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
The genus *Hucho*
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
Taimen are a threatened species listed in the Mongolian and Russian Red Books.
Catch and Removal of Taimen
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
Nr of spot pairs: 21  Score: 0.39

Unknown individual: ...2007EgUu\test_taimen_faces_Jul2007\2050.jpg

Found individual: ...am Files\I3S2.0\Data\Unknown\2050\fp2050b.jpg
Taimen Movement
Tracking on horseback
R13/A34

125 cm

Relocated: 17
Movements: results

Home range size

Seasonal movements

Gilroy et al. 2010
Taimen Movement by Month

Movements by Receiver

Month

1 2 3 4 5 6 7 8 9 10 11 12

Month
Taimen Reproduction
Spawning season model determines fishing season zones

Vander Zanden et al. 2007
Taimen Diet
Food-web Studies

- Hucho taimen (large)
- Hucho taimen (small)
- Phoxinus phoxinus
- Leucicus baikalensis
- Zooplankton
- Esox lucius (large)
- Esox lucius (small)
- Thymallus arcticus
- Brachymystax lenok
- Benthic invertebrates

mice, squirrels, ducks
terrestrial insects
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 pro-active 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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