

Salmus

Salmonid Fish and Freshwater Pearl Mussel – Riverine Ecosystem
Services and Biodiversity in the
Green Belt of Fennoscandia



Evgeny P. Ieshko

Institute of Biology, Karelian Research Centre RAS, Russia

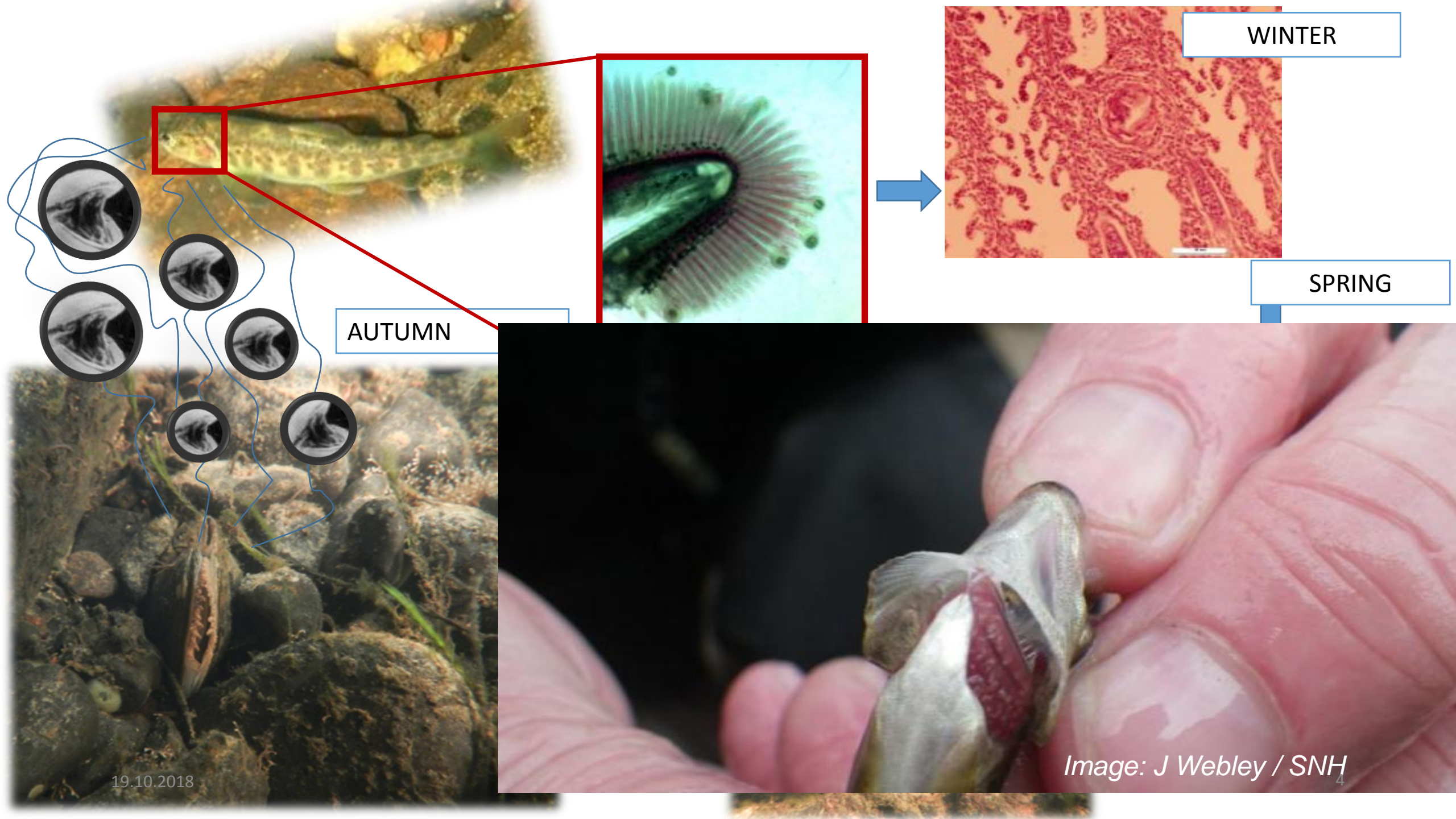
Development of the Green Belt of Fennoscandia: environment, economy, education
October 2-4, 2018



Pearl fishing came to an end in the 1930s

Indispensable part of the life cycle of Freshwater Pearl Mussel is the salmonid host fish (brown trout or Atlantic salmon)





WINTER

AUTUMN

SPRING

19.10.2018

Image: J Webley / SNH

Implementing

- **Lead partner: Metsähallitus, Park and Wildlife Finland**
- Alleco Ltd, Finland
- Natural Resources Institute (LUKE), Finland
- University of Jyväskylä, Finland
- **Biological Institute KRC RAS and State Nature Reserve Kostamukshky, Russia**
- **Institute of Northern Ecological Problems of the North (INEP), Russia**
- County Administrative Board of Norrbotten (CABN), Sweden
- Norwegian Institute for Bioeconomy Research (NIBIO), Norway

Basic facts

- Projects starts 1.1.2019
- Duration 3 years
- Total budget 2 228 880 €
- Program financing 1 869 511 € (83,88%)

Objectives of the project are...

- To enhance cooperation and to streamline common practices for assessing the status of rivers, and especially of freshwater pearl mussel (FPM) and salmonid fish as indicators of ecosystem function and health.
- To improve the knowledge-base on riverine ecosystems in the Green Belt of Fennoscandia (GBF), and provide a common toolkit of best practices and methodology for assessment of riverine ecosystem health.
- To raise people's awareness of riverine ecosystems and their socio-economic influence in the GBF, and thus improve the status and attractiveness of the cross-border watersheds.

WP 1 Development of the cross-border cooperation and methodology

- Project administration
- Steering group
- Knowledge exchange
- Joint workshop for **harmonizing the methodology and data collection**

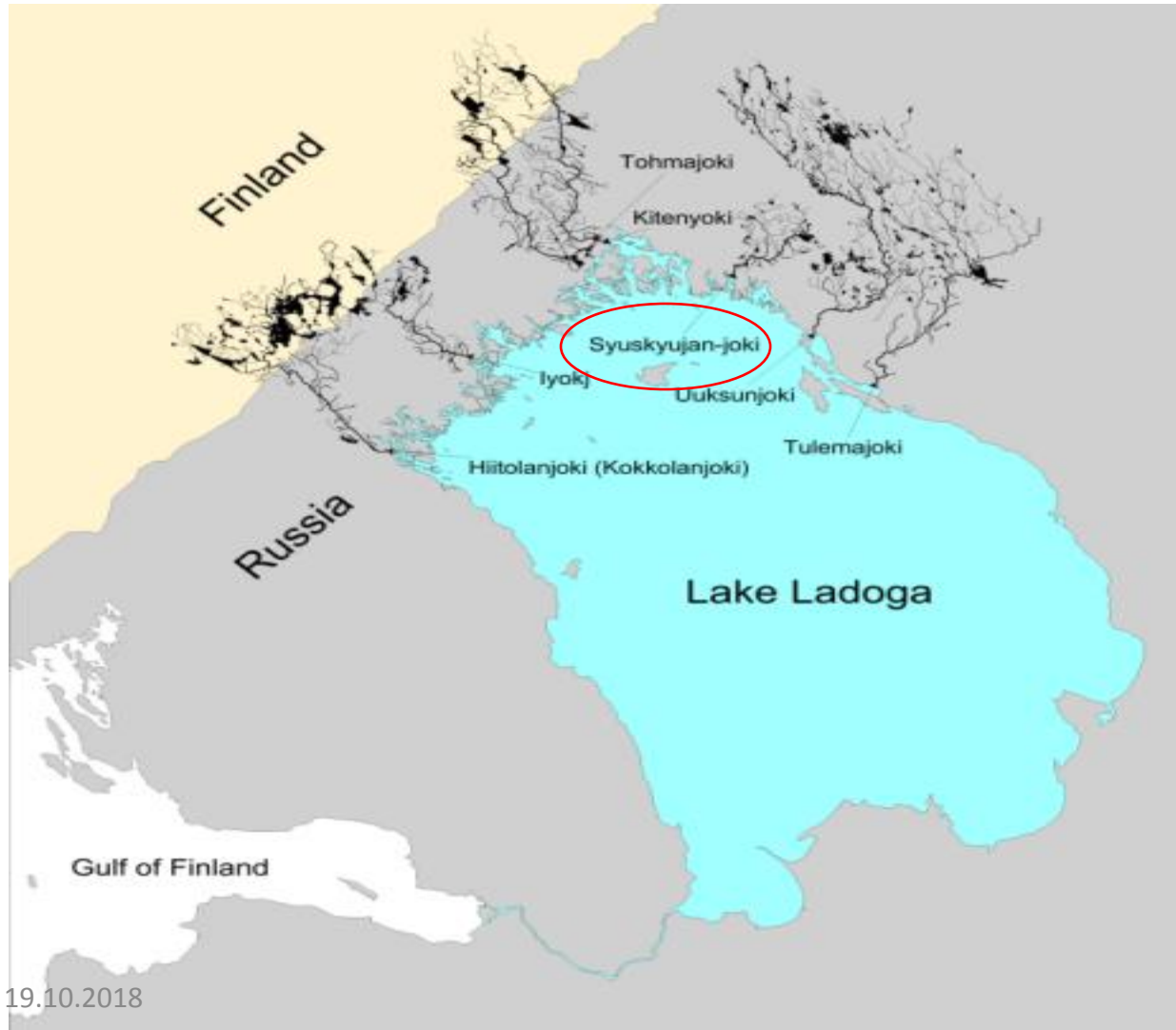
WP2. Improvement of the knowledge-base (baseline studies)

- Mapping of unknown FPM and salmonid populations (novel techniques: eDNA)
- Assessment of the **state of FPM and salmonid populations**
- Determining the river specific **age structure and growth curve** for FPM
- Evaluation of the **genetic diversity of FPM and salmonid fish populations**
- Assessment of the **reproductive capacity and host fish specificity of FPM in different rivers**
- Evaluation of **biochemical responses of FPM and their host fish for the climate change** and other changes in the environment
- **Water and sediment analyses**
- **Analyses of heavy metals and toxic substances from mussels**
- **Assessment of the anthropogenic impacts and threats in the river channel and catchment area**
- **Evaluating the distribution of salmonid parasite *Gyrodactylus salaris* in the target rivers (rainbow trout fish farms)**
- Assessment of ecosystem services provided by FPM and salmonid fish and their links to biodiversity and blue bioeconomy in the GBF area

WP 3. Development of novel techniques and practices for restoring populations

- Development and testing of *captive breeding* methods for FPM
- Development of novel techniques to improve the habitat quality for juvenile mussels
- Feasibility study to find a facility and funding mechanisms for FPM breeding station
- Assessing and testing the best practices *to restore the host fish population* in River Lutto, Tuloma catchment upper parts

North Ladoga region



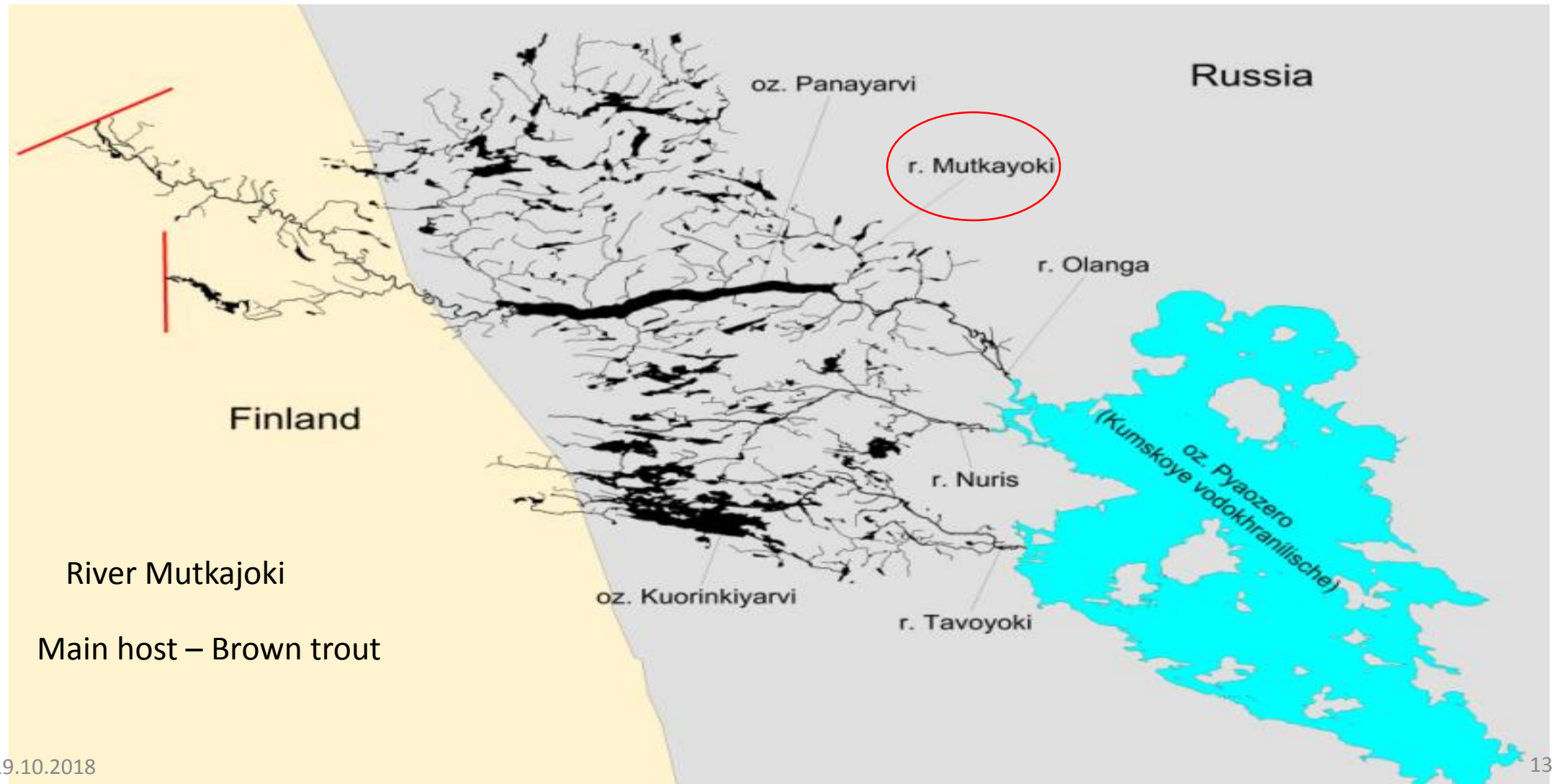
River Syskyanjoki

Atlantic salmon
Brown trout

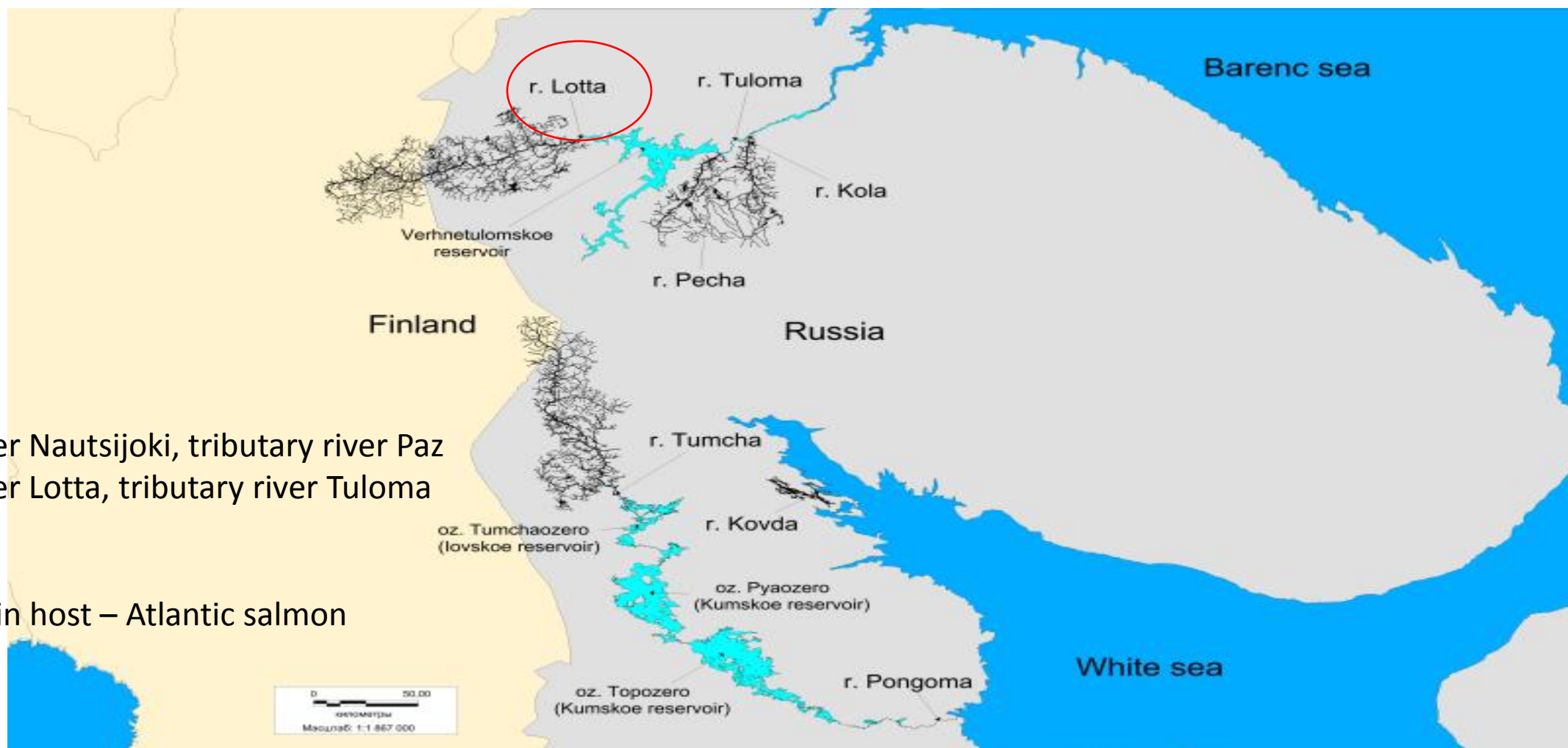
Kostomukha & Kalevala area



Paanajrvi



Kola peninsula region

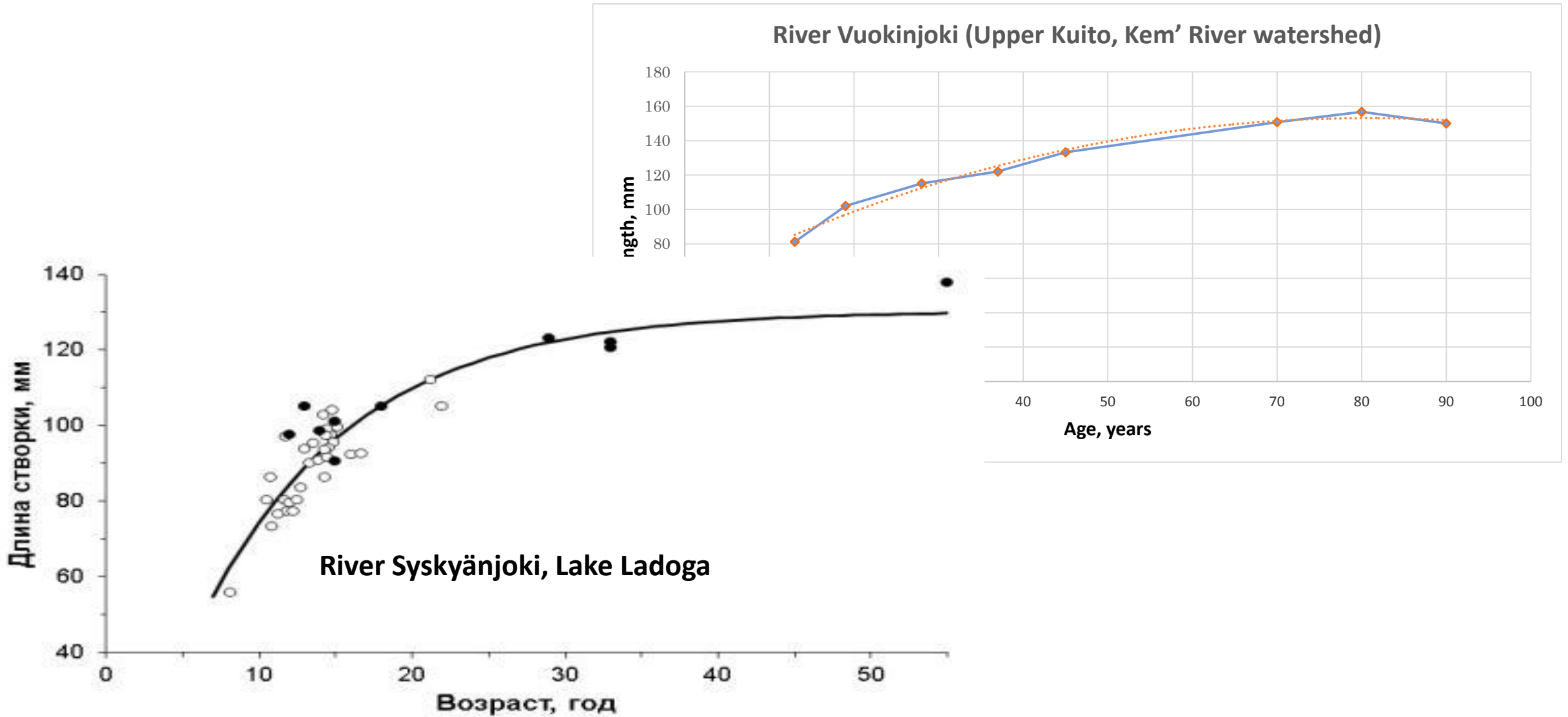


River Nautsijoki, tributary river Paz
River Lotta, tributary river Tuloma

Main host – Atlantic salmon



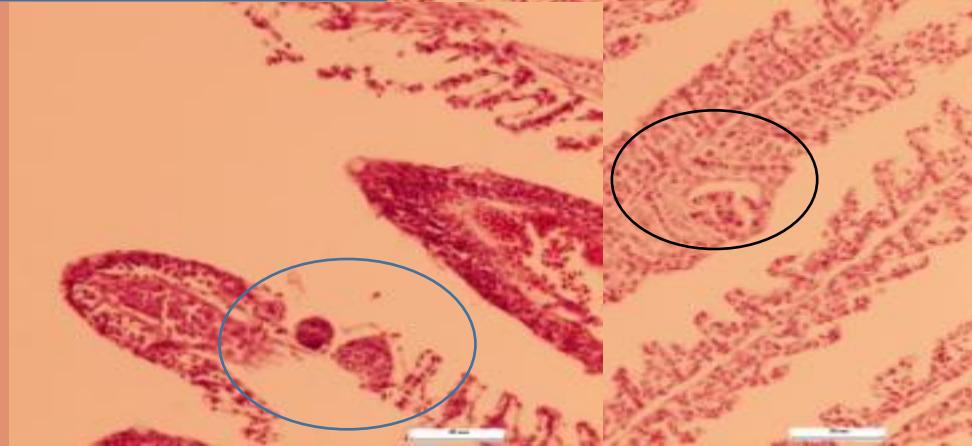
AGE STRUCTURE IN SOME PEARL MUSSEL COLONIES



AUTUMN, OCTOBER

t WATER = 5.6⁰C

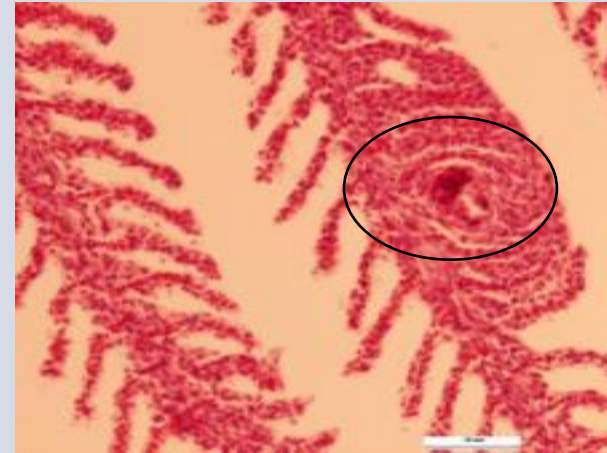
SIZE, MEAN = 70 mkm



WINTER, DECEMBER

t WATER = 0.2⁰C

SIZE, MEAN = 77 mkm



SPRING, MAY

t WATER = 8.4⁰C

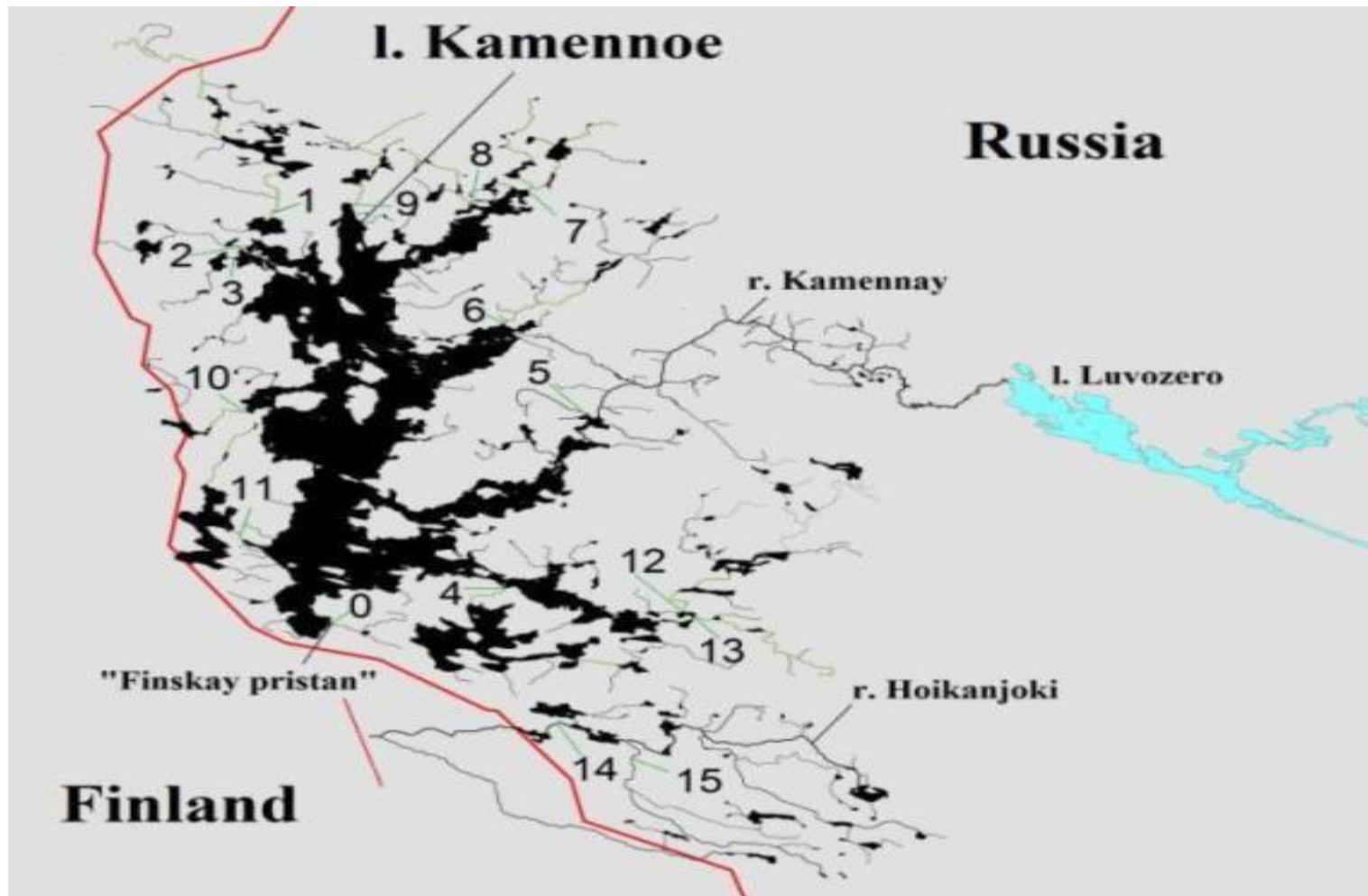
SIZE, MEAN = 135 mkm



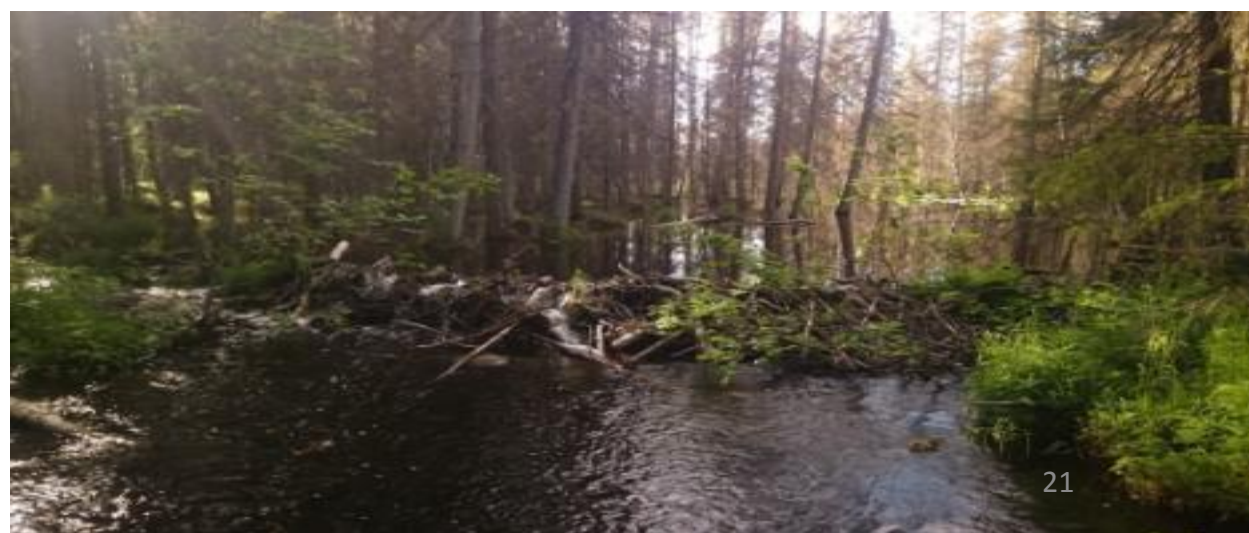
Anthropogenic impact

- Loss of habitat for salmonids and pearls as a result of the resettlement of the Canadian beaver
- The development of rainbow trout aquaculture leads to the spread of *Gyrodactylus salaris* - dangerous parasites of Atlantic salmon

Lake Kamennoe and Salmon spawning tributaries



Dams of Canadian Beavers destroyed the spawning growing place for Atlantic salmon and Brown trout



Rainbow trout freshwater aquaculture



Gyrodactylus salaris
common parasite in rainbow
trout farm



Thank you for attention

