

**Government of the Russian Federation**  
**The Federal State Enterprise “North-West Board of Directors for St**  
**Petersburg Flood Protection Barrier of ROSSTROY”**

**ST. PETERSBURG FLOOD PROTECTION BARRIER**  
**AS A TOOL FOR WATER RESOURCES**  
**MANAGEMENT: FLOOD PROTECTION AND WATER**  
**QUALITY IMPROVEMENT UNDER EXTREME**  
**CONDITIONS**

**Rosa R. Mikhailenko**

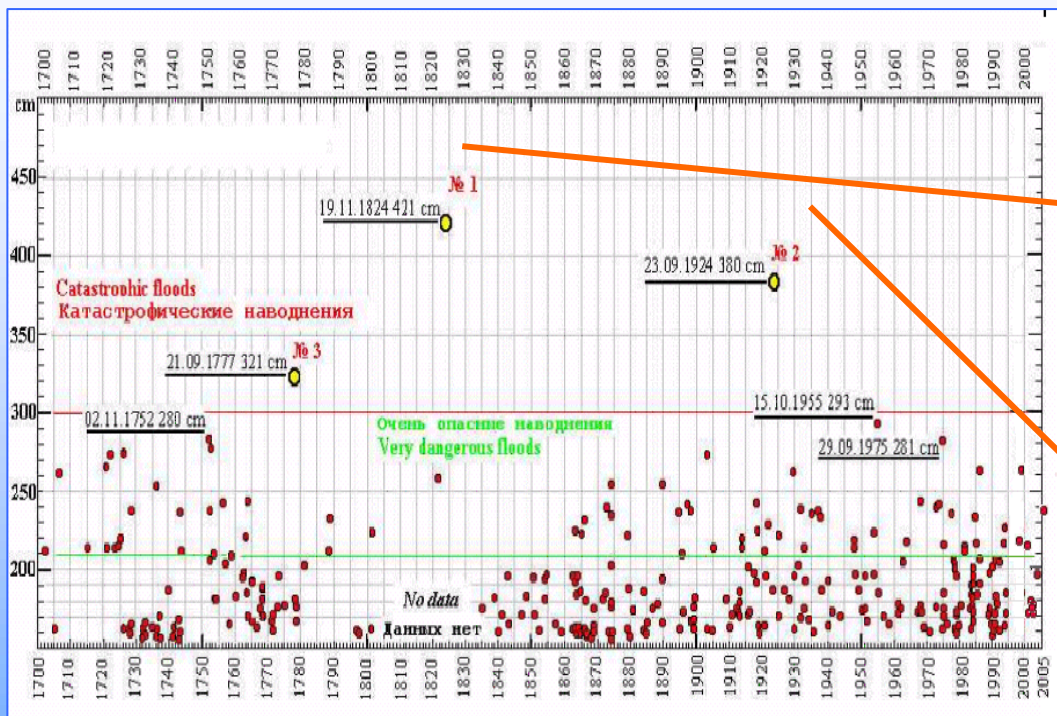
Head of Environmental and Flood Warning System Department The Tel .:+7 921  
3145130, .:+7 921 9693079, e-mail: [rosaecol@online.ru](mailto:rosaecol@online.ru)

## Flooded areas of St. Petersburg



# Catastrophic Floods:

7 (19) November 1824 (421 cm) and  
23 September 1924 (380 cm)



Vasilievskii Isl. Next day after flood.



Broken wooden pavement on Nevskii Pr.



## Water level extrimal rise during floods

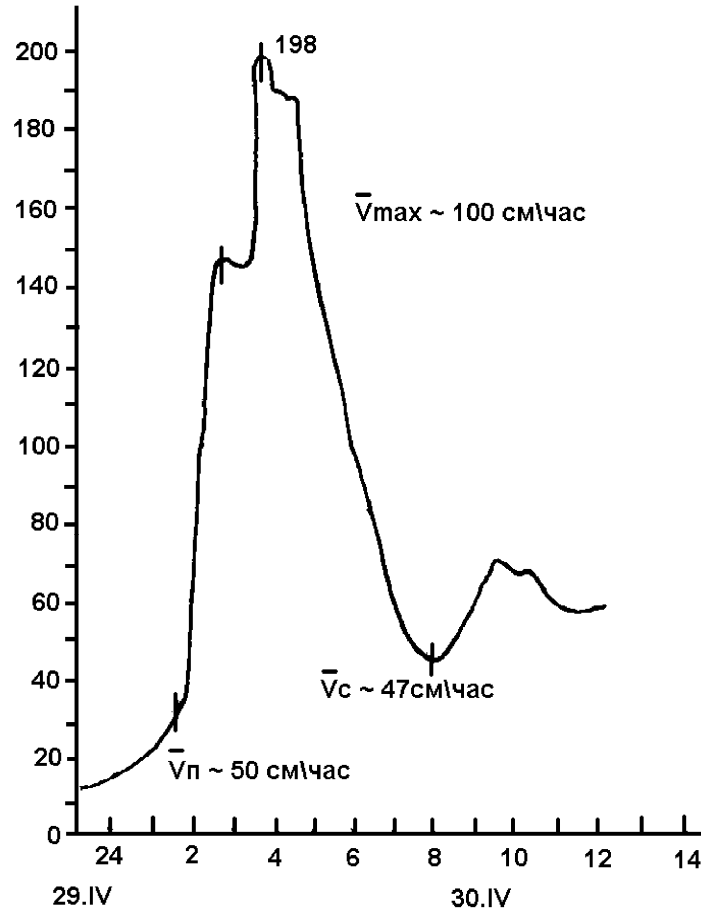
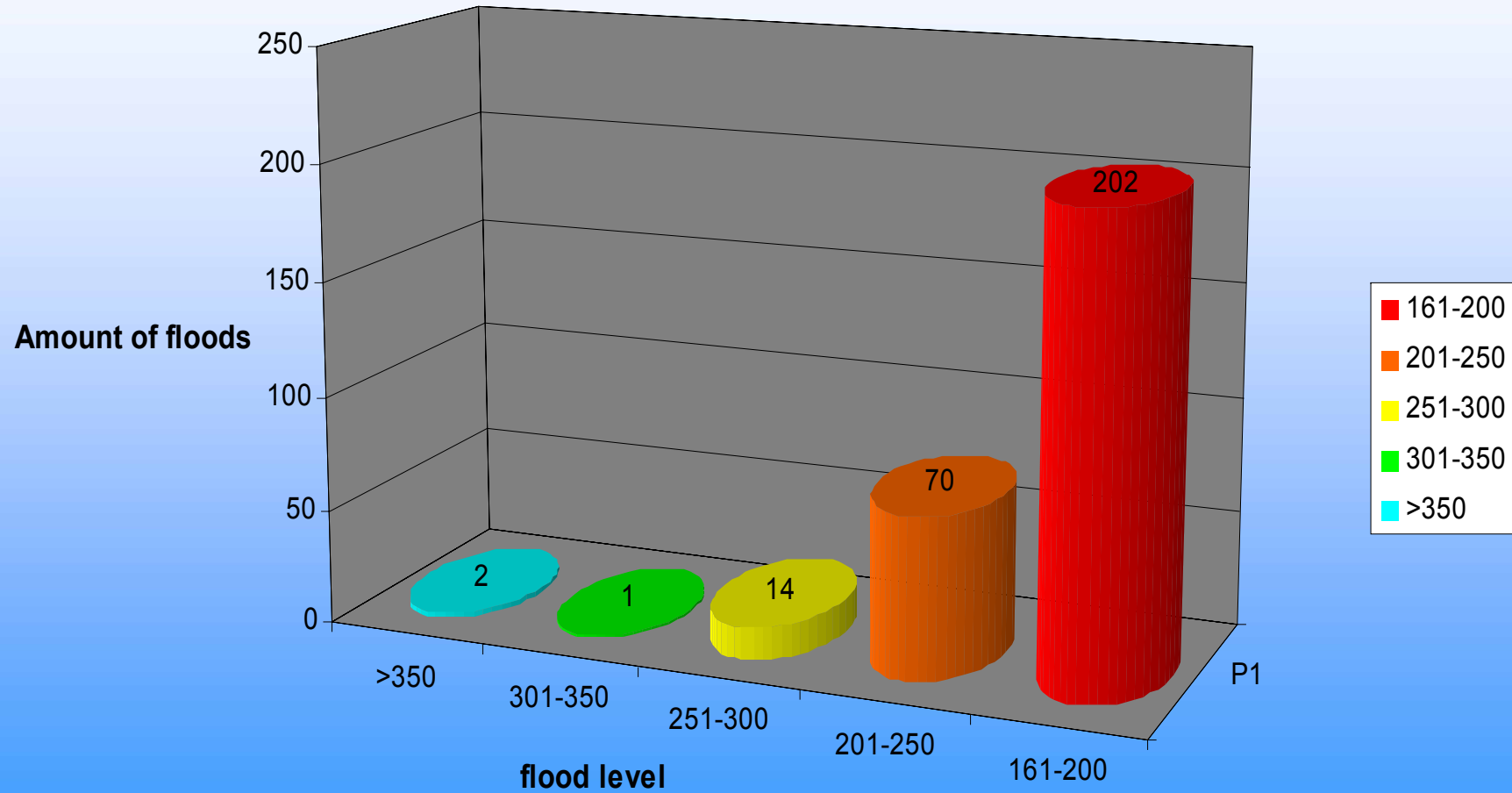


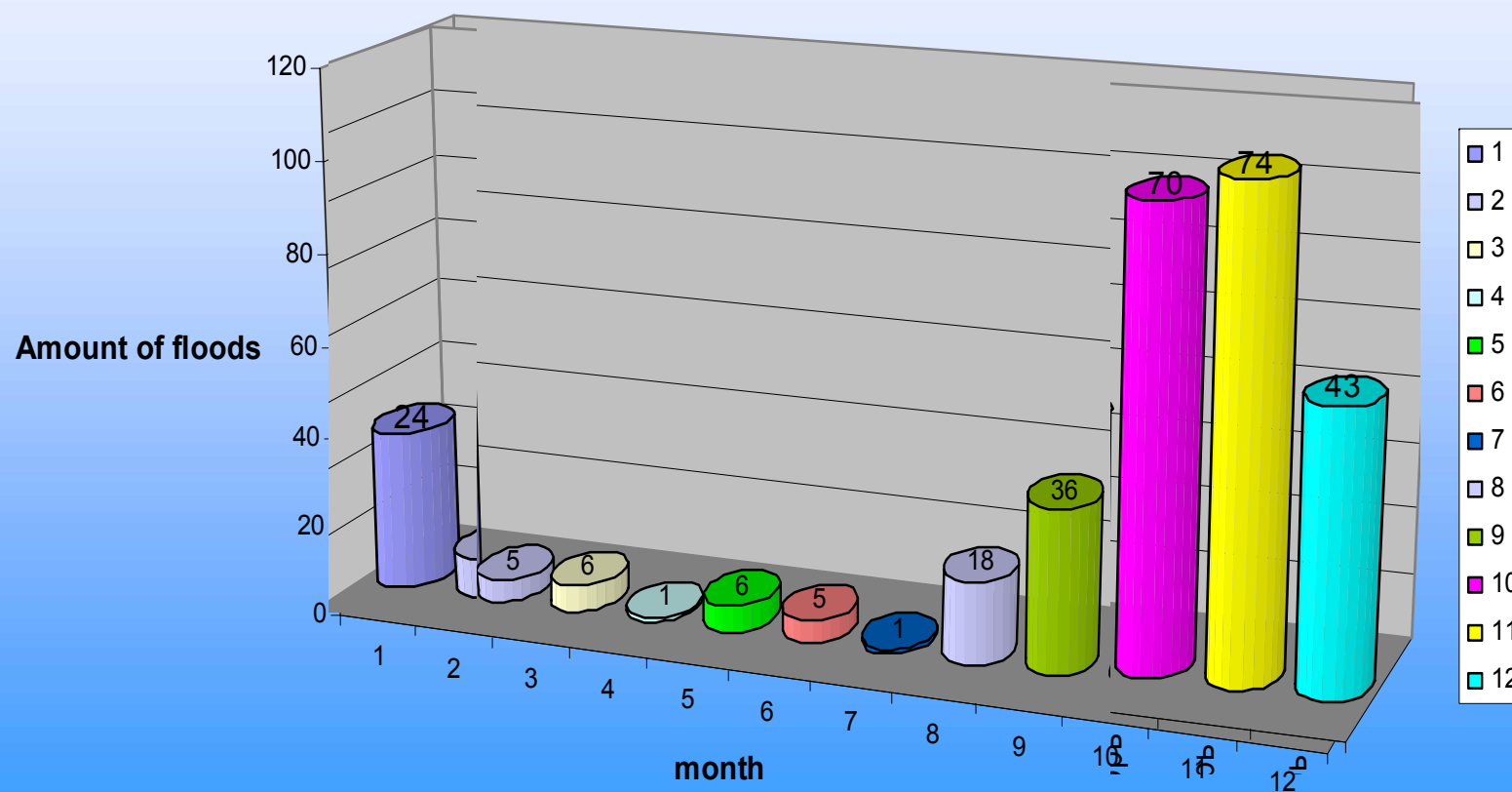
Diagram of water level change during the flood of April 30, 1914 according to Gornyi Institute mark. Average rate of rise is 50 cm/h, maximal 100 cm/h average rate of fall 47 cm/h.

## Diagram of repeatability of floods for different flood water levels



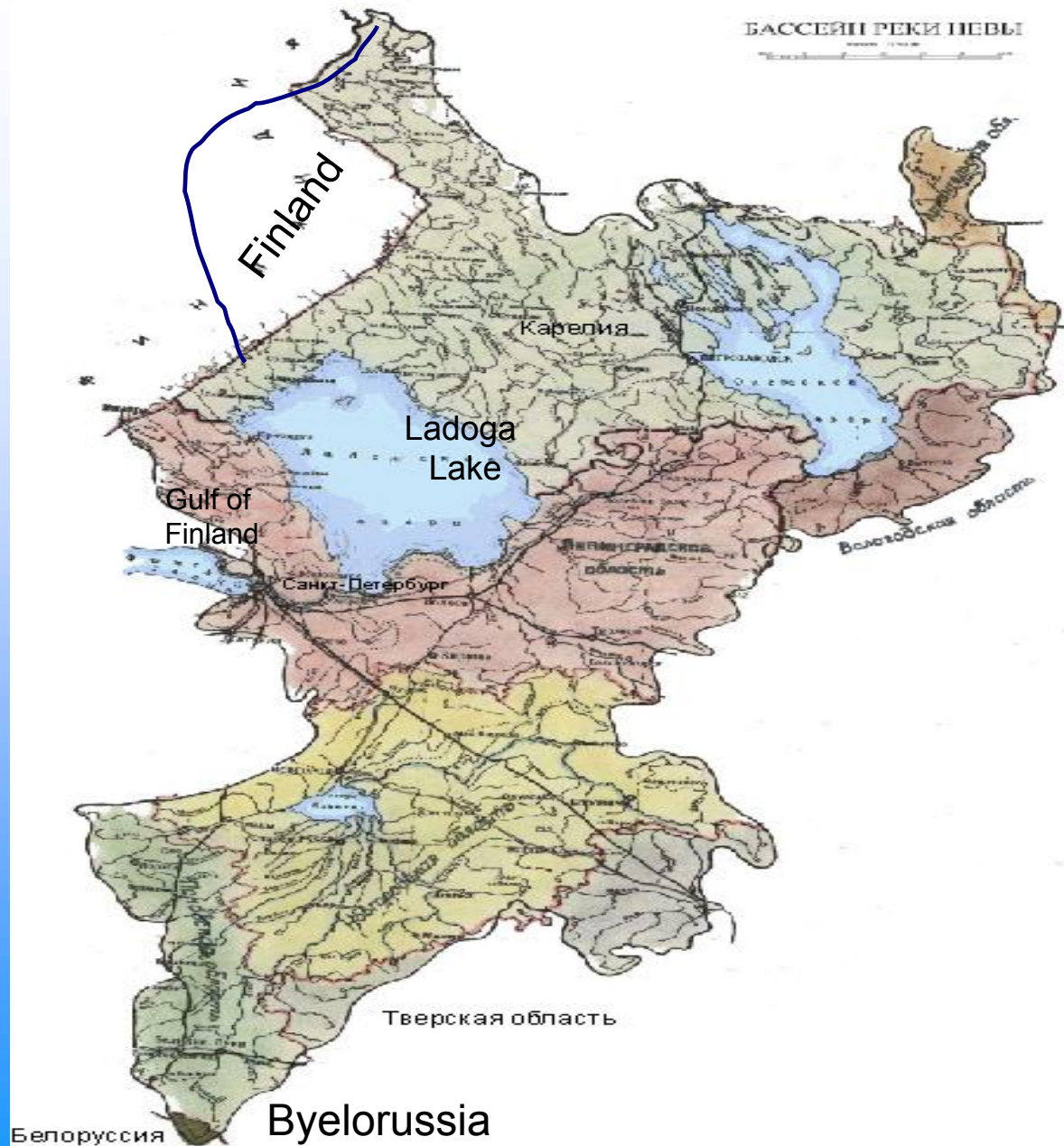
# Diagram of repeatability of floods with breakdown by months

Monthly amount of floods

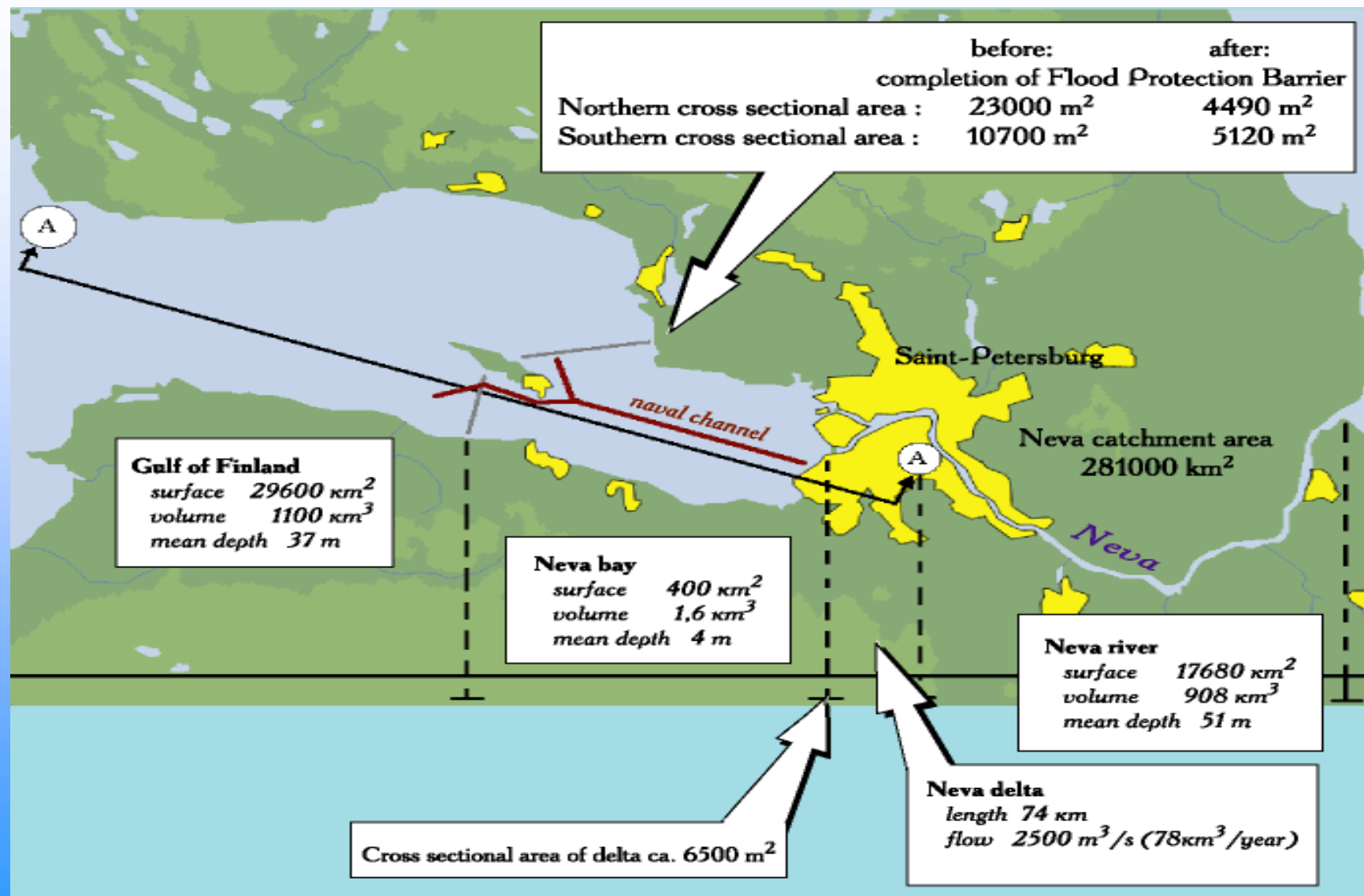




# Catchment area of Neva River

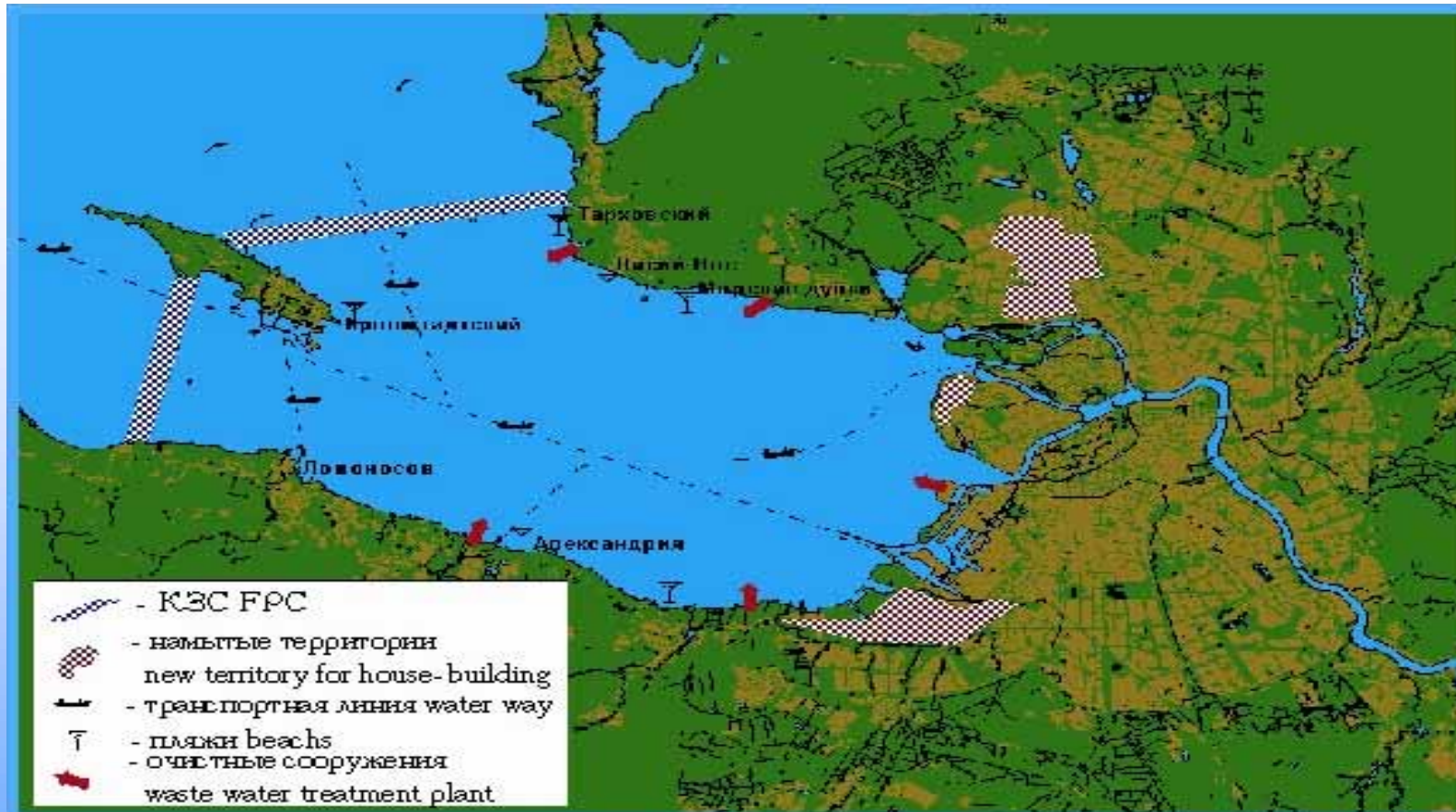


# Area of integrated water management for the Saint-Petersburg region





## Multifunctional using of Neva bay

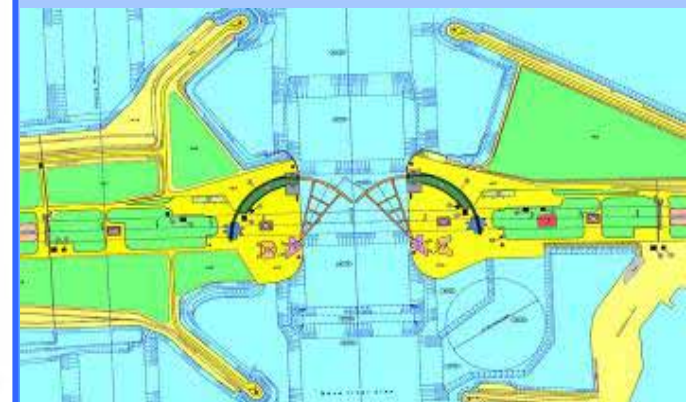
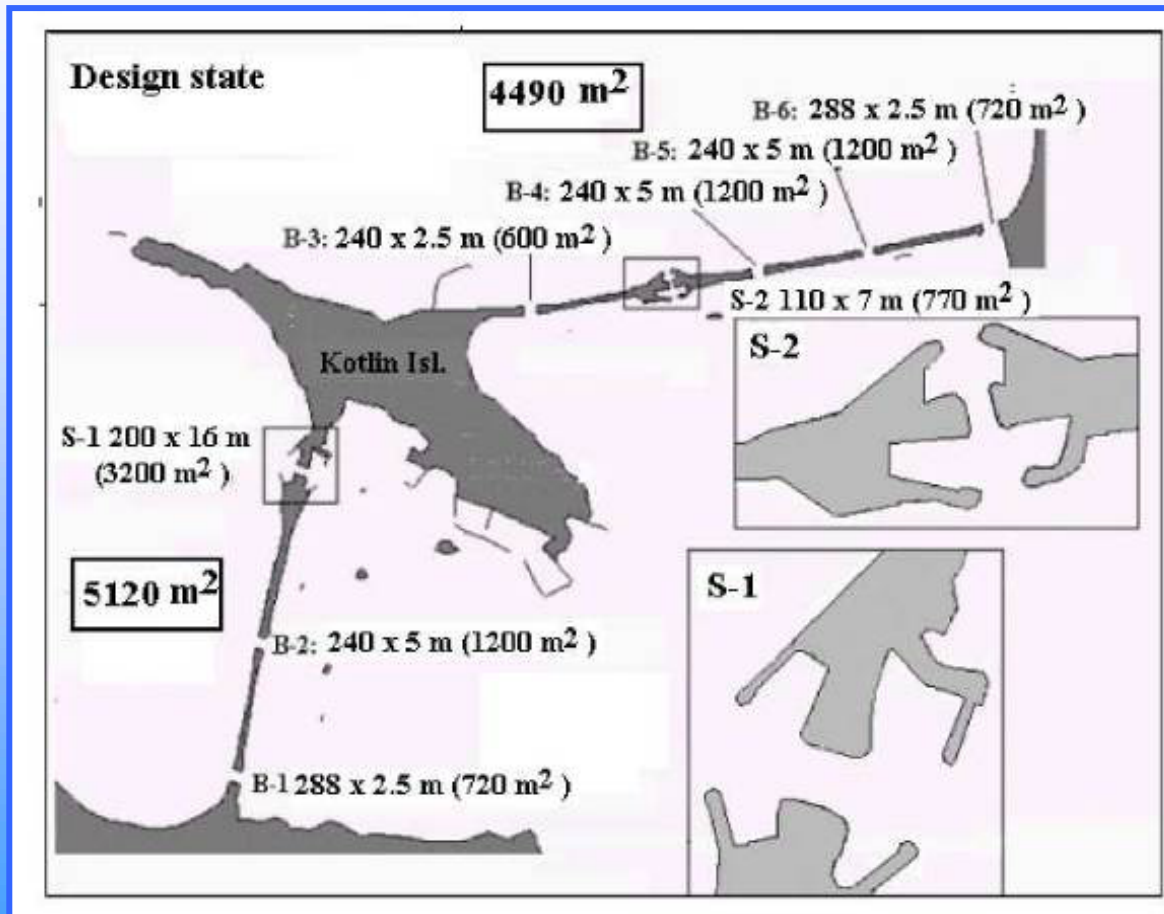


1. Waste water influence
2. Drinking water
3. Commercial and recreation fishing
4. Navigation traffic
5. Along-coast construction of housing and infrastructure
6. Recreation
7. Drainage and sand-extraction
8. Dumping
9. Hydrotechnical construction, rafting
10. Agricultural activity
11. Impact of atmosphere pollution

## History of FPB Construction

- 1979: Start construction
- 1987: Interruption
- 1995-1997 Prefeasibility study for FPB completion by GIBB
- 1990: International Commission
- 2000-2001: Inception Report for FPB completion by NEDECO. Presentation of EBRD.
- 2002: NEDECO feasibility study for FPB completion funded by EBRD
- 2002: EBRD approval of loan for completion of the Barrier Construction
- 2003: Contract for the Detailed Engineering was awarded to the Consortium lead by Halcrow with DHV and Norplan and Lenhydroproject.
- 2004: the Project Management contract was awarded to Geningconsult with Royal Haskoning. First contracts on the sluices.
- 2005: Construction contracts
- 2010: Full completion of the FPB

# Design of Flood Protection Barrier

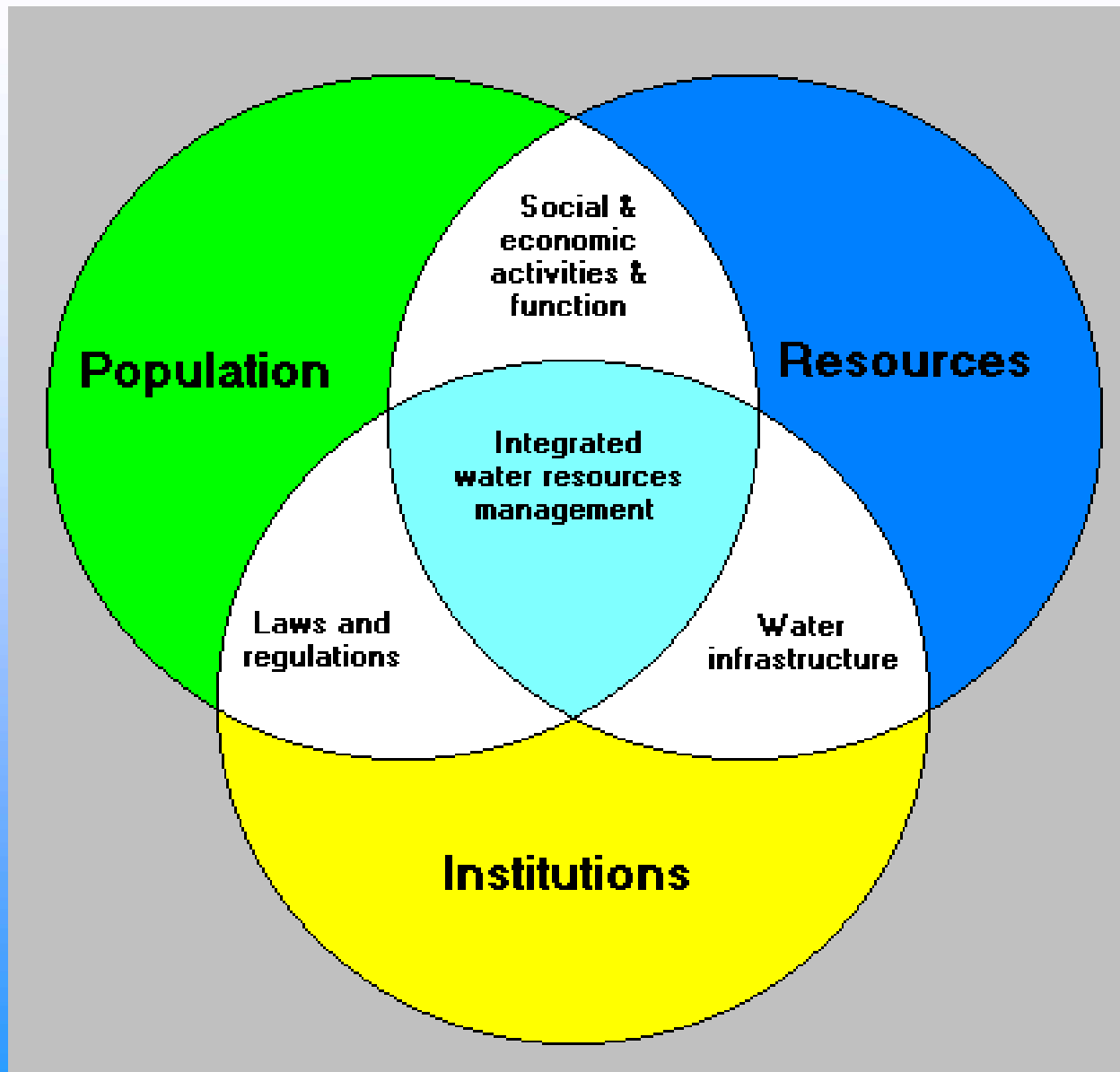




## Watergate B-4



# Integrated water resources management

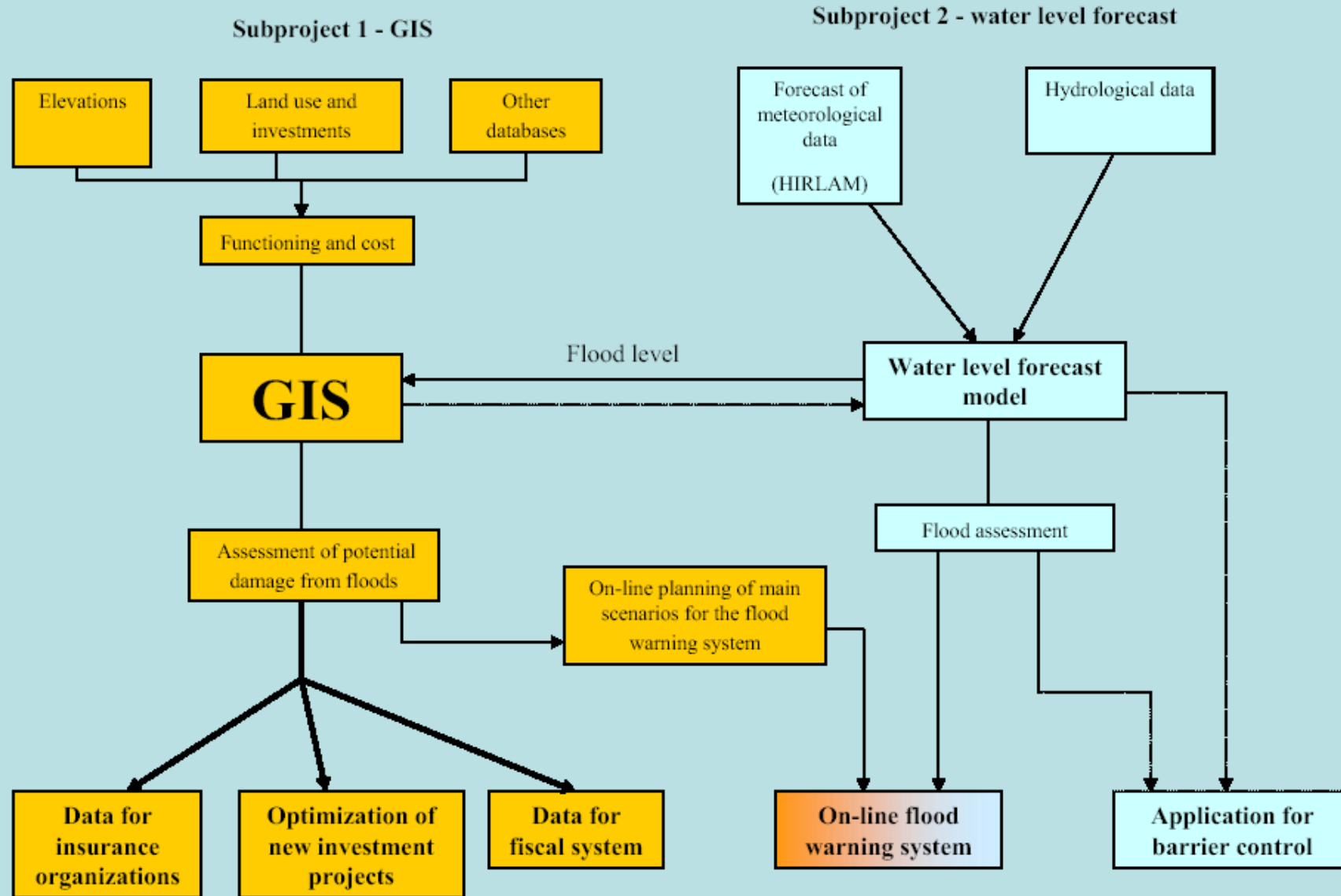




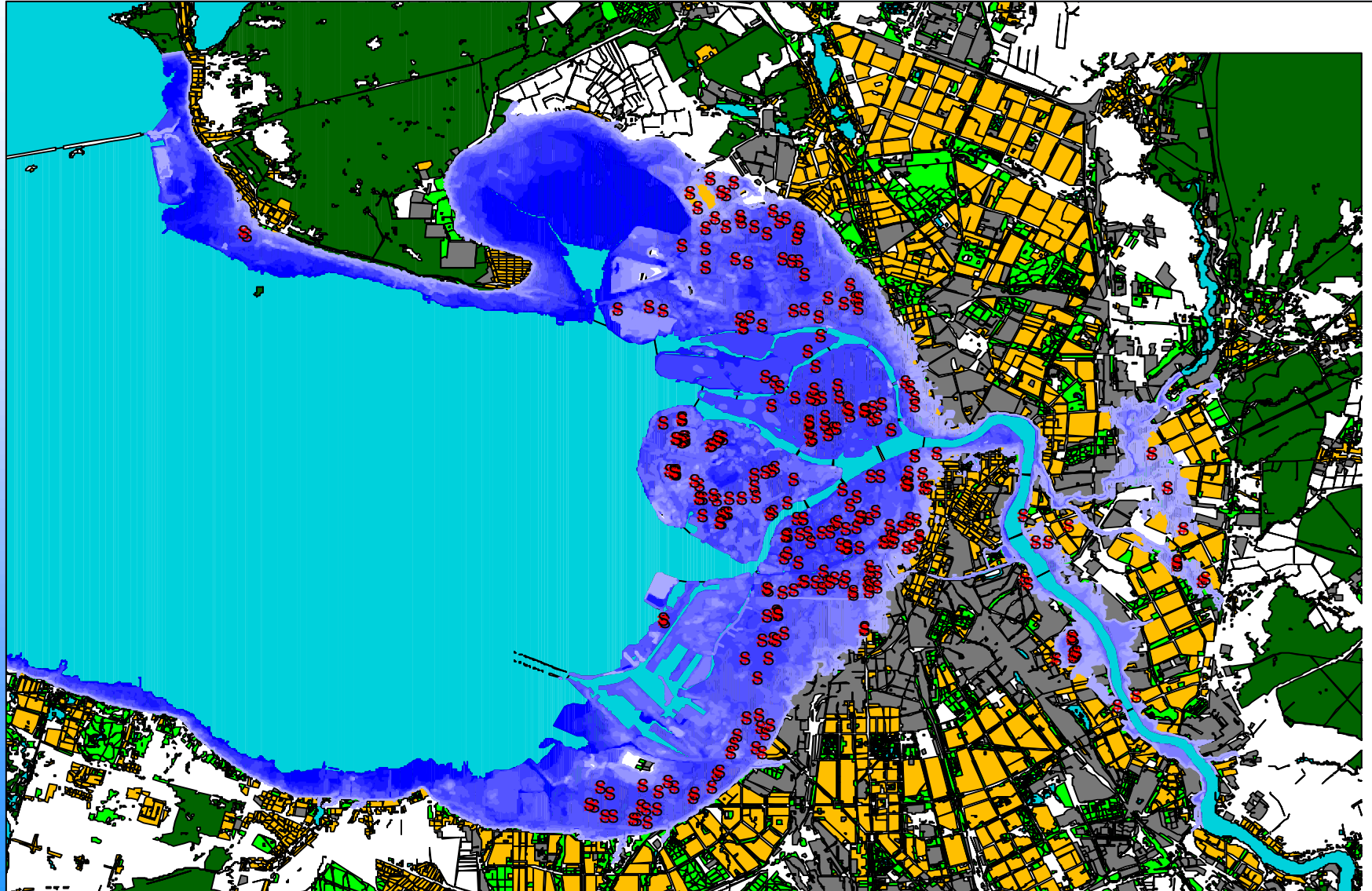
## **Integrated Water Management in St. Petersburg**

- **a system scientific approach of water management, that aims at balancing the various (often conflicting) users of the water systems**
- **needed for sustainable development and rational use of water system**
- **development of other than safety functions of FPB**

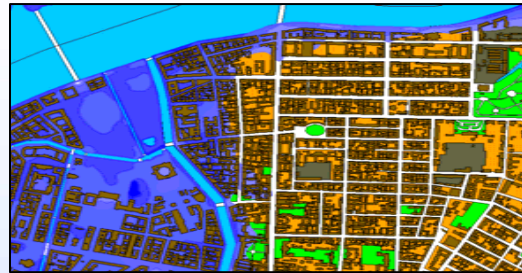
# Flood warning and damage assessment



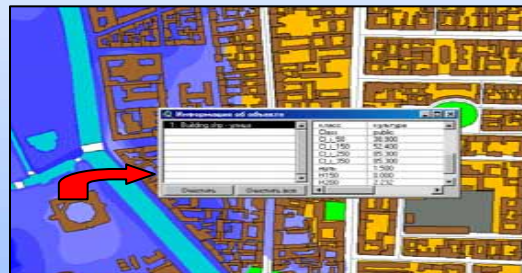
## Colleges and schools within the maximum flooding area



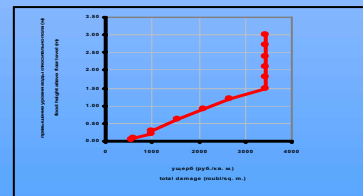
# Algorithm of economic damage calculation in the GIS



Determination of amount of objects within flooded area



Obtaining of information for each object within flooded area



Determination of damage for each object



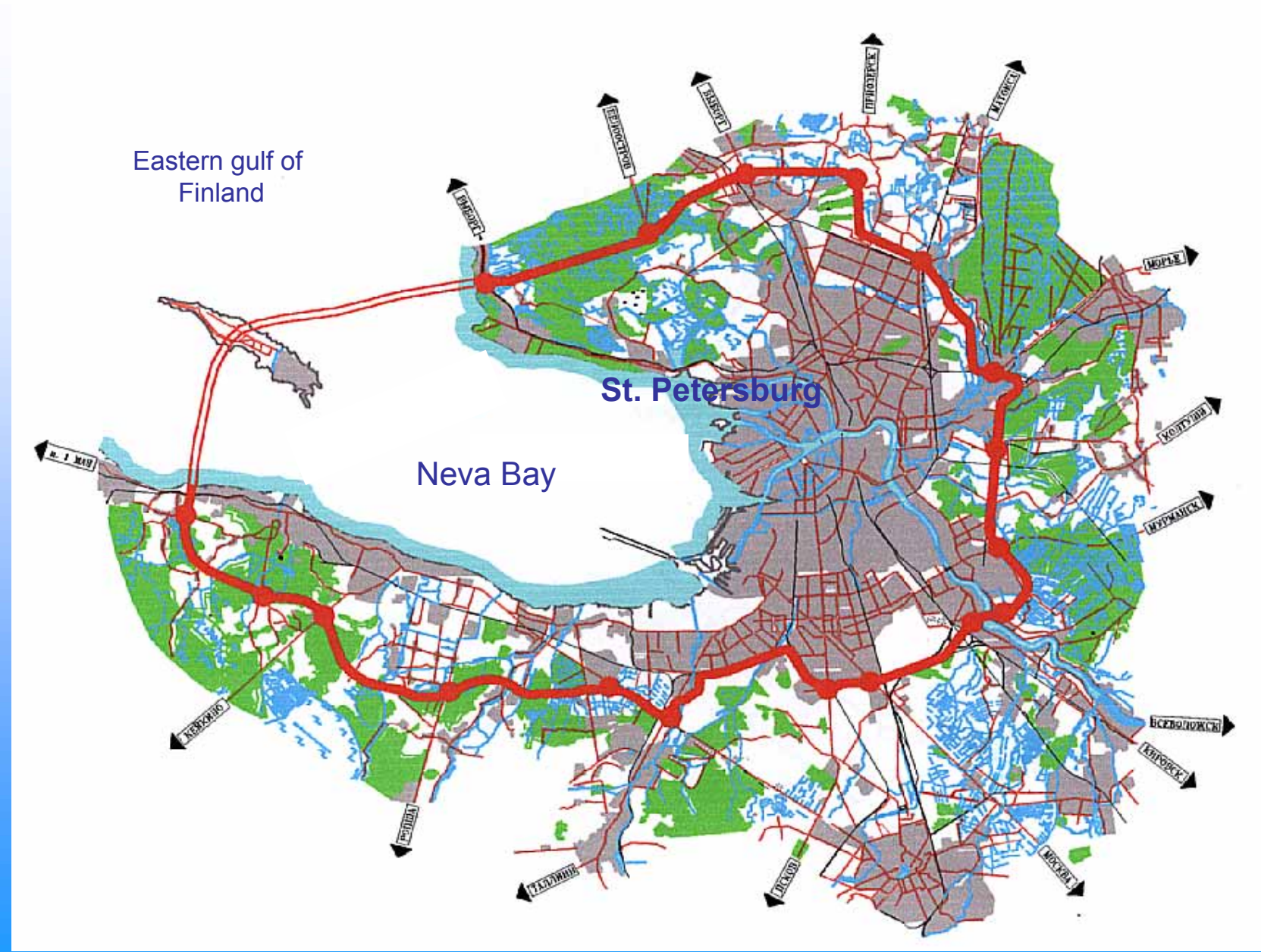
Summing up of damages for each object and creation of report

## **Multifunctional use of the Flood Protection Barrier for St. Petersburg**

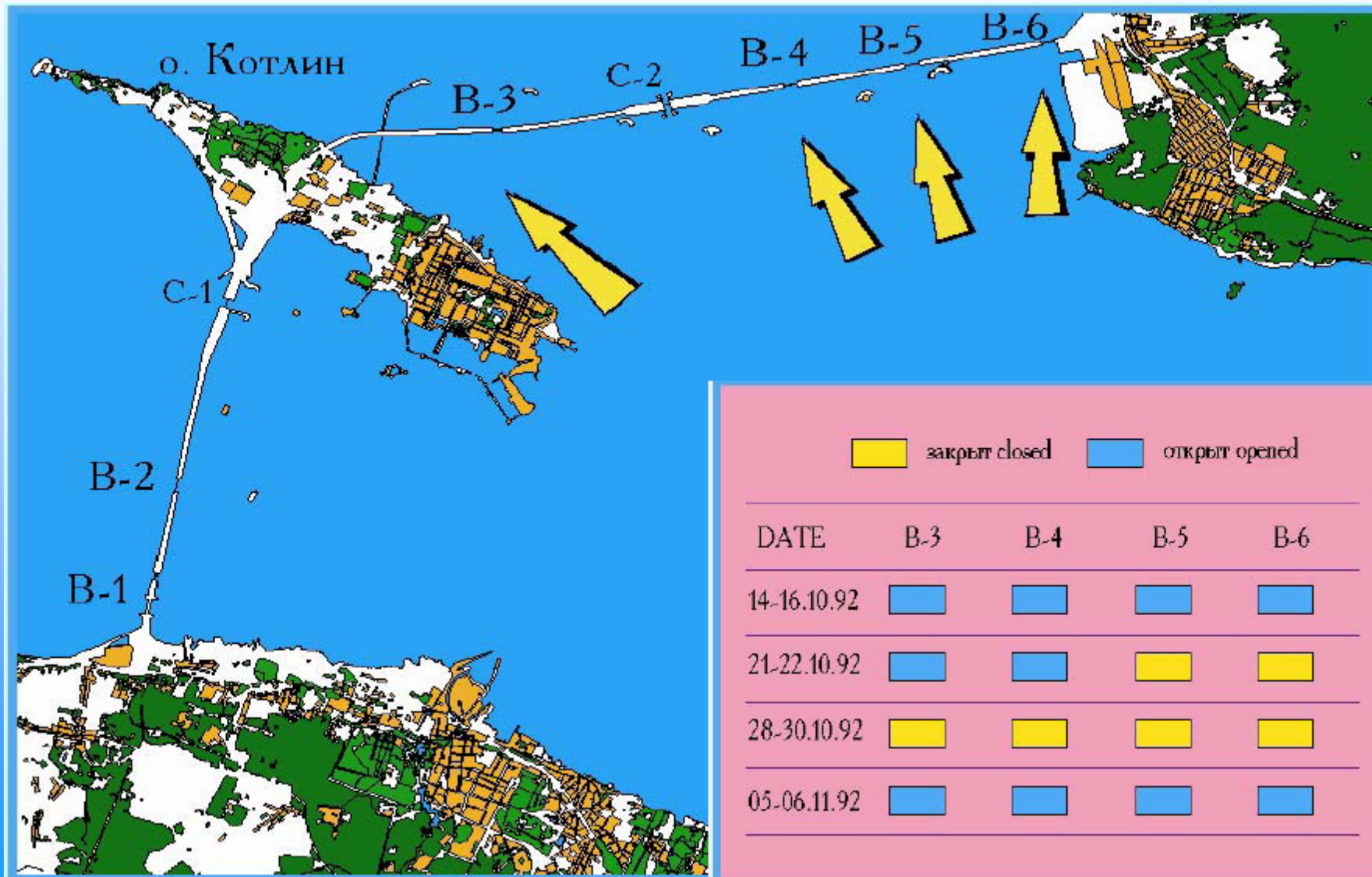
- **Protecting St. Petersburg from floods**
- **Providing St. Petersburg ring road through FPB**
- **Providing management of water flows in the Neva Bay for ecological condition improvement by means of FPB water gates manoeuvring. Minimising pollution damage**
- **Navigation and vessels passage**
- **Recreation, fishing, tourism**



# Ring road around of Saint-Petersburg



# The procedures of the experiment on studying the influence of FPB water gates maneuvering on the ecological condition improvement





# International Network for SSBM

**The Netherlands,**  
RIKZ  
2006

**United Kingdom,**  
EA  
2008

Existing barriers

Coordination for the first stage

Seminars, Workshops, Traineeships/ issues, internet

Coordination for the next stages

2009  
**Russion Federation,**  
MZ

Stage of building the barrier

**Italy,**  
CVN  
2007

**Transfer knowledge and stimulate innovation**

**USA**

**China**

- Barrier Authority, Lenhydroproject
- DHV, Royal Haskoning
- FSE "Vodokanal"
- Sea Administration of the port
- Institute Regeonal Development
- Saint-Petersburg Politechnical University
- Civil Protection Agency and emergency situation

# “Operational management of the St.Petersburg Flood Protection Barrier ” Workshop, 19-20 May 2005



**Participants from Russia,  
the Netherlands, the United  
Kingdom, Italy and Sweden  
decided to create a network  
for Storm Surge Barriers  
managers**



# The Hague, 26 October 2005

## 4<sup>th</sup> session of WATERGROUP

Main conclusions of Protocol:

- Building of International network for Flood Protection Barrier managers
- The Netherlands and St.Petersburg will play an initiating role to build such a network



## Main subjects:

- Experiences with operation of existing barriers in Europe
- Various stakeholders issues
- Flood forecasting; prediction methods, measurements, monitoring
- Legal issues; Flood warning requirements for St. Petersburg



*Thank you for your attention*