# Assessment of Nutrient Loading in ARDA River Catchment

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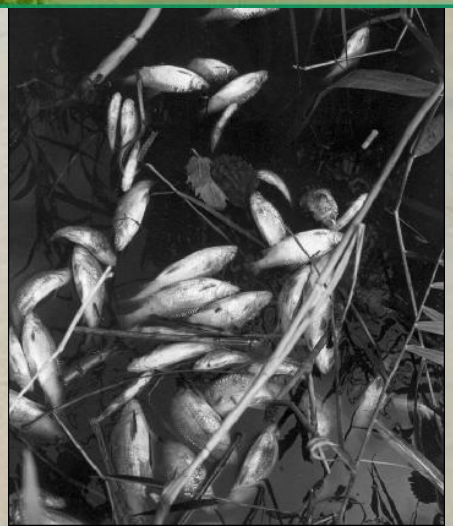
# Nutrient Related WQ Problems

Eutrophication

- Nitrogen and Phosphorus
- Urban and non Urban Sources
- Waste water, Agriculture, Erosion

- Enrichment of ecosystems
  - Change in species composition
- Algal Blooms – reservoirs
  - Toxins
  - Smell and odor
  - Clogging of filters
- Oxygen Depletion (Nitrogen)
  - Ammonia
  - Fish Kills
- Down stream loading of  Sensitive Areas



# River Arda Catchment

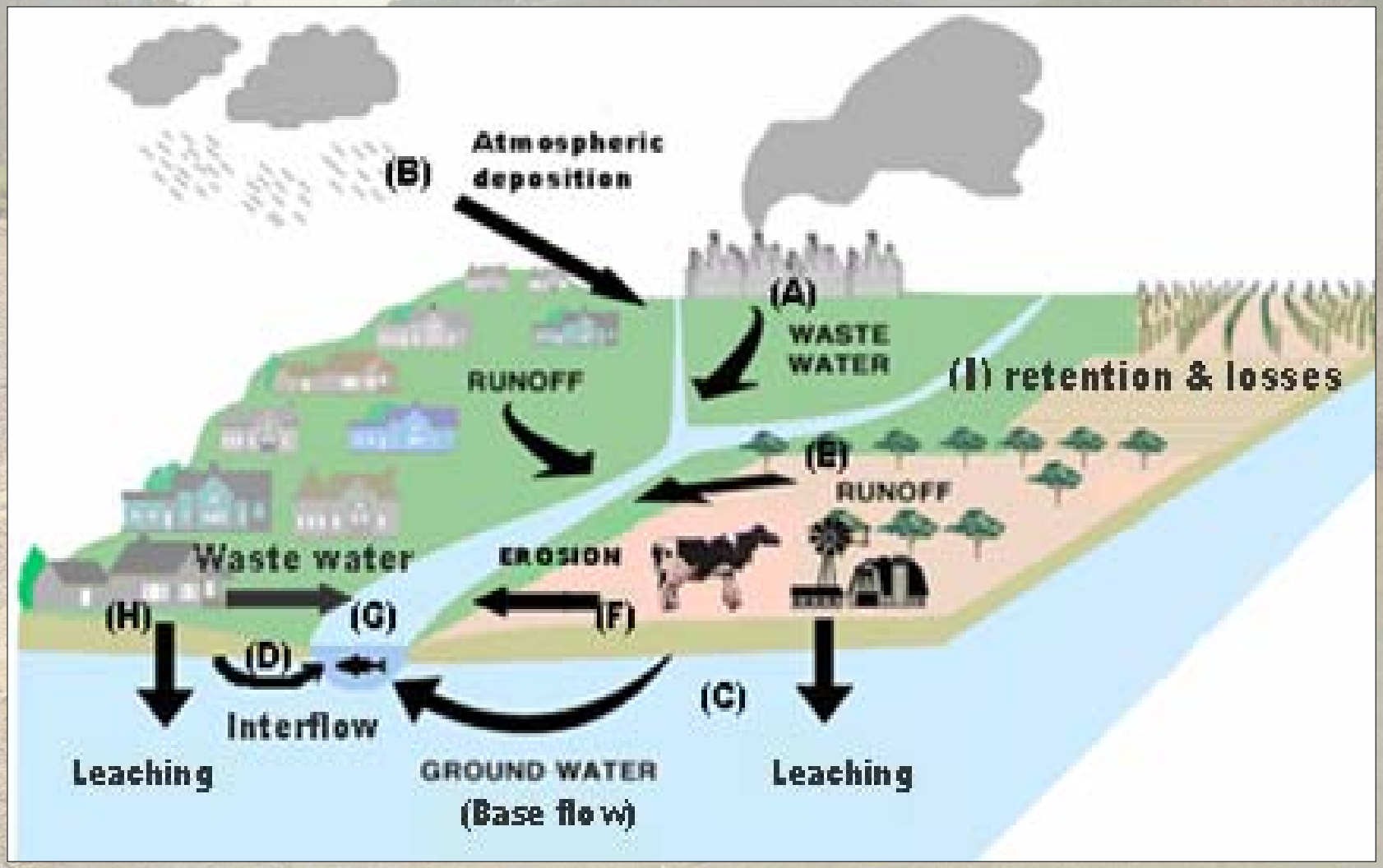
| CLASS LIMIT VALUES | DETERMINANTS IN WATER | | | | | |
|---|---|---|---|---|---|---|
| | | Reference CLASS-high | **TV-good** | **2 x TV** | **5 x TV** | **> 5 x TV** |
| | unit | **I** | **II** | **III** | **IV** | **V** |
| Total-N* | mg/l | 1.5 | 4 | 8 | 20 | >20 |
| Total-P | mg/l | 0.1 | 0.2 | 0.4 | 1 | >1 |

**Quality observations**

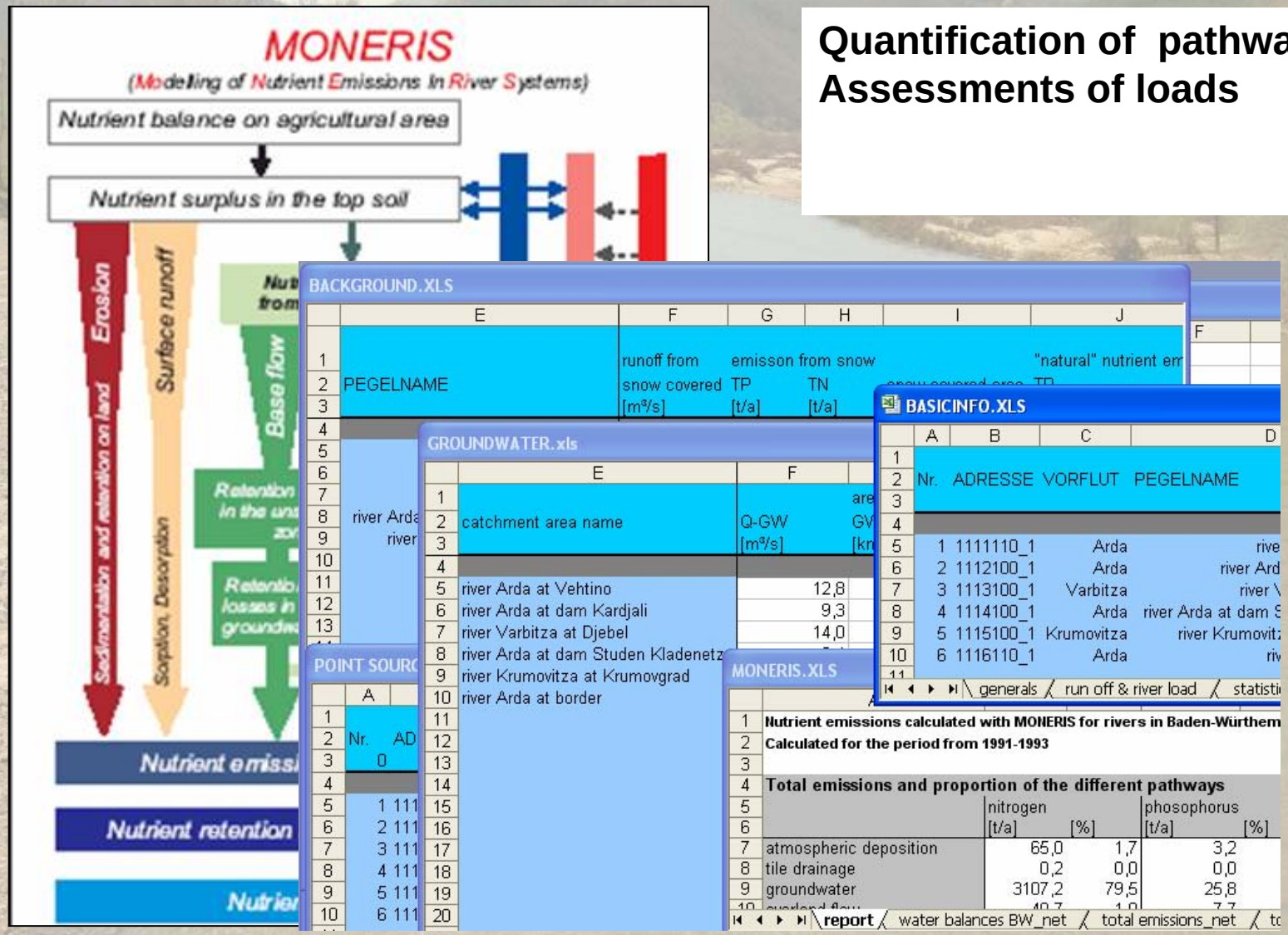
**Tot – N - No problem (1.1 – 1.3 mg/l)**

**Tot – P - Does not meet Good Quality objective (0.6 – 1.3 mg/l)**

# Sources and Pathways



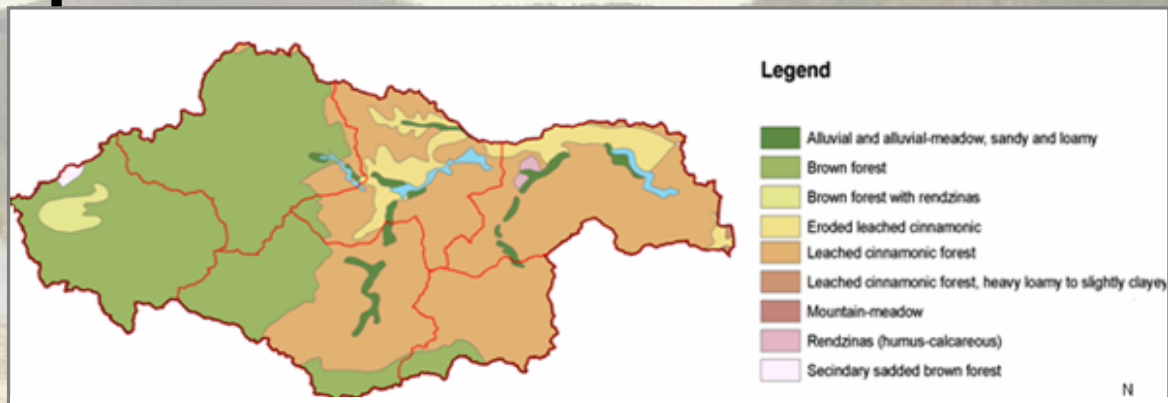
# Moneris Model Approach

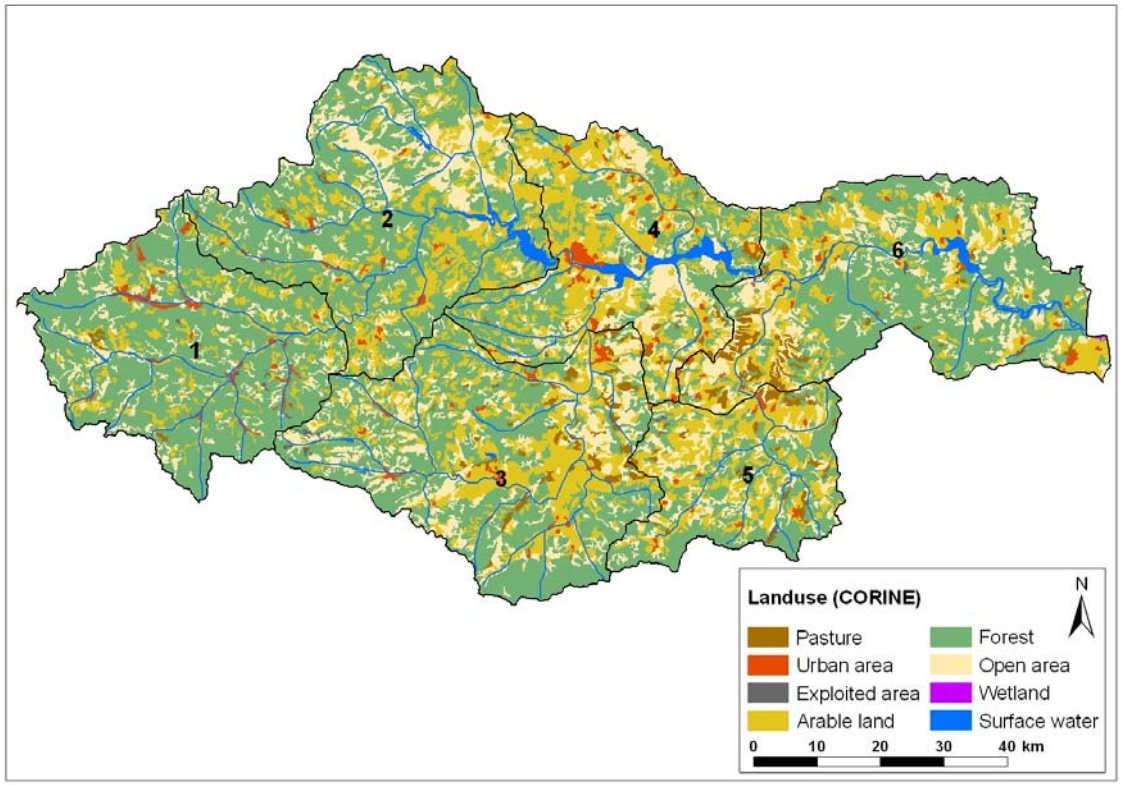



**Quantification of pathways**
**Assessments of loads**

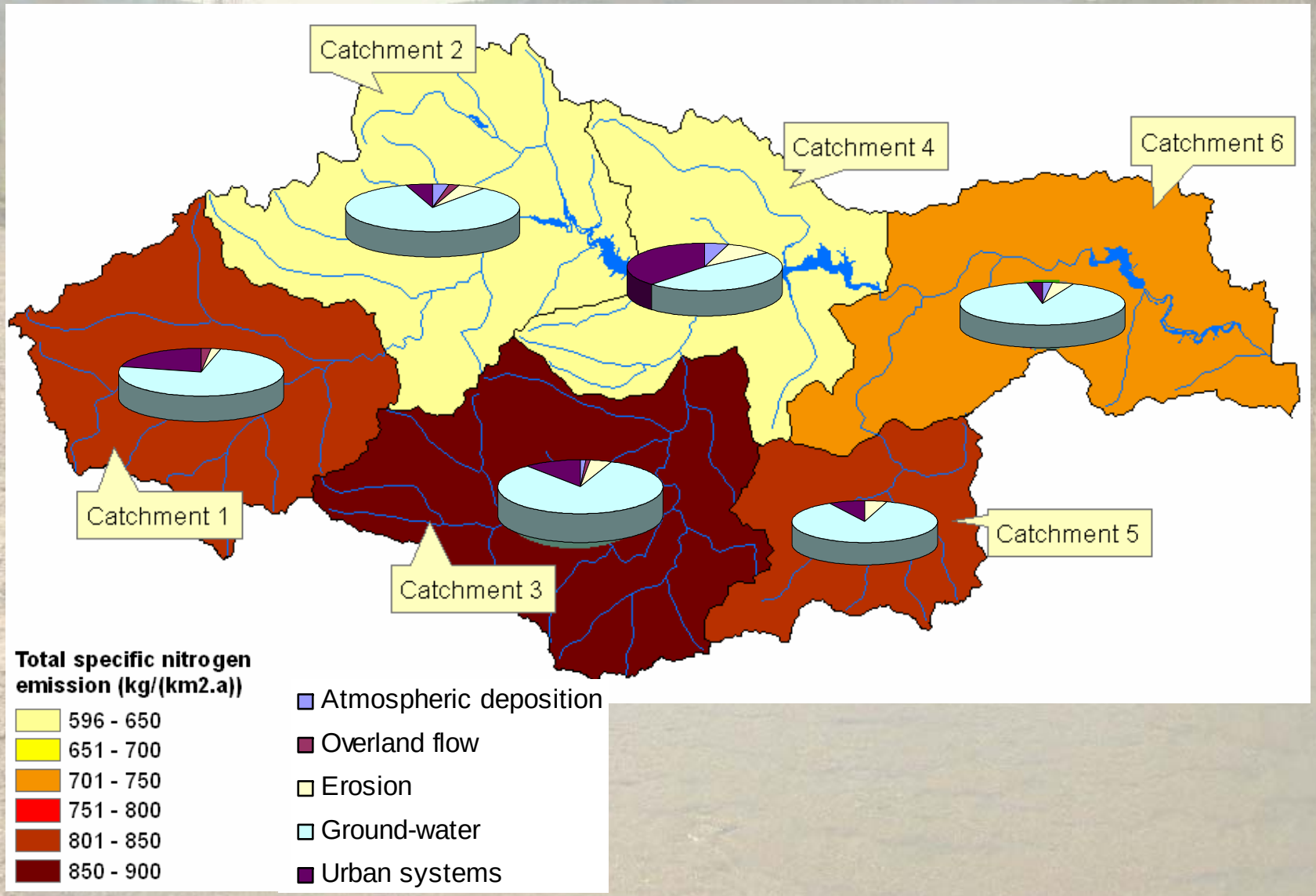
# Input data

- Soil type
- Land use
- Point sources
- Population
- Meteo data
- Hydrological data

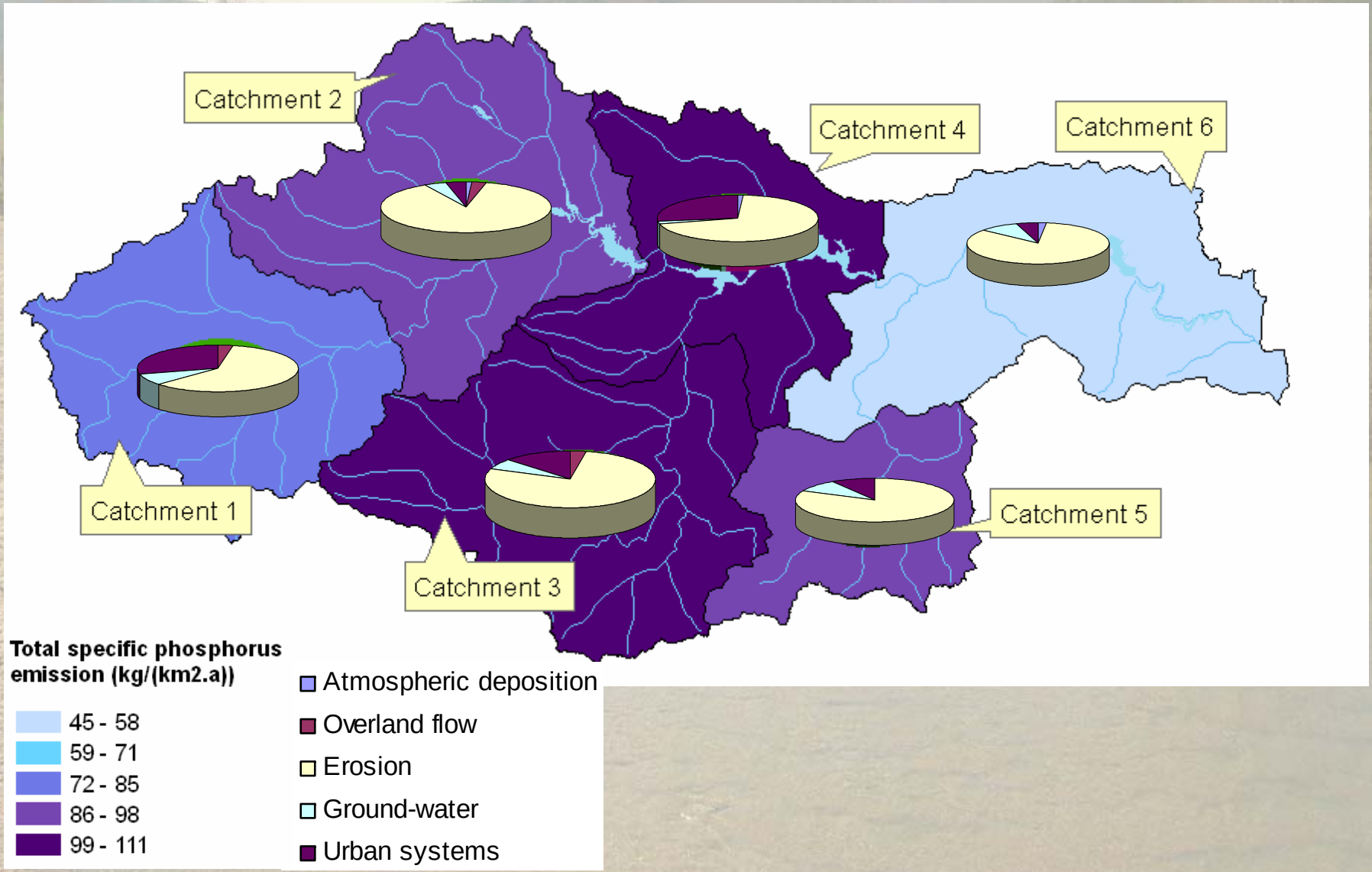


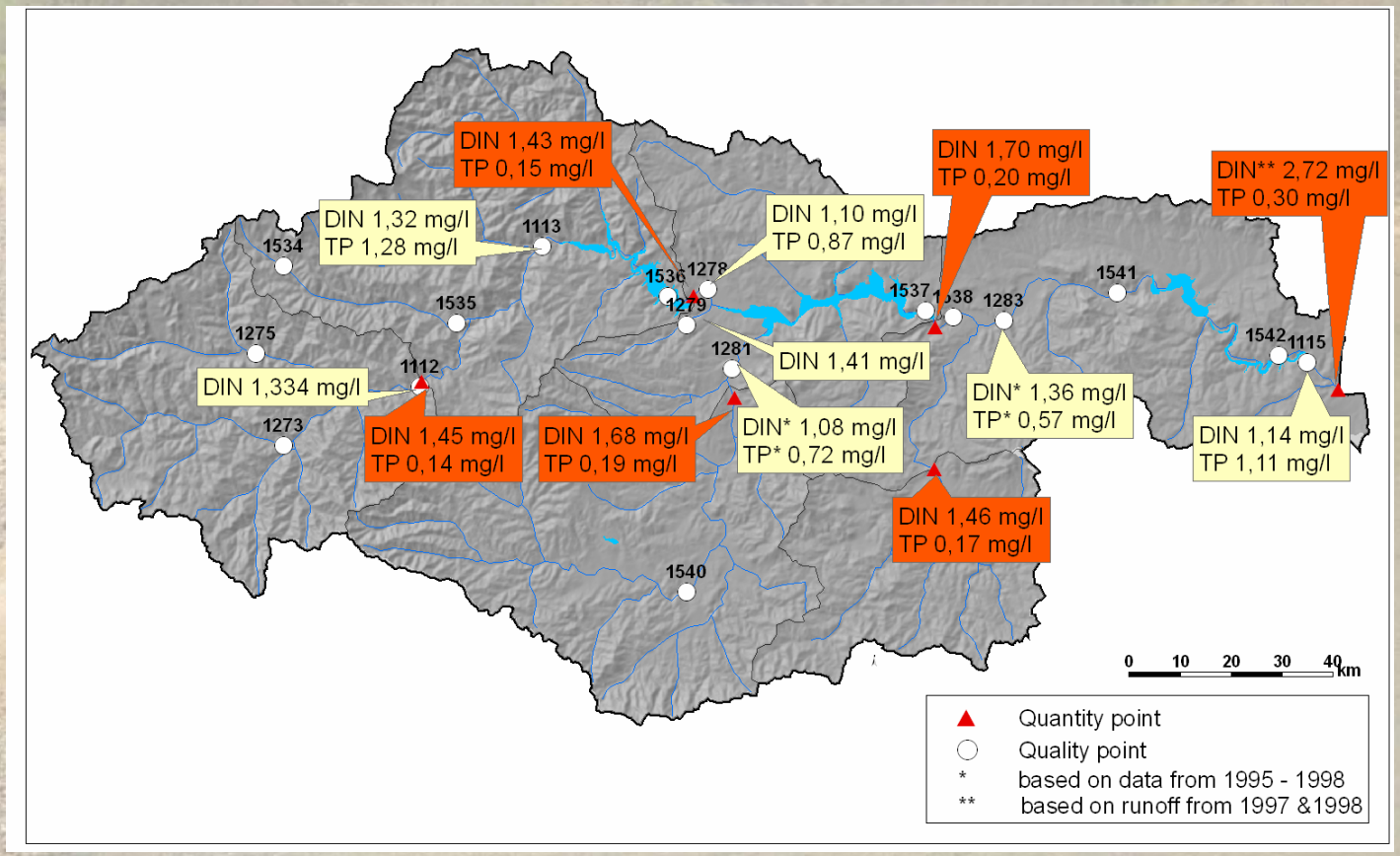
# Total Nitrogen



# Total Phosporus



# WQ Objectives



# Conclusion

- Nitrogen – No problem
  - Main path – Groundwater
  - Main Source – Non point sources (urban)

- Phosphorus - Doesn't meet standards
  - Main path and source Erosion
  - and direct waste water discharge

Effective Measures :
- WWTP, Sewerage
- Erosion protection