



SSA No 1, GULF of RIGA

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GENERAL INFORMATION

- Relatively autonomous subsystem of the Baltic Sea
- Mean depth - 26 m, max depth - 60 m
- Low salinity, 2 - 7 ‰; absence of permanent halocline
- Temperature stratification in summer
- Annual freshwater inflow volume - 7.3% of the Gulf volume
- 85% of the freshwater input (formed by 3 Latvian rivers) to the southern part of the Gulf – the main reason for high DIN/DIP ratio and expressed bloom of potentially toxic cyanobacteria

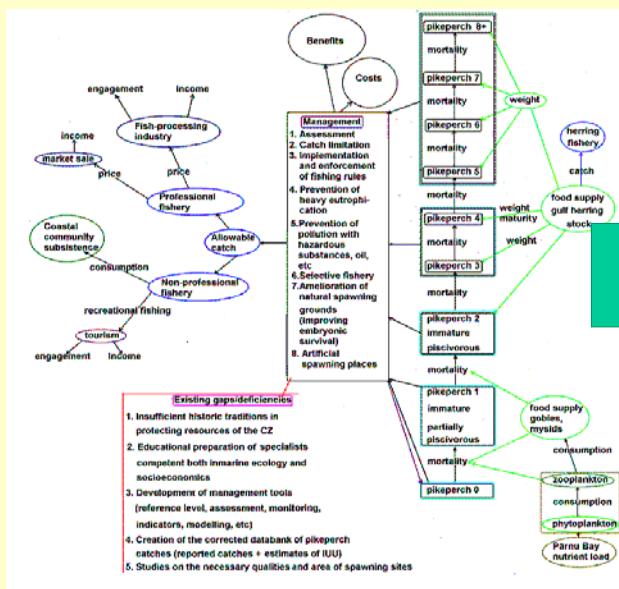
The main human activities in the coastal zone:
Fishing, Shipping, Tourism, Agriculture

POLICY ISSUE “Interaction between eutrophication & fish production”

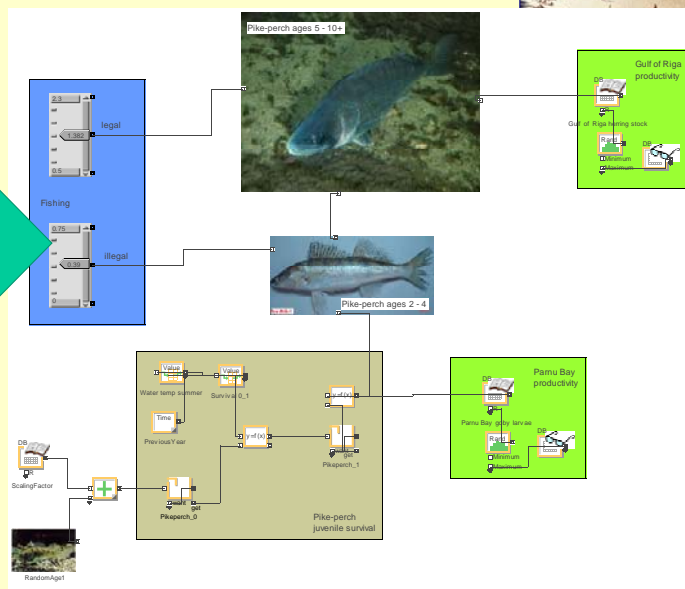
Anthropogenic eutrophication is related with bacterial contamination, increased primary production, expressed algal blooms, increase of HAB (harmful algal blooms), excretion of algal toxins, increased deposition of organic matter on the bottom, decreased water transparency, increased frequency and severity of oxygen deficiency of bottom waters, increased macrobenthic biomass, decreased depth penetration of *Fucus vesiculosus*, general decrease in water quality, decrease in important fish species, like salmonids, while eutrophication tolerant species benefit from higher productivity.



PÄRNU BAY PIKE-PERCH CASE STUDY



ExtendSIM implementation (status so far)



We have selected a local fish stock, Pärnu Bay pike-perch, to demonstrate the interaction between eutrophication, fish production, management actions, and the goods & services provided by the ecosystem.

Pärnu Bay pike-perch

- local pike-perch stock, non-migratory
- economically most valuable species
- high fishing pressure, vulnerable due to late maturity
- experience with local quota and recruitment enhancement
- benefits from eutrophication via increase of Gulf of Riga productivity and stocks of forage fish (herring)
- might suffer from eutrophication during egg development (anoxia)

MODEL FORMULATION

- Main model blocks:
 - Pike-perch juvenile survival
 - Immature piscivorous pike-perch (ages 2 – 4)
 - Mature pike-perch (ages 5 – 10+)
 - Parnu Bay productivity
 - Gulf of Riga productivity
 - Fishery
- Step-wise refinement of model blocks
- User interaction via parameter database and slider utilities
- Model output storage in Extend databases
- Verification with pike-perch VPA output from 1970 - 1999