



# Sturgeon conservation and aquaculture

a WSCS perspective on future challenges for  
research and development

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Szarvas, 14<sup>th</sup> and 15<sup>th</sup> May 2008



# Contents

- What does WSCS stand for? (aims & objectives)
- Sturgeons, their history, distribution and the endangered status of their populations
- Resource utilization (fishery vs. aquaculture)
- Future conservation requirements and aquaculture potential
- Long-term Perspectives



# World Sturgeon Conservation Society

- Founded in 2003
- Facilitating information exchange
- Providing a home for the International Sturgeon Symposia
- Coordinating and supporting regional conservation measures
- Providing advice for international, intergovernmental, regional and local organizations



# World Sturgeon Conservation Society e.V.

[www.wscs.info](http://www.wscs.info)



v.li.: Andy Lofftus, Douglas Beard (beide USA), Yianbo Chang (China), Harald Rosenthal, Mohammad Pourkazewi, Ramin Mohammadi Kouchki (beide Iran) Bürgermeister Günter Schadwinkel und Ron Bruch (Kanada) setzten sich für vom Aussterben bedrohte Störche ein



# WSCS - Objectives

- to **foster** the conservation of sturgeon species and restoration of sturgeon stocks **world-wide**
- to **support** the **information exchange** among all persons interested in sturgeons
- to **promote** information exchange with national, regional, international, inter-governmental organisations, educational institutions and non-governmental organisations (NGOs)
- to **stimulate** and support interdisciplinary and multi-disciplinary **research** on all aspects of sturgeons (e.g. biology, management and utilisation of sturgeons)
- to **enhance** the co-operation between stakeholders
- to **inform the public** on all aspects of the status and biology of sturgeons, requirements for their effective protection, and needs for appropriate management





# Current Activities



- **Services to the general public**
- **Initiating coop with local/regional sturgeon societies**
- **Improving communication efficiency between all involved (overcoming the language barrier)**
- **Formulating advice on specific issues**
- **Participating in and organizing of regional/international conferences**
- **Cooperating with WAS, EAS & other aquaculture societies**

# Services to Members

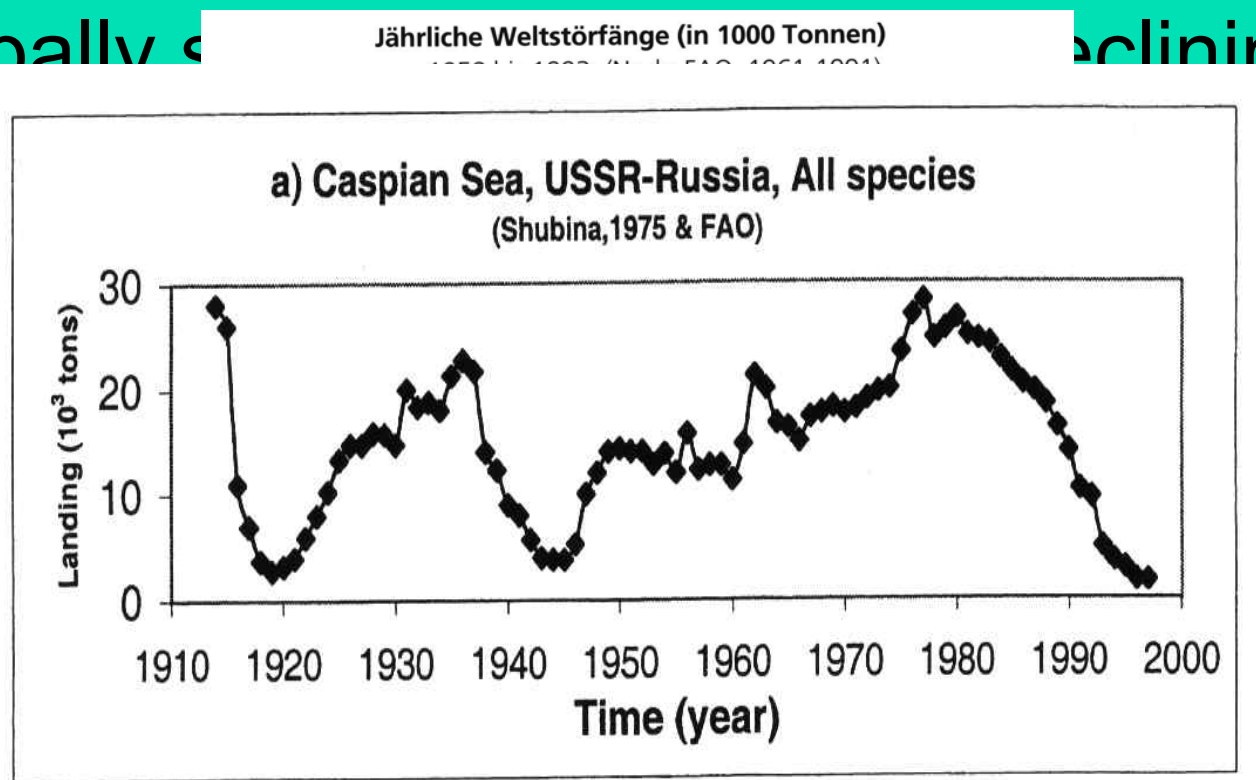


- **Membership Directory & Profiles**
- **Internet info & discussion forum**
- **News archives (searchable)**
- **Contributions from members**
- **Reduced registration rates for Sturgeon Conferences**
- **Sturgeon bibliography & reprint service**
- **Early info & abstracts on accepted or published manuscripts in J. Applied Ichthyology**



# State of sturgeon populations

- Globally declining since 1950
- Major impact from overfishing
- Different management approaches
- Possible recovery of some populations



1958 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93





# Resource utilization

- Sturgeon are valuable and sought after
- Resource utilization varies and includes several forms of culture (also in combination with fisheries)
  - Culture based fishery (enhancing production)
  - Ranching (securing regular recruitment)
  - Farming (utilizing wild fish as broodstock)
- Resource utilization for restoration

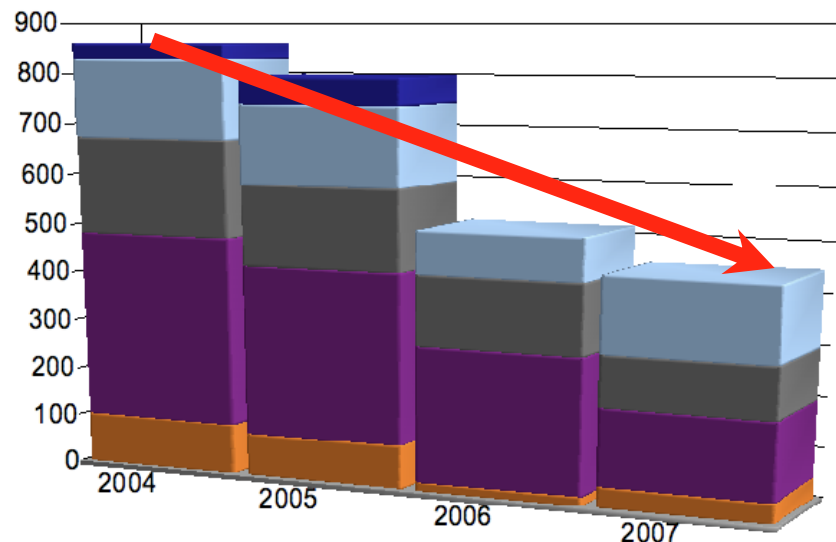
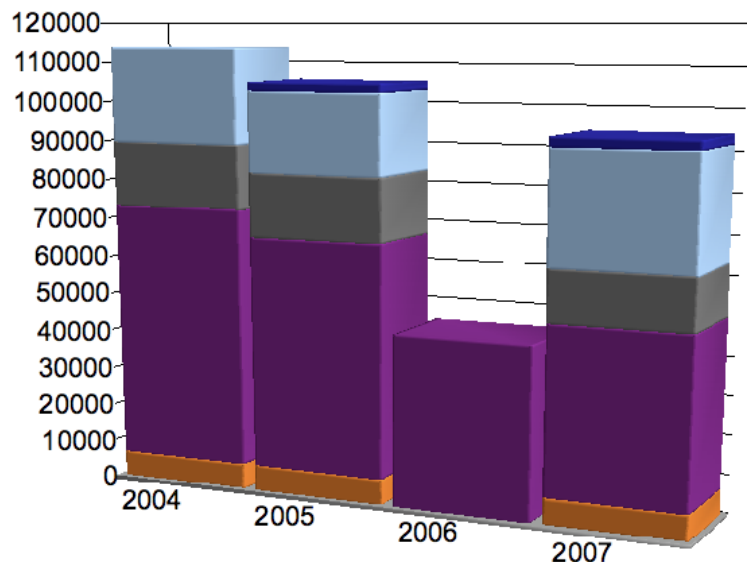


# Fishery yields

Caviar export quotas (kg)



Meat export quotas (tons)



- Harvests at sustainable levels have been demonstrated to enhance the population size and resulted in better resource utilization



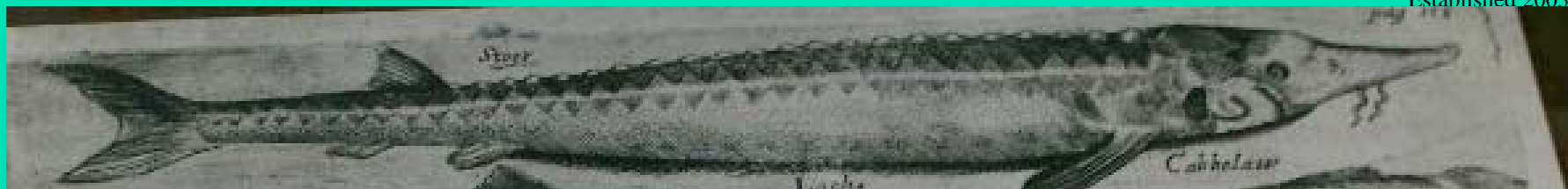
# Impacting factors triggering population decline



- Overharvest
  - Long life cycle and low absolute fecundity render sturgeons vulnerable towards exploitation
  - Bycatch in commercial fisheries reduces broodstock
- River construction
  - Migration obstacles (dams)
  - Loss of river structures for spawning sites, habitat for early life stages
  - Altered temperature and flow regime
- Pollution
  - Impacts of toxicants (pesticides, heavy metals, etc.)
  - Organic wastes (sewage, industrial pollution) to affects reproductive efficiency



# Improper management



**Firstly, the Elbe River  
provides us the sturgeon  
sometimes so plentyfull that one  
cannot thank GOD enough for this  
resource. The sturgeon is one of the  
largest fishes, as the one caught in April  
1661 in Hamburg, which was sold for 20 Thaler,  
the head of which was 128 Pounds and the fat of his**

**belly was 58 Pounds. Therefore, it is a sin to capture the very  
small ones for marketing. The authorities should be aware of this and  
control the fisheries for sturgeon, salmon and flatfish to prevent catching  
juveniles. Man is not prepared to leave GOD and NATURE its time.**

**But what not is done by greed!**

**Petrus Hesselius 1675**



# Examples for sustainable



- Manage numerous
  - natural
  - fishery
  - long term
- Only few
- Lake W
  - Only re
  - Fishery
  - Financial
  - Management



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DNR

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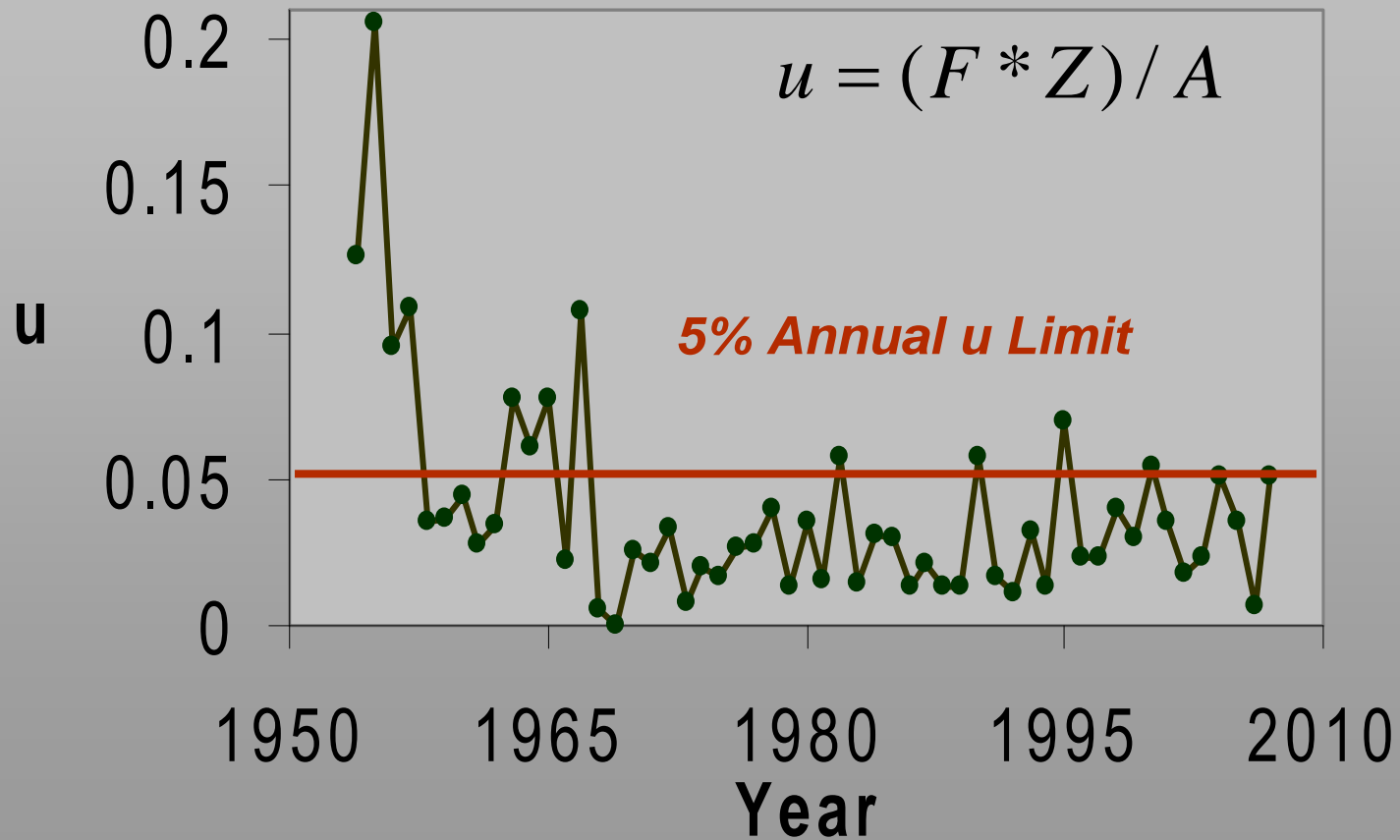
# Lake Sturgeon Mortality



## Fishing Mortality



Lake Sturgeon Exploitation Rates  
Winnebago System, 1954-2007





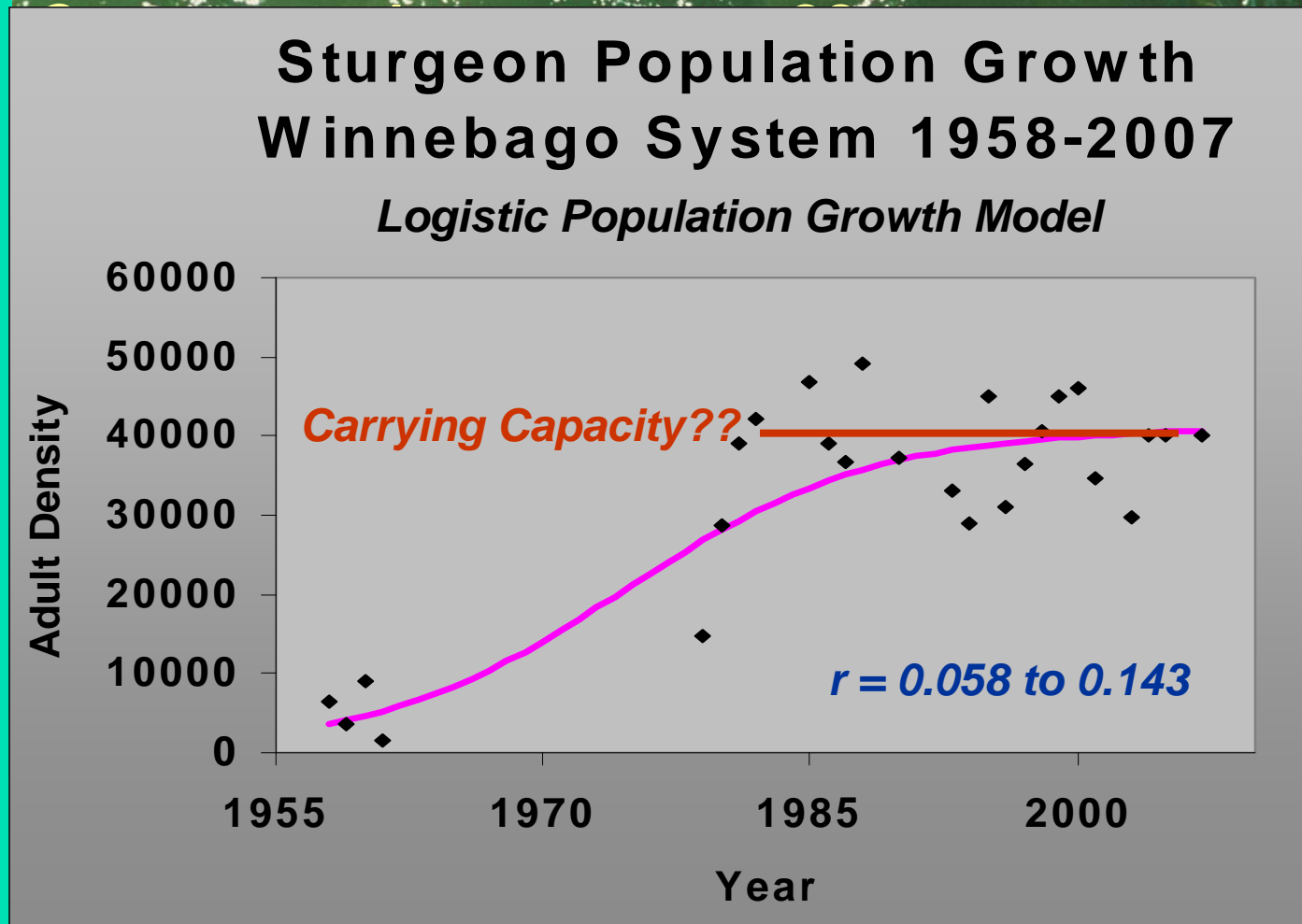


# Lake Sturgeon Recruitment

## Population Growth



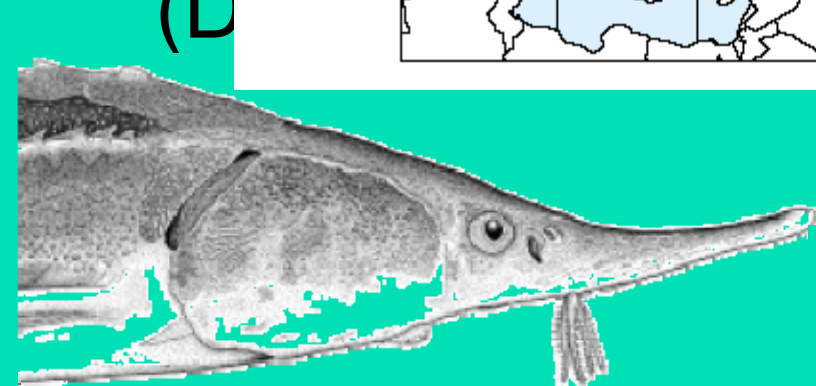
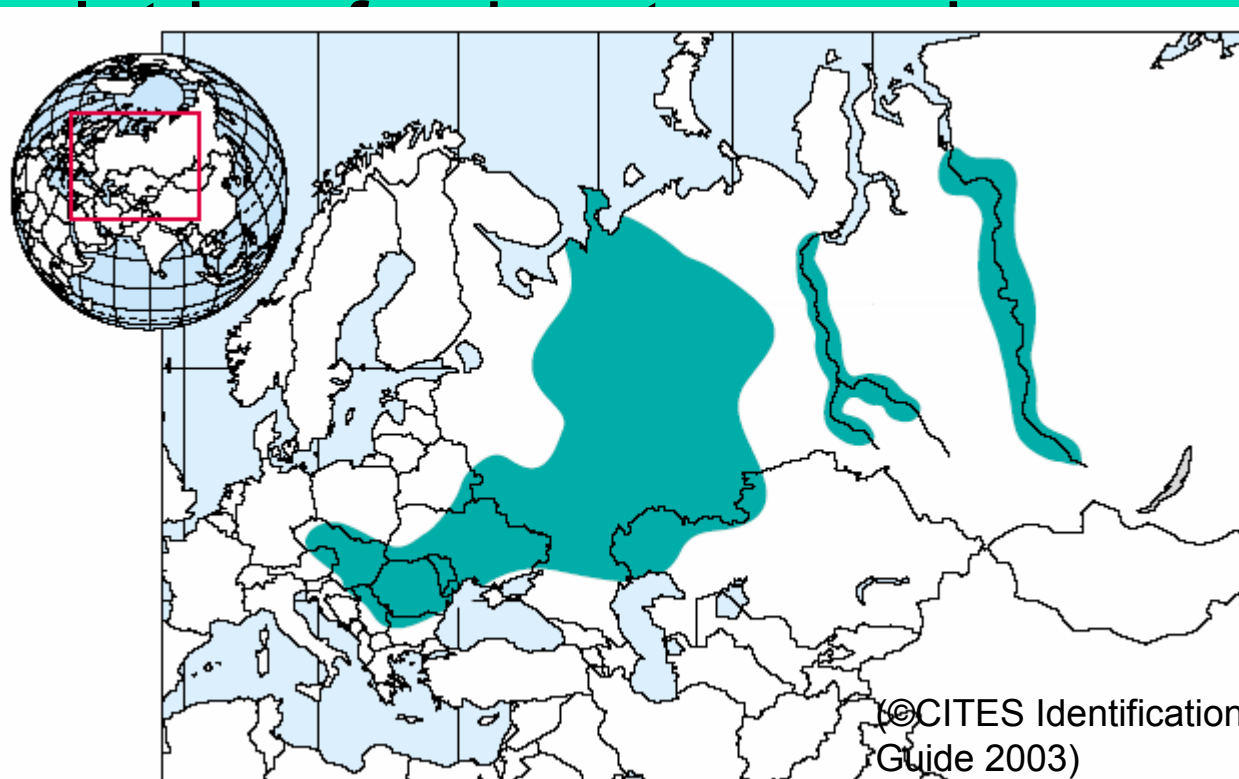
*How have the densities changed over time?*

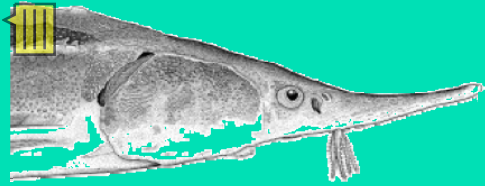




# *Acipenser ruthenus* L. 1758

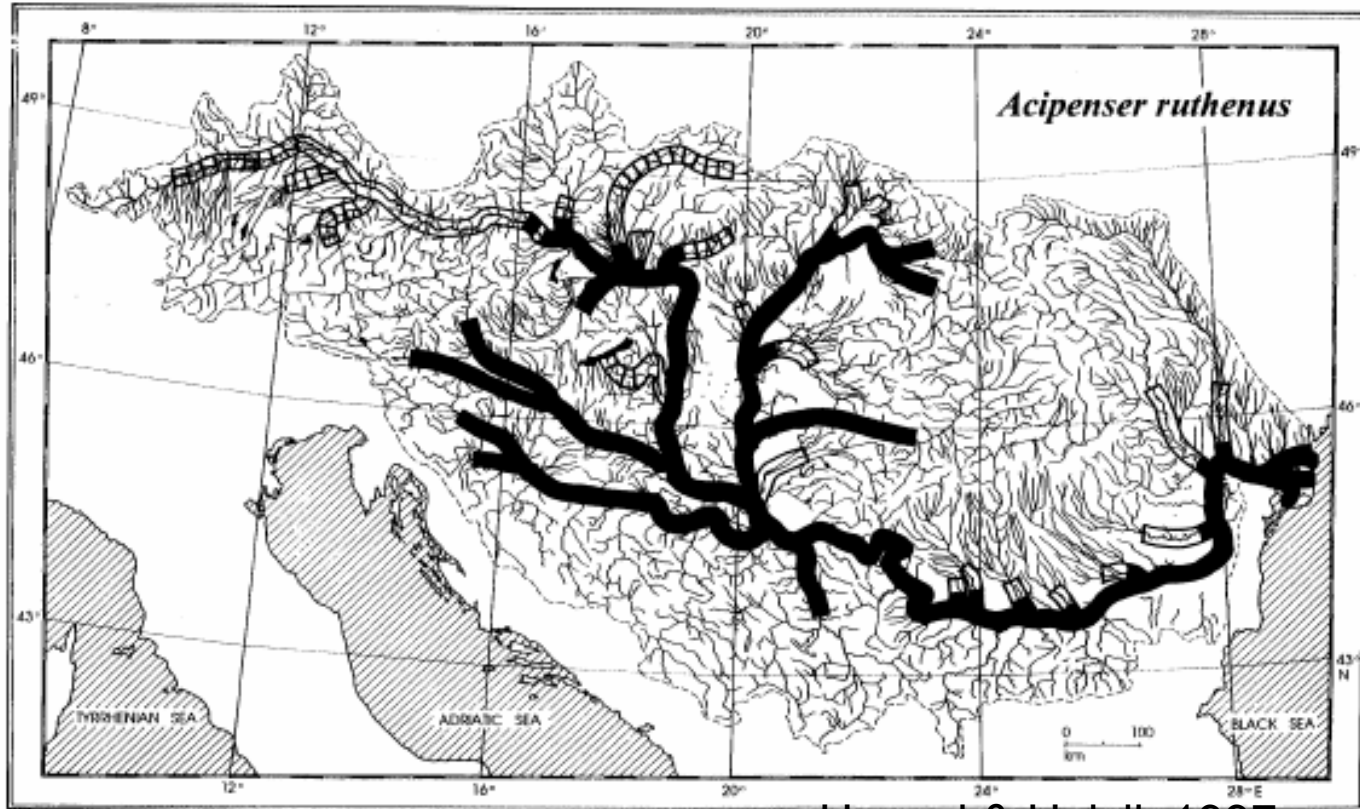
- Sturgeon (in the Danube)
  - M...
  - M...
  - M...
  - Sturgeon (Danube)
- idromous)
- rivers





# Current status

- D
- D
- V



Hensel & Holcik 1997

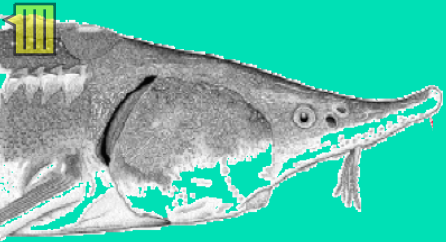
rus

- and Russia
- Habitat restoration and dam removal are considered only locally

# Aquaculture production

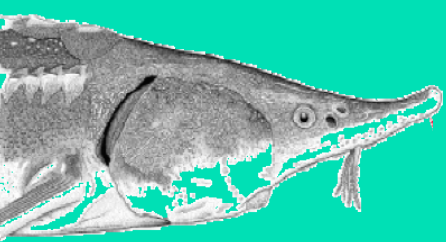
“Eurasia”/EU	at present	near future
growout plants	n°324 (EU 66; 20%)	???
meat production	5800 tons (EU 3200; 55%)	8-10000 tons (EU 4000-5000)
caviar factories	n° 50 (EU 25)	n° 70 (EU 35)
caviar production	67 tons (EU 63)	160 - 190 tons (EU 90 - 100)

China, Canada and USA excluded;  
other plants in Finland, Saudi Arabia, Abu Dabi, South Korea, Israel, etc.



# Sterlet aquaculture

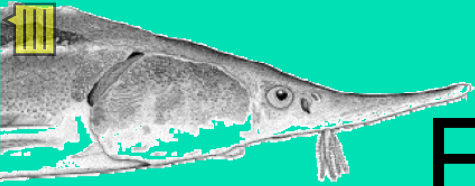
- Dominating sturgeon production in aquaculture locally
- Sterlet comprises approx. 45% of the Russian aquaculture production
- Main products
  - Meat
  - Stocking material
  - Caviar



# Advantage of sterlet in aquaculture

- Robust
- Small tank dimensions required
- Easy to handle
- Low susceptibility against stress
- Good quality meat
- Early maturation, low generation interval
- Highest Gonado Somatic Index



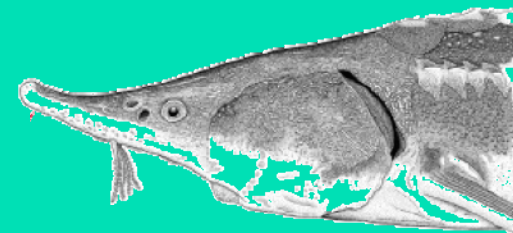


# Future requirements

## Separate restoration & aquaculture purposes

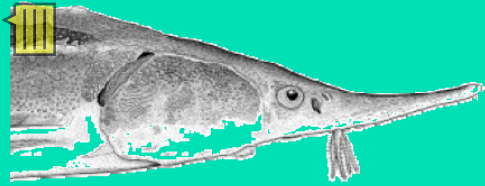
### Restoration

- Developing criteria for production of stocking material
- Rearing juveniles with **fitness for survival** in nature!
- **Avoiding** domestication effects
- Develop genetically suitable breeding plans preventing inbreeding & outbreeding depression!
- Ensure homing
- **Adaptation** to adverse impacts (diseases, predators)



### Farming

- Domestication and **selection** for aquaculture
- Improvement of **rearing** conditions
- Increased **prevention** to avoid interference of both groups (escapement, disease transfer, genetic interference)



# Perspectives

- Developing aquaculture with native species decreases the risk of introduction and disease transfer
- Advantage of native species in the fresh market
- Selection - e.g. shorter generation cycle, shorter shortest
- Restoration of native species in naturalized habitat
- Long-term sustainable conservation depends on ecological/economic efficiency



**Thank you for your attention!**

