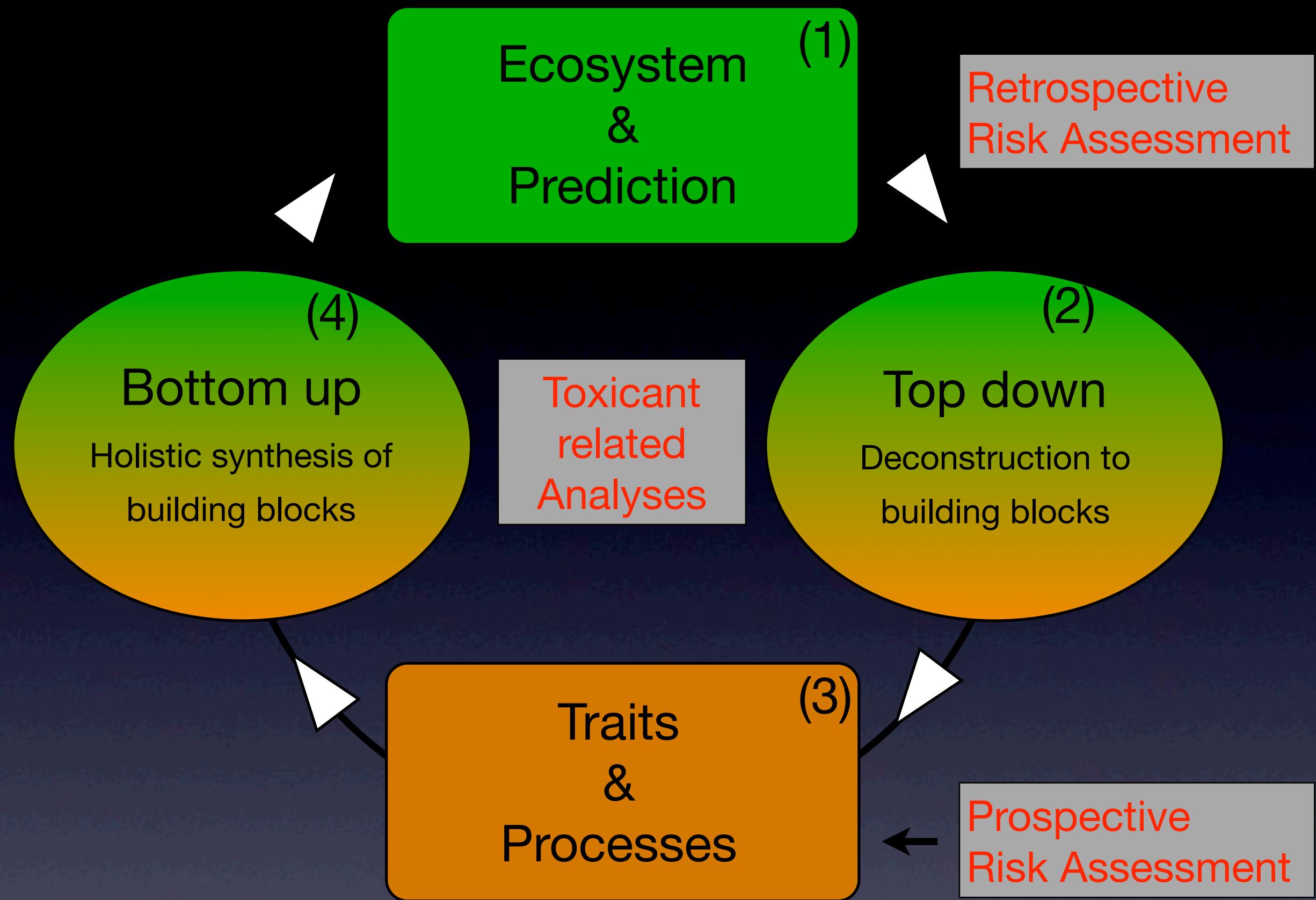


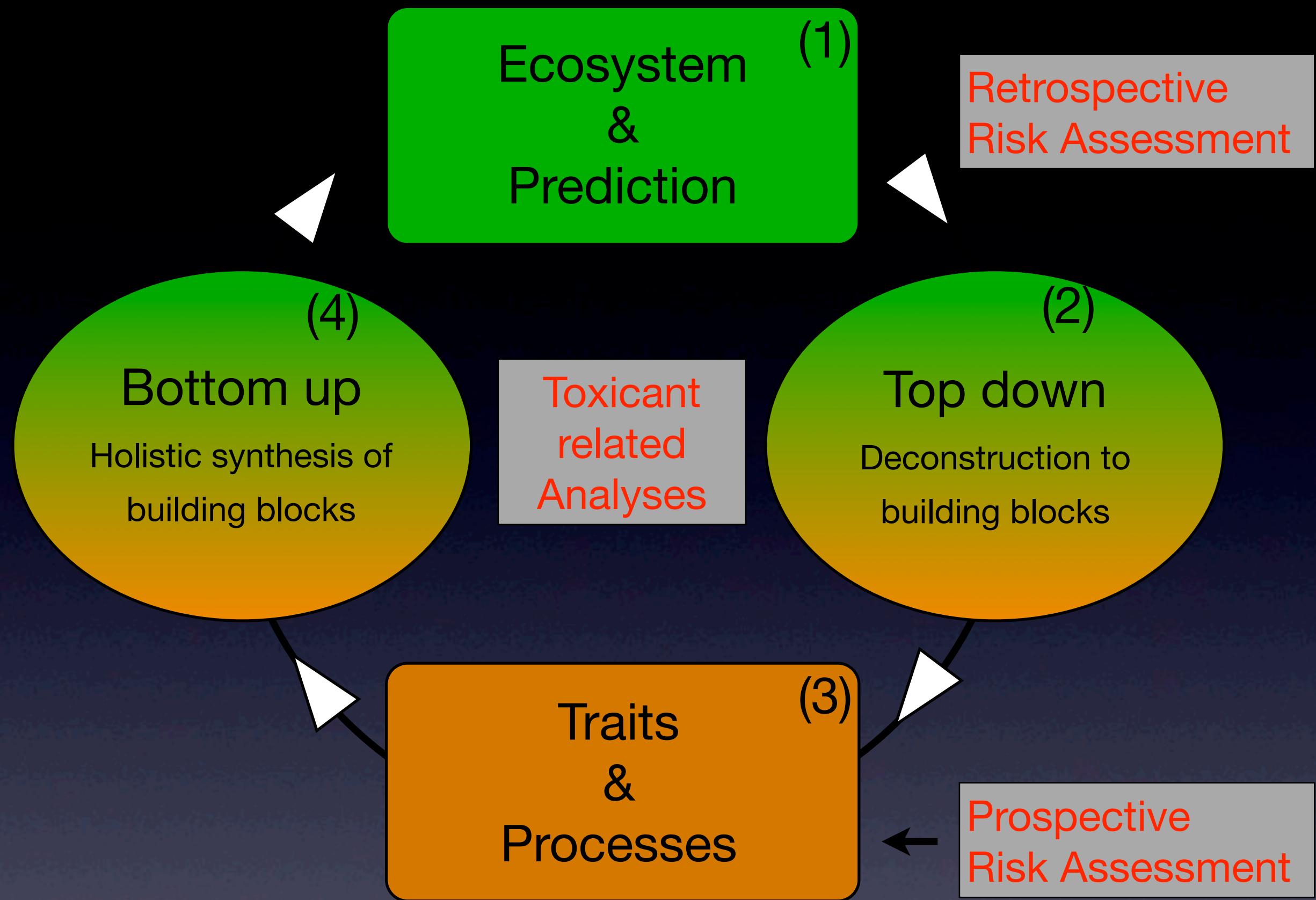
The Living Planet Index is an indicator of the state of the world's biodiversity: it measures trends in populations of vertebrate species living in terrestrial, freshwater, and marine ecosystems

Source: WWF, UNEP-WCMC

Millennium Ecosystem Assessment: Biodiversity synthesis

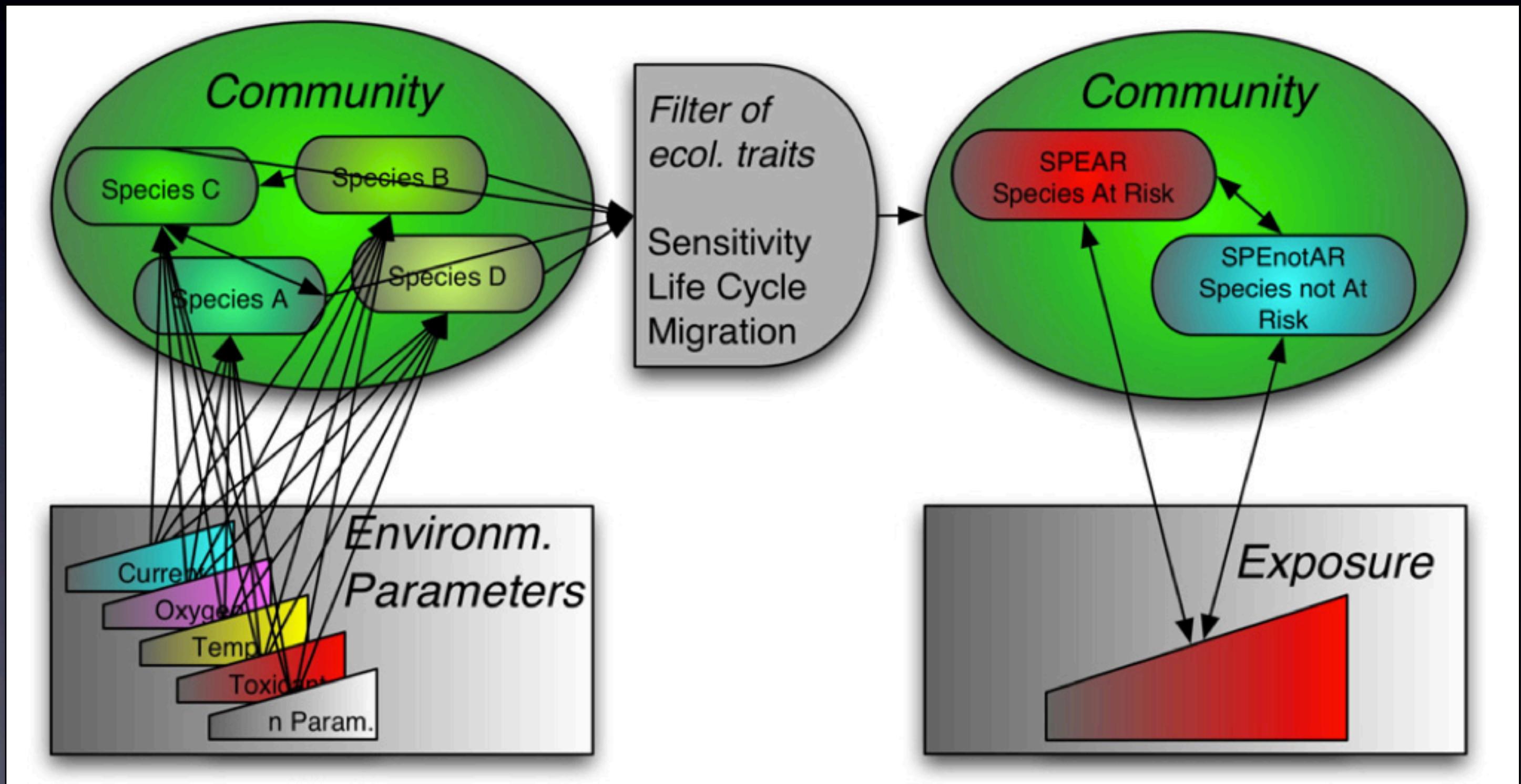
- Identifying vulnerable species / traits
- Consider in prospective risk assessment
- Validate protection level (under- overprotective)





Liess M et al. 2005.
Analyzing effects of pesticides on
invertebrate communities in
streams.
ET&C

spear
species at risk



Retrospective Risk Assessment

non-point pesticide Risk

non-point source pollution

runoff from agricultural land

pesticides, fertilizers, manure

soil erosion, sedimentation

eutrophication, loss of biodiversity

freshwater pollution

groundwater contamination

air pollution, climate change

soil degradation, soil loss

loss of soil productivity

loss of soil organic matter

loss of soil structure, compaction

loss of soil infiltration capacity

loss of soil water holding capacity

loss of soil biological activity

loss of soil biodiversity

loss of soil depth, thickness

loss of soil texture, porosity

loss of soil nutrient content

loss of soil nutrient balance

loss of soil nutrient availability

loss of soil nutrient uptake

loss of soil nutrient retention

loss of soil nutrient leaching

loss of soil nutrient volatilization

loss of soil nutrient runoff

loss of soil nutrient infiltration

loss of soil nutrient adsorption

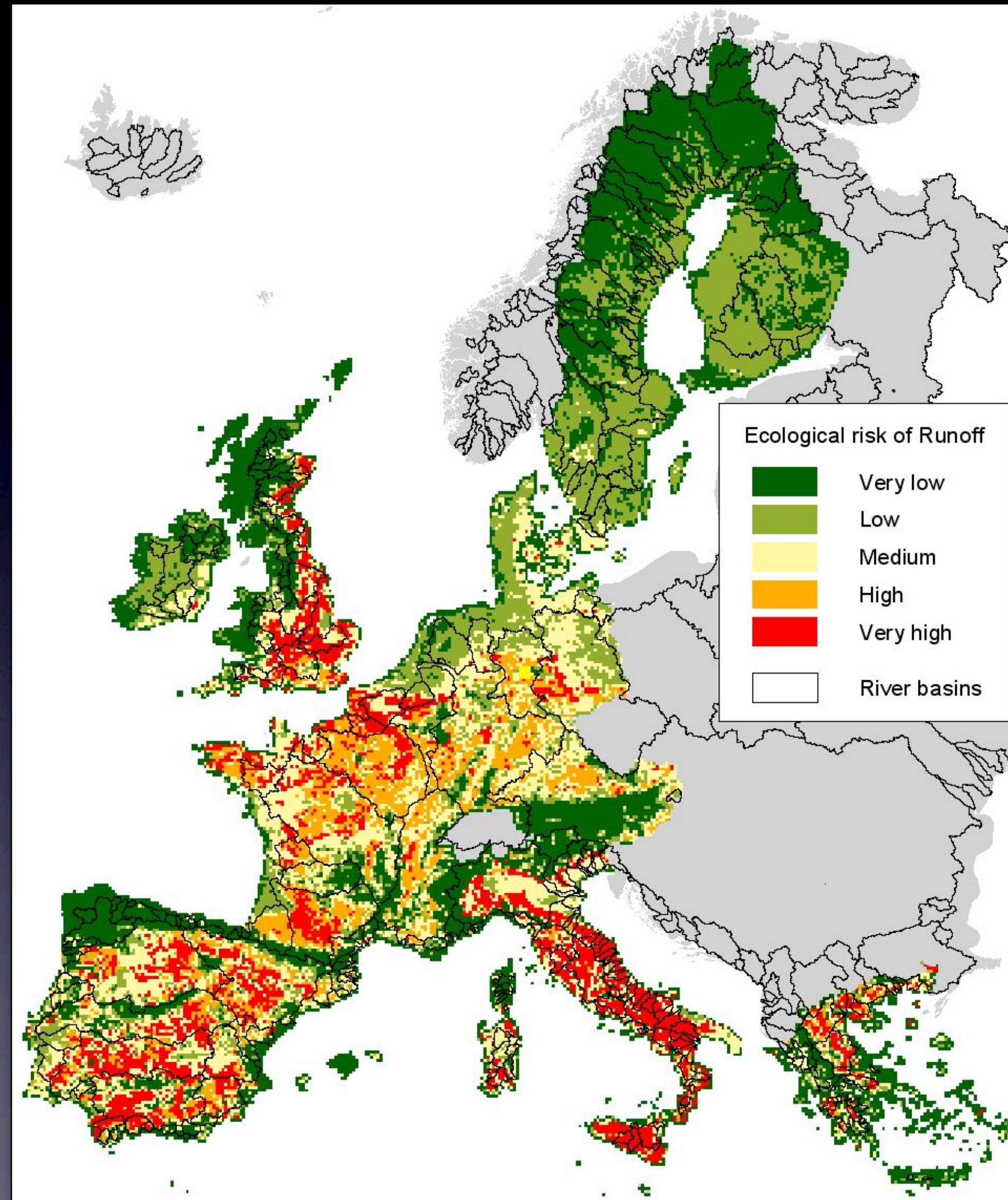
loss of soil nutrient desorption

loss of soil nutrient cation exchange

loss of soil nutrient anion exchange

loss of soil nutrient mineralization

loss of soil nutrient immobilization



Prospective Risk Assessment

Random selection



Trait related selection

In-sensitive



Pisidium sp.

Plurivoltine



Chironomus sp.

Migration



Gammarus sp.

Early emergence

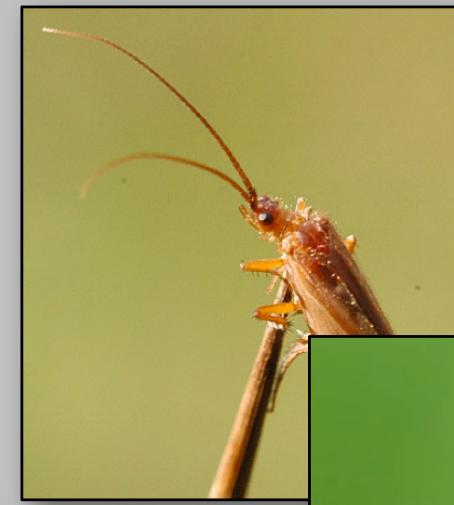


Baetis sp.

Sensitive, univoltine



Caloperyx sp.



Anabolia



Ephemera sp.