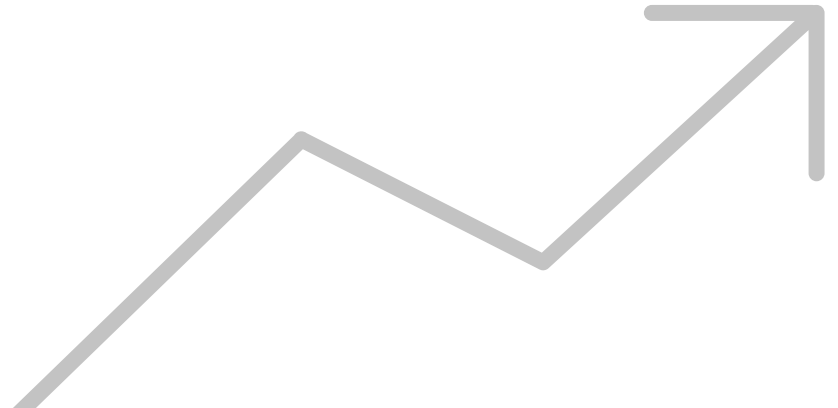
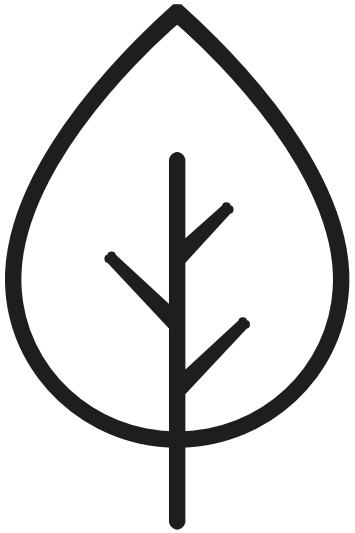
Issues in Accounting for Regulating Ecosystem Services: Baselines and Demand

Federal Statistical Office Germany



Physical Ecosystem Service Accounts



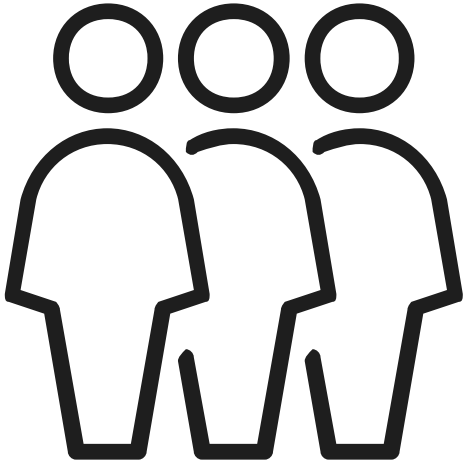
Implementation issues:

? Baselines

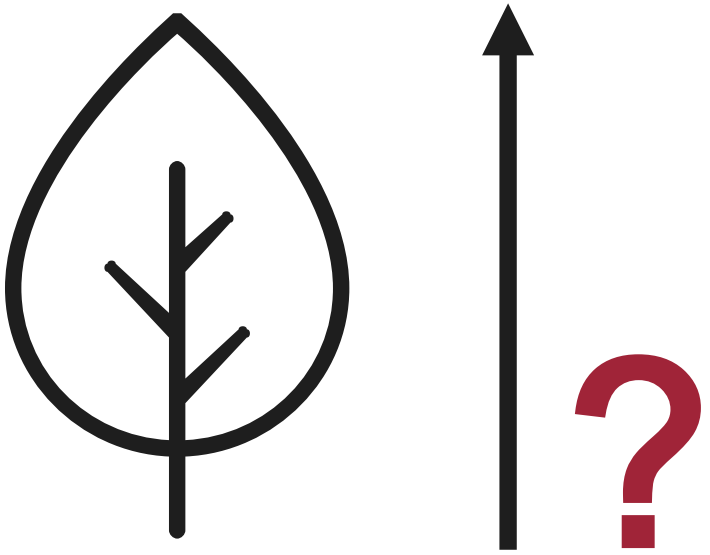
Service provision compared to what?

? Demand

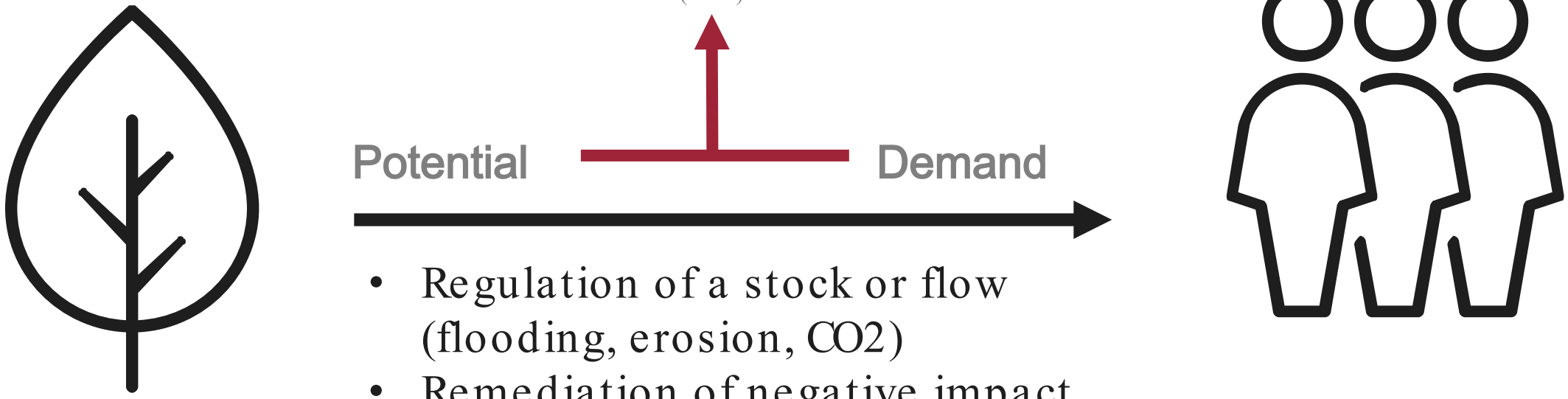
Incorporating supply and demand



I. Baselines for regulating services

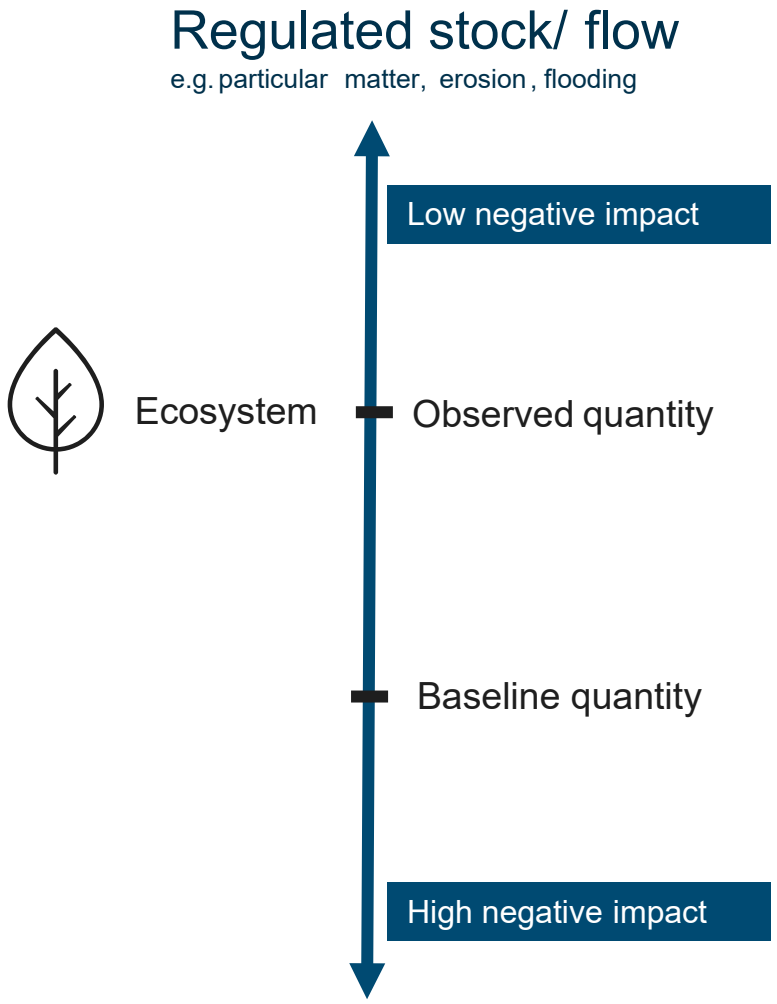


Regulating Physical Ecosystem Services

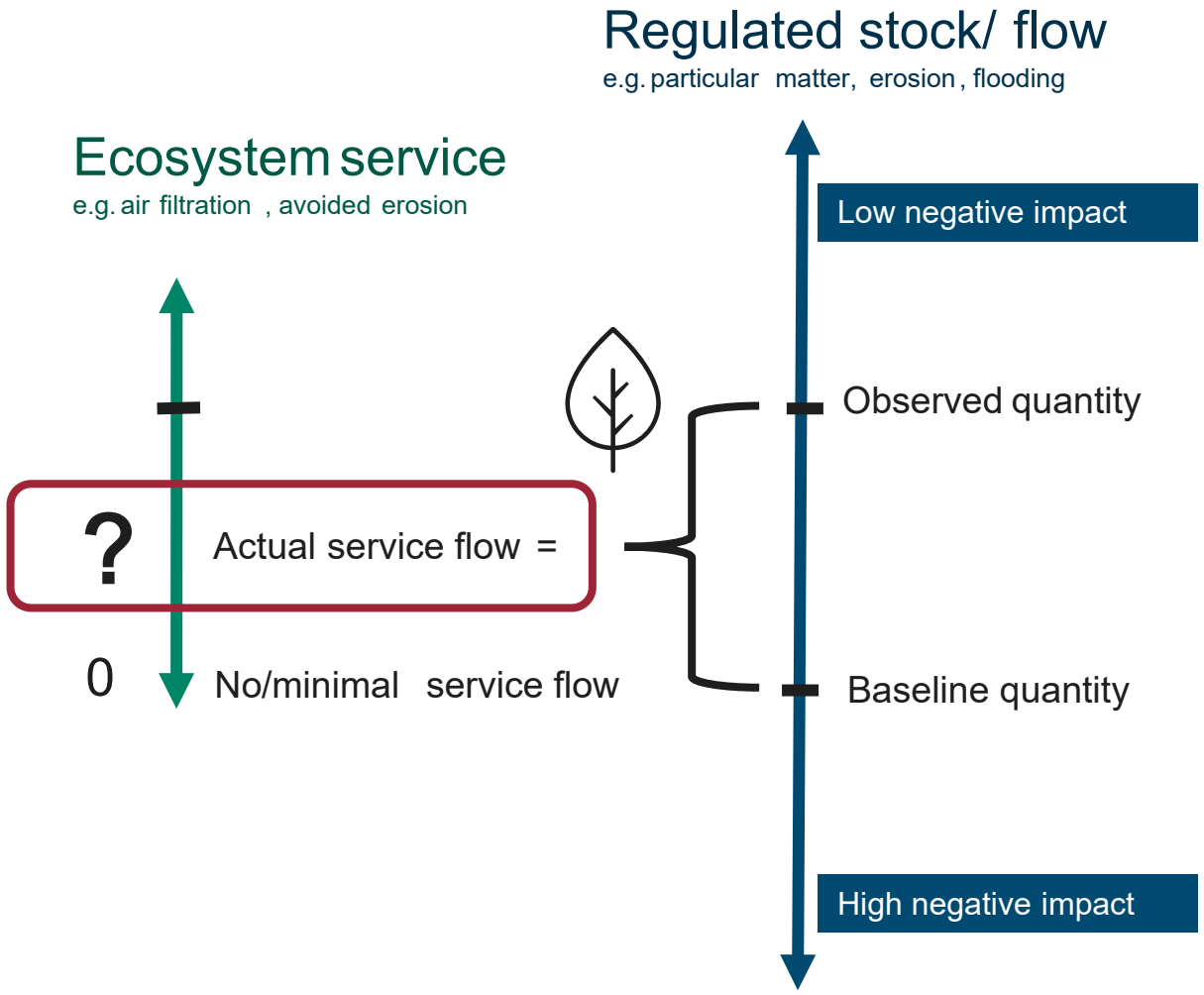


- Regulation of a stock or flow (flooding, erosion, CO2)
- Remediation of negative impact

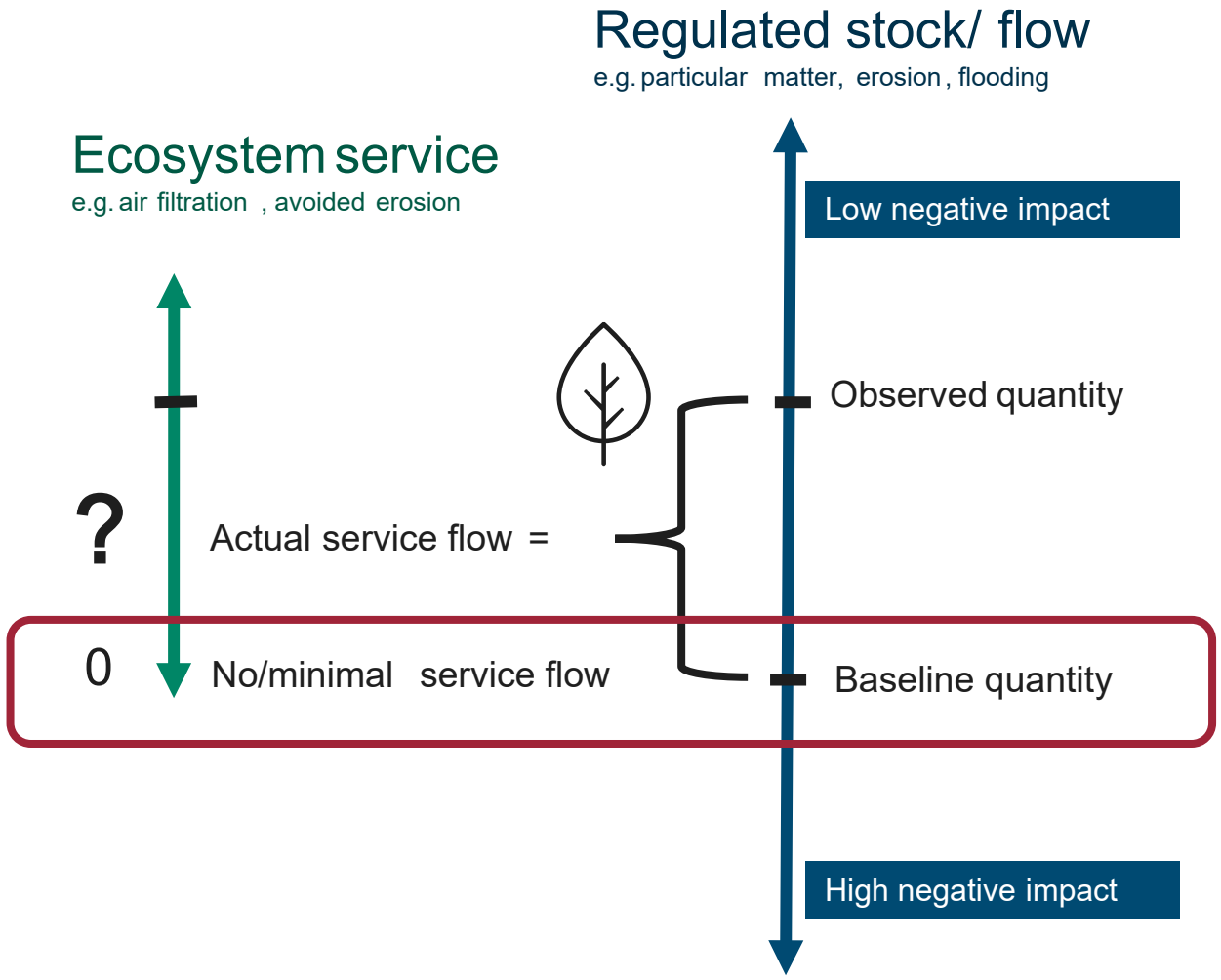
Regulating Physical Ecosystem Services



Regulating Physical Ecosystem Services



Finding a baseline



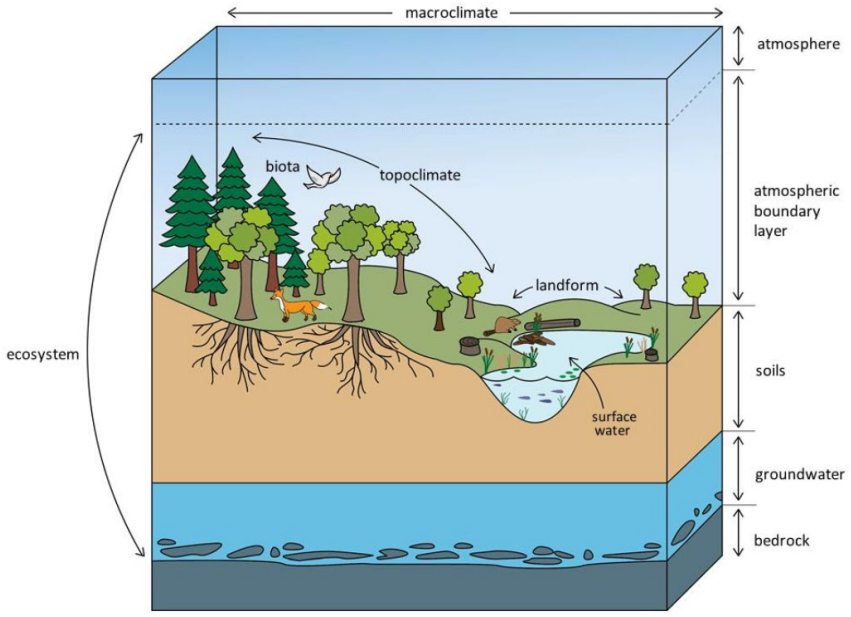
Finding a baseline

- Is there a hypothetical ecosystem type or condition that would minimize the ecosystem service provision?

- What if…
  - the ecosystem would be converted to bare land?
  - the ecosystem condition would be different?
  - what if service provision is zero?

Baseline Issues

- Baseline with positive service flow
  - Examples: carbon retention and air filtration

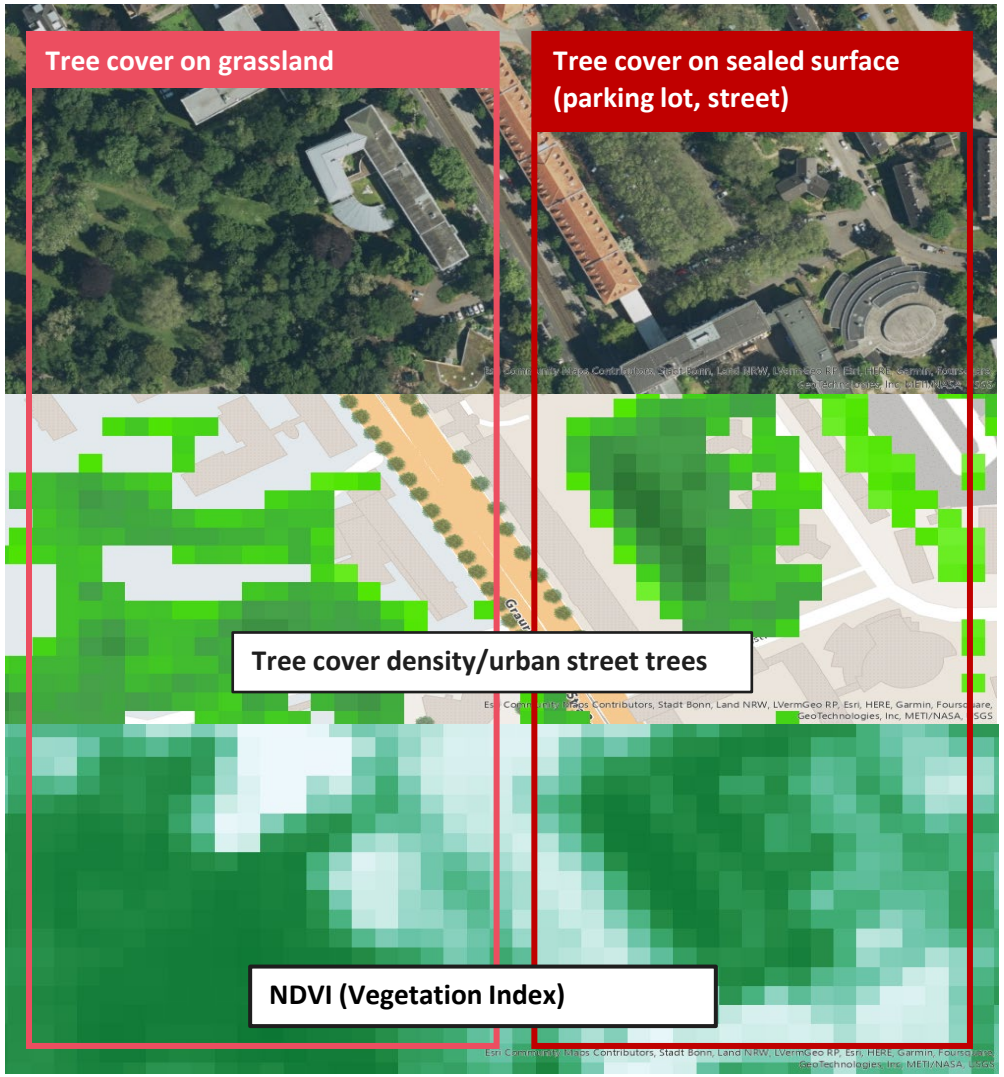


Source: Keith et al.

[Image credit: Flickr user Stacy | CC BY-SA 2.0]

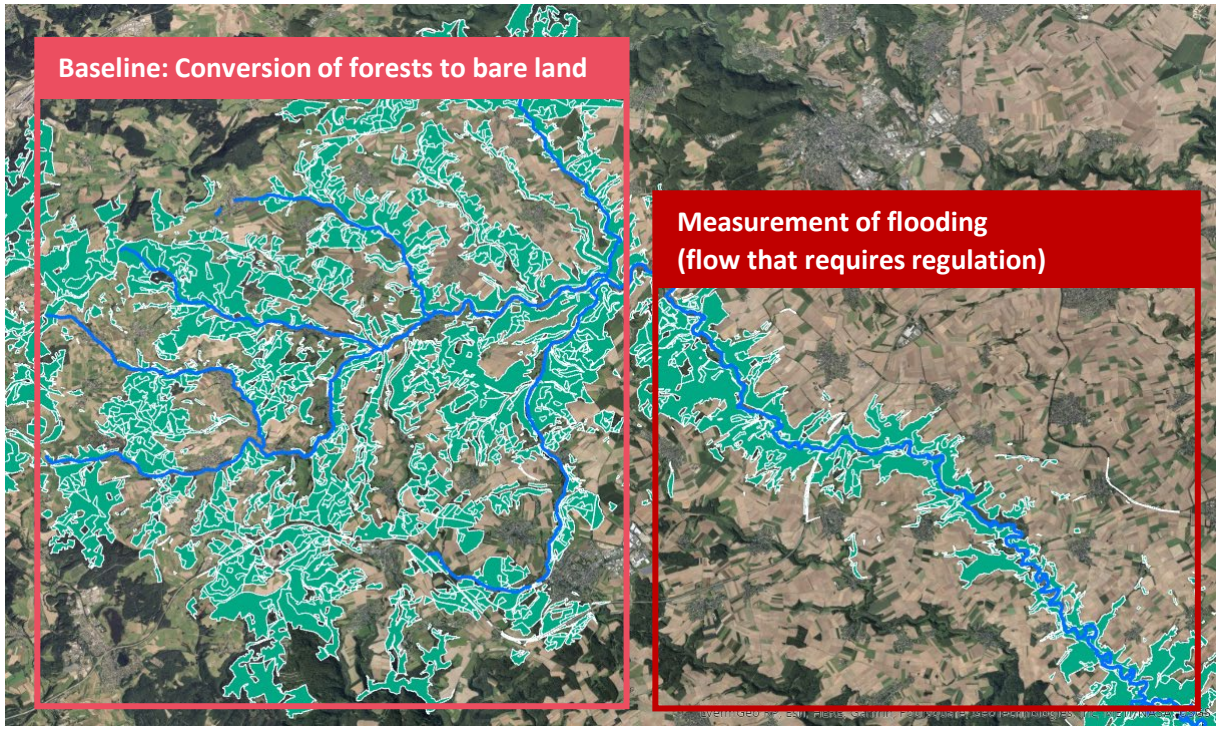
Baseline Issues

- Baseline with positive service flow
- Multiple/ mixed baselines
  - Green and blue carbon
  - Urban cooling effect



Baseline Issues

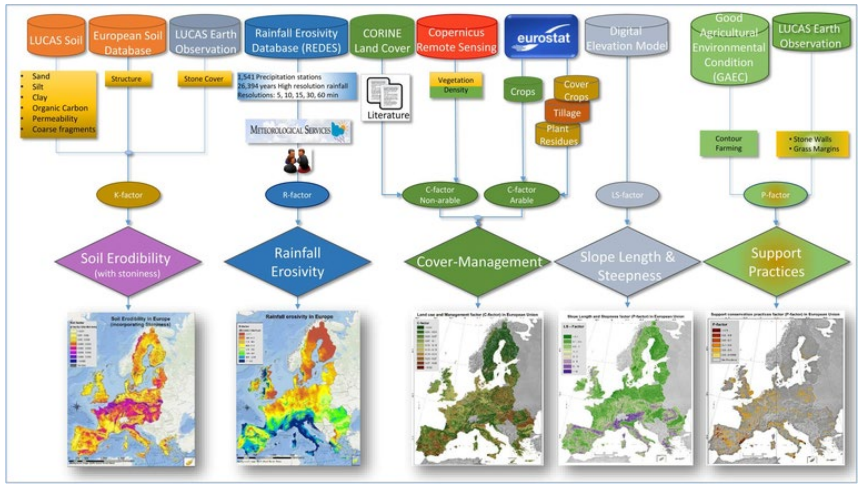
- Baseline with positive service flow
- Multiple baselines
- Spatial delineation of baselines
  - Non-additivity of service provision
  - Supply and use areas?



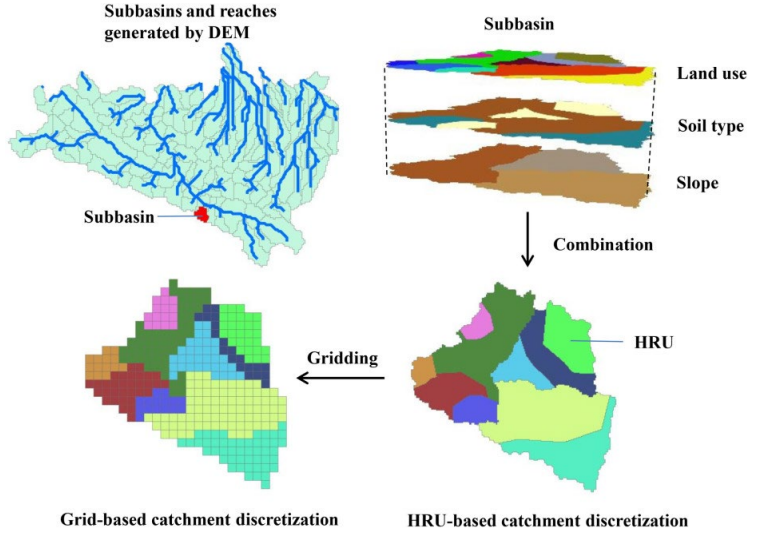
Baseline Issues

- Baseline with positive service flow
- Multiple baselines
- Spatial delineation of baselines
- Empirical identification
  - Sufficient baseline observations for model calibration/ estimation?

Soil erosion (EEA)



Water flow regulation (Zhang et al.)



Local climate regulation (Marando et al. 2022)

$$LST = \beta_{0e1} + \beta_{1e1}Tc + \beta_{2e1}E_{tree}$$

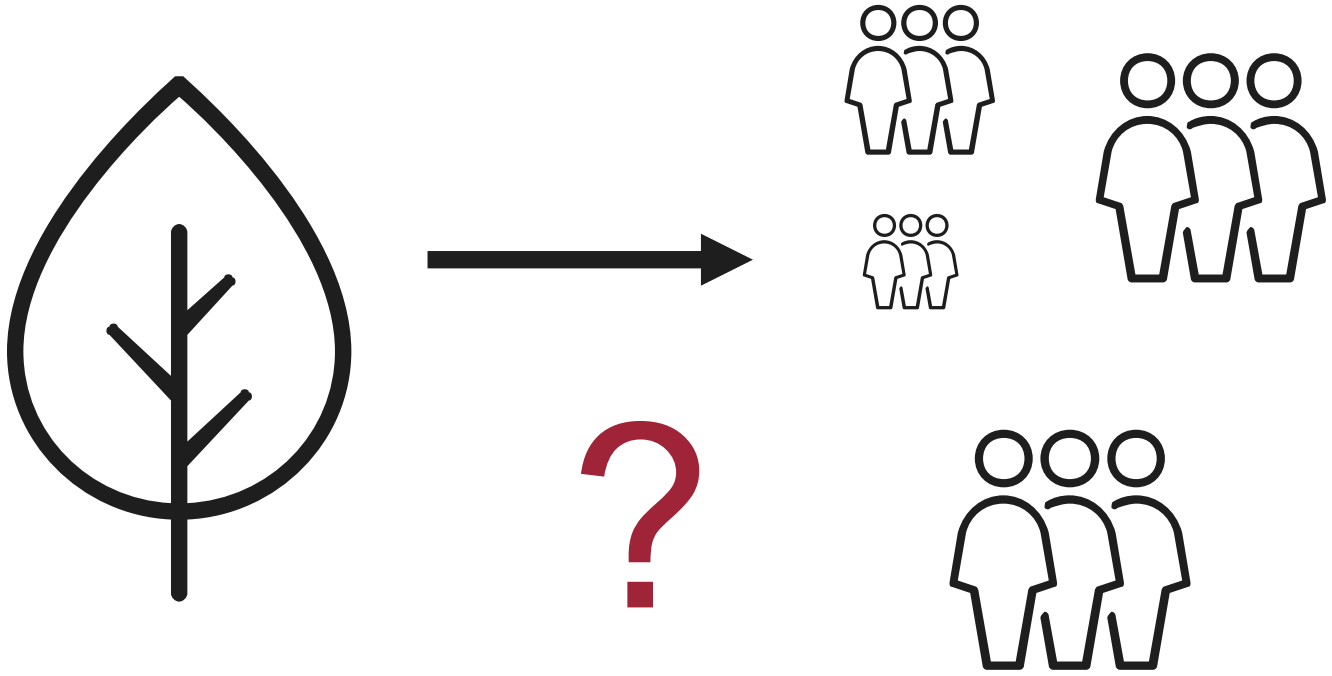
$$Tair = \beta_{0e2} + \beta_{1e2}LST + \beta_{2e2}Latitude$$

Baseline Issues

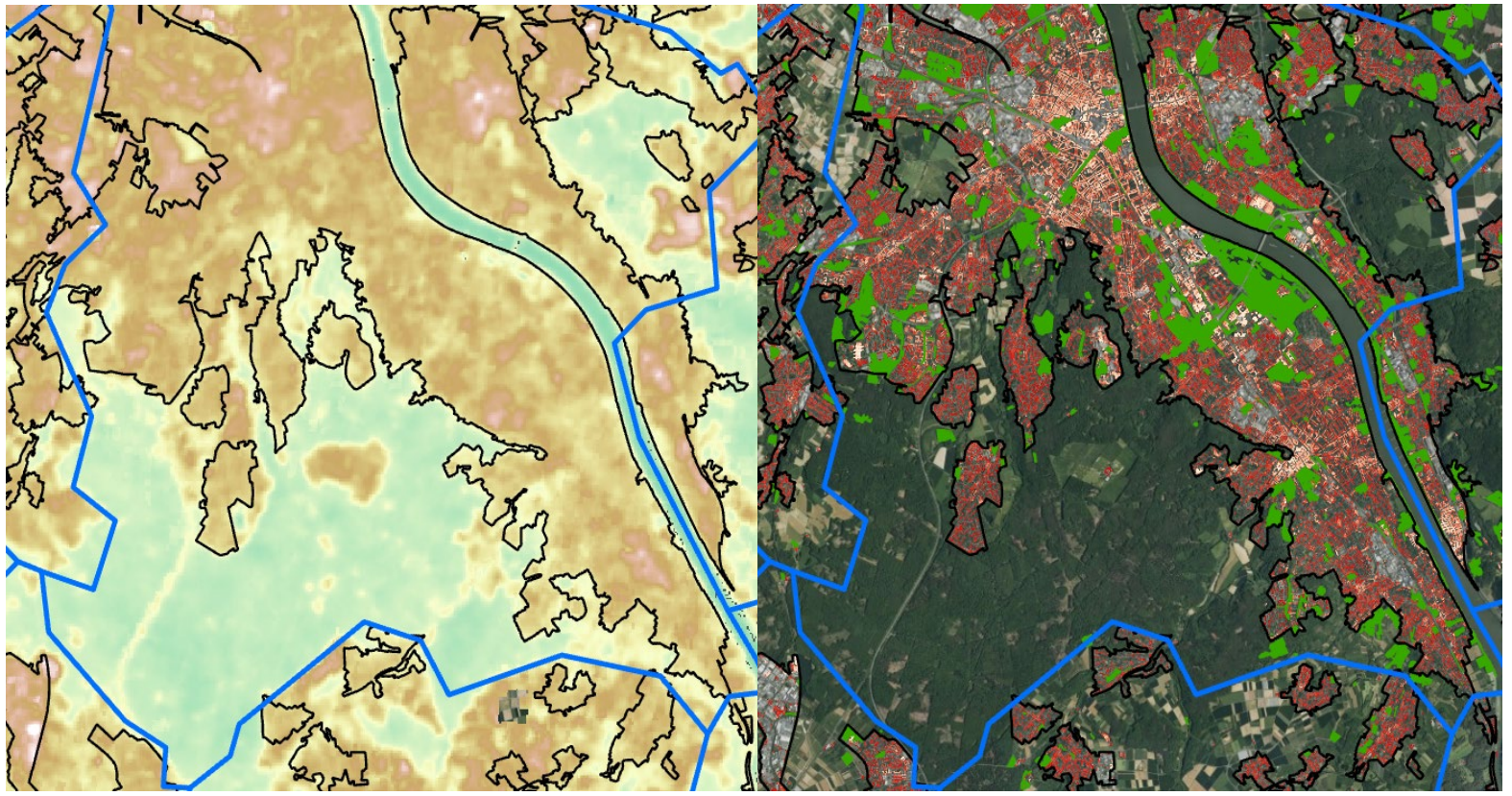
- Baseline with positive service flow
- Multiple baselines
- Spatial delineation of baselines
- Empirical identification
- Accounting and communication
  - Baselines are not (necessarily) policy relevant, likely to occur or even legal comparisons
  - Baselines can not (always) be interpreted like conversions
  - Baselines are always natural, not anthropogenic

  ➢ Communication to the user in supply tables / narrow definition of services
  ➢ Ready-to-use comparisons

II. Incoporating demand



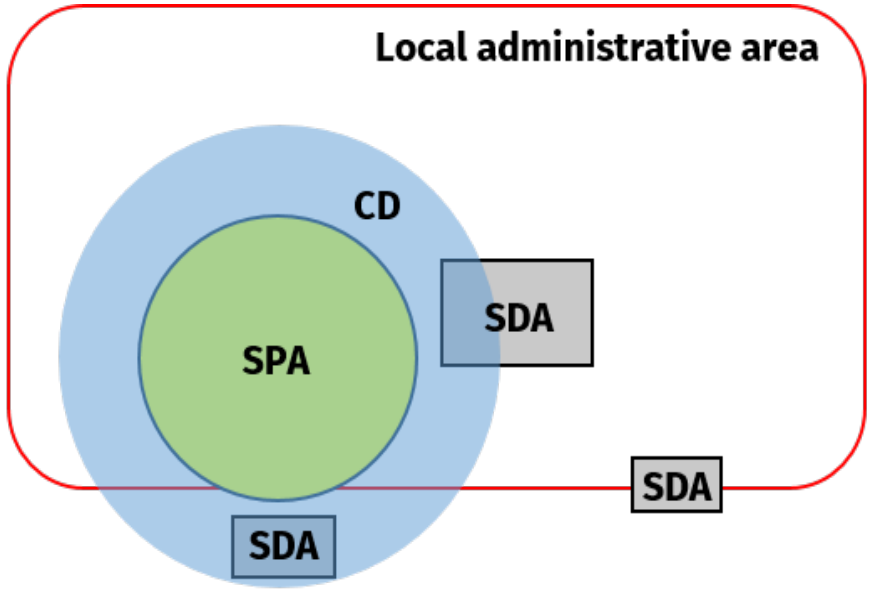
Demand in Local Climate Regulation Service



Sources: LBMDE, Schug et al., ESRI

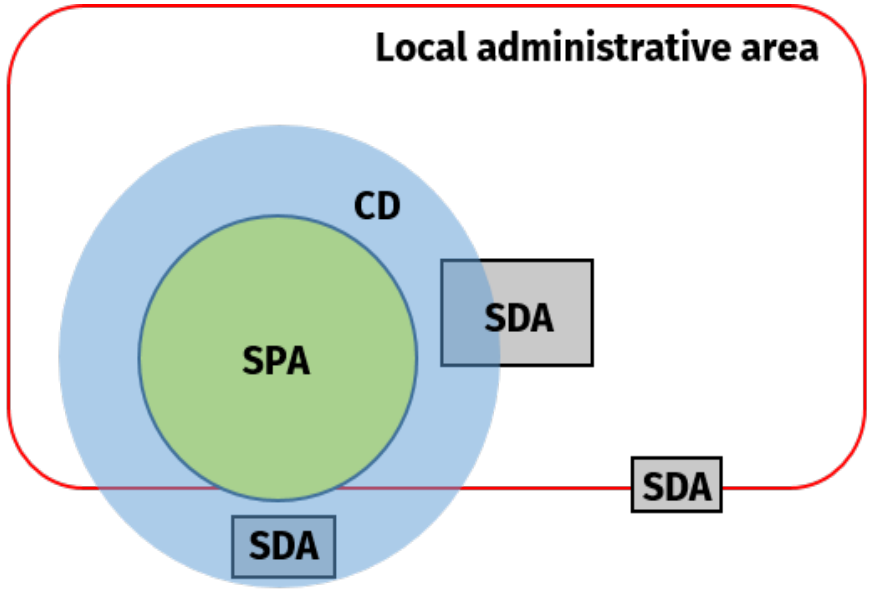
- Service is typically accounted in *city* local administrative areas
- Restrict demanding areas to where people live/ work?
- Avoid double counting with recreation service

Demand in Local Climate Regulation Service



- Buffer supply areas (can be differentiated)
- Intersect with *demanding* areas
- Account cooling effect where supply and demand overlap

Demand in Local Climate Regulation Service



Incorporating demand:

- Isolates actual service flow
- Allows for additional indicators:
  excess/ unmet demand, number of users
- Avoids double counting

For other services:

- Comparable implementation (flood regulation)
- Increased consistency (cultural services)
- Higher complexity (air filtration)

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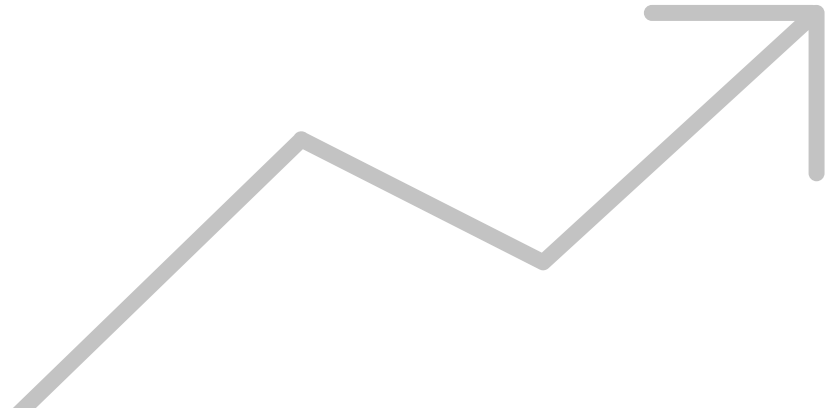

Finding a baseline