



Conservation and ecological research of the world's largest trout, *Hucho taimen*, in Mongolia's Eg-Uur Watershed

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Taimen (Hucho Taimen)



- Most closely related to lake trout (*Salvelinus namaycush*)
- Spends its entire life in large rivers
- Taimen have been removed from 90% of their original habitat

Taimen (*Hucho taimen*)



Family

Salmonidae

Sub-family

Coregoninae

Salmoninae

Thymallinae

Genus

Salvelinus

Salmo

Oncorhynchus

Hucho

Brachymystax

The genus *Hucho*



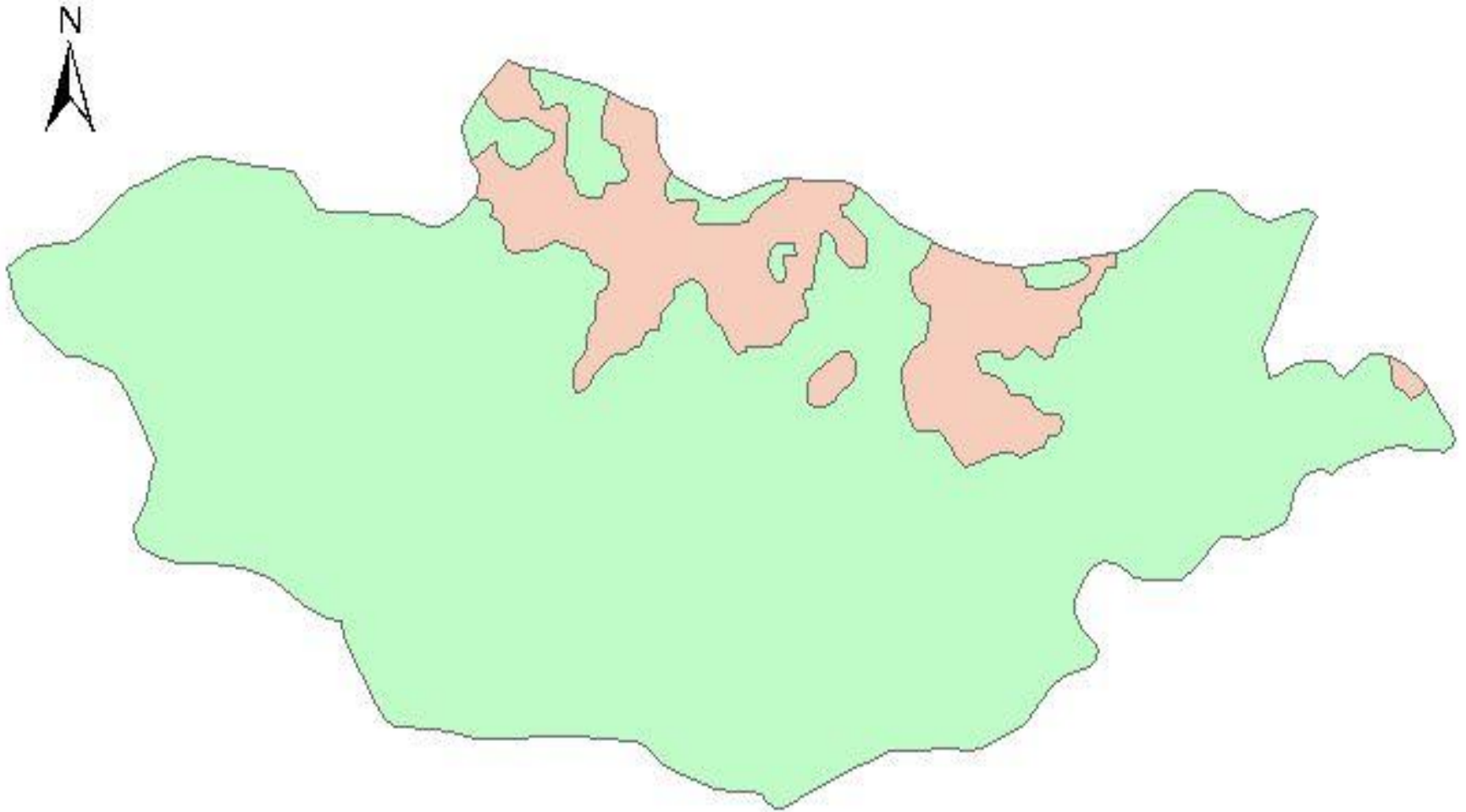
A map of Eurasia showing the distribution of the genus *Hucho*. The map includes major cities, rivers, and seas. Four fish illustrations are placed on the map, with orange dashed lines and red circles indicating specific locations or migration paths. The fish are positioned in the North Atlantic, the Baltic Sea, the Caspian Sea, and the Yangtze River in China. Red circles highlight the locations of Bucharest, Fuxin, and Mianyang. Orange dashed lines connect these locations across the map, suggesting a distribution or migration pattern.

Mongolia has Worlds Last Thriving Populations of Taimen



- Least populated country on the planet with 4.5 people/mi²
- 2.8 million people in a country the size of Alaska. About 1 million in the Capital of Ulaan Baatar
- Primarily nomadic herders - Ratio of livestock to humans is 11 to 1
- 98% literacy rate

Taimen Range in Mongolia



Zoological Society of London 2006





Taimen are a threatened species listed in the Mongolian and Russian Red Books

Regional Red List Series

Mongolian Red List of Fishes



Edited by
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THE WORLD BANK



Catch and Removal of Taimen



Placer Gold Mining



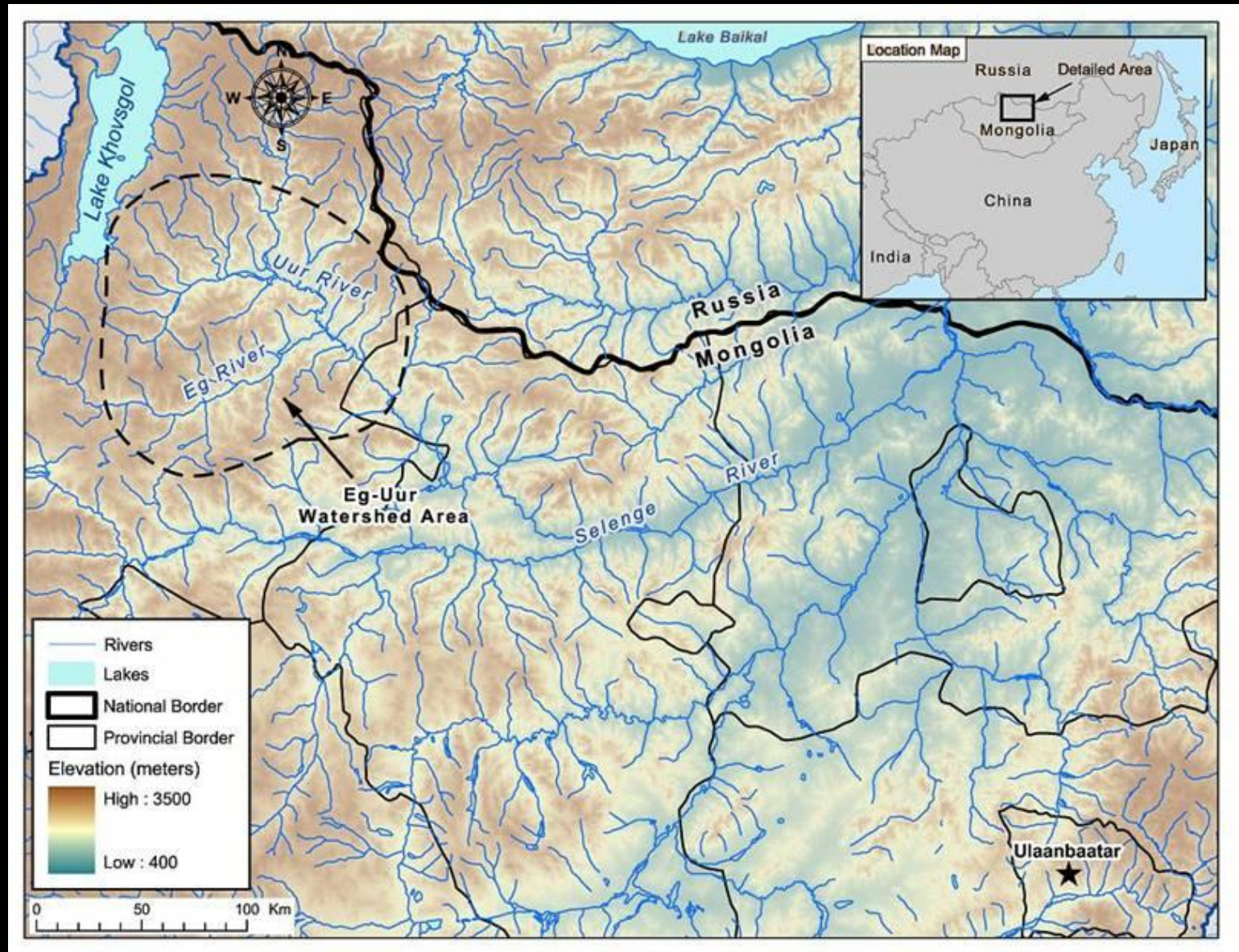
Hydropower dams



CHINA



Project location: Eg-Uur watershed, Mongolia



Conservation Strategy



Recreational fishing as ecotourism





Ichiro Nagai © 2006 IGFA Record 21.2 kg on 9.0 kg line.

Natural Resource law enforcement





Buddhism and Conservation





Scientific Research



Science team and its goals

- multi-institutional study
- goals
 1. population estimates and structure
 2. migration patterns and critical habitat
 3. growth / diet research
 4. taimen's environmental needs
 5. student training



The Role of Science (2004 – 2008)



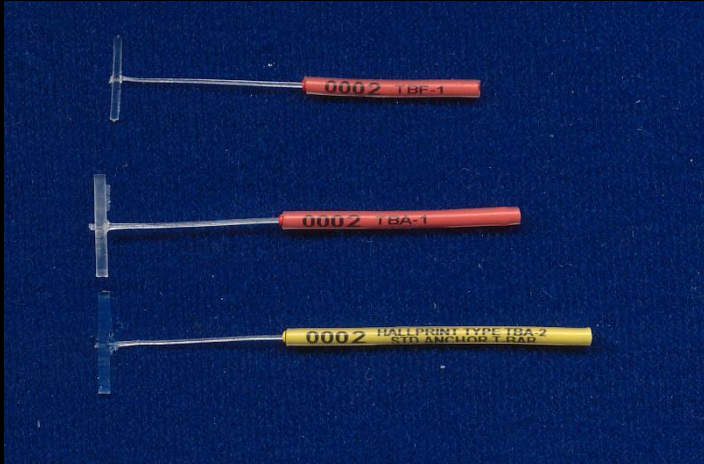
- Determine appropriate size of a concession area
 - Must include nursery grounds, spawning grounds, and feeding habitat
 - Must contain a viable population of taimen including trophy sized fish (50+ inches)
 - Fish can not migrate beyond the bounds of the concession area

Key output goal for management

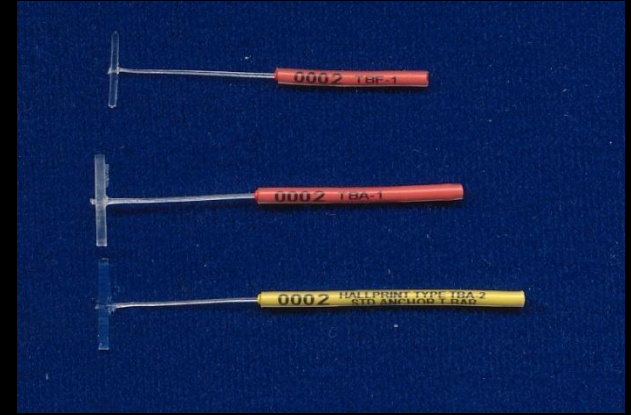
- Develop a population model to predict changes in taimen abundance and mean size under different release mortality and poaching scenarios



Taimen Population



Tagging and Tracking Taimen



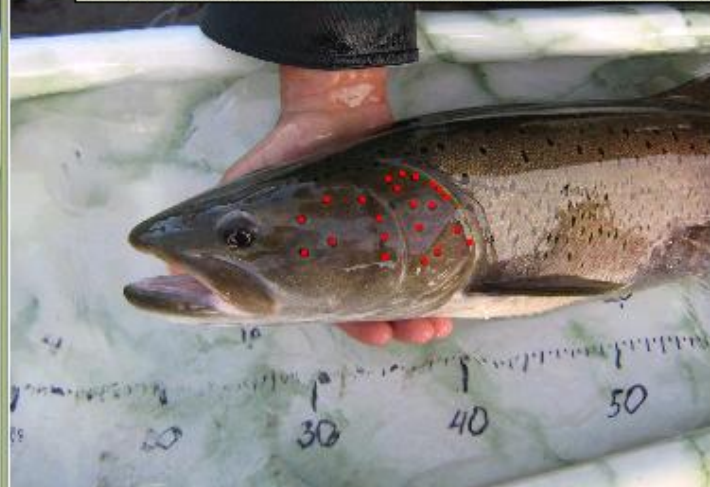
Taimen Research Station



I3S: Compare results

Images Unknown individual Found individual Spot cloud

Shows the images of both individuals together with the selected spots



Nr of spot pairs: 21 Score: 0.39

Unknown individual: ...r2007EgUur\test_taimen_faces_Jul2007\2050.jpg

Found individual: ...am Files\I3S2.0\Data\Unknown\2050\fp2050b.jpg

Include in database

Only identification

Close



Taimen Movement



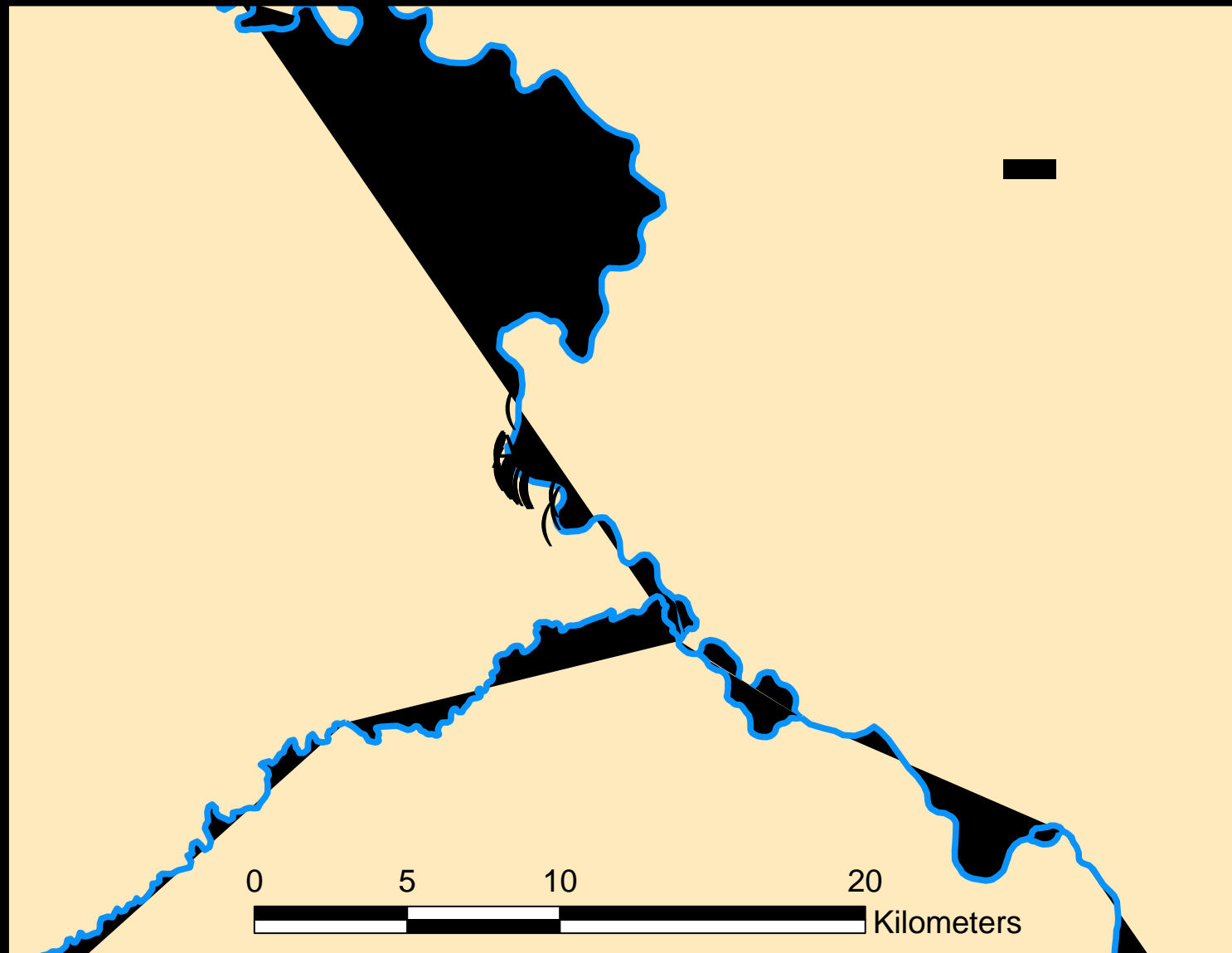
Tracking on horseback



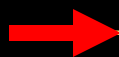
R01

76 cm

Relocated: 21



0 5 10 20 30 40 50 60 70 80 90 100

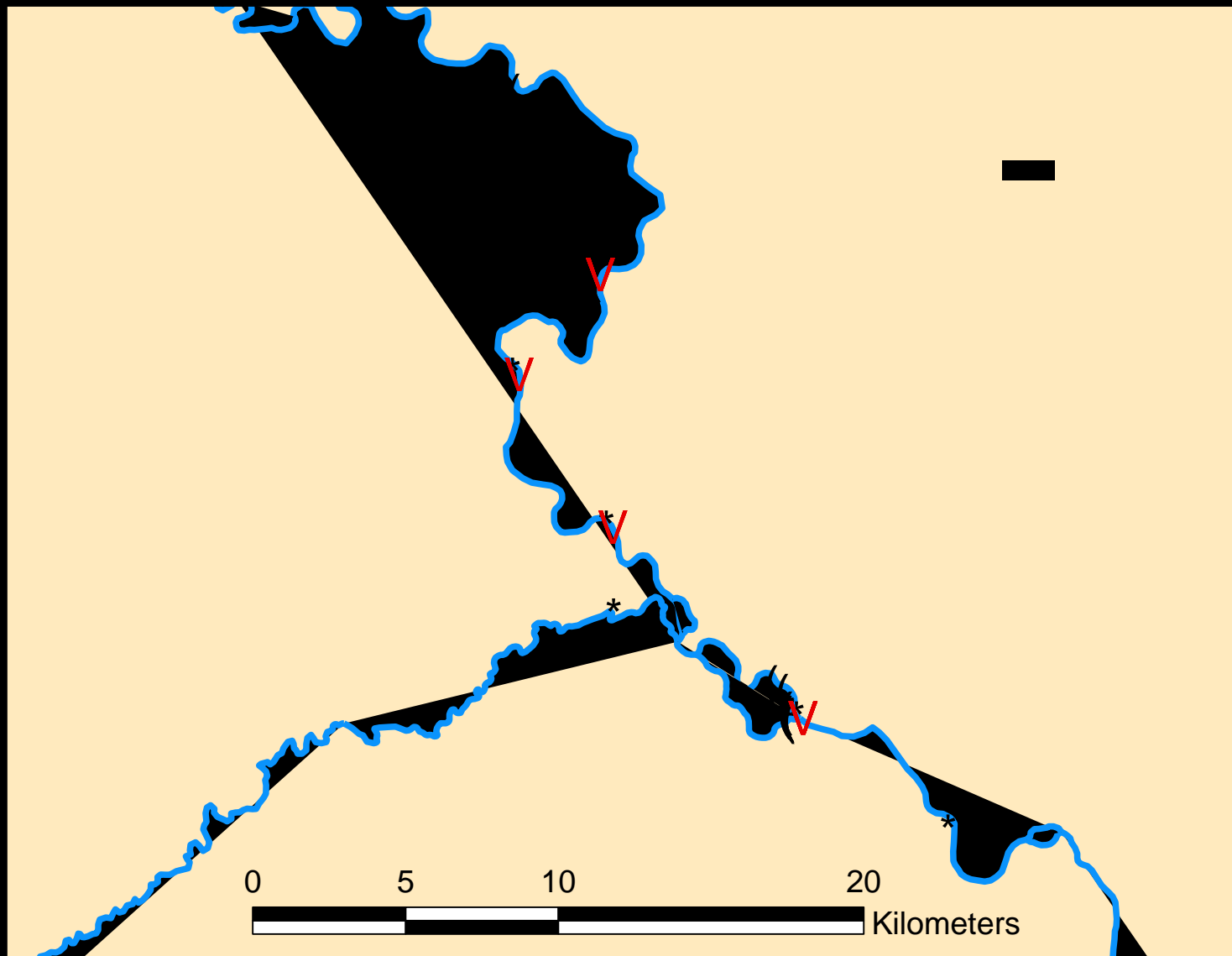


Kilometers

R13/A34

125 cm

Relocated: 17

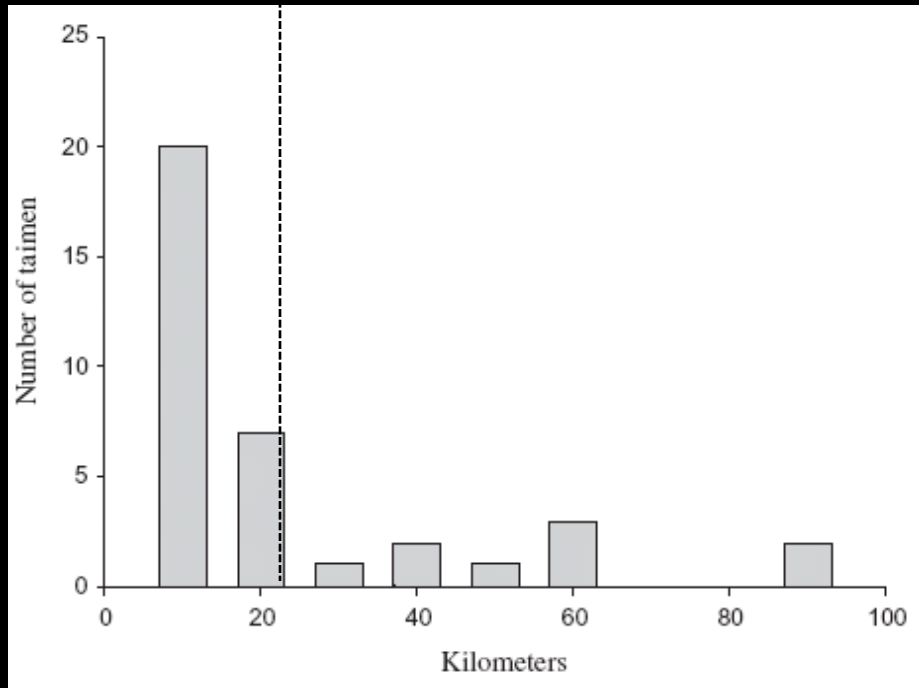


0 5 10 20 30 40 50 60 70 80 90 100

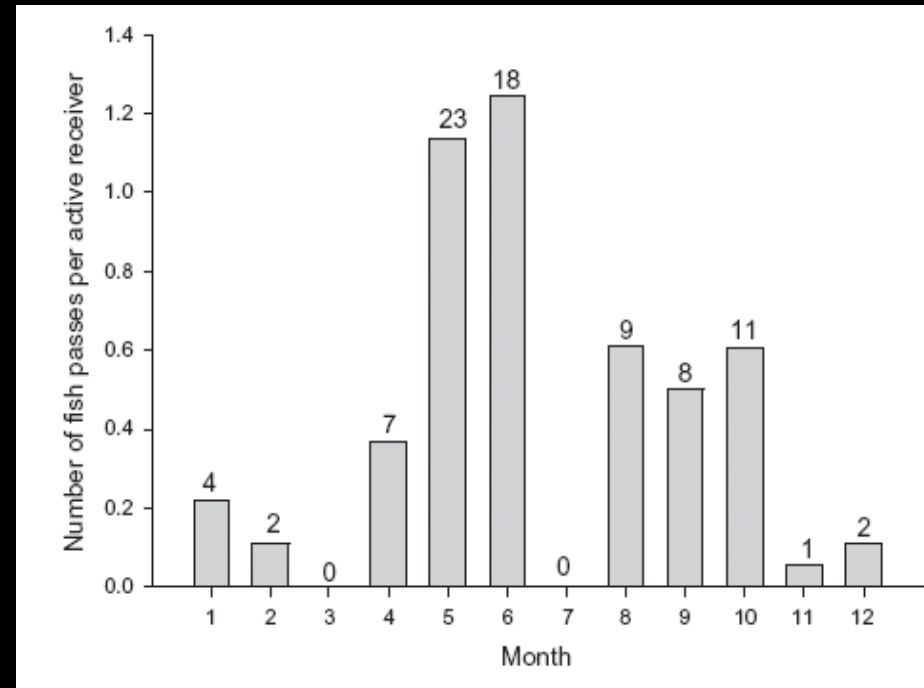
Kilometers

Movements: results

Home range size

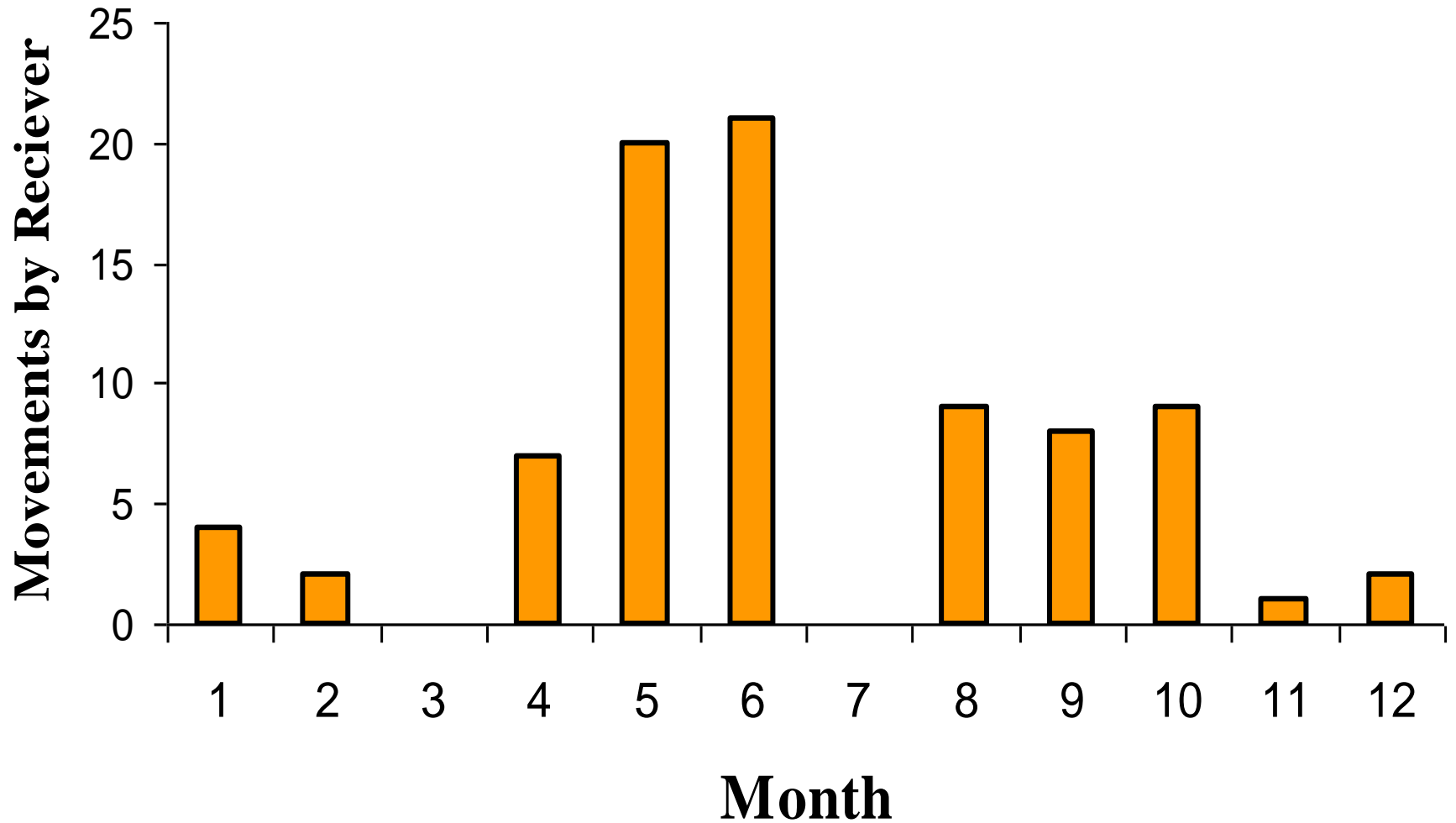


Seasonal movements



Gilroy et al. 2010

Taimen Movement by Month

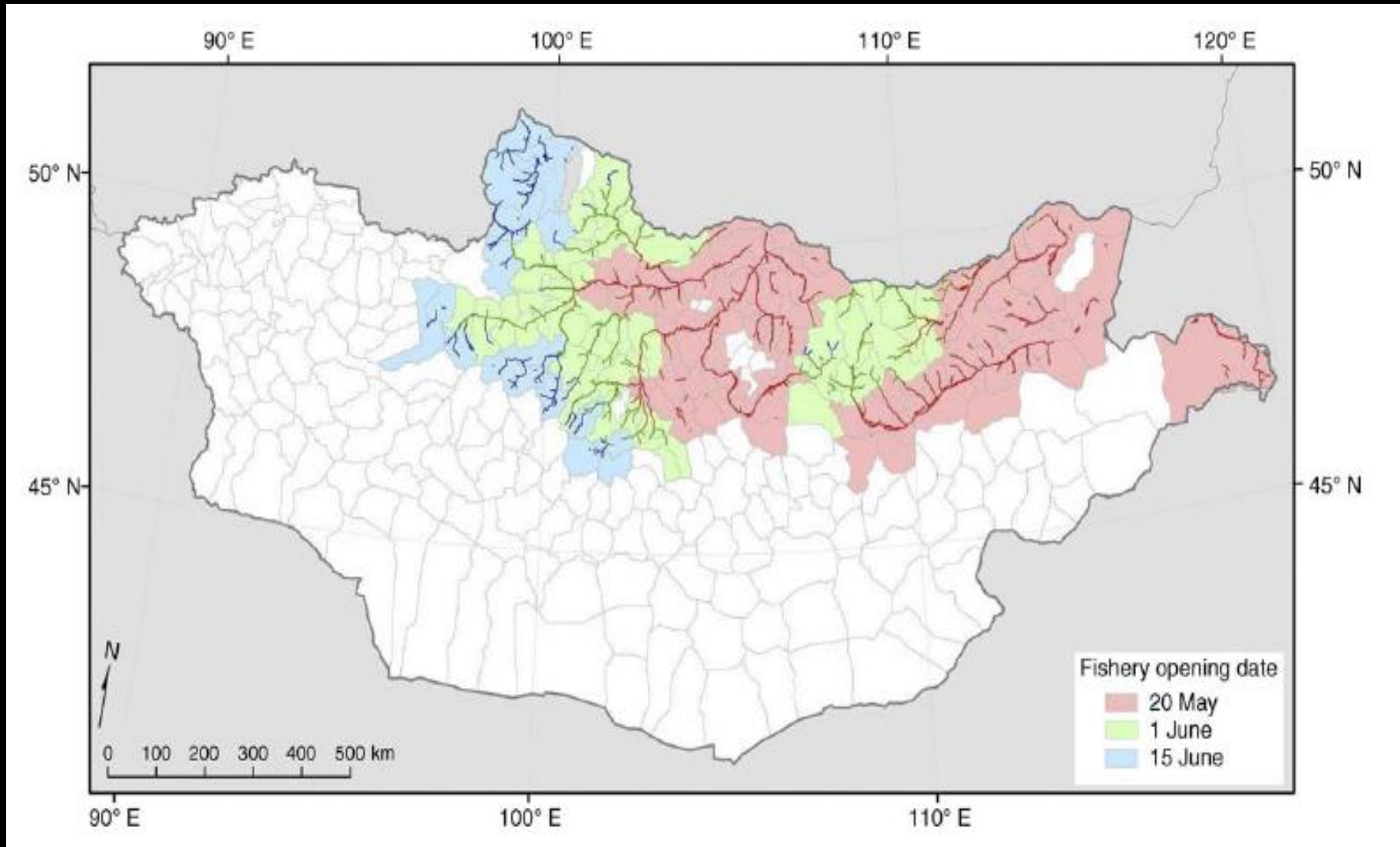


Taimen Reproduction





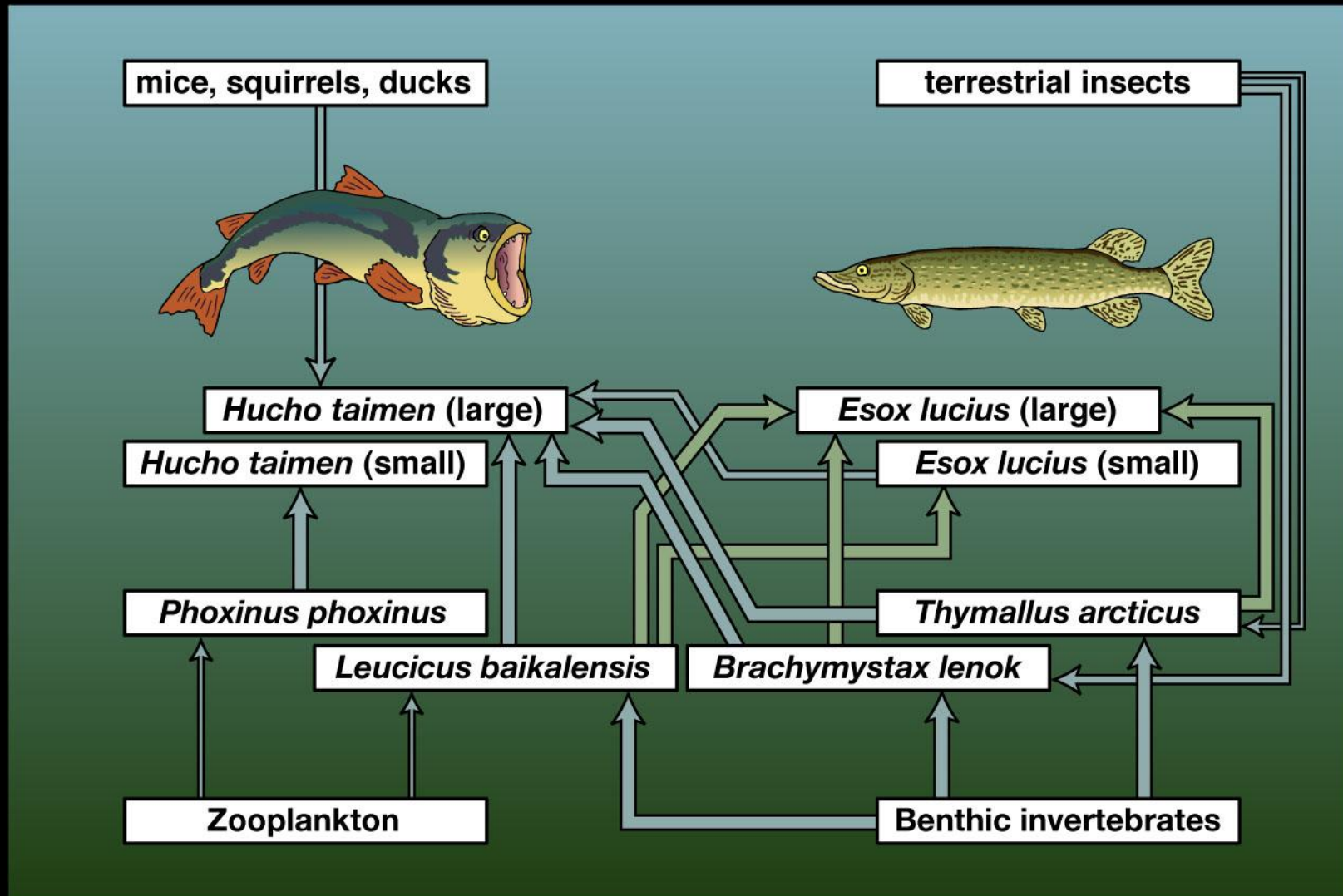
Spawning season model determines fishing season zones



Taimen Diet



Food-web Studies



Studying the requirements of Juveniles



Investigation continues in Eg-Uur study area, current information comes from literature

Eggs take about a month to hatch with timing dependent on water temperature (early June)

Taimen up to 1 inch in length feed on insect larvae while utilizing calm, shallow river habitat

Juveniles begin feeding on other fish at about 2 inches in length

By August they are 3 inches in length and feed exclusively on fish

Maturity occurs at about 1m in length in 10-13yrs







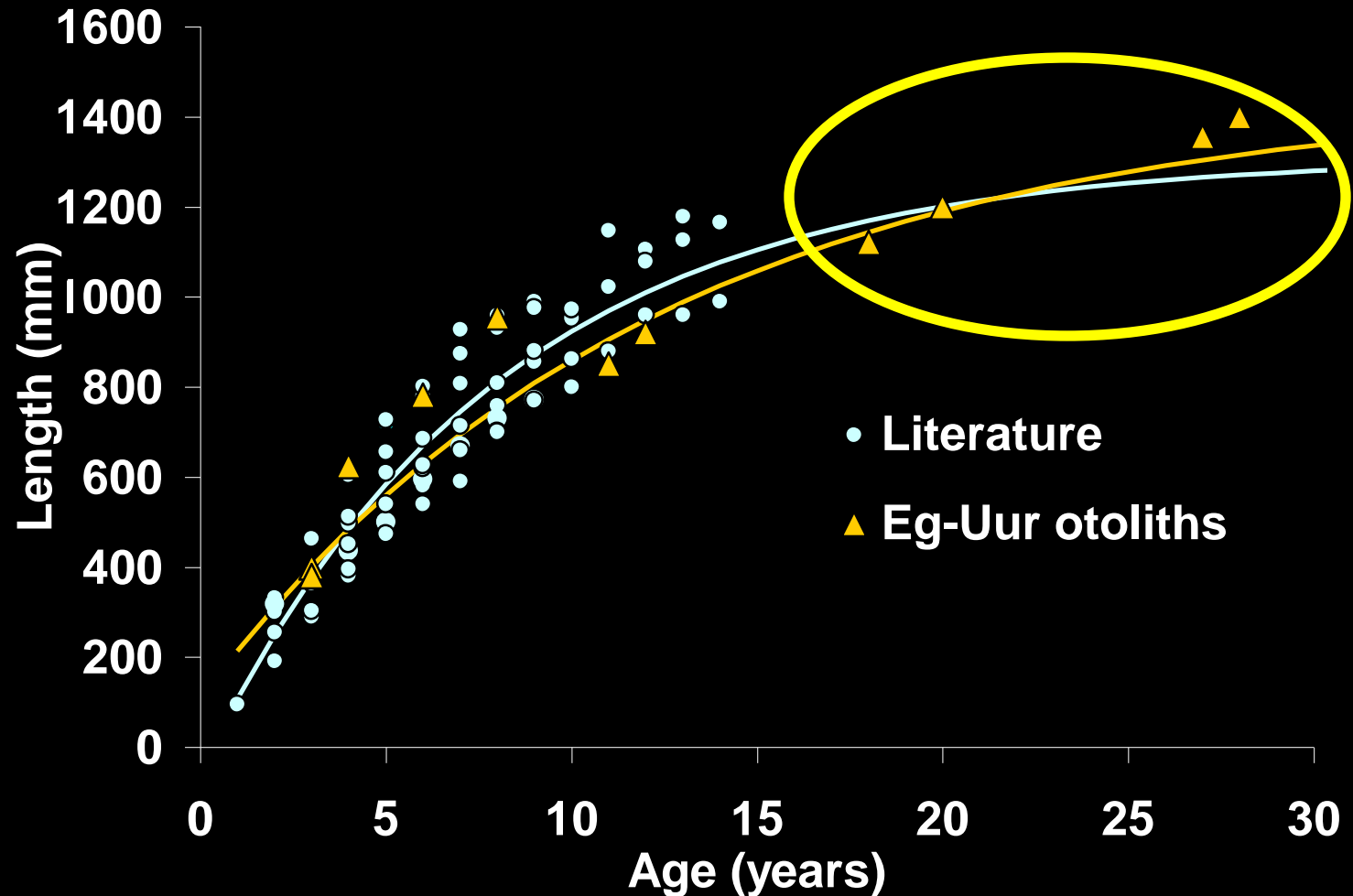
Data

- Age-length info from 11 taimen otoliths
- Growth from published literature
- 4 year mark-recapture study
- Life history invariants and meta-analysis
- Movement and release mortality from telemetry



Data

- Growth from published literature (Russia)



Preliminary Findings

- Taimen growth in the Eg-Uur is slower and maximum length is larger than data from heavily fished populations suggest.
- Even relatively low levels of harvest could depress mean size and abundance.
- Recovery time from overfishing, poaching, or other sources of mortality is likely to be long.

Management Goal for region: Sustainable Recreational Fishery by Catch and Release Angling



Conclusions

- The 100% catch-release recreational fishery has little impact on the taimen population, but recreational harvest could impact survival, abundance, and size structure.
- A commercial fishery operated at MSY would not be compatible with a high-end recreational fishery in the same area and would generate considerably less revenue (\$10 – 20 K vs. \$300 – 500 K per year).
- Movement rates suggest that spatial management should occur at larger scales (> 20 – 40 km segments)

Fisheries Science in Mongolia

- Few fish biologists in a large area.
- Fisheries research and proactive management is almost non-existent
- Increasing need for fisheries science as fisheries decline, species are threatened, and economic values for fish increase





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