



Population and habitat conservation of Danube salmon (*Hucho hucho*) in The Sava River (Danube catchment) - Slovenian case -

Dr. Daša Zabrc

Fisheries Research Institute of Slovenia
Sp. Gameljne 61a, 1211 Ljubljana-Šmartno
SLOVENIA

[tel:+386\(0\)12443413](tel:+386(0)12443413), e-mail: dasa.zabrc@zzrs.si



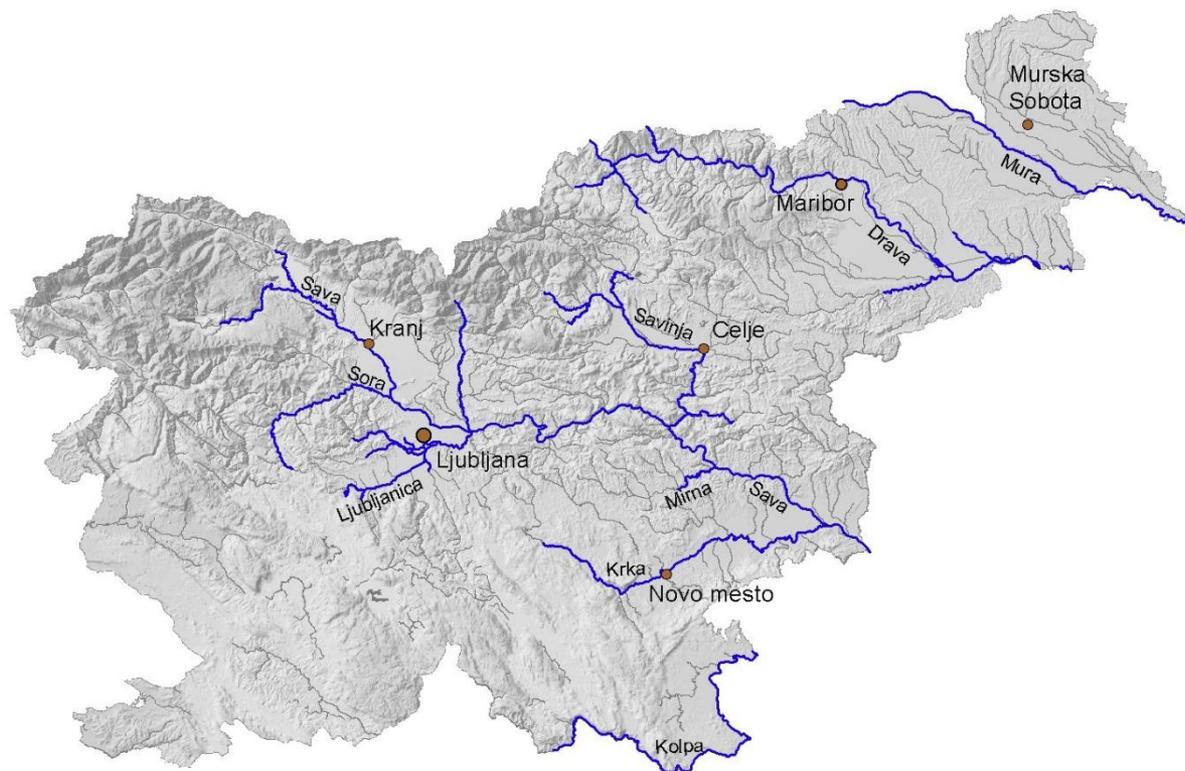
Distribution of Danube salmon

Danube salmon is native only in the Danube catchment, where it has a very fragmented distribution. Population in Slovenia represents an important fragment.



The IUCN Red List of Threatened Species. Version 2015-4. <www.iucnredlist.org>. Downloaded on 17 March 2016.

Historical distribution of Danube salmon

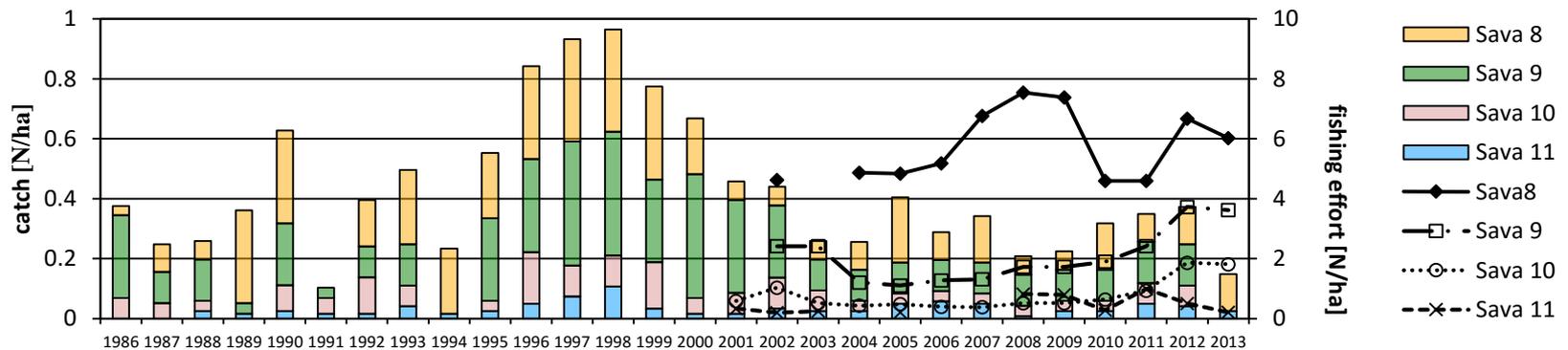


Munda, A. 1926. Ribe v slovenskih vodah. Slovensko ribarsko društvo, Ljubljana, s.14

Franke 1892. Die Gewässer in Krain und ihre nutzbare Fauna, Erläuterung zur Fischerkarte von Krain

Recognition of the middle Sava as a core area for Danube salmon population

Important milestone: 2008 –The population of Danube salmon in the middle Sava was recognized as the largest and the most vital in Slovenia (Zabrc, 2008).

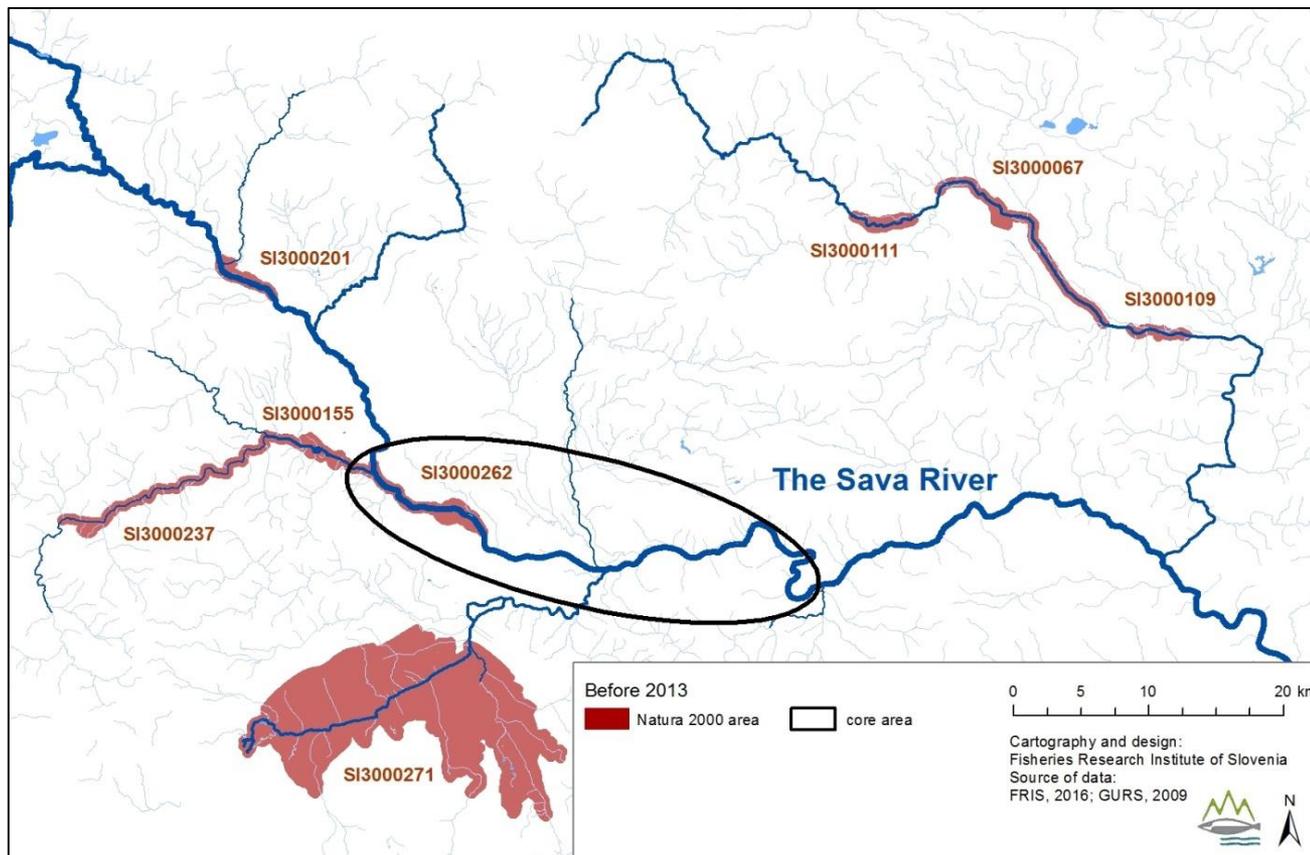


The middle Sava in Slovenia was recognized as one of the largest and the most important river stretches for Danube salmon in The Balkan region that is considered to hold long-term viable gene pool for the species (Freyhof et al., 2015).

Freyhof, J., S. Weiss, A. Adrović, M. Čaleta, A. Duplić, B. Hrašovec, B. Kalamujić, Z. Marčić, D. Milošević, M. Mrakovčić, D. Mrdak, M. Piria, U. Schwarz, P. Simonović, S. Šljuka, T. Tomljanović, & D. Zabrc. 2015. The Huchen Hucho hucho in the Balkan region: Distribution and future impacts by hydropower development. RiverWatch & EuroNatur, 30 pp.

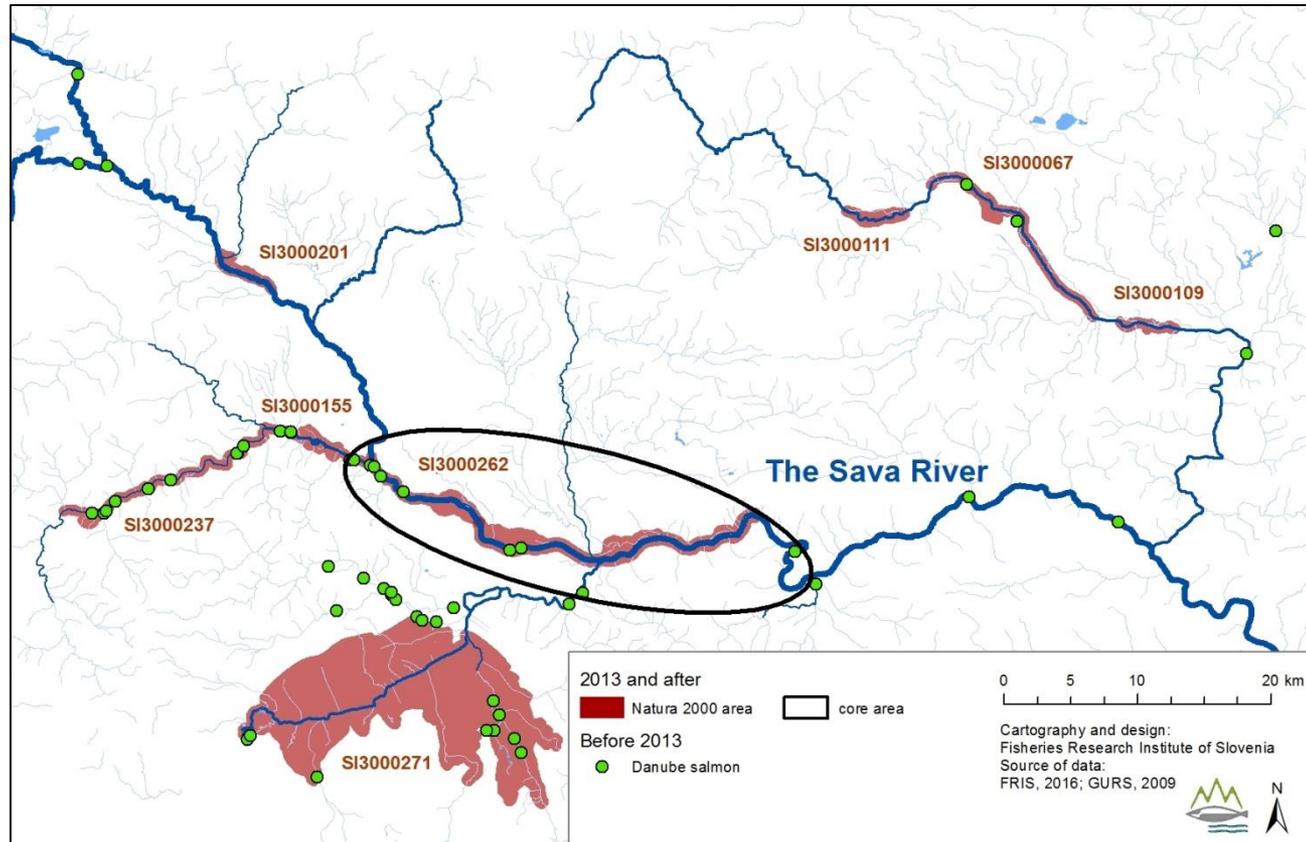
Zabrc, D. 2008. Stanje in varstvo sulca v Sloveniji. Zavod za ribištvo Slovenije, 70 p.

Nature 2000 areas for Danube salmon before 2013



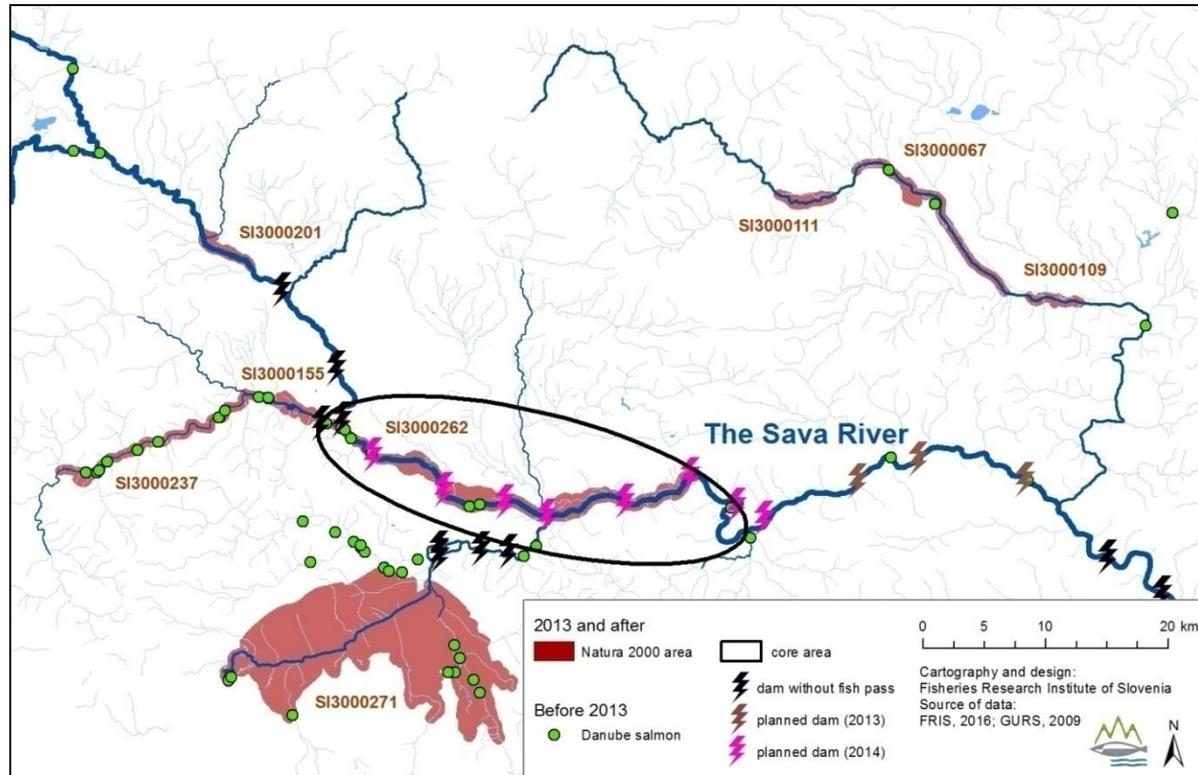
The core area for the population of Danube salmon in The middle Sava is 46.176 m long. Only its short stretch was in the Nature 2000 area before 2013.

Nature 2000 areas for Danube salmon after 2013



Important milestone: 2013 – „Sava – Medvode – Kresnice“ Nature 2000 area was enlarged. It now covers almost the whole stretch of the core area.

The new hydropower scheme for the middle Sava

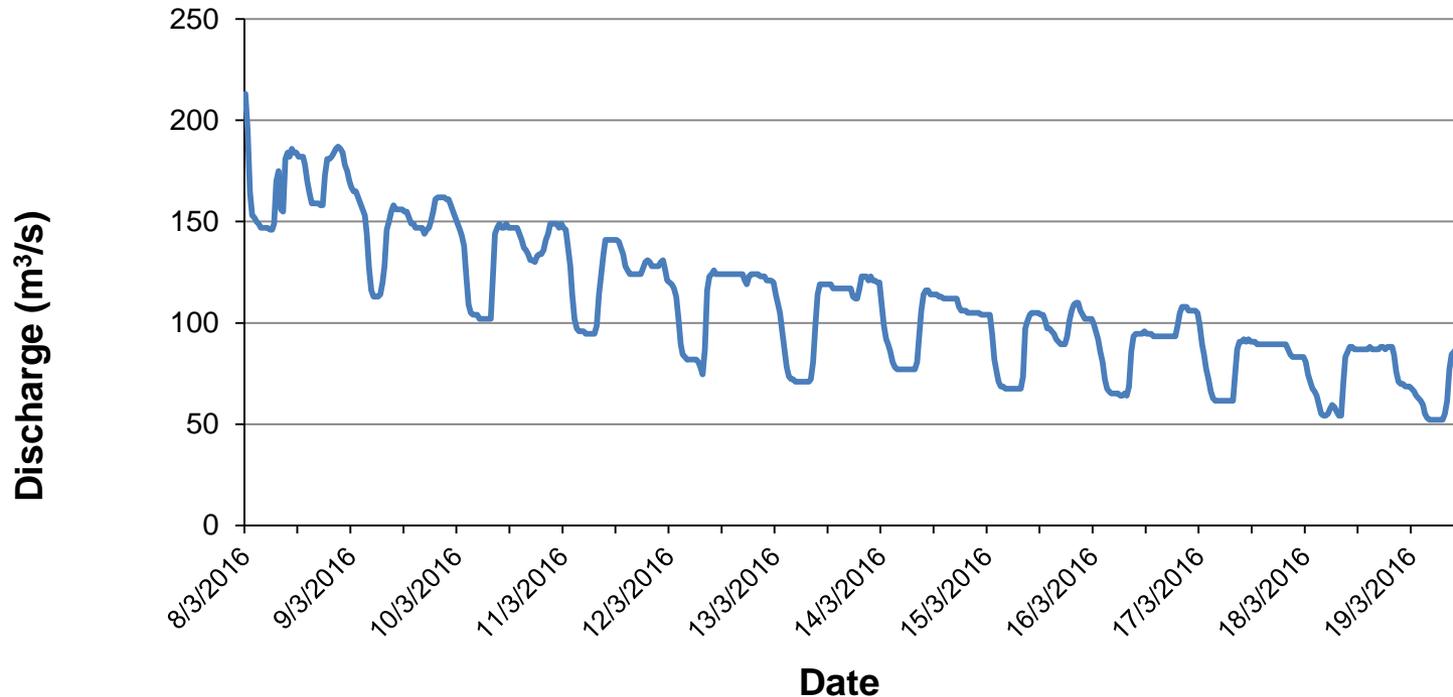


Important milestones:

2013 – National spatial plan for building three HPPs on the middle Sava was approved.

2014 – The initiative for National spatial plan for building a chain of another 8 HPP in the core area of the middle Sava started.

The impact of the existing HPP on the core area for Danube salmon



The dams and weirs are not equipped with fish passages. Migration is stopped. Dams cause sediment reduction which leads to the erosion of the river bed. Hydropeaking and reservoir flushing eliminates invertebrate fauna and the spawning grounds.

The impact of the possibly built chain of HPP on the core area for Danube salmon

- The habitats for Danube salmon to complete the life cycle would be destroyed at the dams and on the stretches influenced by the reservoirs.
- A reservoir is not a habitat of rheophilic fish species (species that need river conditions) such as Danube salmon and many others (also prey for Danube salmon). This species are eliminated or severely reduced.
- Invertebrate fauna (fish food) in the reservoir is massively reduced.

Research programme

2014 – a target research programme „Elaboration of expertise for habitat and population conservation of Danube salmon (*Hucho hucho*) in the middle Sava river” started, financed by Slovenian Research Agency and Ministry of agriculture, forestry and food.

The aim of the project is to gather more information on Danube salmon population in the middle Sava and thus to provide a scientific base for complete protection of the species.

Sampling of Danube salmon

Sampling methods

Angling

Sport fishing

Fishing with electricity by boat

Fishing with electricity by wading

Information gathered

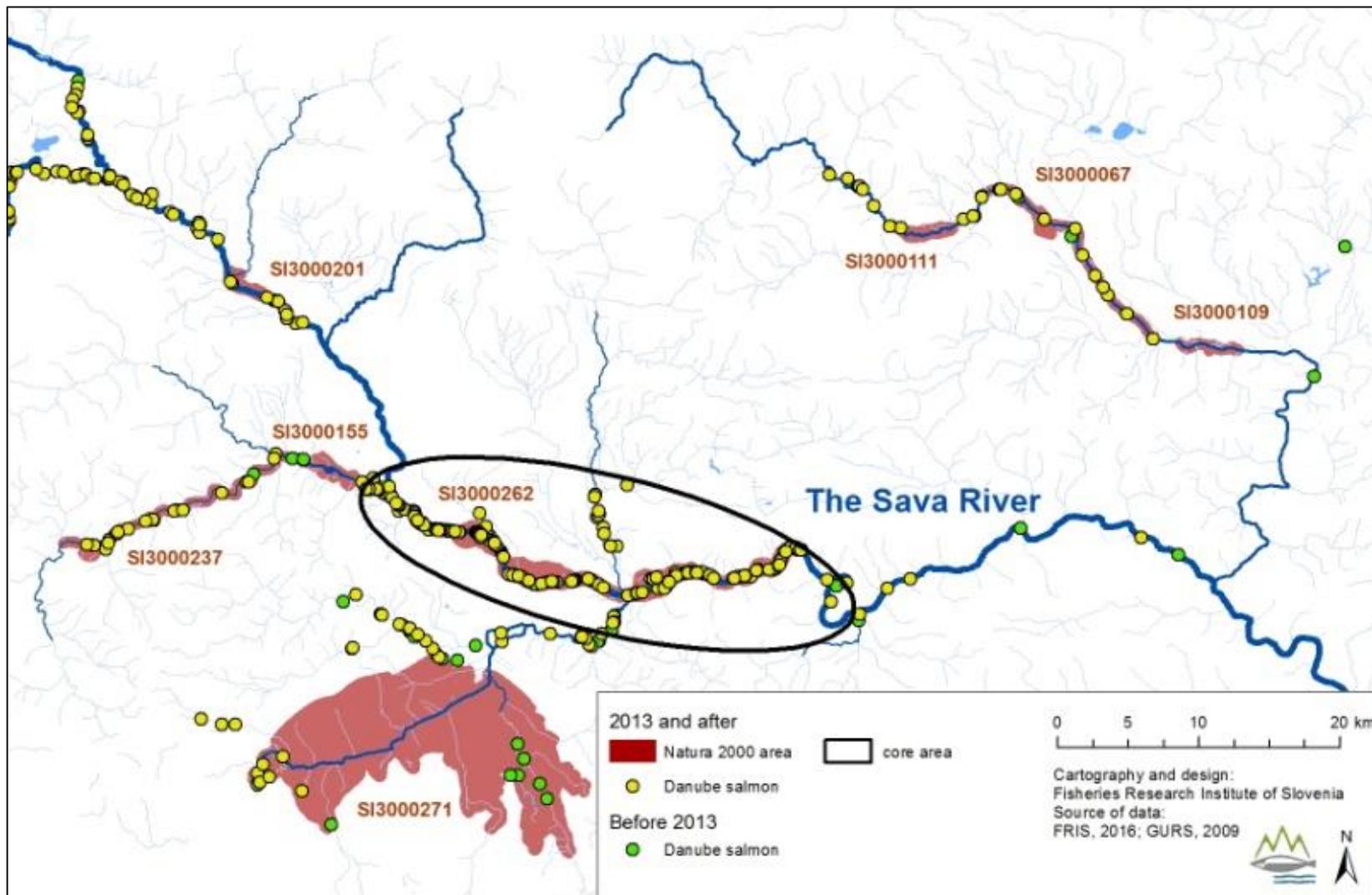
Length and weight measurements

Tagging

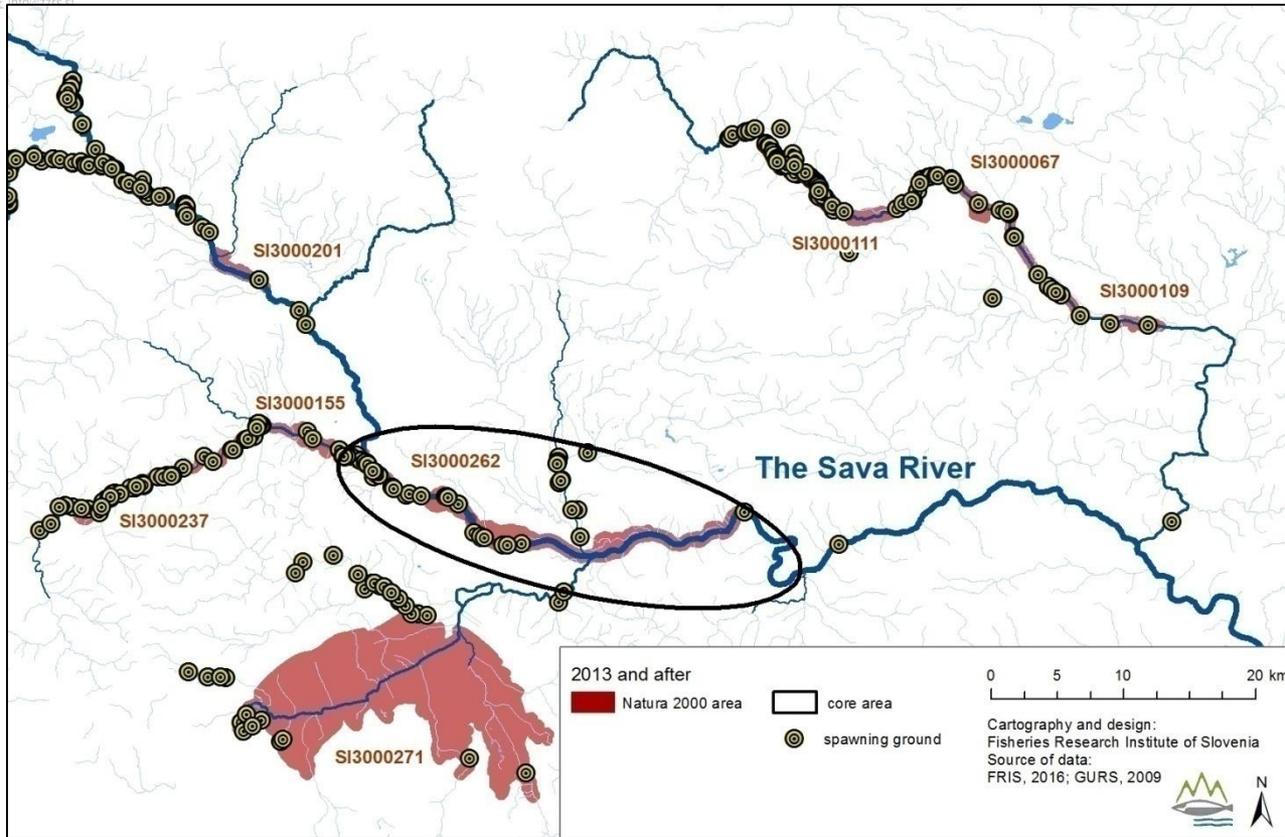
Taking samples for DNA analysis



Sampling of Danube salmon



Survey of spawning grounds



26. april 2016

Tagging programme

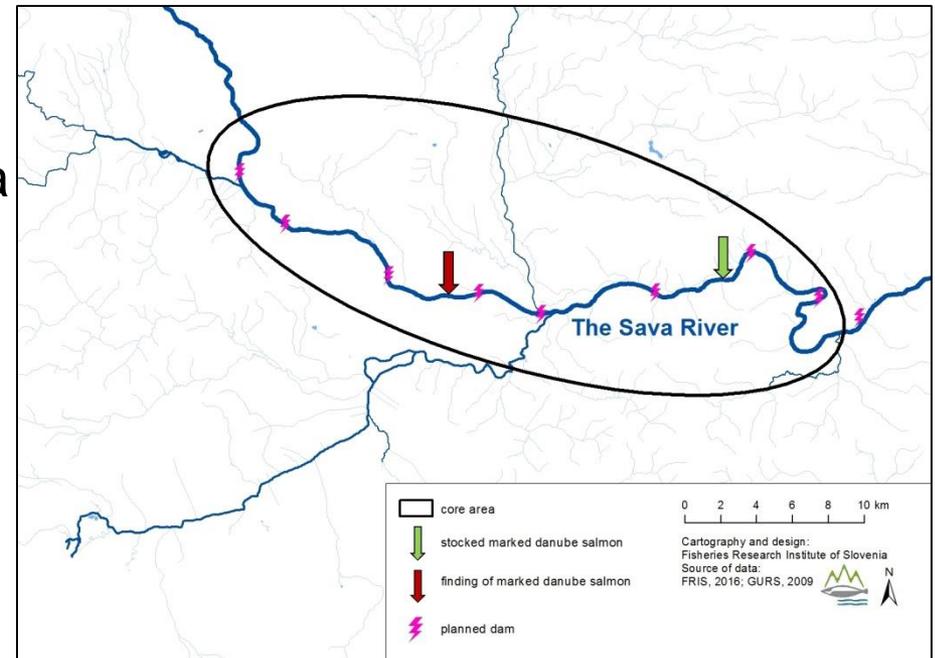
Tagging of Danube salmon has been performed **since 2008**.

Movements analysis

Danube salmon in the middle Sava travels short distances, the movements are restricted to the current river region (middle Sava)

Reasons

- There are still spawning grounds and good conditions in the core area of The Sava River.
- The spawning grounds in the tributaries are not accessible.



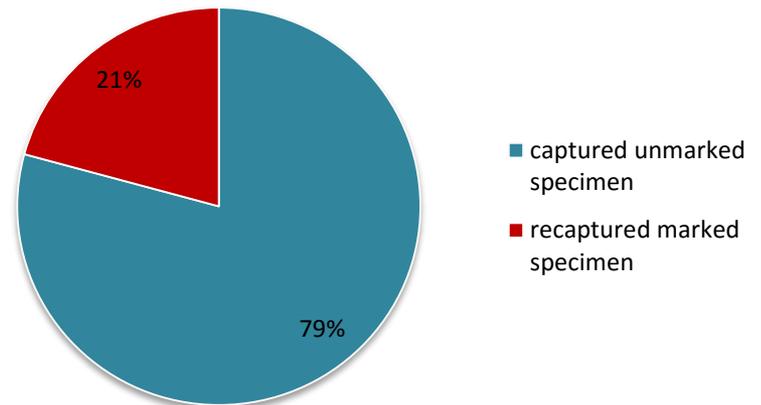
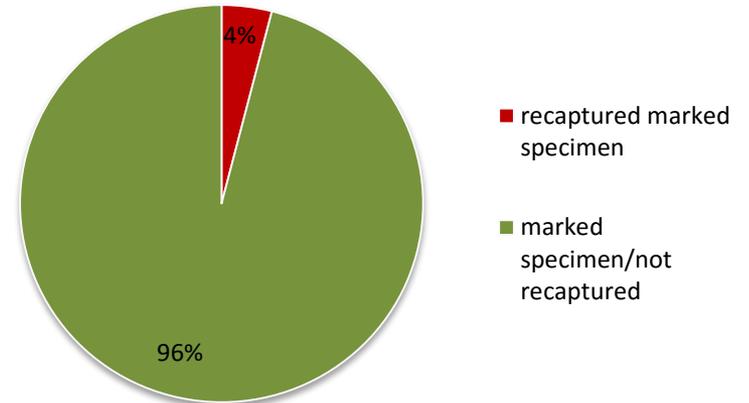
Tagging programme

Stock contribution analysis

Stocking of Danube salmon in the middle Sava has been performed continuously and regularly as a measure to compensate for withdrawn specimen. More than 50% of stocked specimen has been marked since 2008.

Stock contribution to total catch of Danube salmon is 38 %.

2/3 of total catch in the middle Sava belongs to a self sustainable population of Danube salmon.

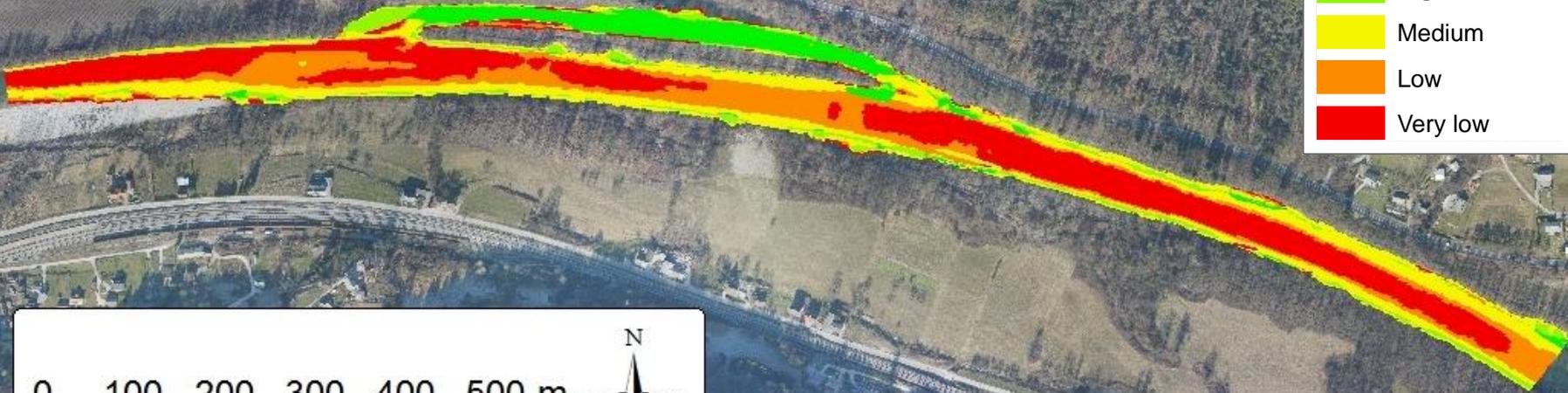


Discharge = 170 m³/s

Habitat modelling

Habitat suitability

- Very high
- High
- Medium
- Low
- Very low



The Sava River, Dolsko, years 1806 - 1869



Source: Österreichisches Staatsarchiv (<http://mapire.eu>)

The restoration of the middle Sava

- To build fish passages at the existing dams in the Sava and at the weirs in the tributaries, following the guidelines for Danube salmon.
- To apply measures that support downstream migration at the existing dams.
- To restore channelized stretches of the Sava and the tributaries.
- To restore the spawning grounds (active input of bed sediment) where necessary.
- To reconstruct shallow habitats for juveniles and prey.
- The goal should be to connect artificially fragmented large metapopulation of Danube salmon in the middle Sava and to establish a network of high quality habitats for the largest salmon in Europe.
- A chain of HPP in the middle Sava would destroy one of the core populations of Danube salmon in Europe.



Thank you for your attention!

“Sulec team”



26. april 2016