



# Conservation Strategies for Acipenseridae Species in the Yangtze River Basin

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# 2007 Conservation Exchange Program

- Agreement to Exchange knowledge and expertise in the field of conservation
- For the Benefit of Both Countries
- Signed by the Chinese Ministry of Agriculture and USFWS Office of International Affairs in 2007
- Reciprocal Visit from Chinese Fisheries Scientists is planned for April of 2009

# Species under protection

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National Protection Catalog (1989)

List No. 1 : 13

List No. 2 : 70

Provincial Protection catalog: 200

National Protection Catalog (1996)

List 1: 44

List 2: 118

Endangered species survey (2002)

363-400 in concern

National Protection Catalog (2007)

159 species included (wait State Council approving )



斑海豹

*Phoca largha* (Pallas, 1811)

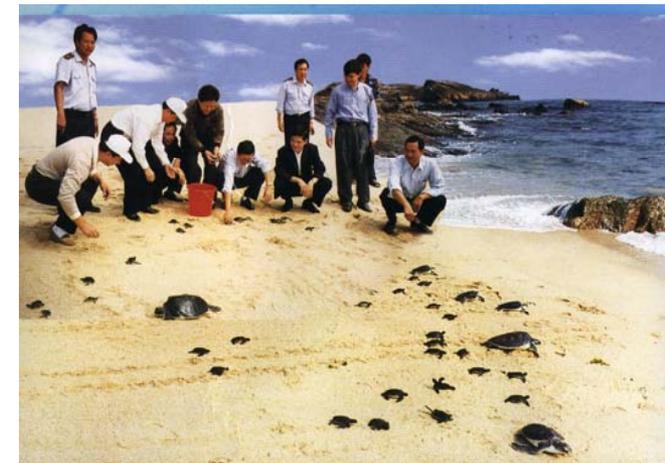


*Dugong dugon* (Müller, 1776)



# Aquatic fauna and flora conservation

- 200 aquatic natural reserves
  - 10 in national level
  - 40 in provincial level
  - Total area: 10,000,000 ha
- Stock enhancement:
  - Acipenser sinensis* 7,000,000
  - Acipenser schrenckii*
  - and *Huso dauricus*: 7,800,000
  - Sea turtle: 70,000
- Rescuing: 10,000



# Rescuing and Refuge

15 rescuing refuges has been established in past years



Anhui resurging center



Guang Dong Rescuing Center

# Nursery Area Resource Protection

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- National protection list for important aquatic commercial species

Issued year: 2007

Number: 166

Types: fish, shrimp, crab, shellfish, algae, reptile, aquatic plant.

- Natural reserve for Nursery Areas

Resource Protection:

Issued year: 2007

Number: 40

Types: gulfs and bays, island, marsh, estuary, river, lakes

# The Yangtze River System

- 3<sup>rd</sup> largest river in the world
- 400 million people live in the basin
- 4000 miles in length (350 fish species)



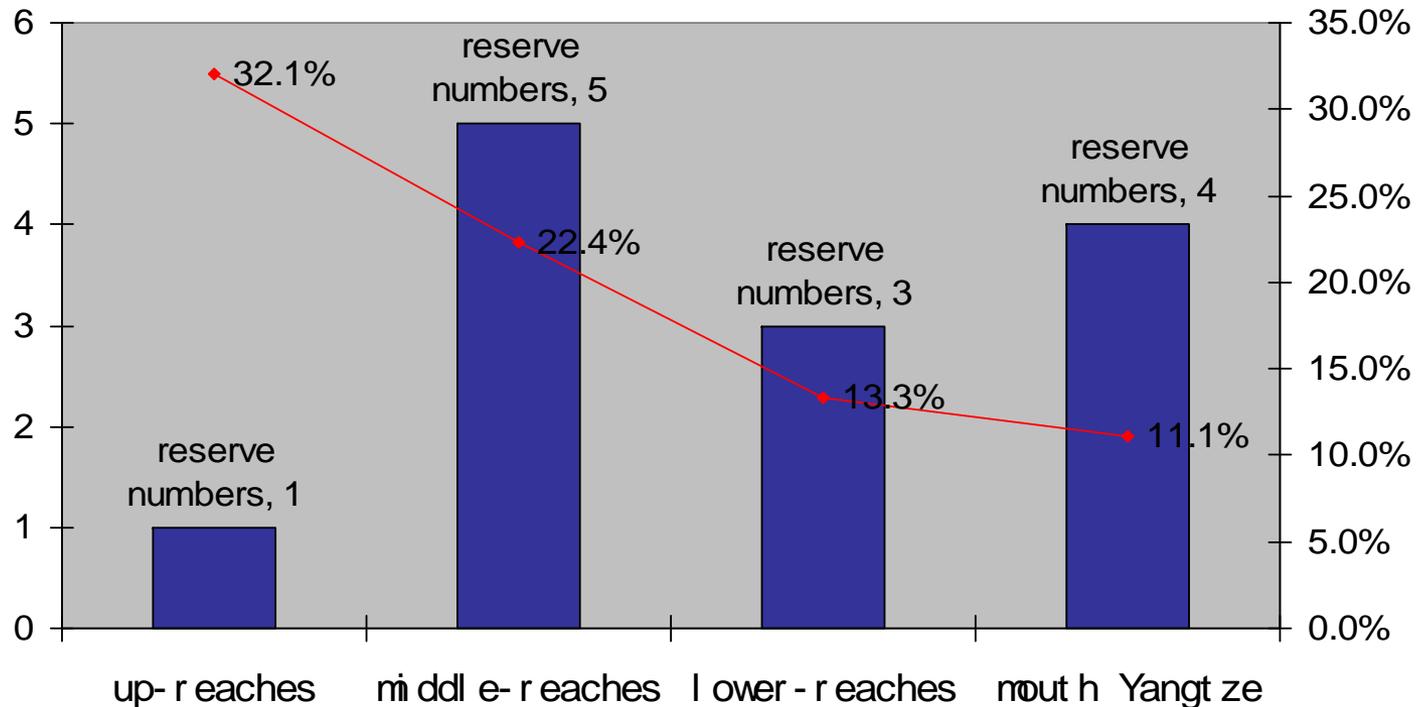


# Threats to the biodiversity

- **Habitat degradation**
  - Fragmentation: damming, disconnection of river and lakes
  - Alteration: Navigation channel regulation, sand and gravel excavation, channelization, port construction
- **Alteration of Hydrological regimes**
  - Damming, South-to-North Water Diversion
  - Flow discharge, water temperature, silt content, velocity et al
- **Deterioration of water quality**
  - pollution
- **Disturbing**
  - Navigation, noise
- **Over-fishing and illegal fishing**
- **Exotic species (channel catfish and non-native sturgeon and paddlefish)**

# Efforts and conflicts in conservation

- Habitat protection:
  - One of major measures is to set up nature reserve in Yangtze River, so far, there are already 12% river length which has been set up for nature reserves

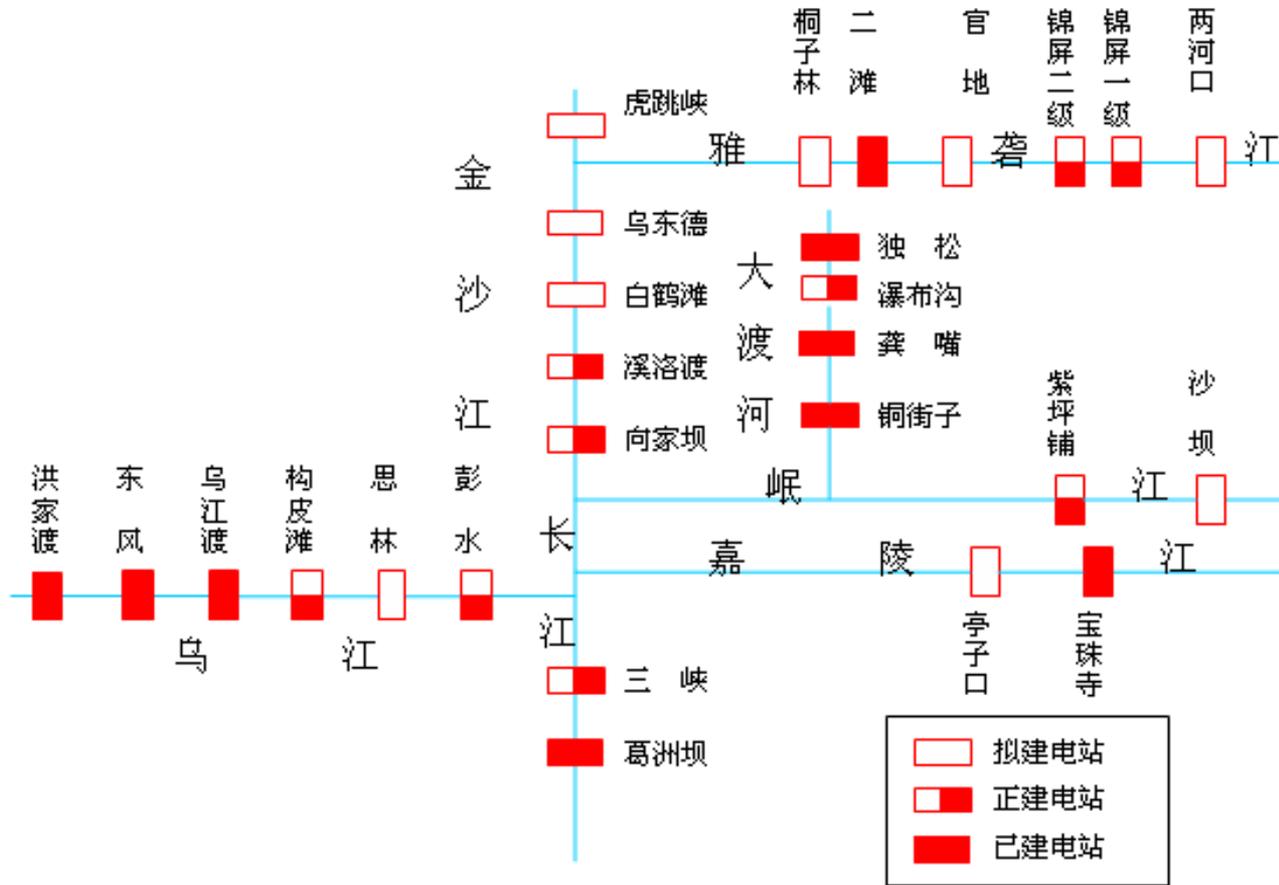


# Risks to Chinese sturgeon



River Regime Regulating Project in the last spawning area of Chinese sturgeon below Gezhouba Dam

# Dam Construction on the Yangtze River and Its Tributaries



# 4.1 Damming

- Availability:  $277.8 \times 10^6$  kW; Annual power generation:  $24336 \times 10^9$  kWh (40% of China)
- 107 hydroelectric power stations (HPS) ( $>30 \times 10^4$  kW), 52 HPS ( $>10^6$  kW), TGD ( $22.4 \times 10^6$  kW)



HPS in the middle and lower Jinsha



HPS in the upper mainstem of Yangtze

# 中华鲟



Chinese sturgeon (*Acipenser sinensis*)



Chinese Academy of Fishery Science  
Fishery Environment Monitoring Center

Enyuan Fan

# Flagship species - Chinese sturgeon

Threatened by over-fishing, dams, pollution, and navigation. Spawning stock numbers decreased by 50%-75% in the last 25 years



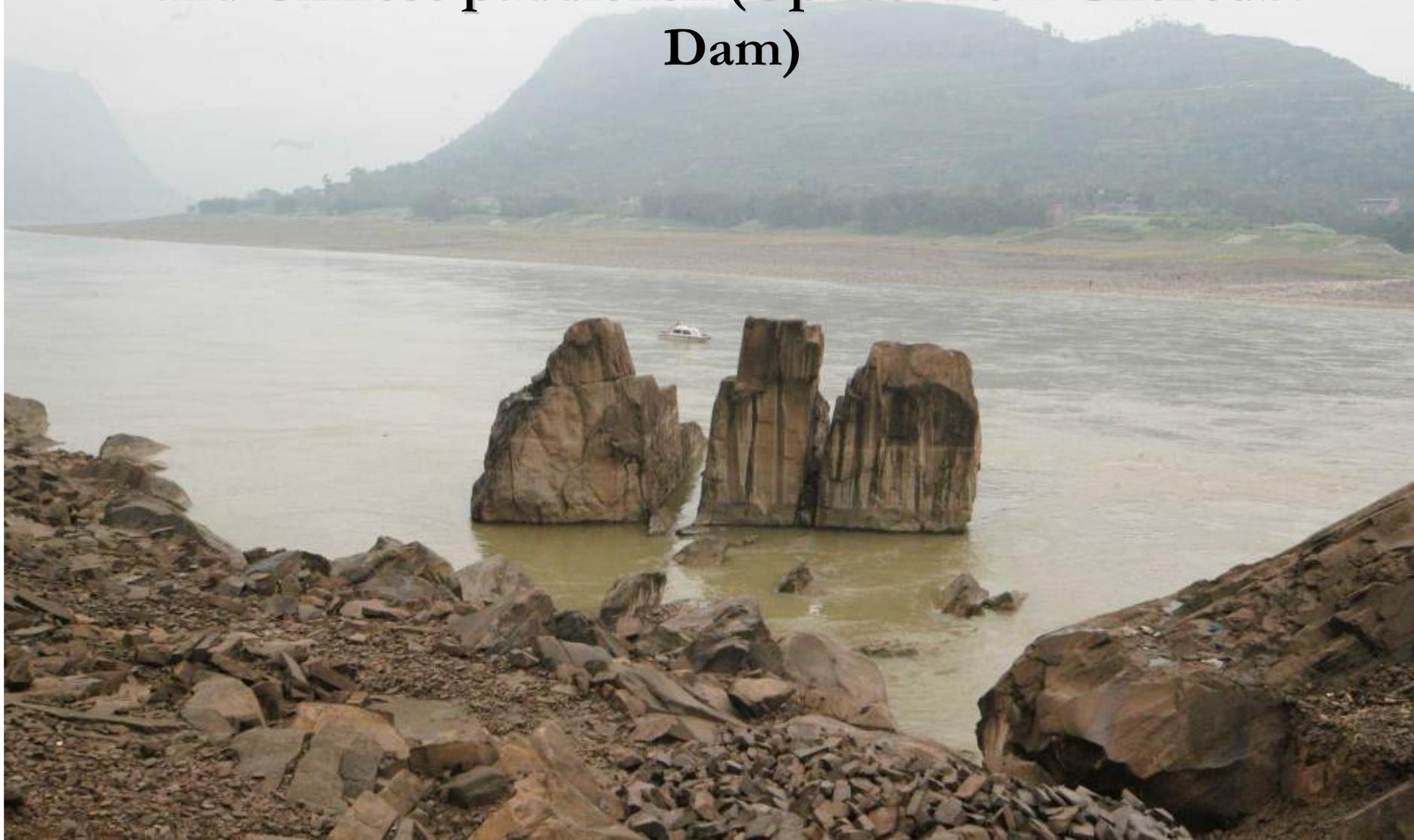
- Chinese sturgeon (*Acipenser sinensis* Gray, 1834)
  - The First Class Protected Animal of China (1989)
  - IUCN Red-list Endangered species (EN) (1996)



# Life History

- Anadromous sturgeon East China Sea
- Longest migration of any sturgeon species (2000 miles)
- Spawn 3-4 times in life av. age at mat >14 years
- Estimated natural lifespan 50-60 years
- 1970 2,000 spawning adults annually returning
- Presently less than 200 spawning adults annually
- Largest specimen >1200 lbs 12.7 ft in length

# View of a spawning ground of Chinese sturgeon and Chinese paddlefish (Upriver from Ghezouba Dam)



# Chinese Sturgeon Conservation Efforts



- Develop Captive Brood line of F1's from over 130 individuals circa 1970's
- Annual stockings of different life stages since mid 90's
- Conservation Reserve at newly found spawning area below Ghezouba Dam
- Closed fishing to the species

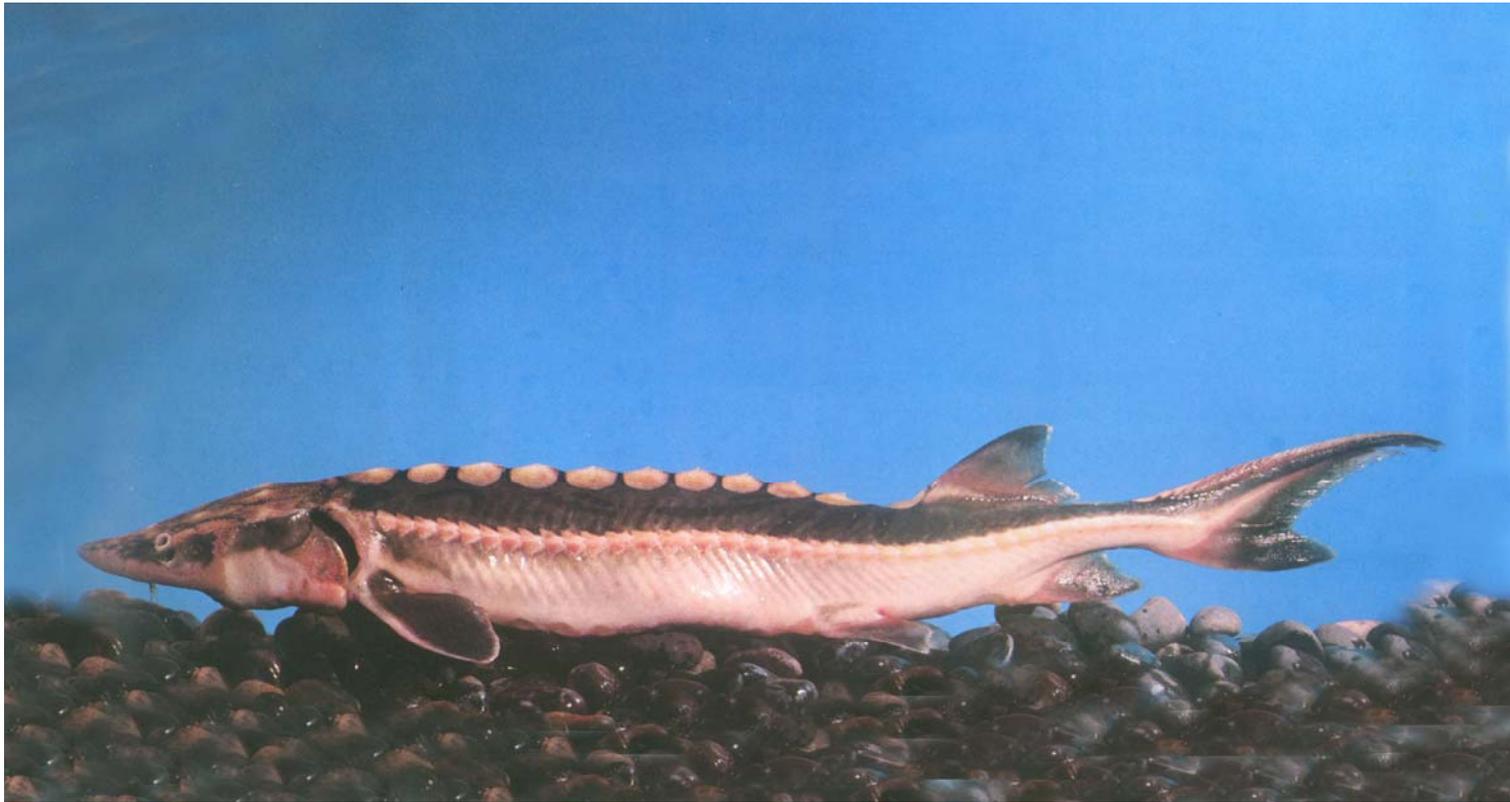


# Remaining Threats

- Navigation
- Habitat Fragmentation/Pollution
- Development in River and Watershed
- Illegal fishing and fisheries bycatch
- Ambiguity of environmental laws
- “Developing Nation” Status
- Conservation ethic slow to develop

# 达氏鲟

River sturgeon (*Acipenser dabryanus*)





# Life History

- Matures at 4-7 years of age
- Spawning historically occurred around Yibin city above Ghezouba Dam
- Migrates upstream to spawn during spring flooding
- Dabry's now only found above Ghezouba Dam

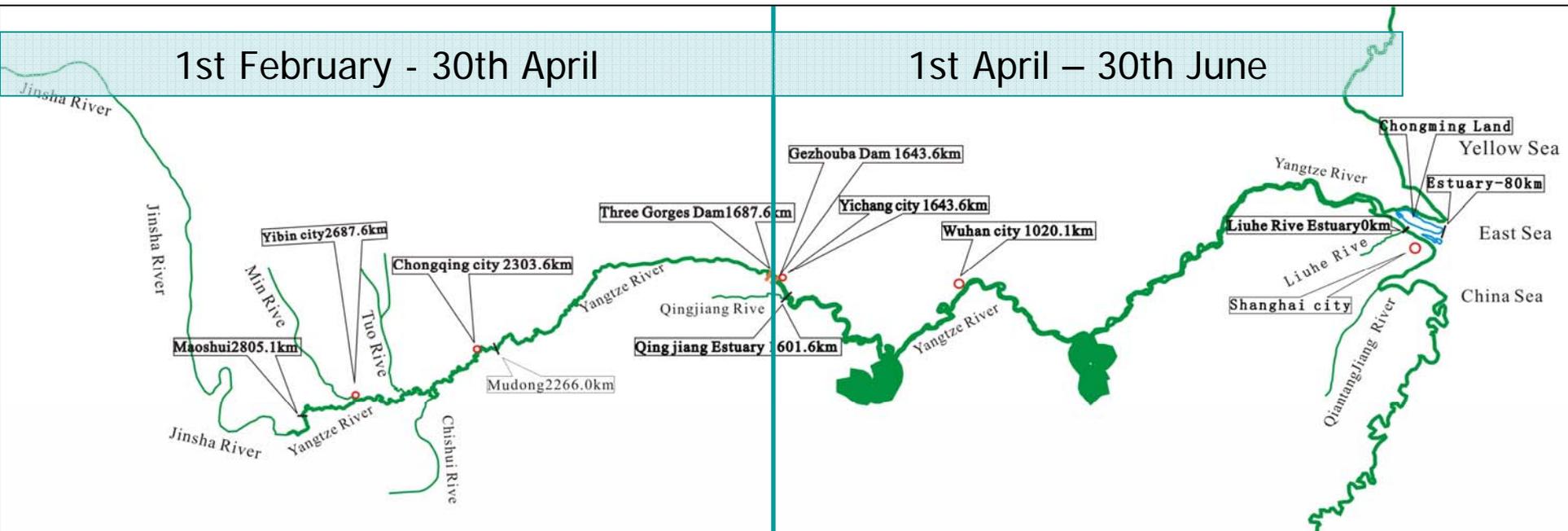
# Dabry's Sturgeon Conservation Efforts



- Small amount of yearling releases 1-2,000 annually
- Development of Captive Brood line planned
- Conservation Reserves established above Ghezouba Dam



- 5.3 Setting up Prohibited Fishing Season for fish reproduction in entire Yangtze River since 2003:



# 白鲟

Chinese paddlefish (*Psephurus gladius*)

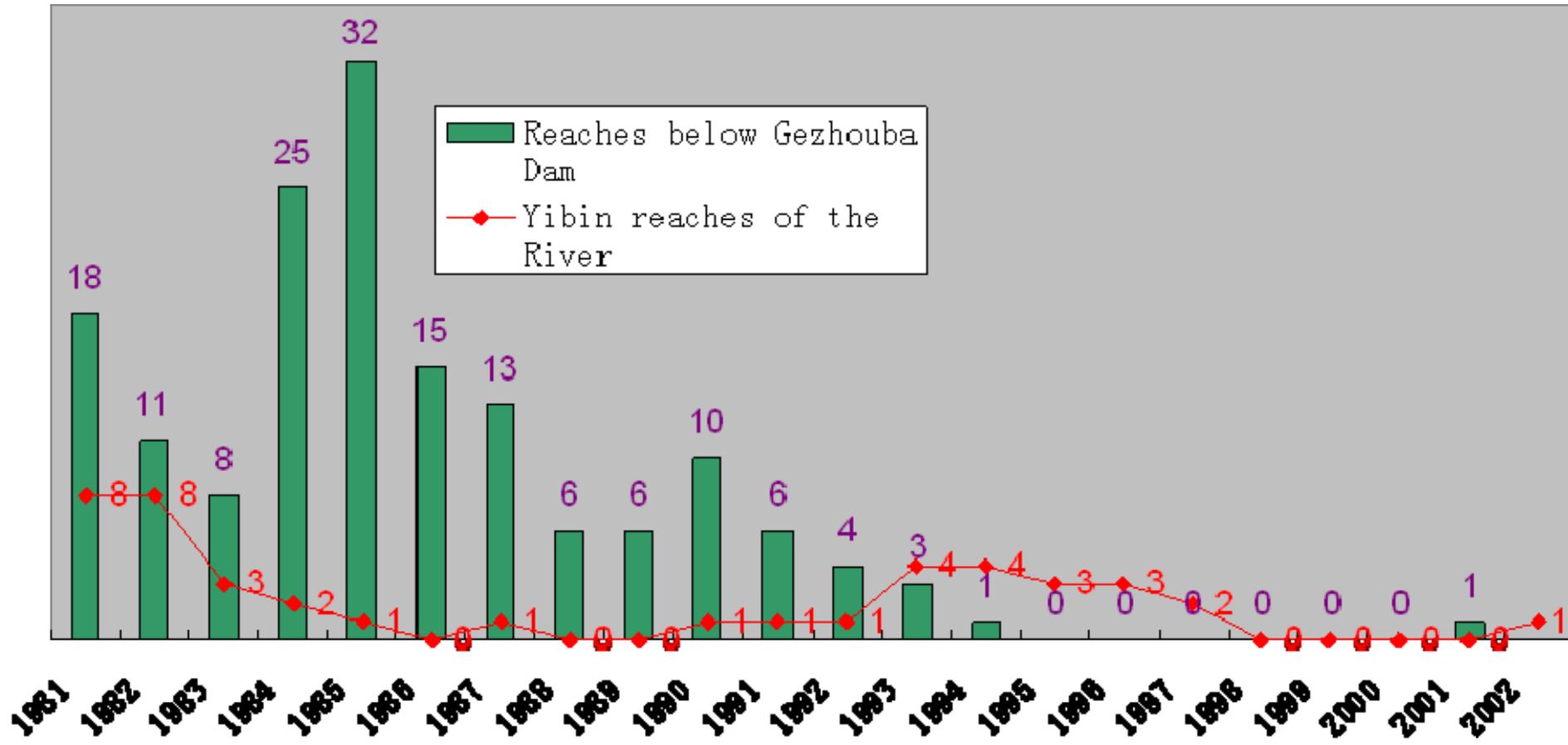




# Chinese Paddlefish Life History

- Matures at 7-8 years of age
- Can grow to 7 feet in length
- Over 250 pounds
- Spawn in upper reaches of Yangtze, exact areas unknown
- Last known sighting was 2003
- 1960-1980 75 tonnes annually were reported caught by commercial fishermen

# Incidental catches of Chinese paddlefish (1981-2002)



# Chinese Paddlefish Conservation Efforts



- Milt Cryopreservation
- Rescue Stations
- Conservation Refuges
- Research Propagation Techniques
- Never been cultured before in captivity
- Most Endangered of the Acipenseridae family in the Yangtze basin
- Causes of Decline: Overfishing, Habitat Destruction and Fragmentation, Navigation

# Other Threats to System

## South-to-North Water Diversion



- Eventual diverted volume: 44.8 billion m<sup>3</sup>/year
  - Eastern route: 14.8 billion m<sup>3</sup>/year
  - Central route: 13.0 billion m<sup>3</sup>/year
  - Western route: 17.0 billion m<sup>3</sup>/year
- Estuary: loss of nutrition





# Yangtze Sturgeon Research and Conservation Needs

- Genetics Conservation Expertise
- Milt Cryopreservation
- Development of Fisheries Areas that can be safe refugia
- Research and Assistance in Life History Requirements, Sound Conservation Stocking Practices and Essential habitat locations and preservation

# Potential priorities in US-CHINA cooperation for conservation of the Yangtze biodiversity



- ① Research the impacts of development on aquatic biodiversity: hydro-dams, water discharge regulation, dredging, boat navigation
- ② conflicts between human needs and requirements of aquatic species sustainability (habitat, life history)
- ③ sustainability of endangered fish species *in situ* and in captivity

# Proposal to ban commercial fishing in the entire Yangtze River step by step



- The catches is only about 0.1 million tons/year in entire Yangtze river, or 2 billion CNY/year in sale income
  - It is economically unsound: only 0.83% of aquaculture products in the Yangtze Basin, but 50% costs with diesel oil, and **will be more**
- Step by step to implement the fish moratorium plan
  - Firstly, mainstem river, then tributaries
  - Upper to lower reaches, then the whole stem river, then Dongting and Poyang lakes
  - To reduce fishing vessels
    - Fishermen compensation=51000 fishing boats×20000 **CNY/year=1.2 billion CNY/year**
    - Allowance of diesel oil=51000 fishing boats×2000 CYN/year=0.12 billion CNY/year paid by center government. **10 years = 1.2 billion CNY**
  - Fishermen's way out: to transfer the commercial fishing to other industries, such as
    - Sport fishing
    - Aquaculture

# To make a regulation for sport fishing in nature waters of Yangtze River

Angling is totally free in Yangtze River



Yichang Reach, Hubei Province

## To set up a tax system for sport fishing: big income?

- lures, bait, lines, rods, reels, nets and trawls, downriggers, outriggers, gaffs, harpoons, clevises, floats, and traps
- Sport fishing people: at 5% of population in the Yangtze basin or 20 million people
- Tax (income): 20 million people participate sport fishing = 100CNY/year.person×20 million = 2 billion CNY /year?

- Fishermen assist management of sport fishing
- To encourage Eco-tourism



# Is it enough?

- TNC/USGS and other NGO efforts in Basin
- Build conservation expertise in the development and management of existing and planned hydropower projects in the Basin
- Develop Conservation Blueprint for Country
- Supply Technical Expertise in Conservation Programs and Rescue Efforts
- Requested Tour of Large River Systems of U.S. impacted by Water Management Projects