Ecological requirements in operation of the Three Gorges Project

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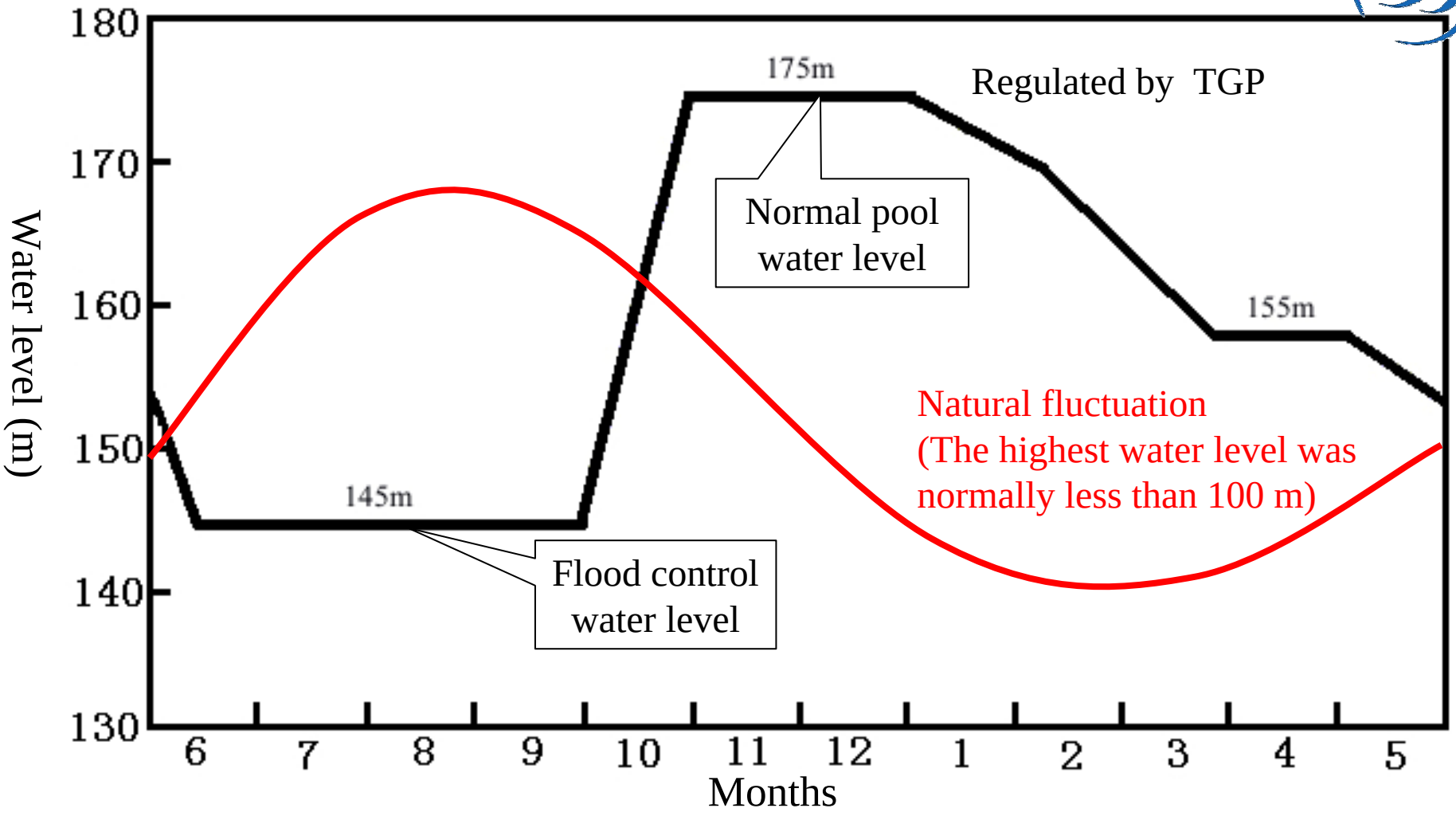
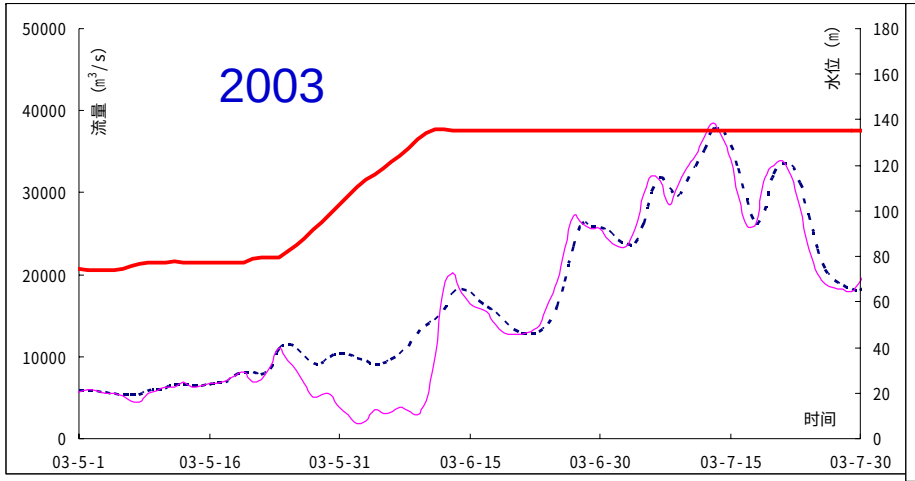
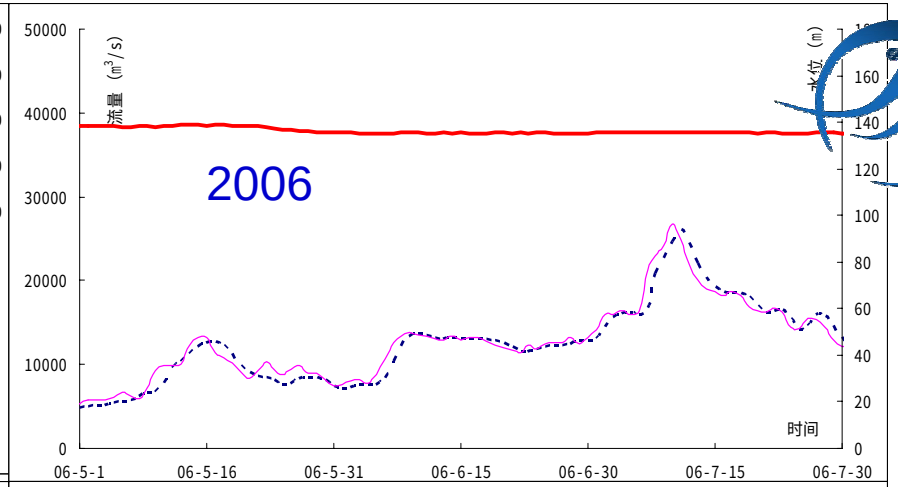
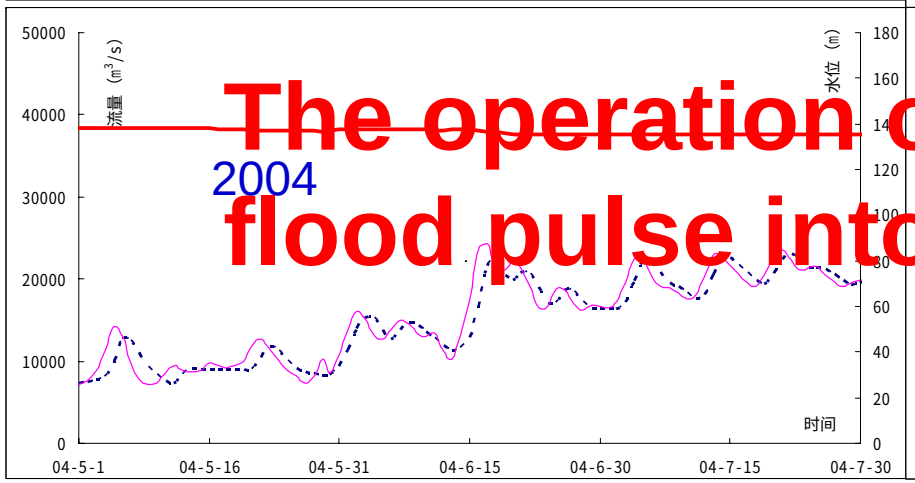
Content

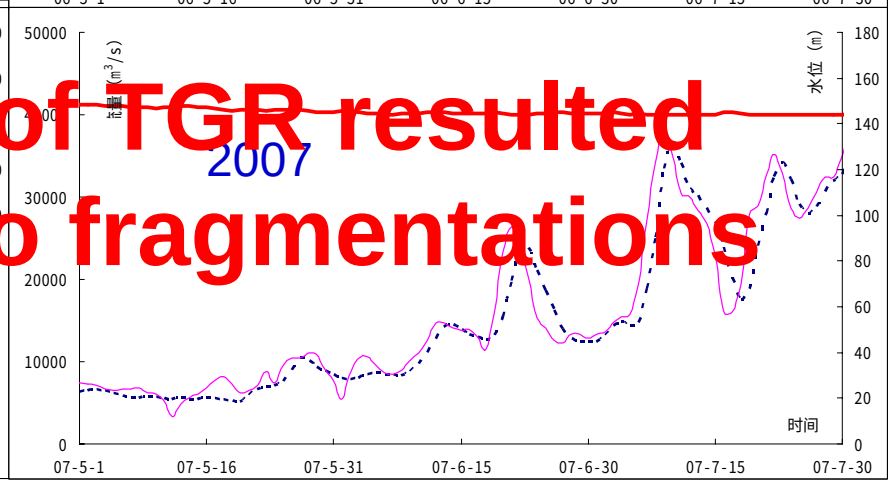


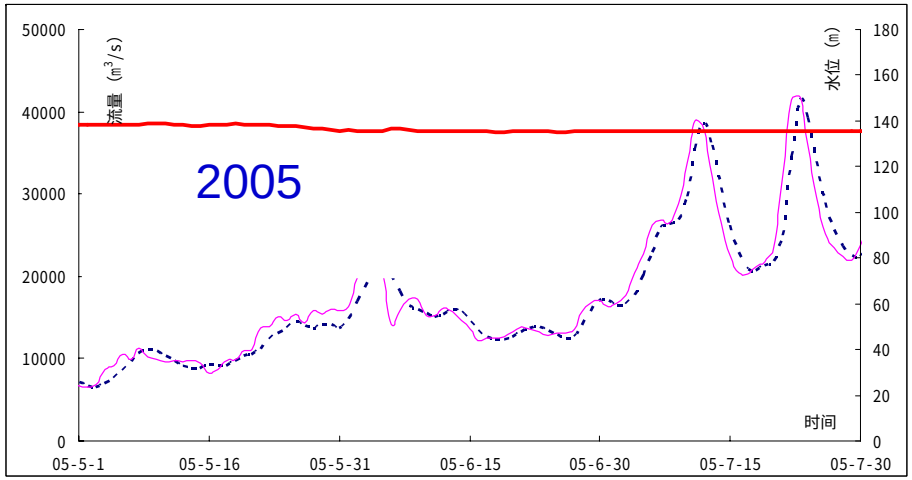
Reverse seasonal fluctuations in the reservoir











The operation of TGR resulted flood pulse into fragmentations

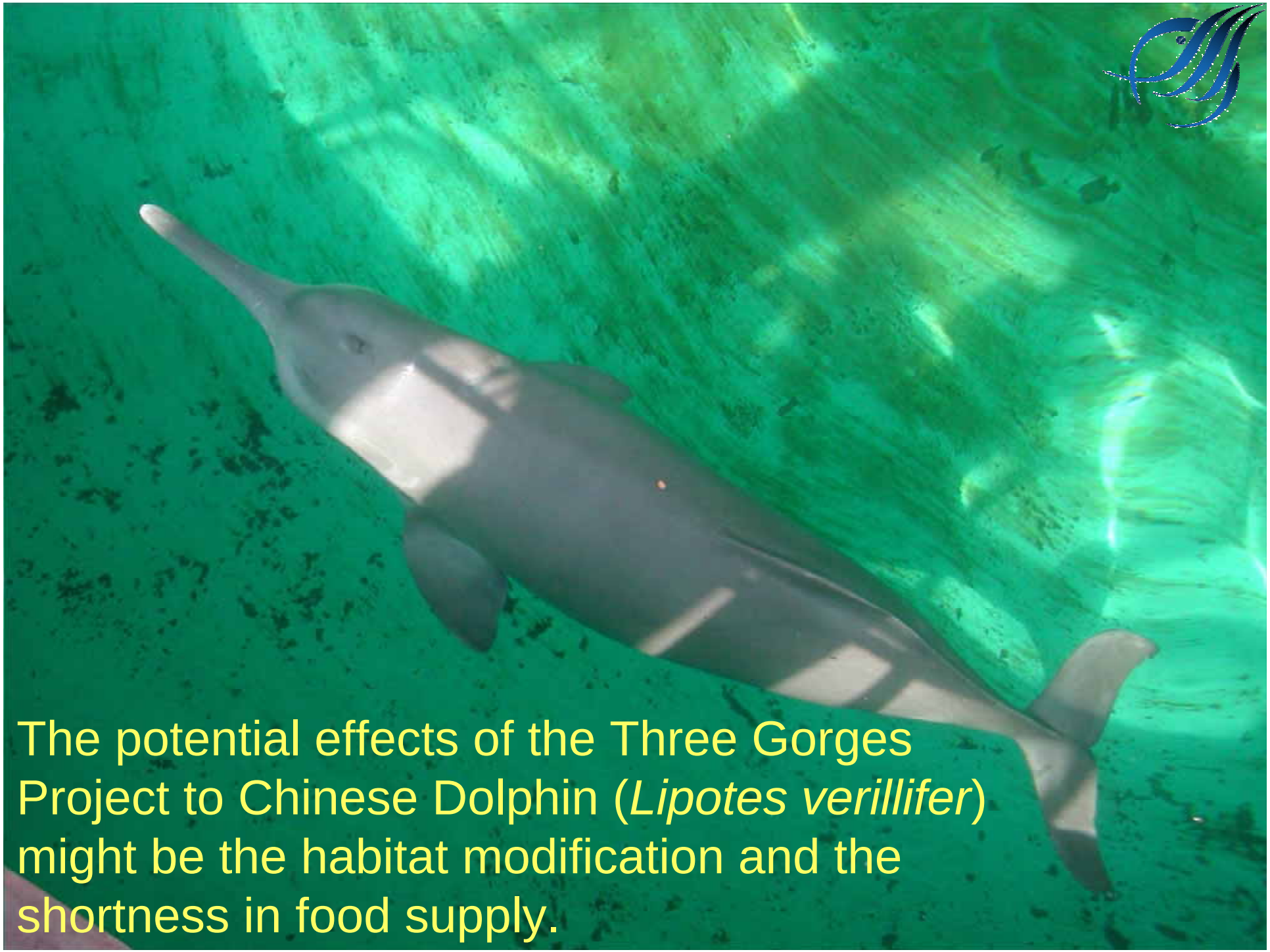
Estimation on differentiations in water levels in Yichang Reach (with/without the operation of TGR)

- **Discharge without TGR**
- **Discharge with TGR**
- **Water levels in TGR**

Habitats and flow regimes simplification will be harmful to the most of endemic fish species of the upper Yangtze

Reservoir with simple habitats

Natural riverbed with complicated flow regimes and habitats



The potential effects of the Three Gorges Project to Chinese Dolphin (*Lipotes verillifer*) might be the habitat modification and the shortness in food supply.

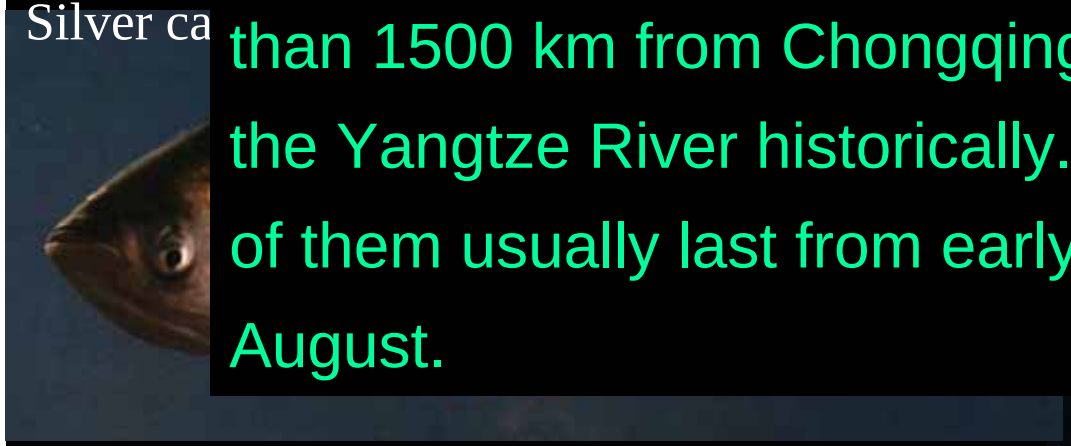
Reduction in discharge of the Three Gorges Reservoir might disturb the natural propagation activities of the sturgeon.

Incubation and early development of Chinese sturgeon (*Acipenser sinensis*)

Black carp (*Mylopharyngodon piceus*)

These wild populations of the four domesticated carps normally take three to five years for maturation. They spawn in fast running flow (main channel usually) and feed in lentic habitats (lakes and seasonal submerging areas). Their spawning sites distribute in a reach more than 1500 km from Chongqing to Hukou sections in the Yangtze River historically. The spawning seasons of them usually last from early May to the end of August.

Silver ca



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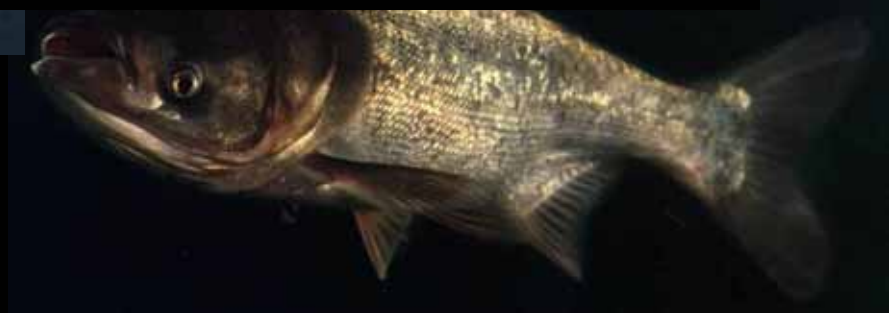
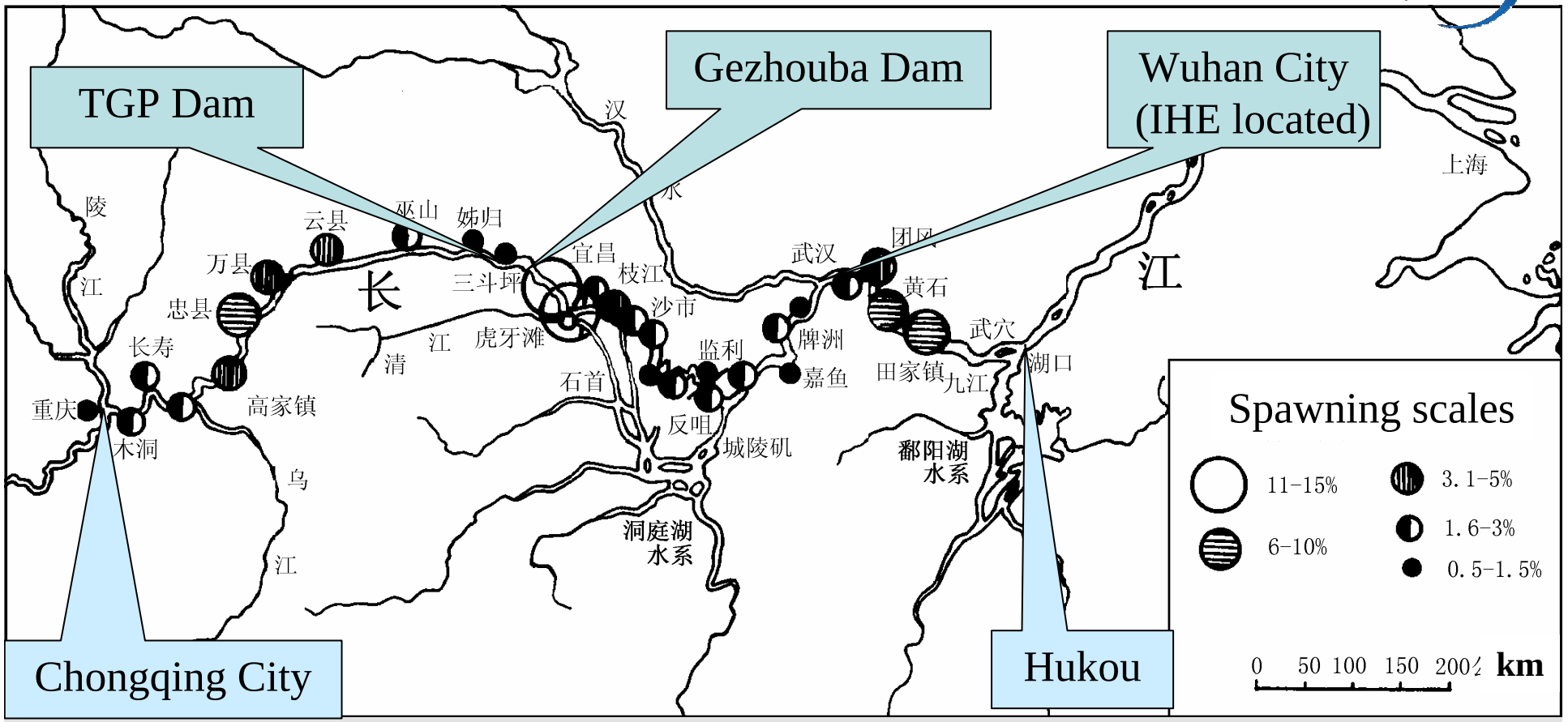


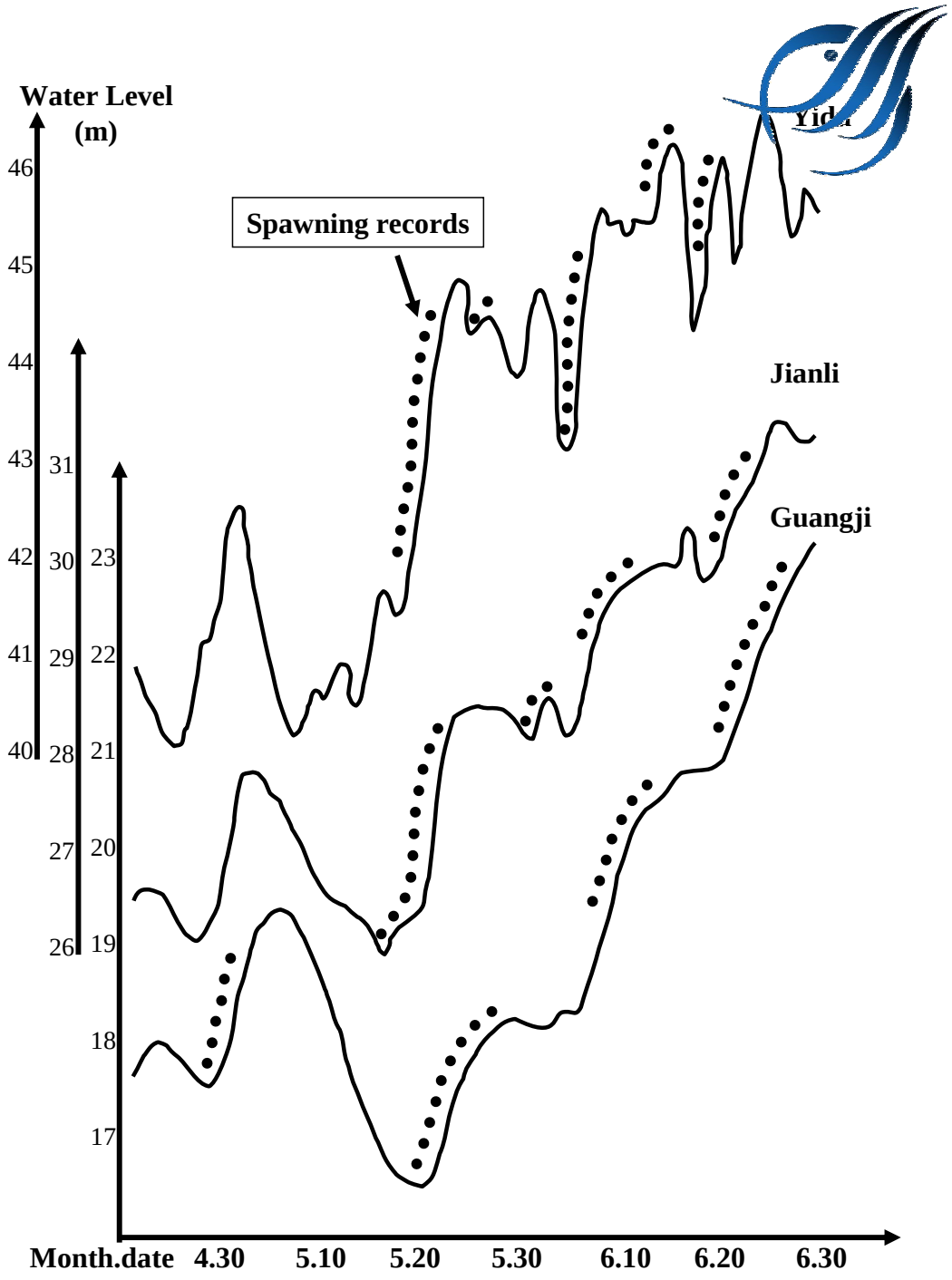
The four domesticated carps

Distribution of spawning sites of the four carps in the Yangtze River



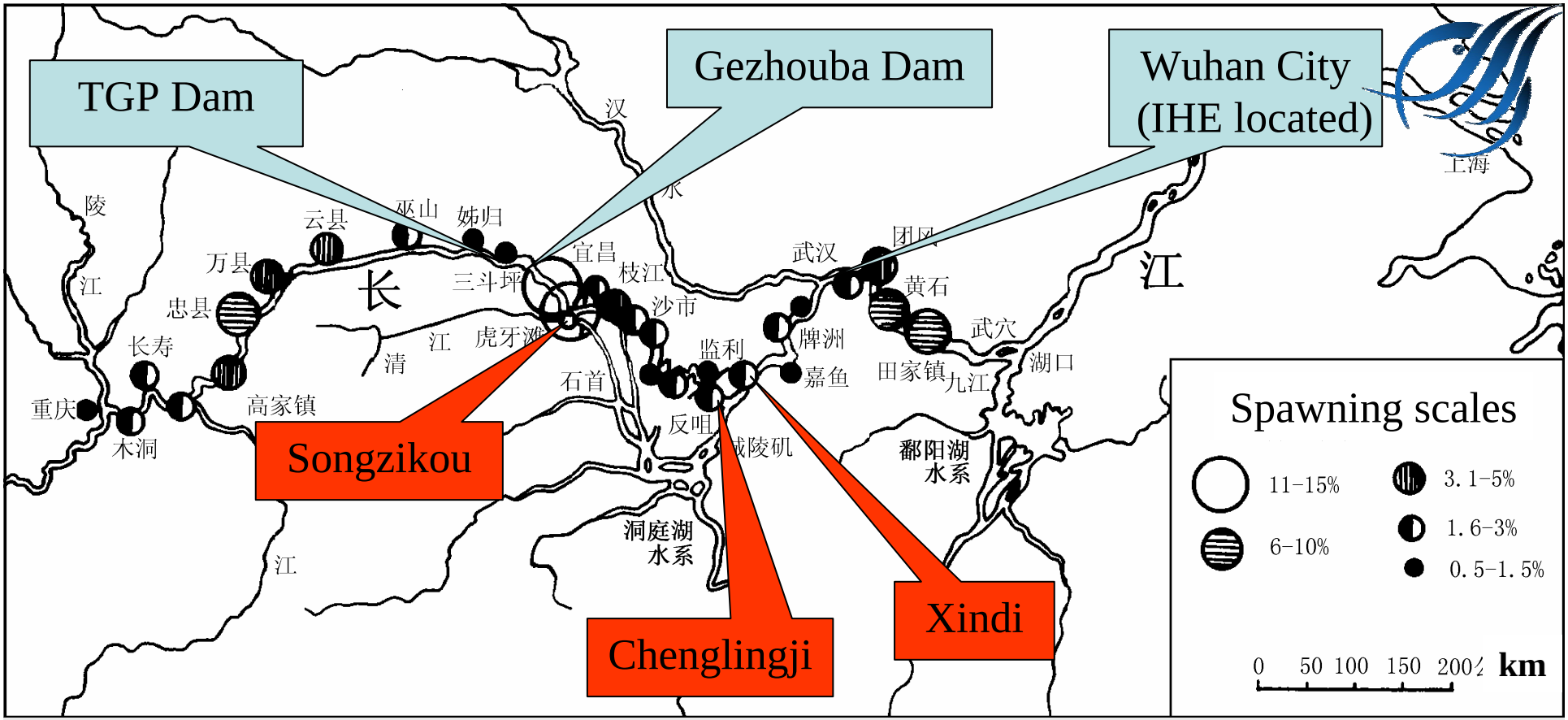
After the construction of the Gezhouba Dam in 1981, there are still 30 spawning grounds of the four carps remained in the Yangtze River. Eight of them located in upstream of the dam site, which made up 20% of the total egg production in the river and will be eliminated after the impoundment of TGR.

Long term investigations have indicated that all the four carps spawn only when the water level rising. However, how to describe the relationship between natural spawning of the four carps and water level fluctuations is still unaccounted



A flooding process was divided into nine variants in order to simulate the requirements of the four carps to the hydrological conditions based on a method of “Factor-criteria system reconstruction analysis” (Zhang et al. 2000)

V_1 Starting water level of a flood period
V_2 Daily increasing rate of water level
V_3 Starting flow amount in a section
V_4 Daily increasing rate of flow amount
V_5 Duration of water level rising in a flood period
V_6 Interval between a flood period and its former flood period
V_7 Difference of water level between a flood period and its former flood period
V_8 Starting date of a spawning period
V_9 Order of a larval flood



Songzikou: Starting water level 37.6-38.9 m, Increasing rate of water level 1.05-1.25 m/d, starting flow 12200-15600 m^3/s, increasing rate of flow 1310-1550 $m^3/s/d$, 5 or 6-day duration of water level.

Chenglingji: Starting water level 26.7-27.8 m, Increasing rate of water level 0.31-0.38 m/d, starting flow 21560-27540 m^3/s, increasing rate of flow 1220-1450 $m^3/s/d$, 10-day duration of water level.

Xindi: Starting water level 26.5-28.0 m, Increasing rate of water level 0.25-0.30 m/d, starting flow 25600-33240 m^3/s, increasing rate of flow 2110-2500 $m^3/s/d$, 10-day duration of water level.

Thanks for your attention

Q & A

2008.11.04, the 5th International Forum on Waterfront and Watershed Restoration, Tsinghau University, Beijing