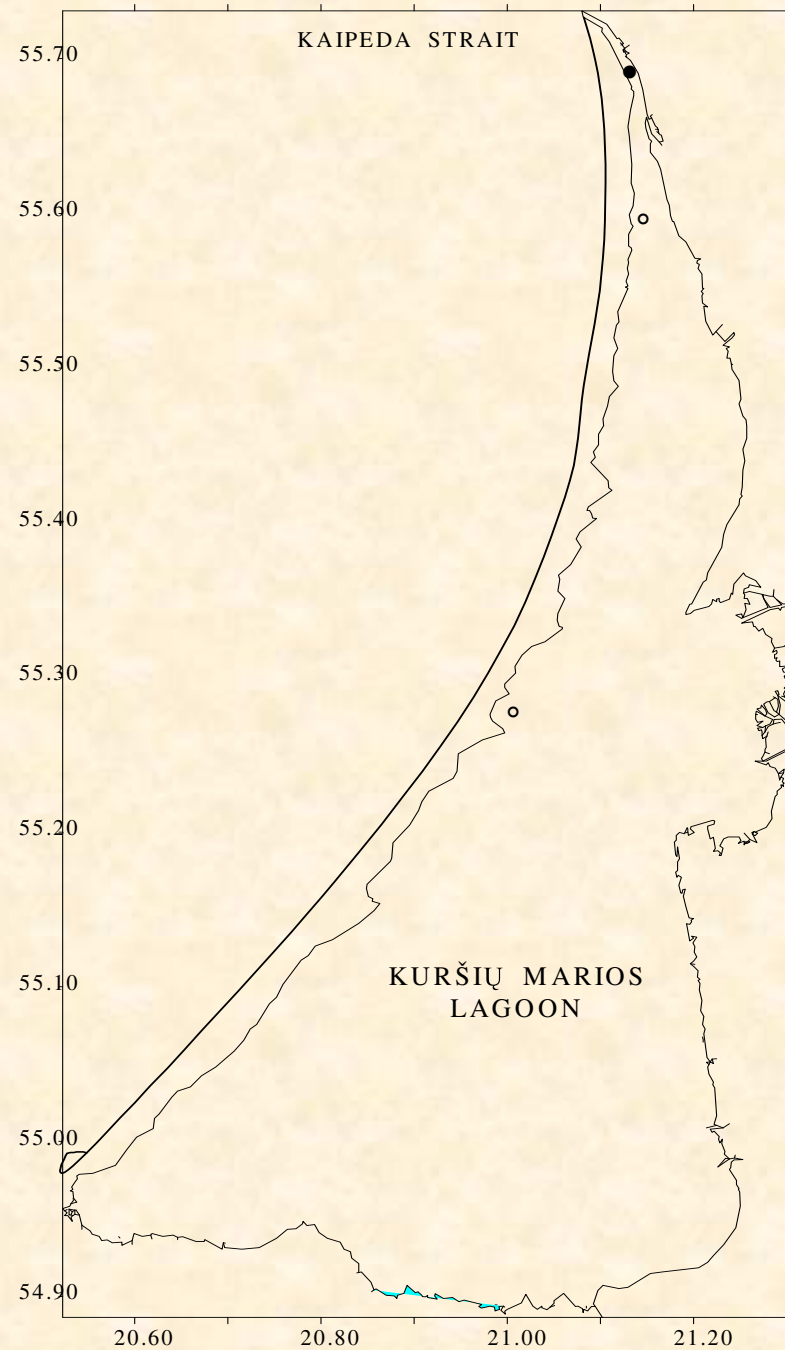
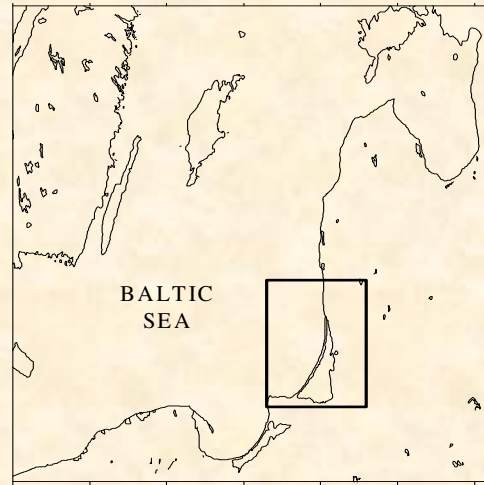


Curonian lagoon case study

By A. Razinkovas
Coastal Research and Planning institute, Klaipeda University

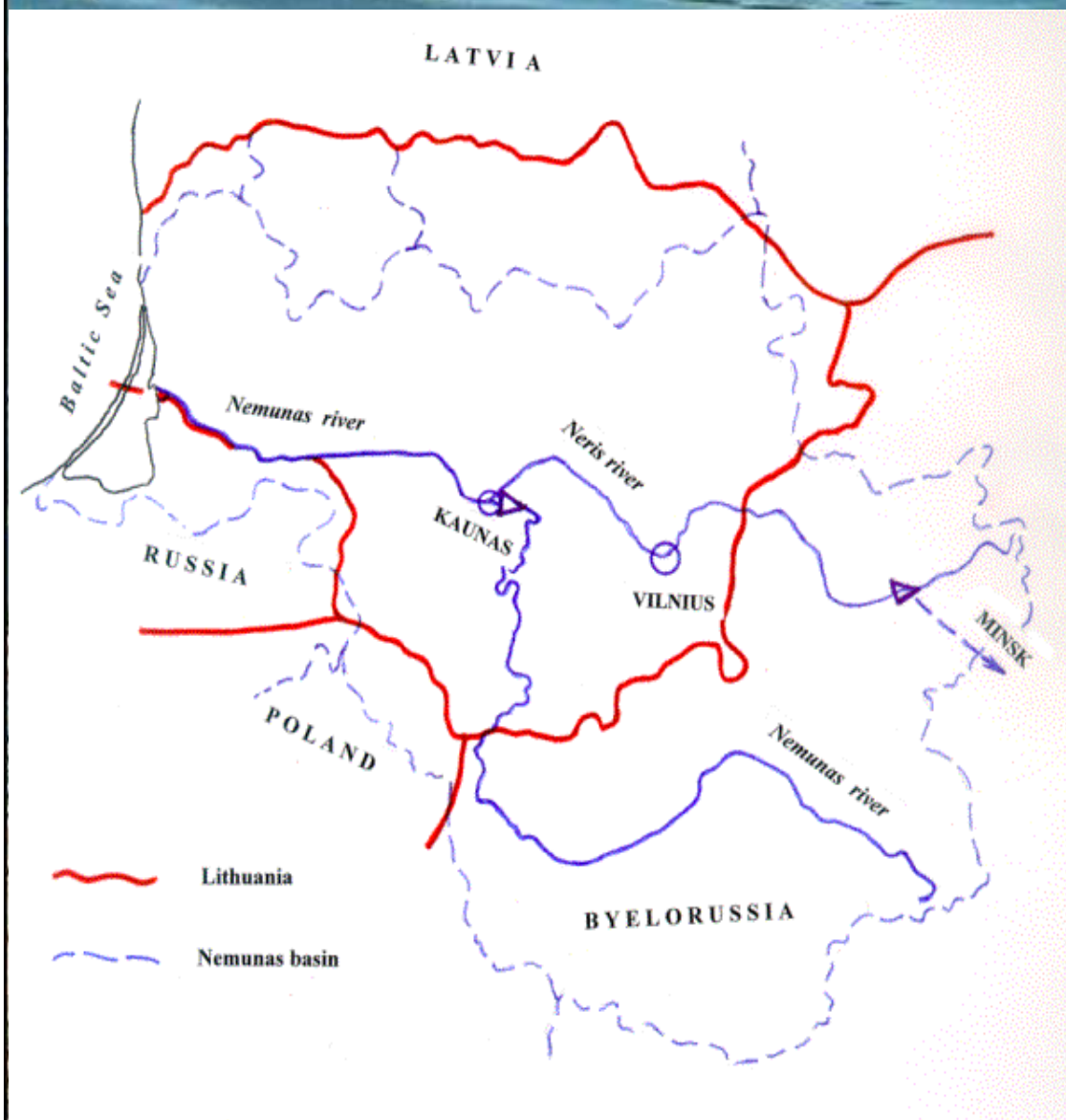




- Area: 1 584 km²
- Average depth 3.5 m
- Respective to WFD:
River, estuary, costal
waters

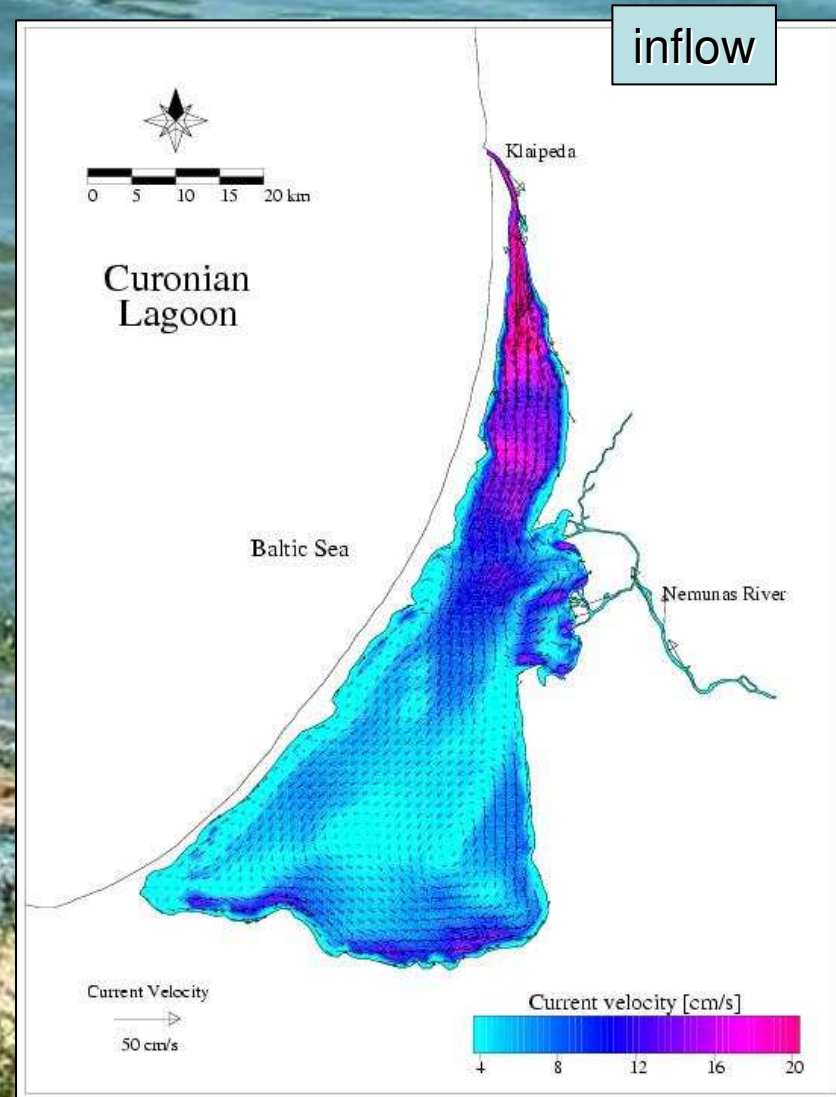
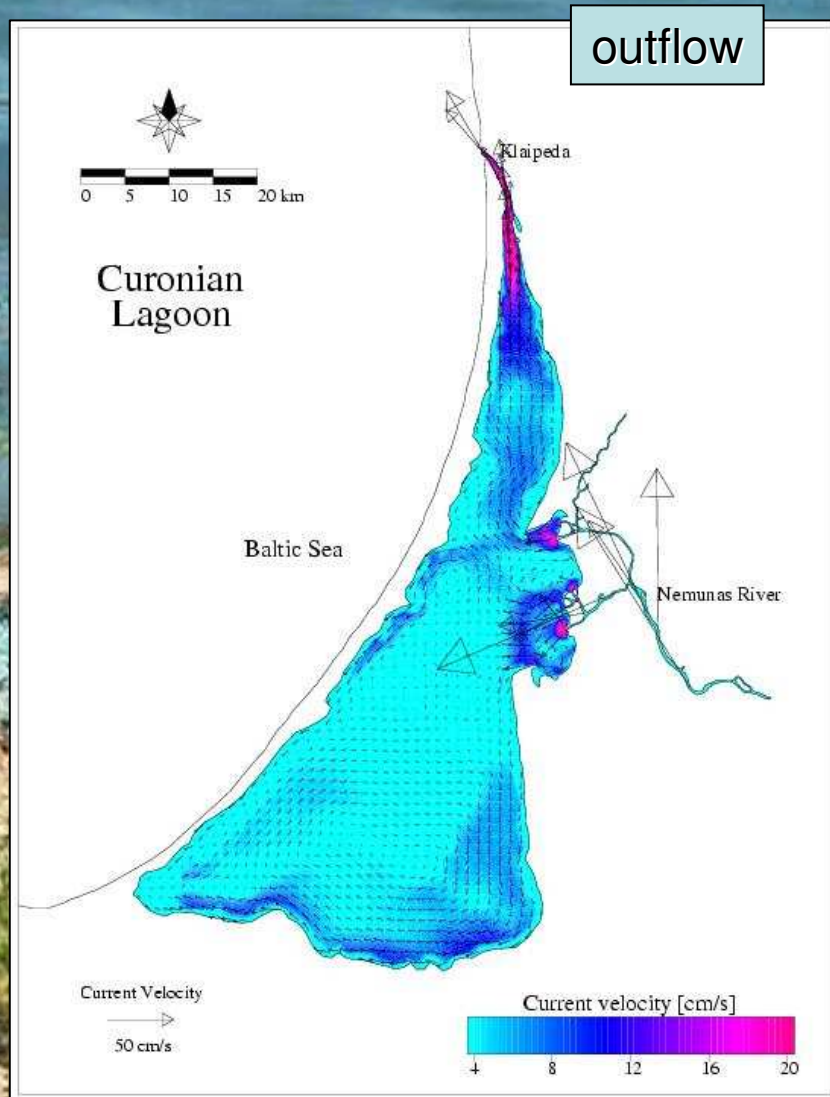
**The mean winter:
phosphate (PO₄ -P) 1.7 ±0.6
DIN 61.1±29.4 mmol/m³**

CURONIAN LAGOON



- Total drainage area: 1 000 460 km² – 98% belongs to Nemunas River
- The Nemunas basin covers 75% of the Republic territory.
- The Nemunas length - 937 km.
- Basin area – 97 923,8 km².

Hidroynamics



Curonian lagoon (northern part)

		Physico-chemical quality elements								Biological quality elements					Hydromorphological quality elements			
		Transparency	Temperature	Oxygen conditions	Conductivity	Salinity	Nutrient status	Acidification status	Priority substances	Other pollutants	Macrophytes	Phytoplankton	Planktonic blooms	Benthic invertebrates	Eutrophication	Hydrological regime	Morphology	River continuity
Diffuse sources	Urban drainage																	
	Agriculture diffuse	Low impact		Medium impact			Medium impact			Medium impact	Medium impact	High impact	Low impact	High impact				
	Forestry																	
	Other diffuse																	
Point sources	Waste waters	Low impact		Low impact			Low impact			Low impact	Low impact	Low impact		Medium impact				
	Industry			Low impact				Low impact										
	Mining								Low impact									
	Contaminated lands																	
	Agriculture point													Low impact				
	Waste management														Low impact			
	Aquaculture																	
	Manufacture																	
Abstraction	Potable supply																	Low impact
	Agriculture																	
	Industry																	Low impact
	Fish farming																	
	Hydro-energy																	
	Open cast coal sites																	
Morphological pressures	Flow regulation	Medium impact	Low impact	Low impact	Medium impact	Medium impact				Medium impact	Medium impact	Low impact			Medium impact			
	River management																	
	Coastal management														Low impact			
	Other																	
Other anthropogenic pressure	Recreation																	
	Fishing/angling																	
	Climate changes																	
	Land drainage														Low impact			
	Exploitation of animals																	
	Introduced species											Low impact	Low impact					
	Introduced diseases																	

Non existed

Non affected

Low impact

Medium impact

High impact

Main problems

- **Eutrophication**
- **Flow regulation**
- **Sectorial conflicts**



Sub study: Klaipeda port development

- The only industrial harbor in Lithuania
- Connection with the Baltic Sea: narrow, dredged channel near Klaipeda – Klaipeda Strait (Lithuania) of depth up to 12 m
- Ongoing activities – inflow from the

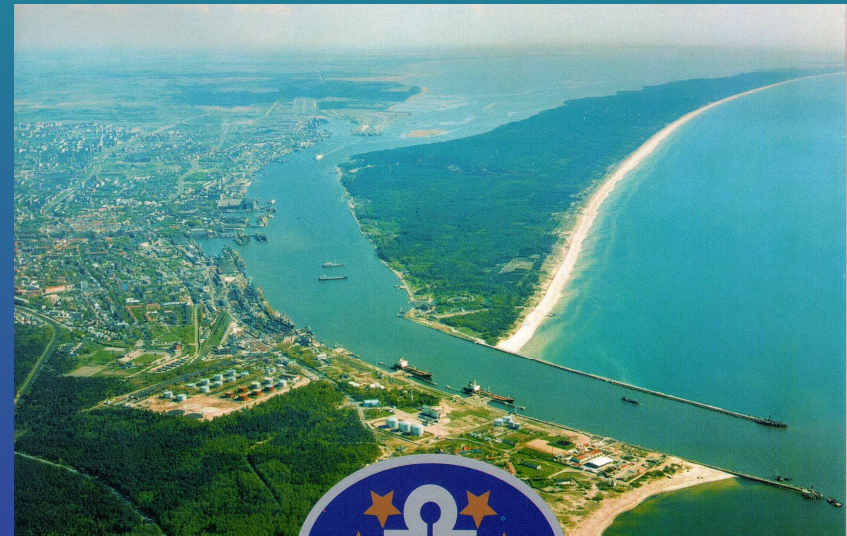
The average inflow from the Sea to the Curonian Lagoon before and after the dredging of Klaipeda Strait (Klaipeda Seaport water area) in 1981-1982

Up to the dredging (1973-81)

4.772 km³

After the dredging (1982-90)

5.954 km³



Conflicts

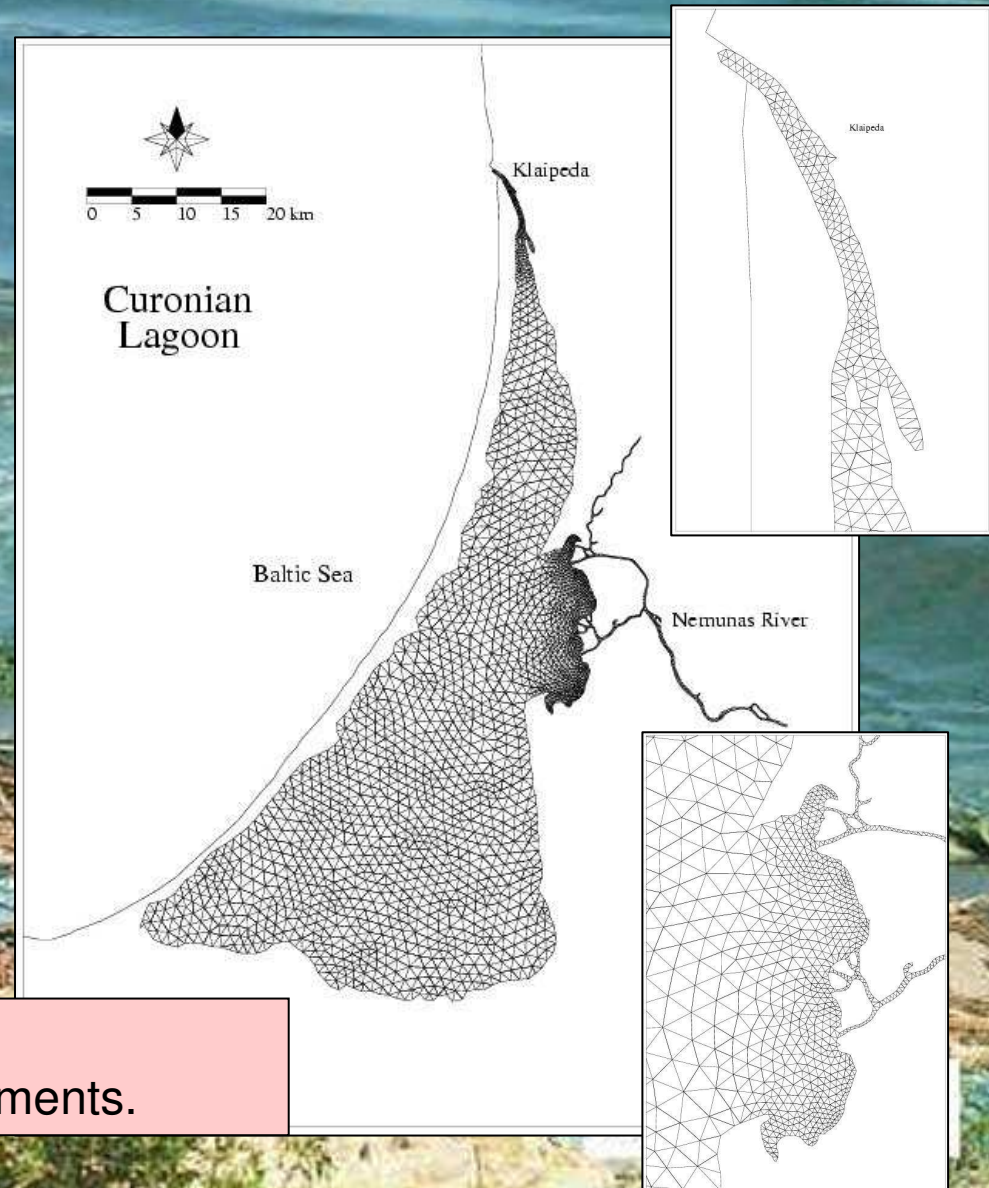
- **Klaipeda port development is one of the national priorities**
- **Fisherman association claim possible effects on fishery**
- **Russia claims possible ecosystem wide changes in the Curonian lagoon**

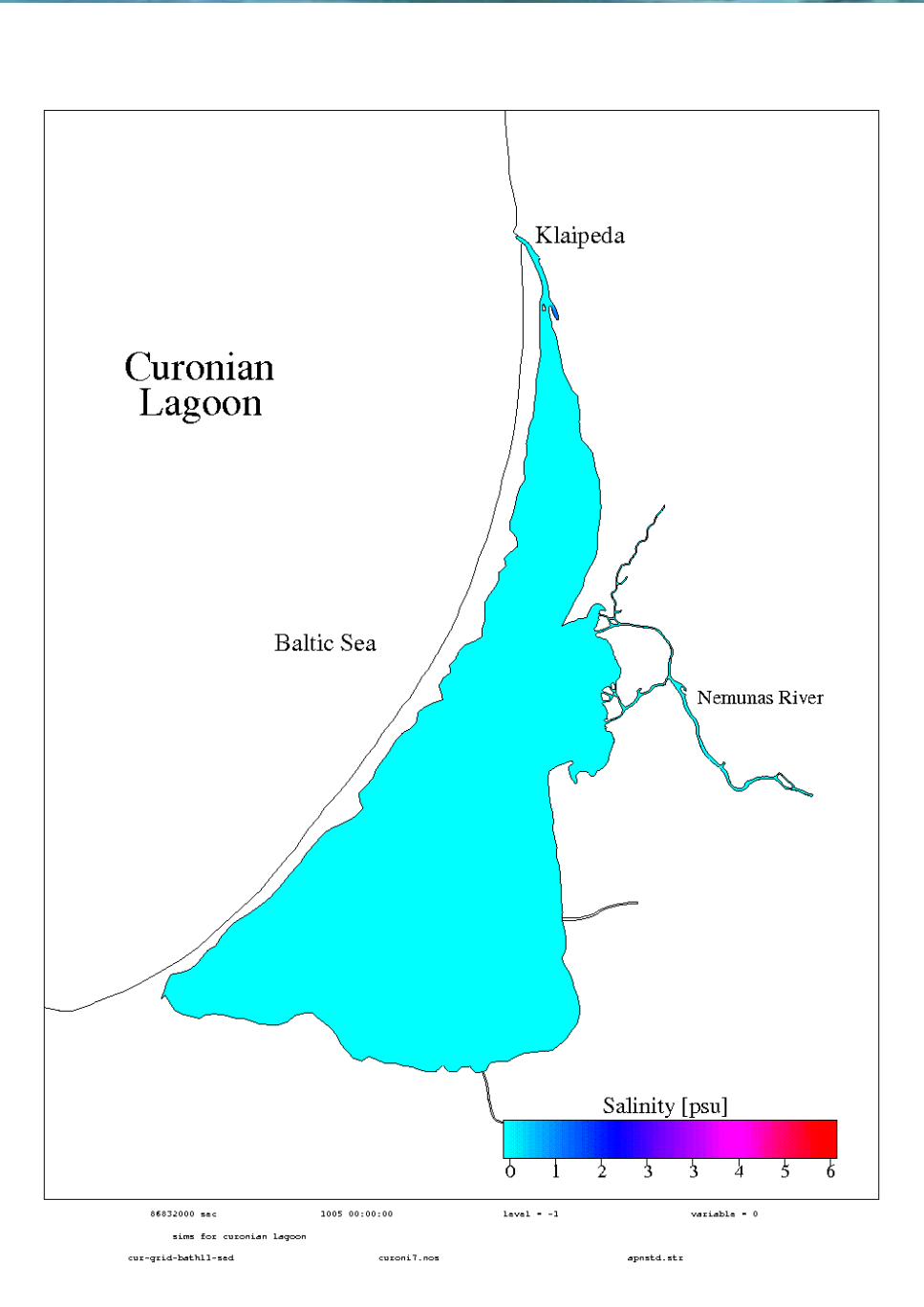
Numerical model

SHYFEM – 3D finite element model

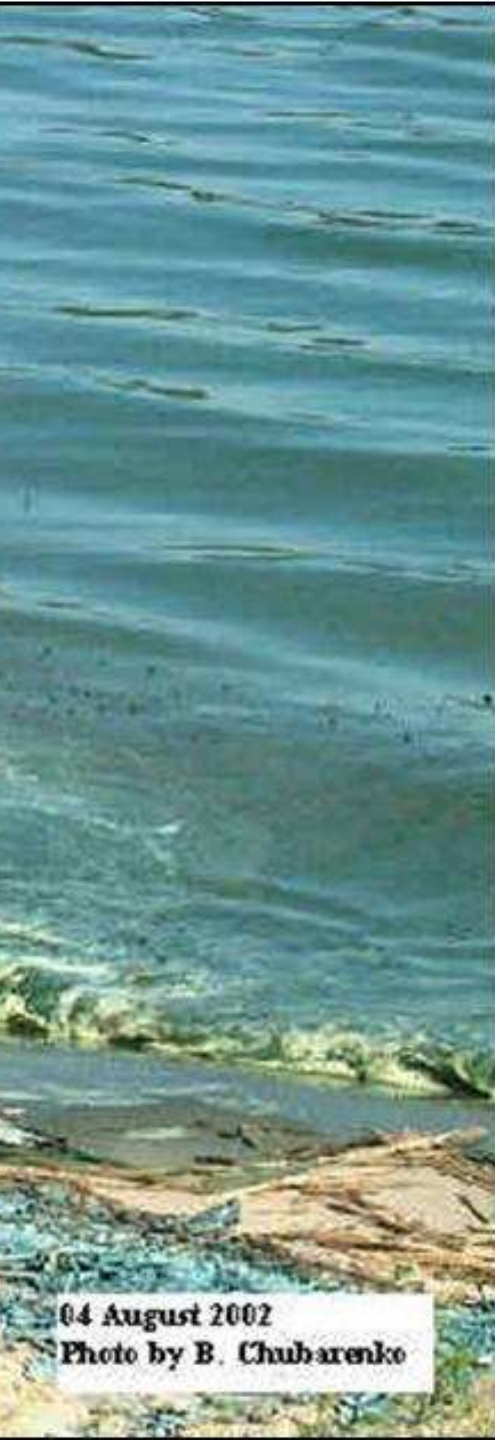
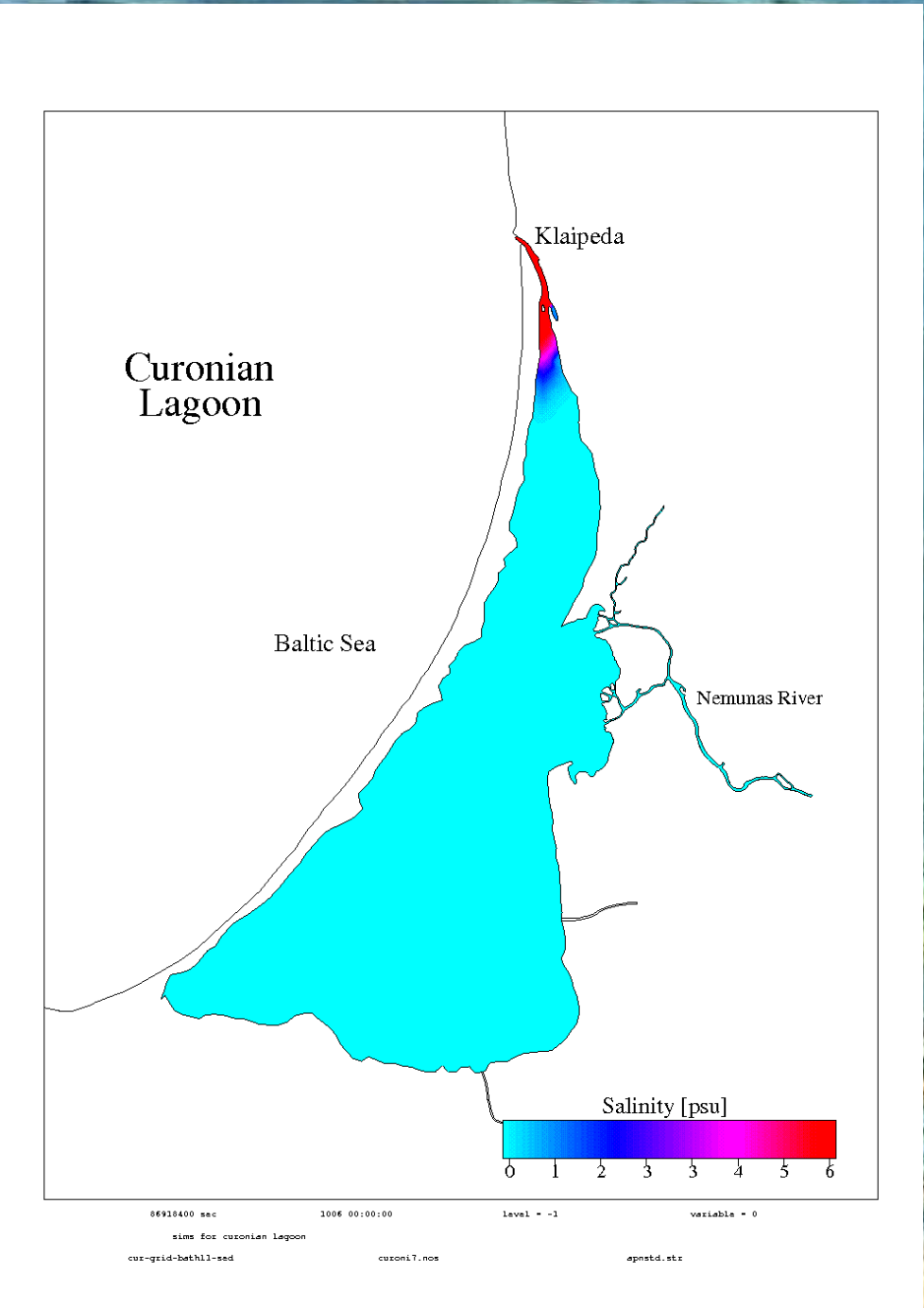
Higher resolution in the Nemunas delta and Klaipėda strait.

Numerical grid:
2486 nodes ir **3859 elements.**

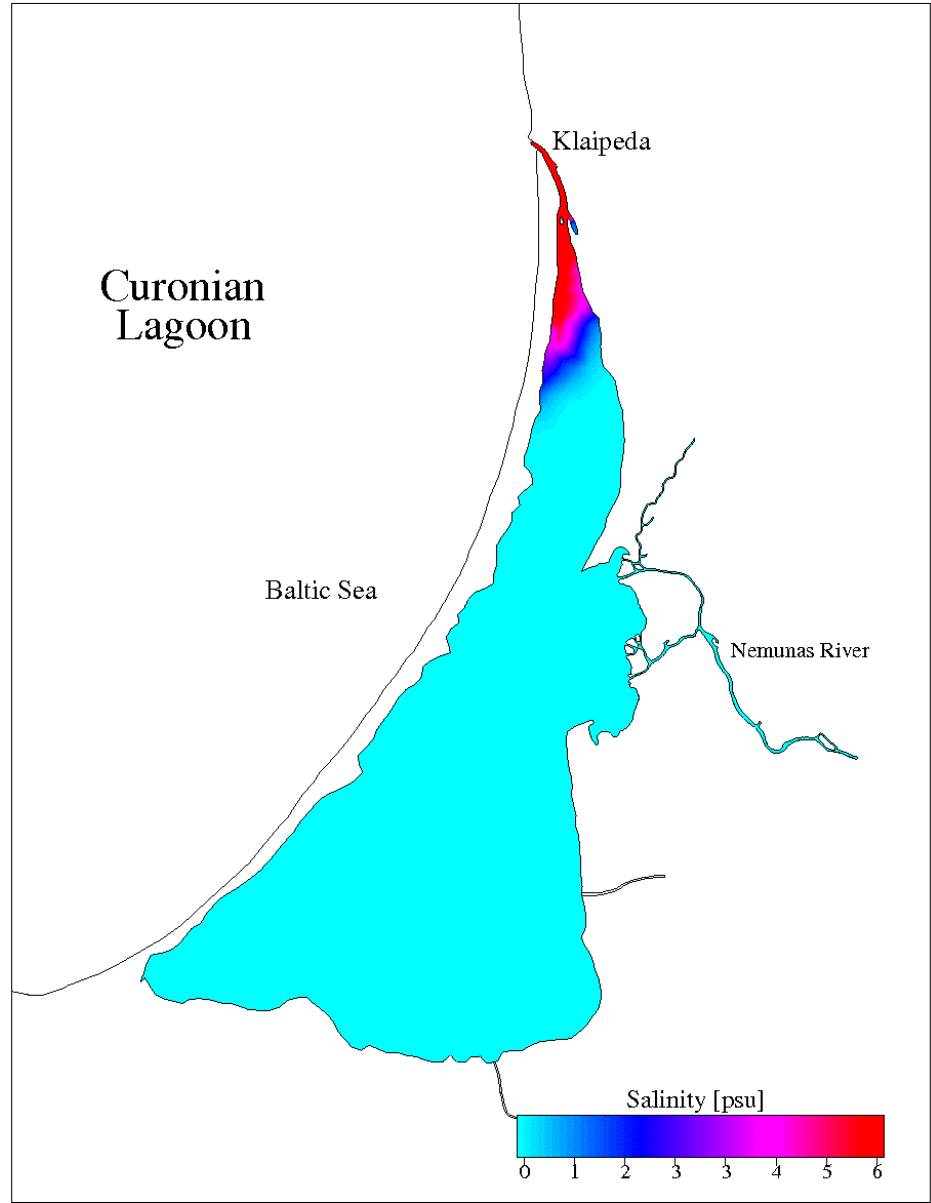




04 August 2002
Photo by B. Chubarenko

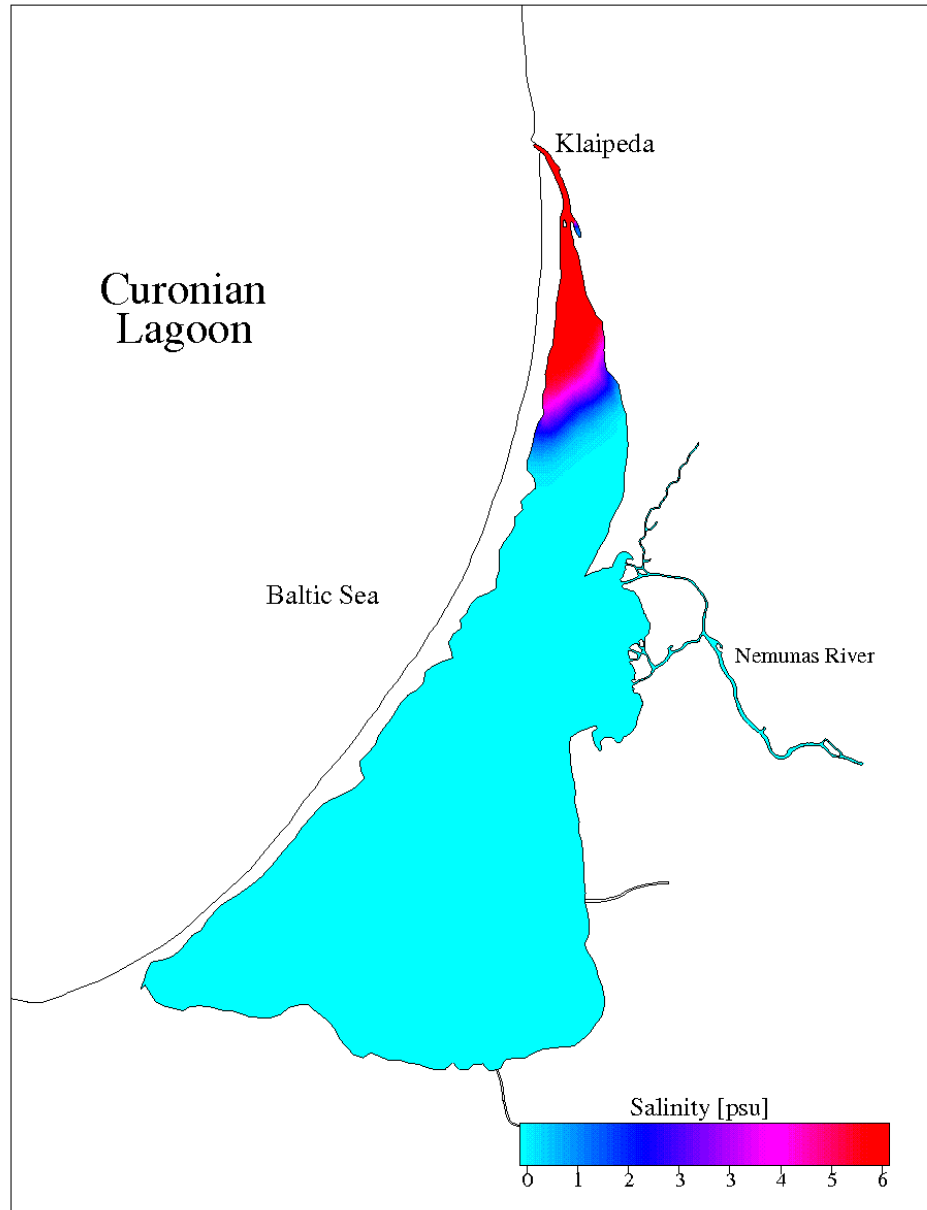


04 August 2002
Photo by B. Chubarenko

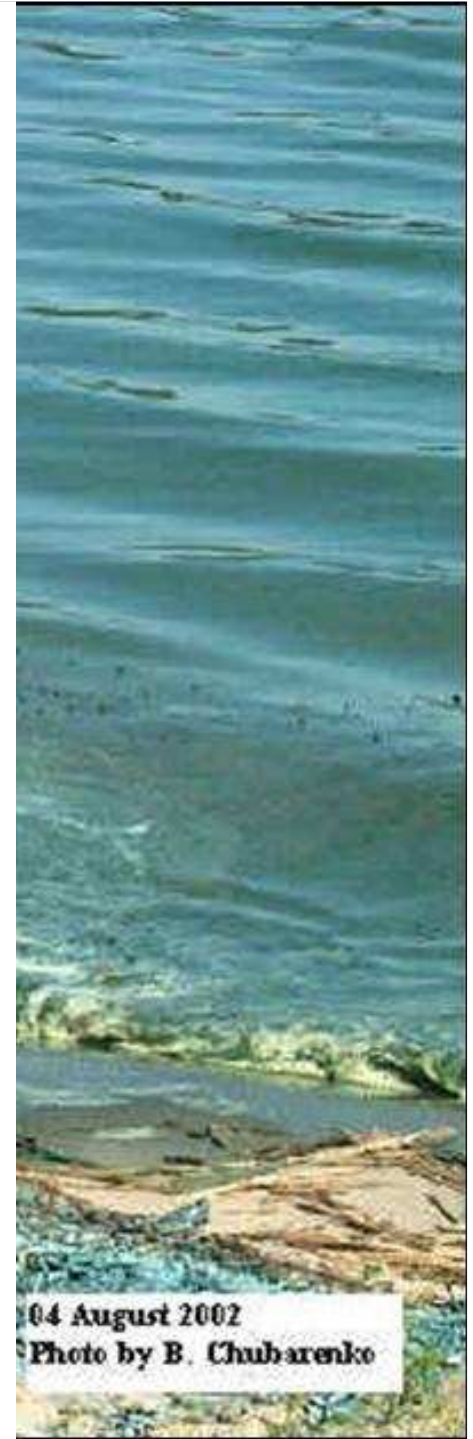


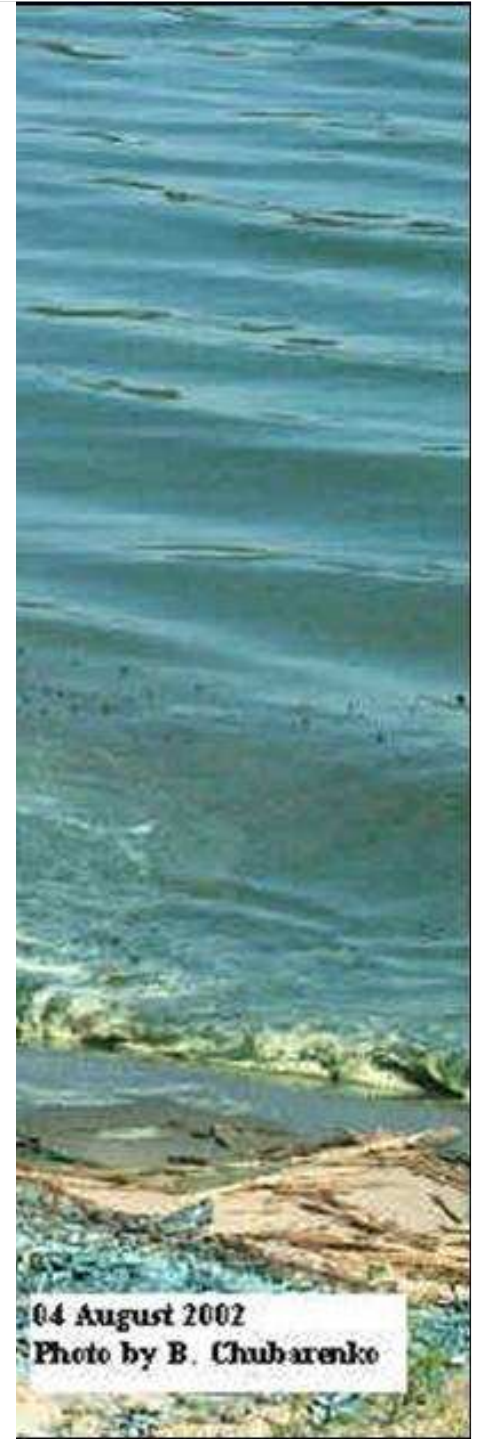
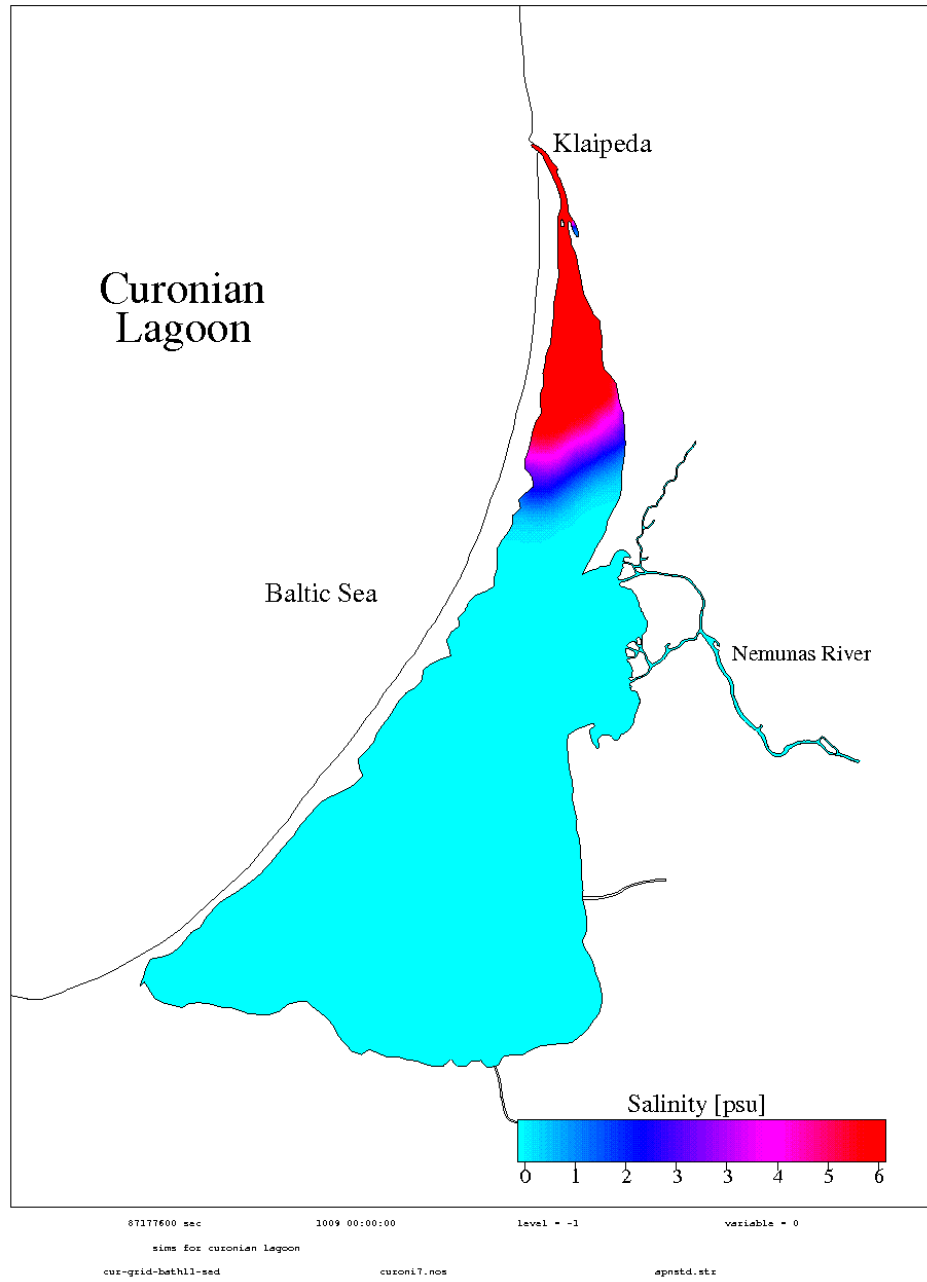
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sims for curonian lagoon
cur-gqid-bethl1-sed curon17.nos apnstd.str



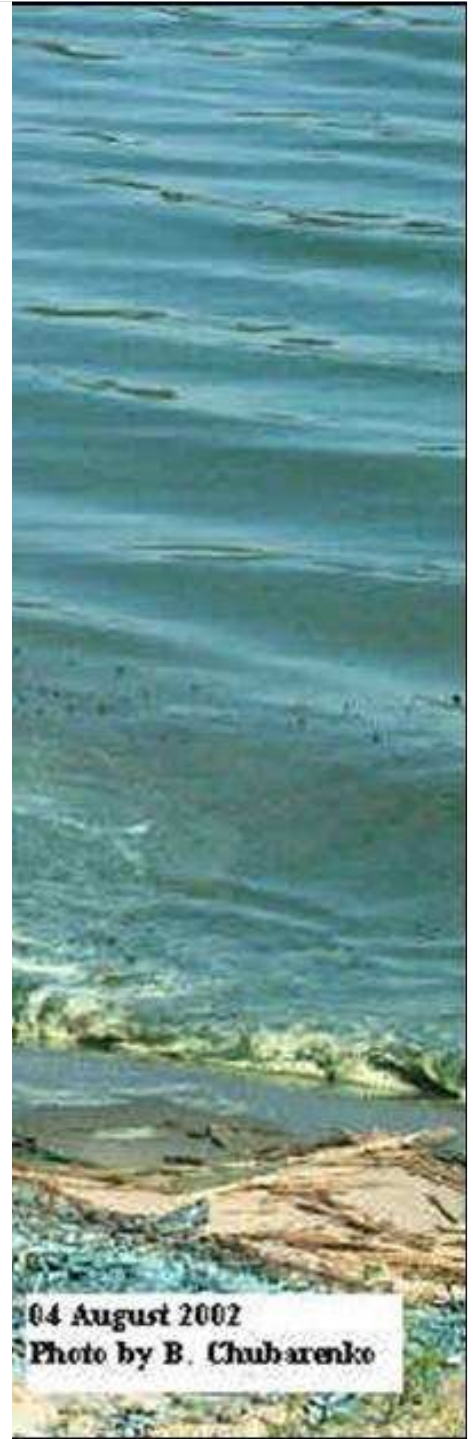
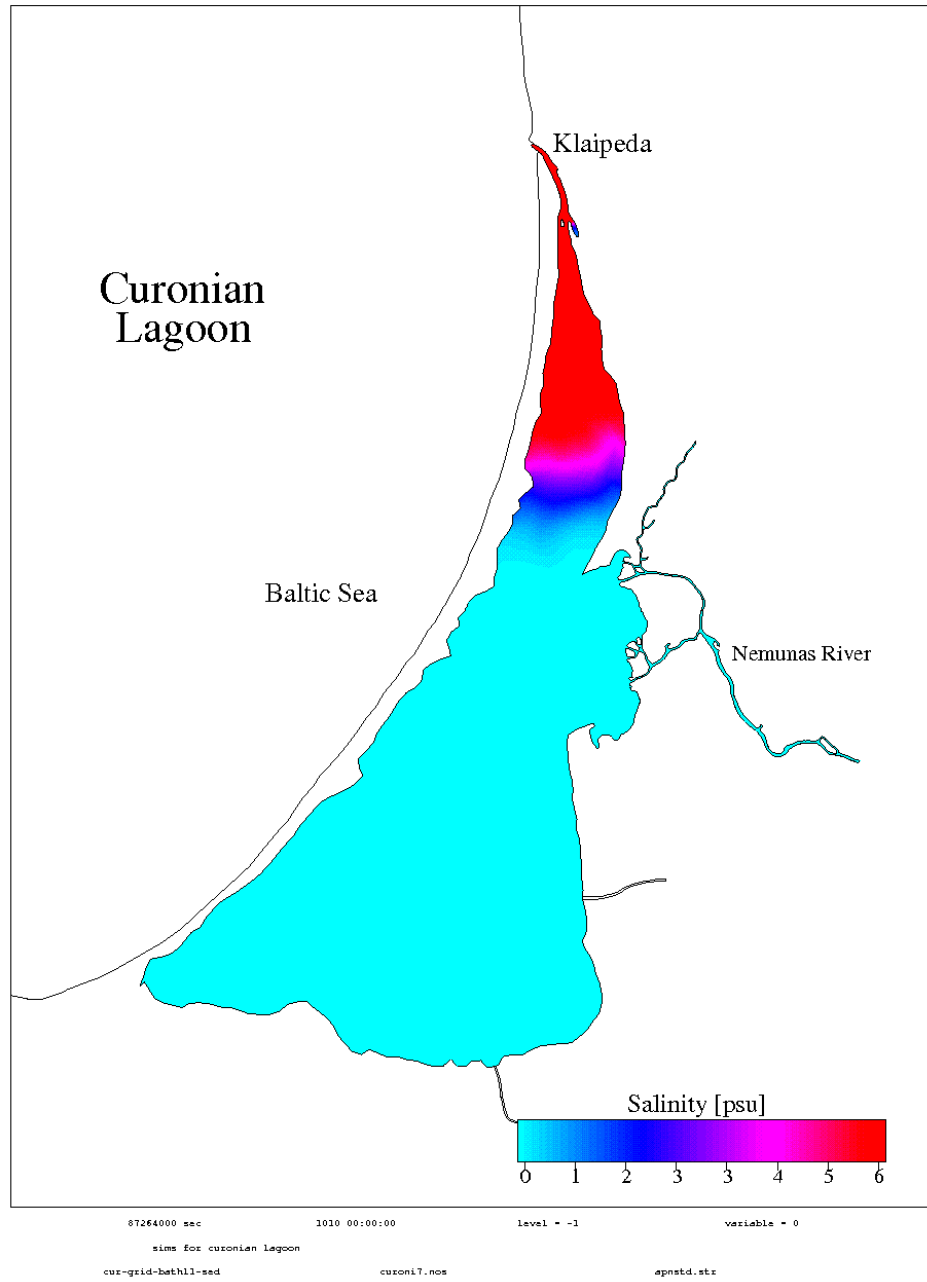


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sims for curonian lagoon
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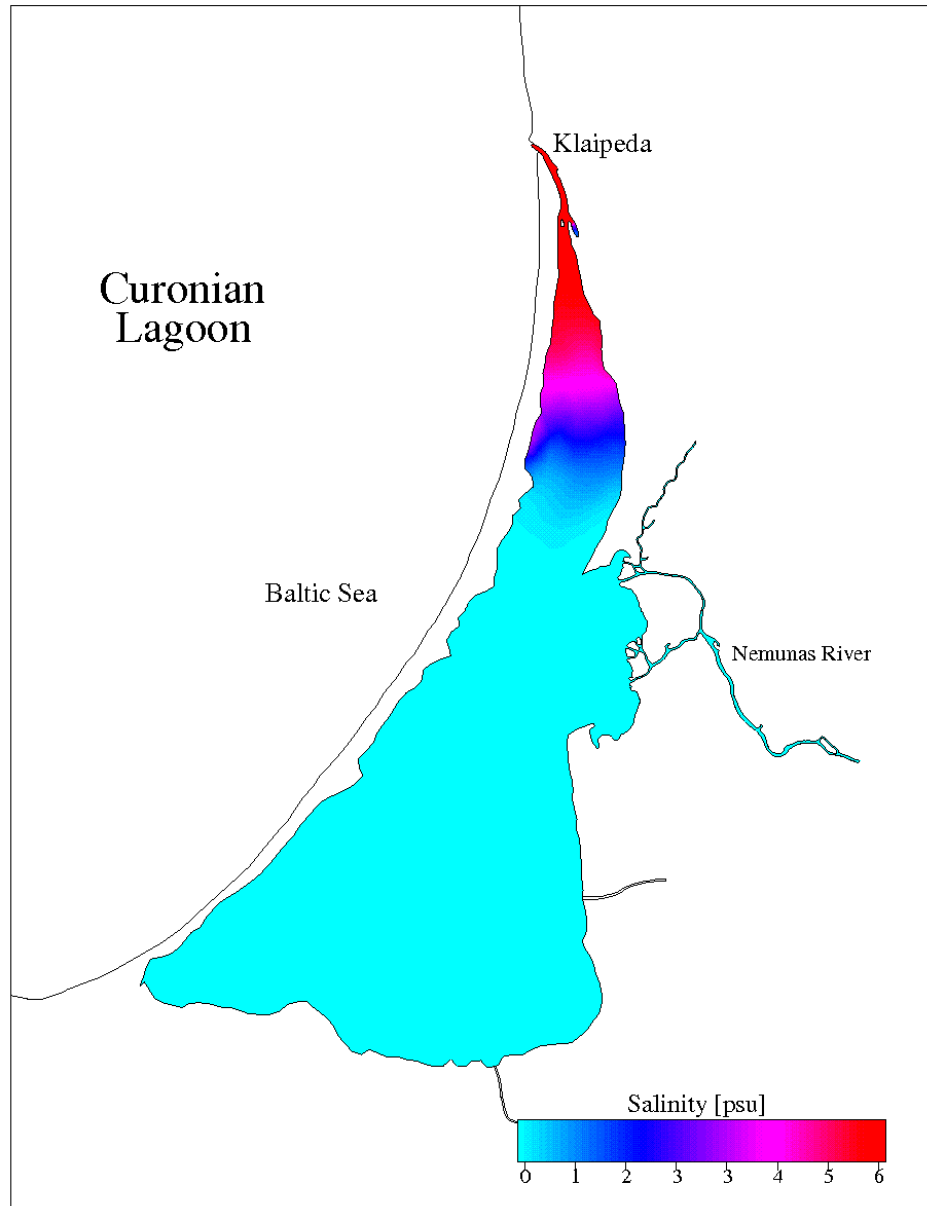




04 August 2002
Photo by B. Chubarenko

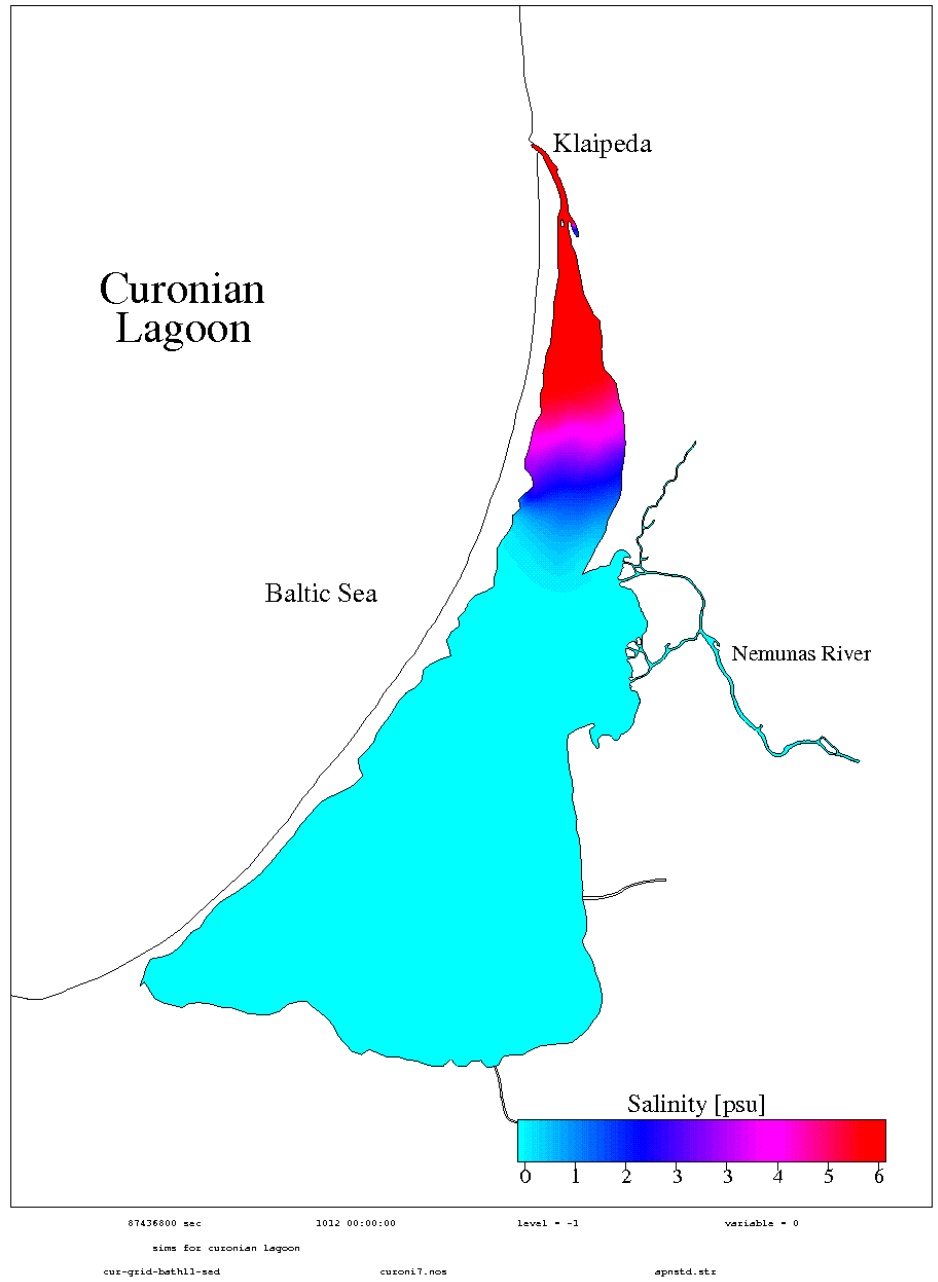


04 August 2002
Photo by B. Chubarenko

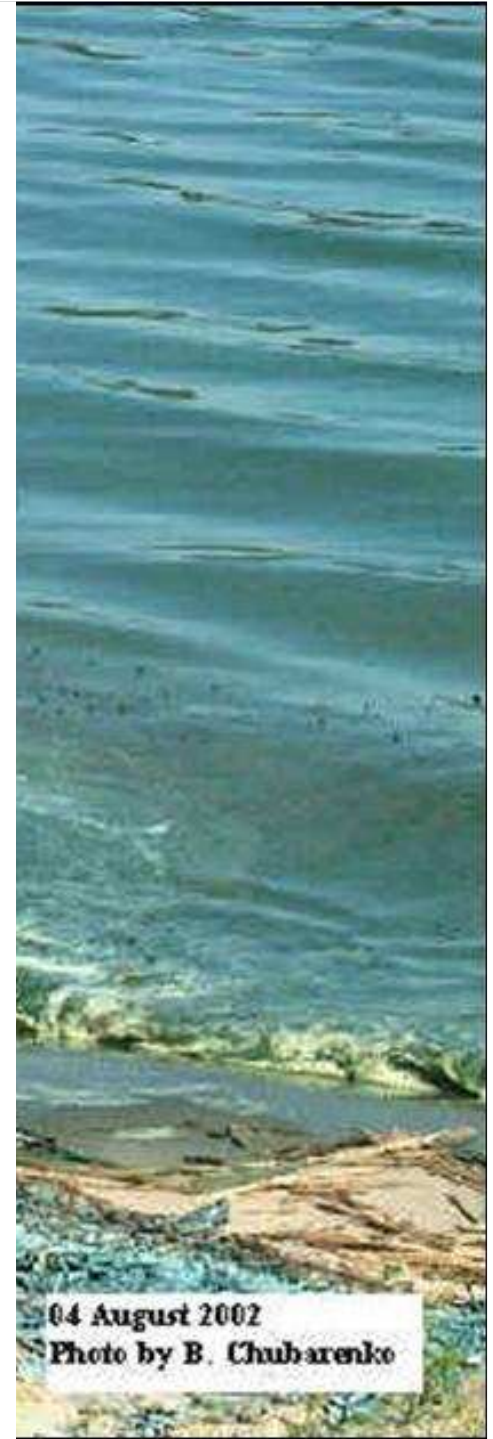
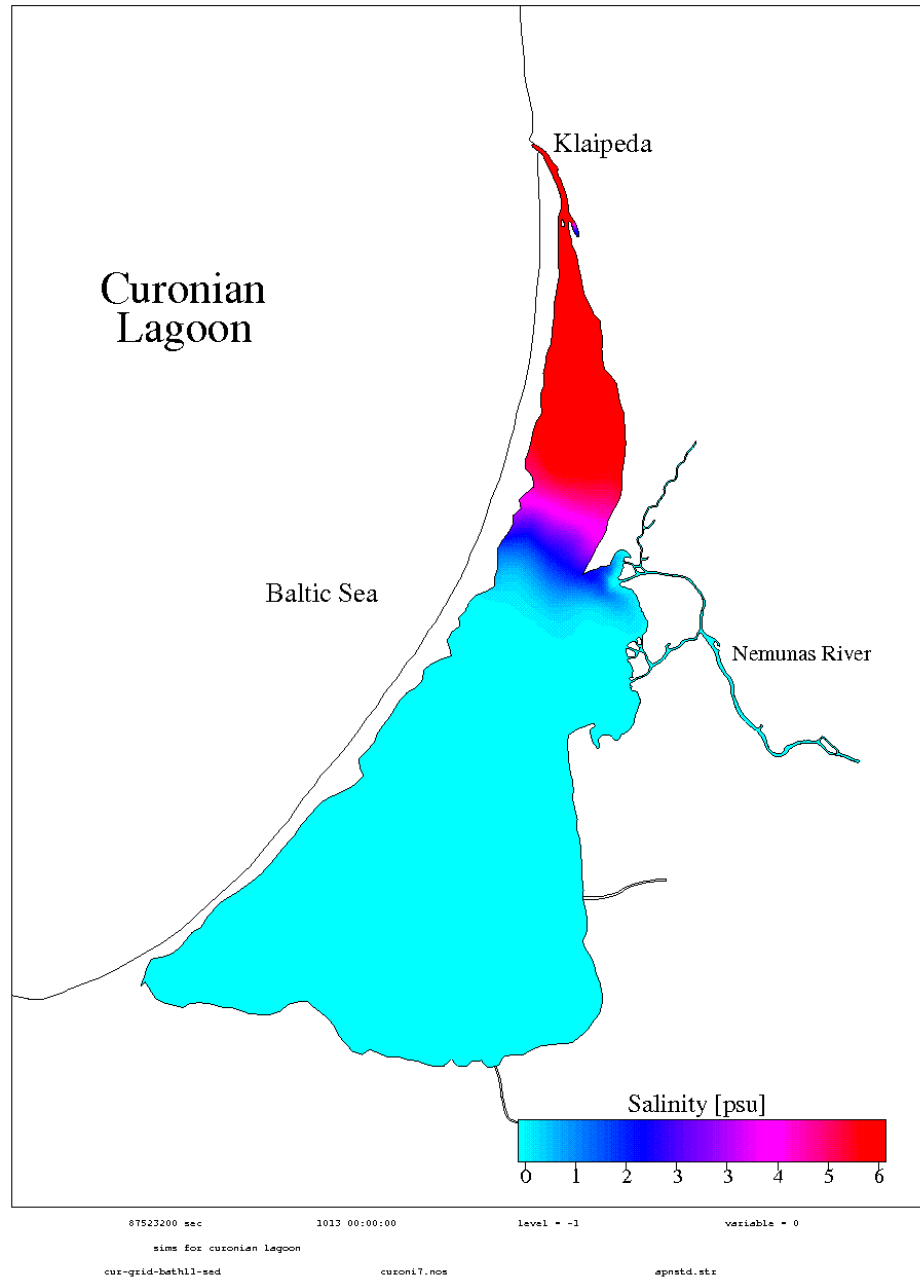


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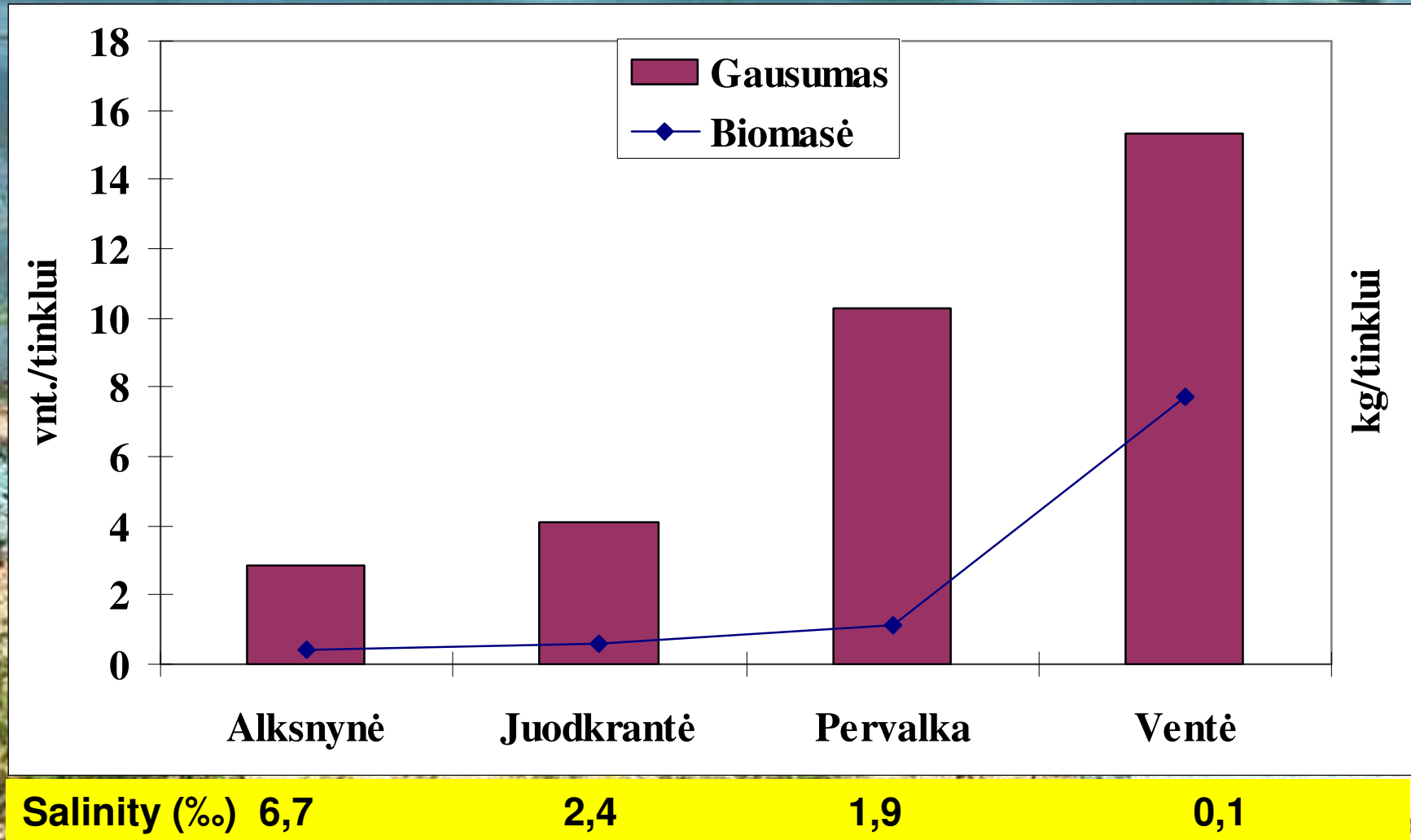


04 August 2002
Photo by B. Chubarenko



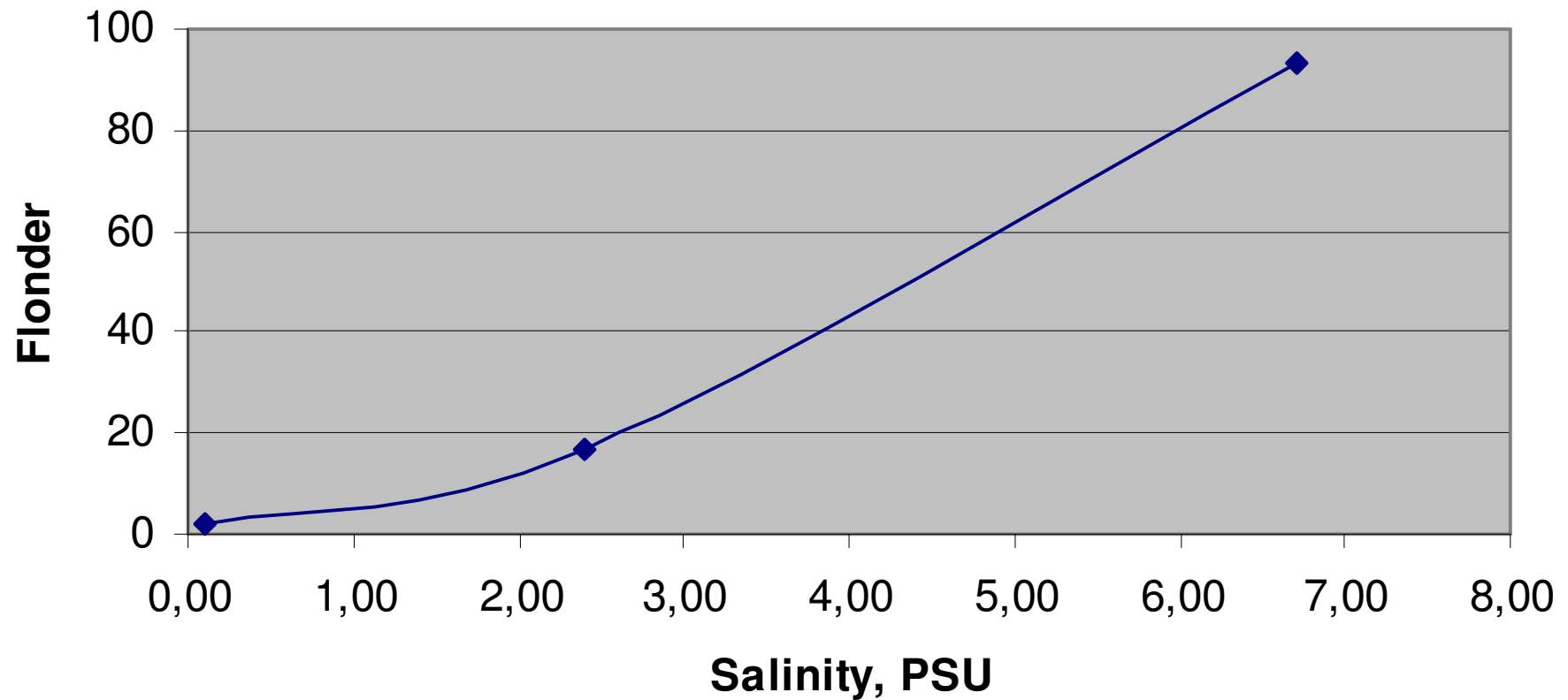
Effect on fisheries

A. General decrease in fish biomass

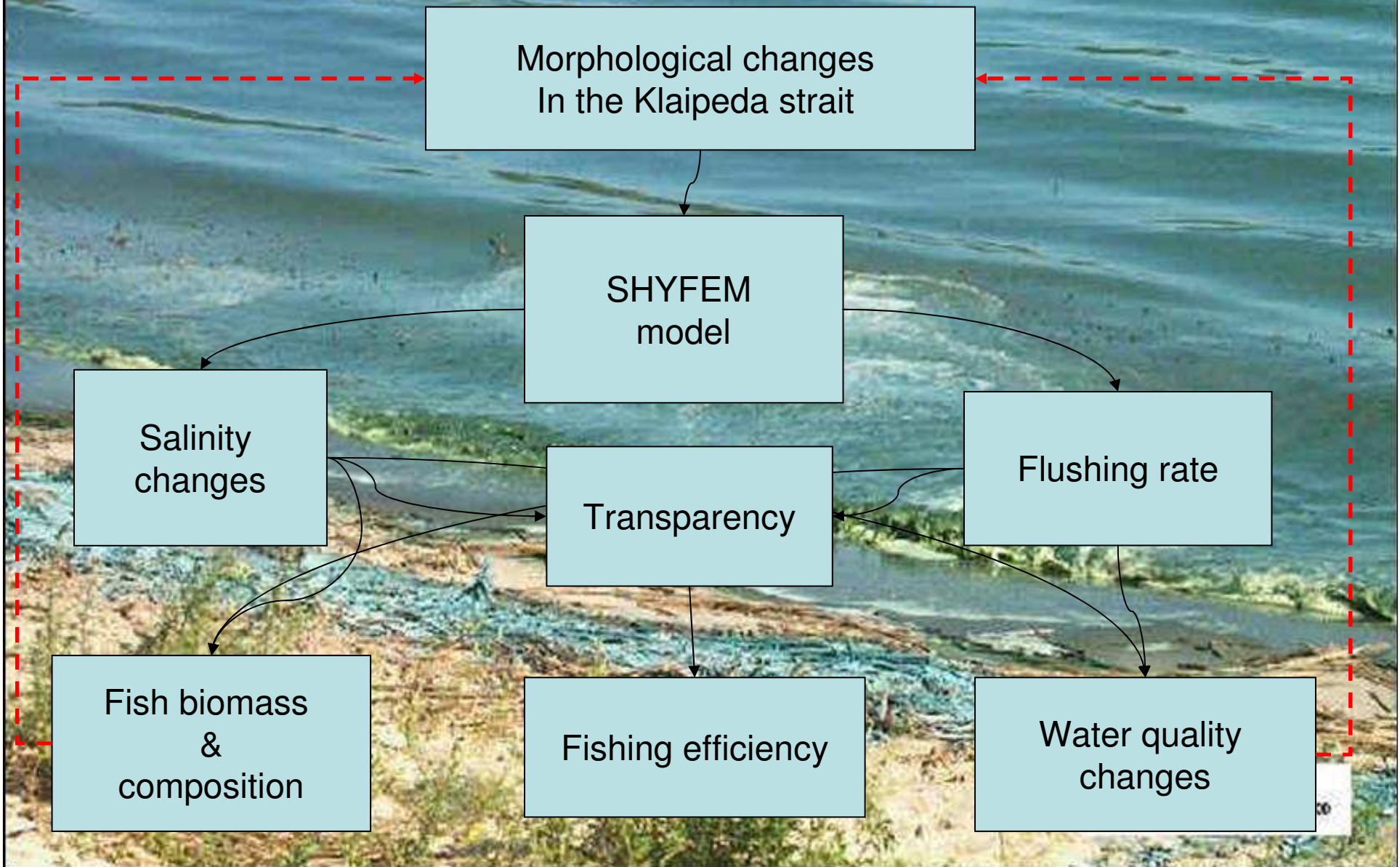


Changes in catch composition

Flounder catch % depending on salinity



Management support system



Management options

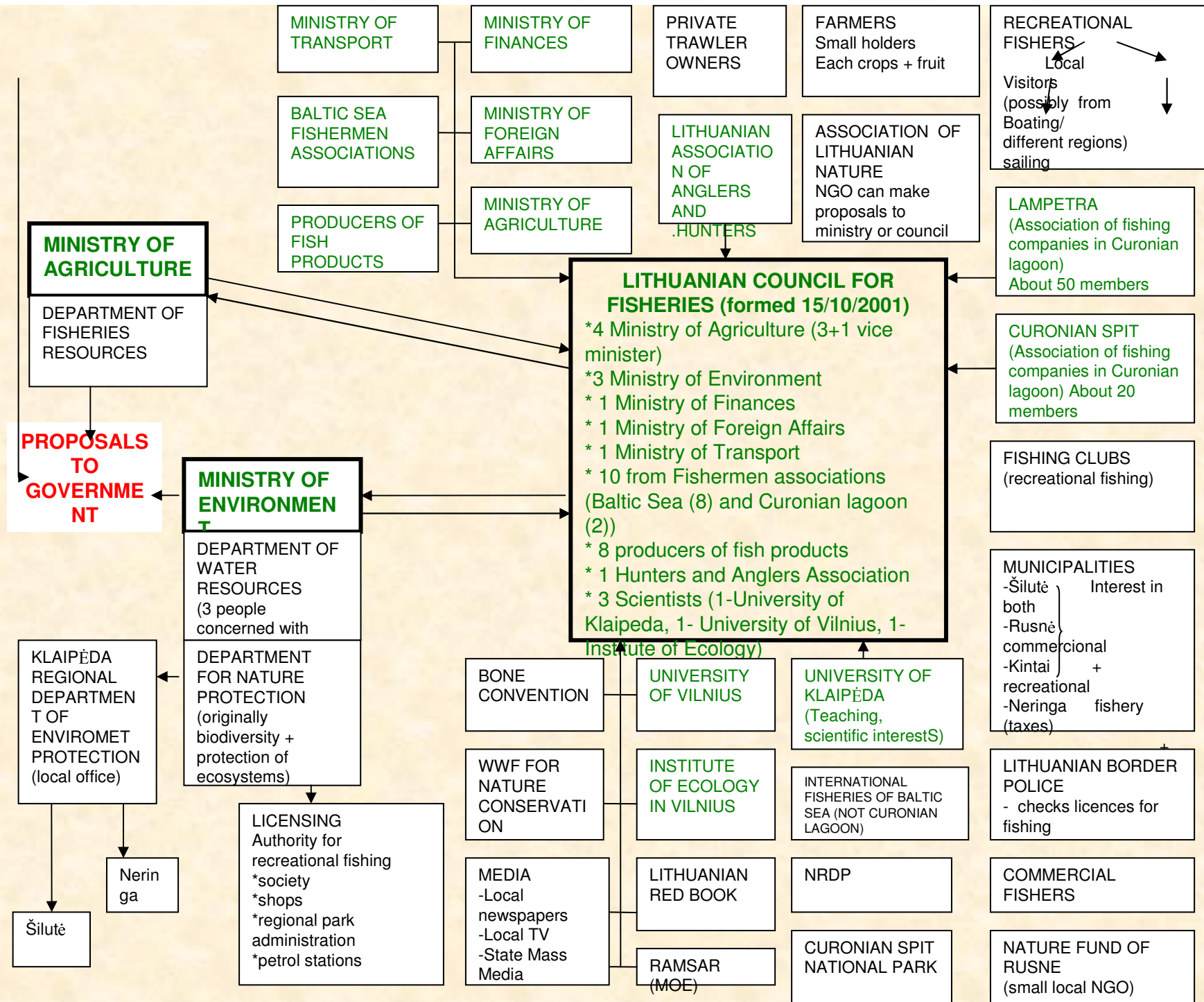
- Not much variation
- Compensations to fishermen
- Spatial variation of dredging activities
- Alternative harbor location



Involved

- Port authority/ministry of transportation
- Stevedoring industry
- Fishermen associations
- Department of fishery, ministry of agriculture
- EPA
- City government
- NGOs







Thanks for your
attention

04 August 2002
Photo by B. Chubarenko