Jun 23rd, 2:30 PM - 2:45 PM

Session E5: What Should We Know About Behavior of Sturgeons to Provide Their Efficient Passage?

Dmitrii Pavlov
A.N. Severtsov Institute of Ecology & Evolution, Russian Academy of Sciences, Moscow, RUSSIA

Victor Mikheev
A.N. Severtsov Institute of Ecology & Evolution, Russian Academy of Sciences, Moscow, RUSSIA

Mikhail Skorobogatov
A.N. Severtsov Institute of Ecology & Evolution, Russian Academy of Sciences, Moscow, RUSSIA

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Dmitrii Pavlov, Victor Mikheev & Mikhail Skorobogatov

A.N. Severtsov Institute of Ecology & Evolution, Russian Academy of Sciences, Moscow, RUSSIA

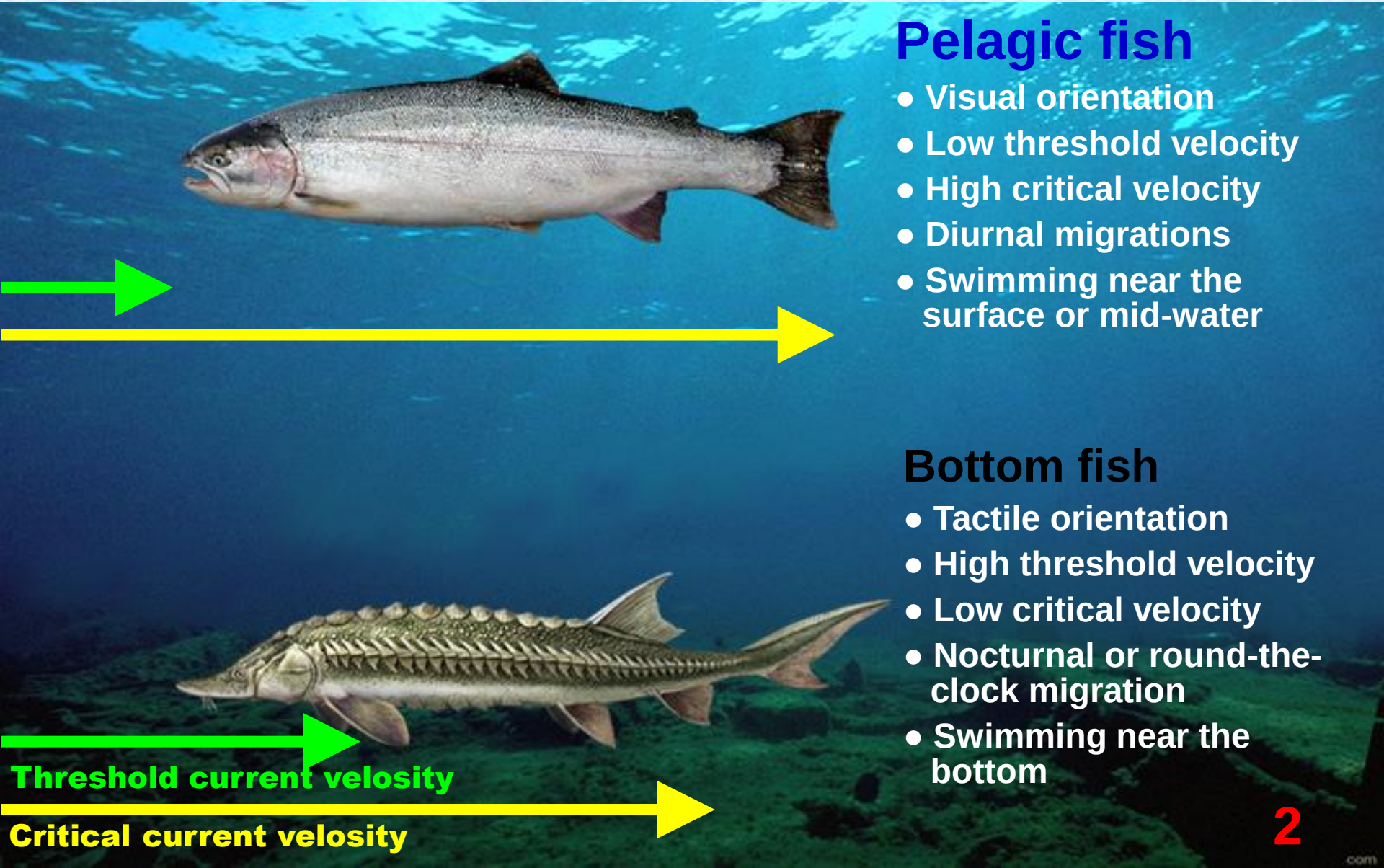
Main issues:

- Behavior of sturgeons migrating upstream

- Fish passage facilities: structure and biological basis of operation

- Examples of sturgeon passage in the Volga, Don and Kuban rivers. Contemporary state.

Behavioral patterns of pelagic and bottom fish migrating in rivers

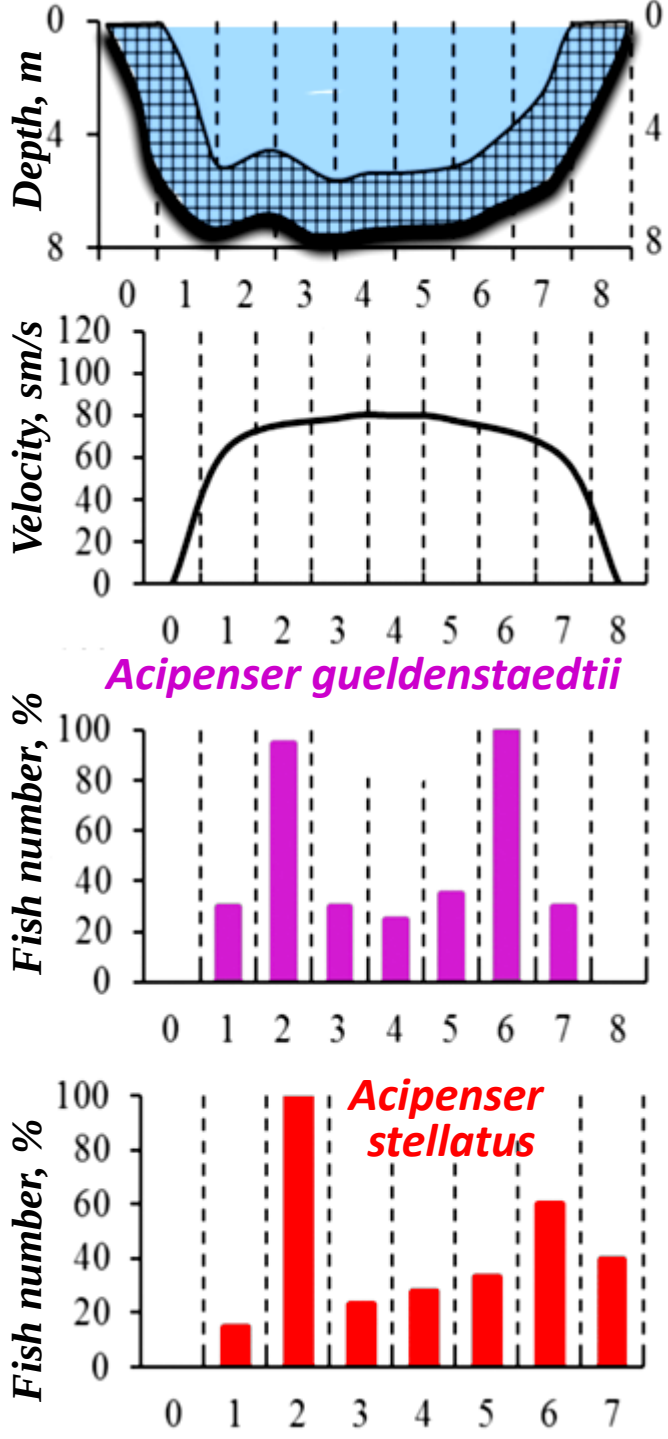


Pelagic fish

- Visual orientation
- Low threshold velocity
- High critical velocity
- Diurnal migrations
- Swimming near the surface or mid-water

Bottom fish

- Tactile orientation
- High threshold velocity
- Low critical velocity
- Nocturnal or round-the-clock migration
- Swimming near the bottom



Location of drift net (cross-section of the river)

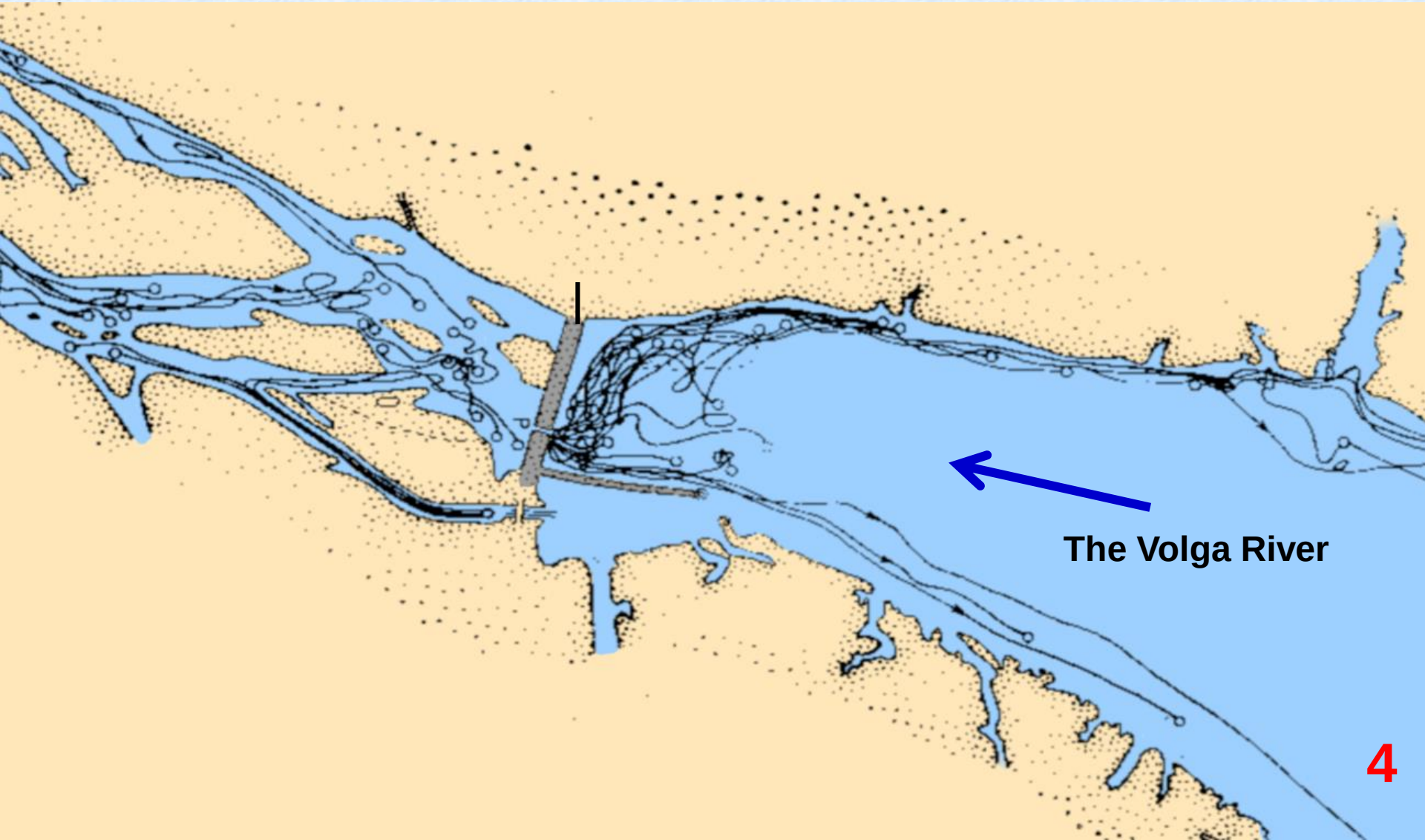
Flow velocity at the zone of sampling

Distribution of migrating fish

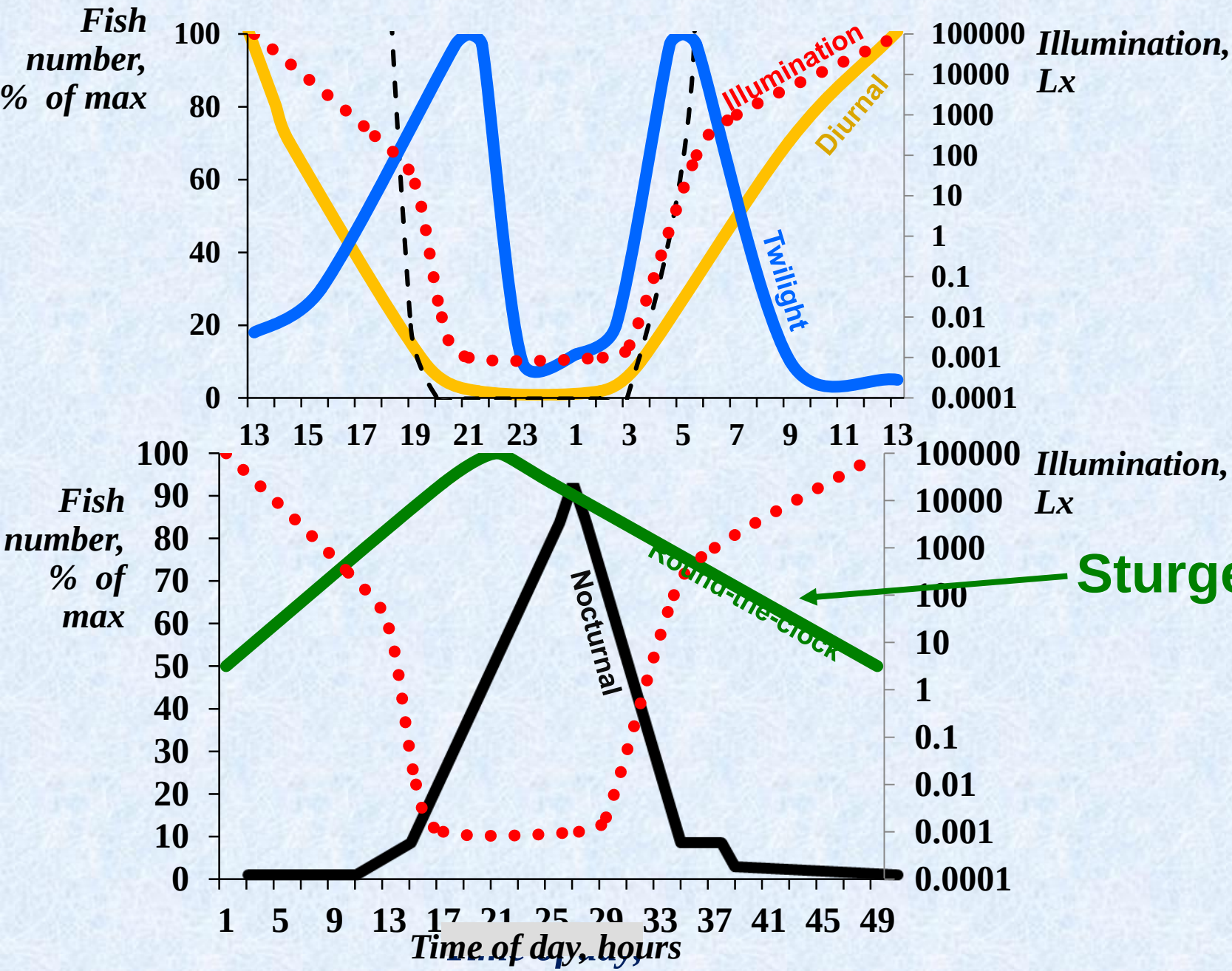
Cross-river distribution of fish in the Lower Volga during spawning migrations

Tracks of *Acipenser gueldenstaedtii* in tail water and head water of the Volgograd dam

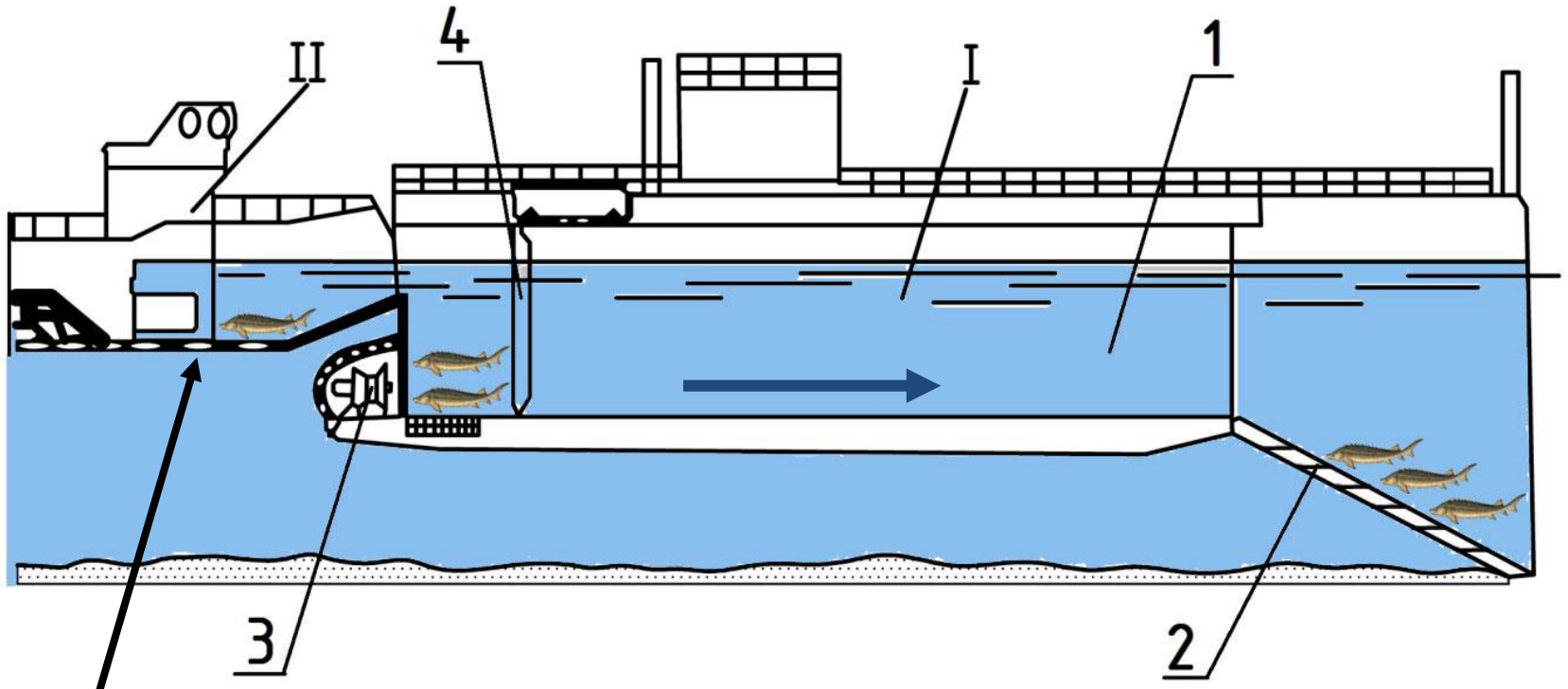
(from Poddubnyi & Malinin, 1988)



Patterns of dial changes in fish spawning migrations



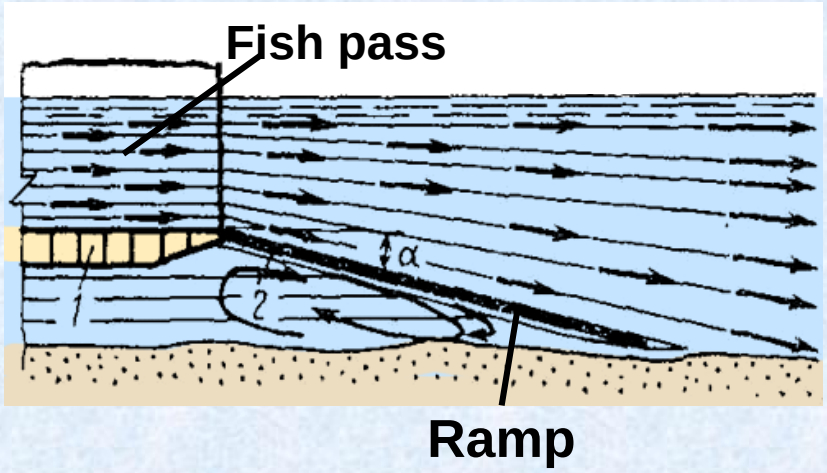
Experimental movable fish collector



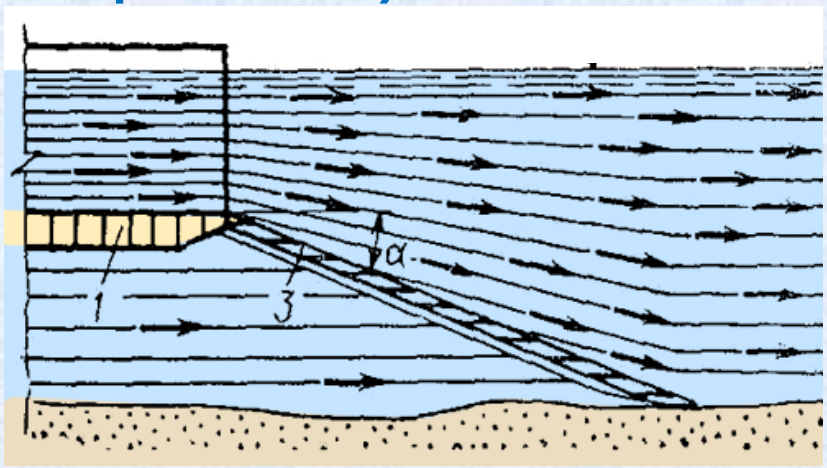
1 – fish collector, 2 – ramp, 3 – pumps, 4 – movable screen *(to concentrate fish)*

Modifications of the water flow in front of the movable fish collector

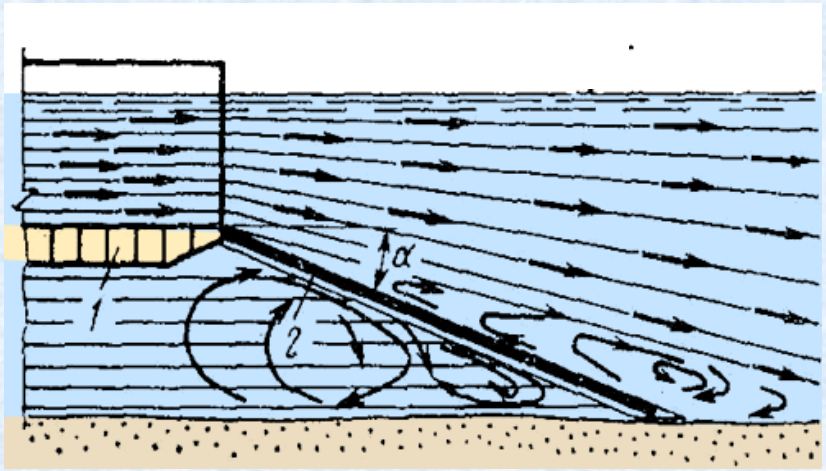
Watertight ramp. Small angle



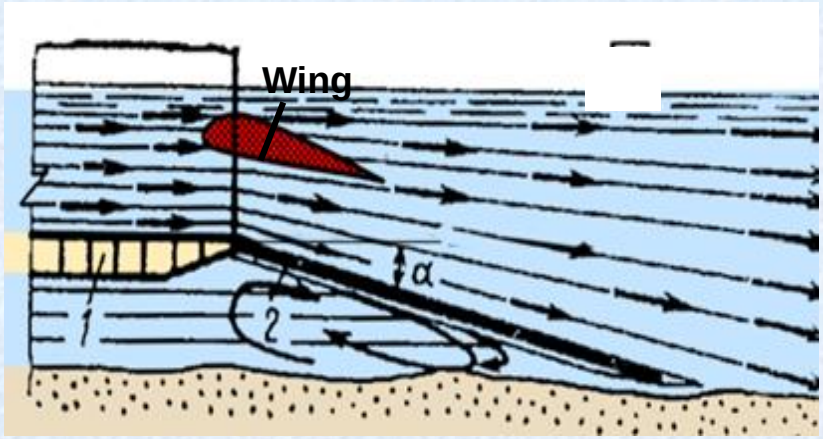
Ramp with slots (water-permeable). No vortices.



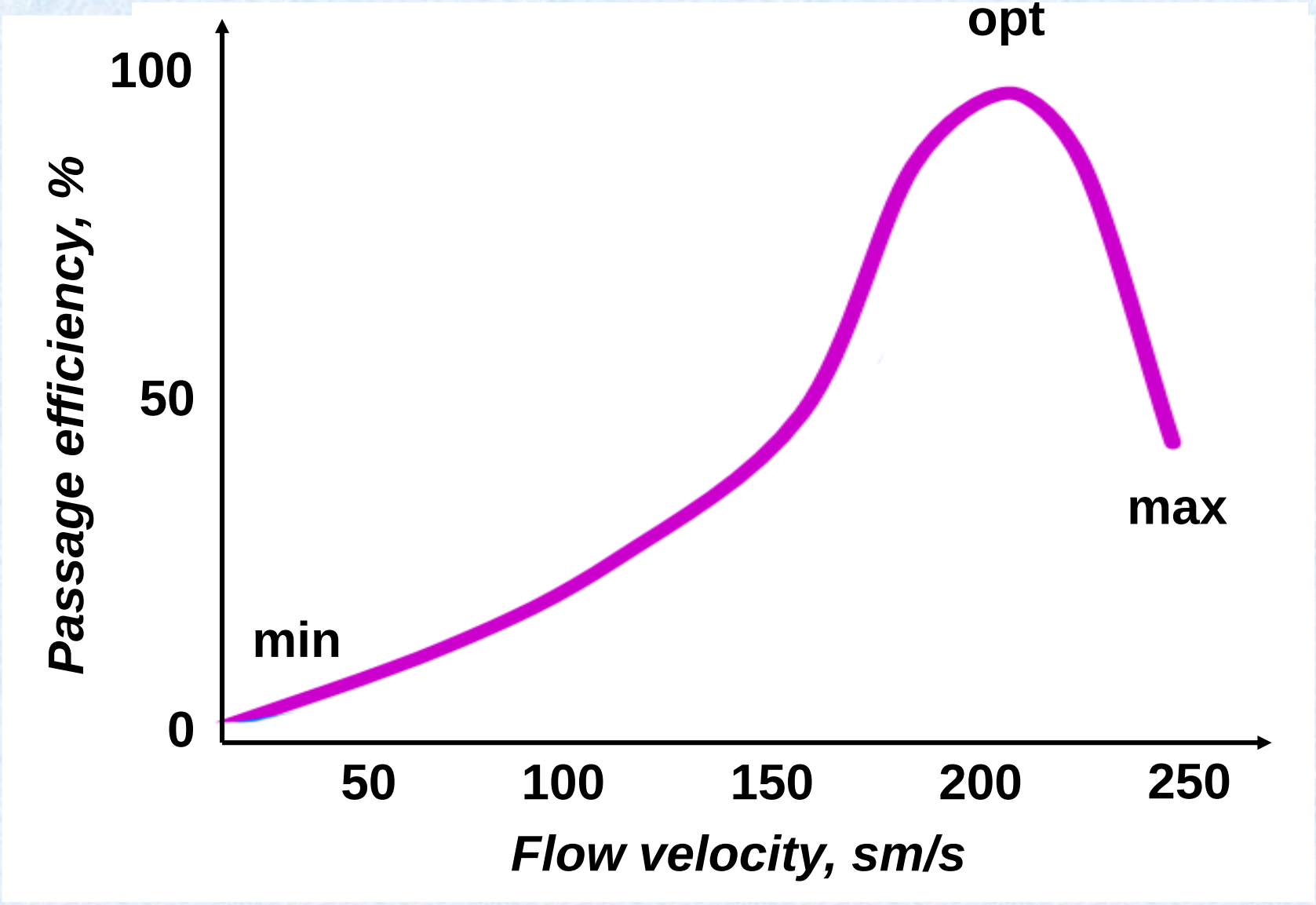
Watertight ramp. Large angle



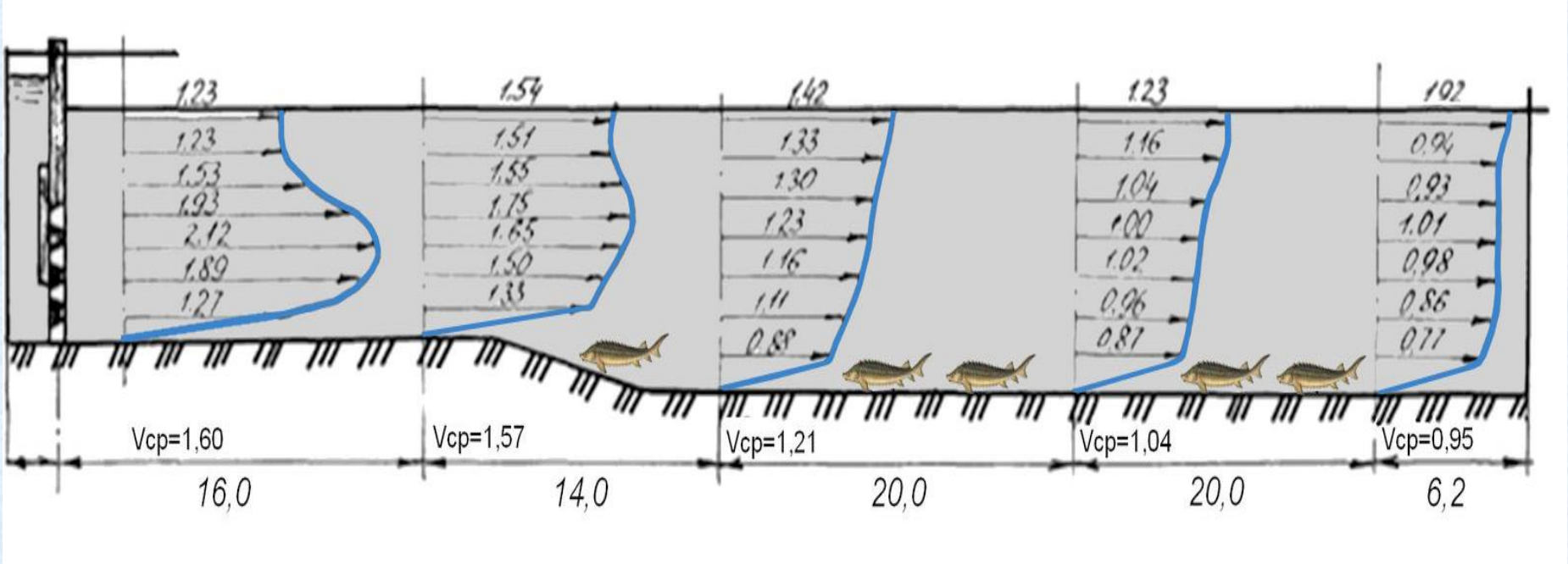
Watertight ramp, “hydraulic wing”



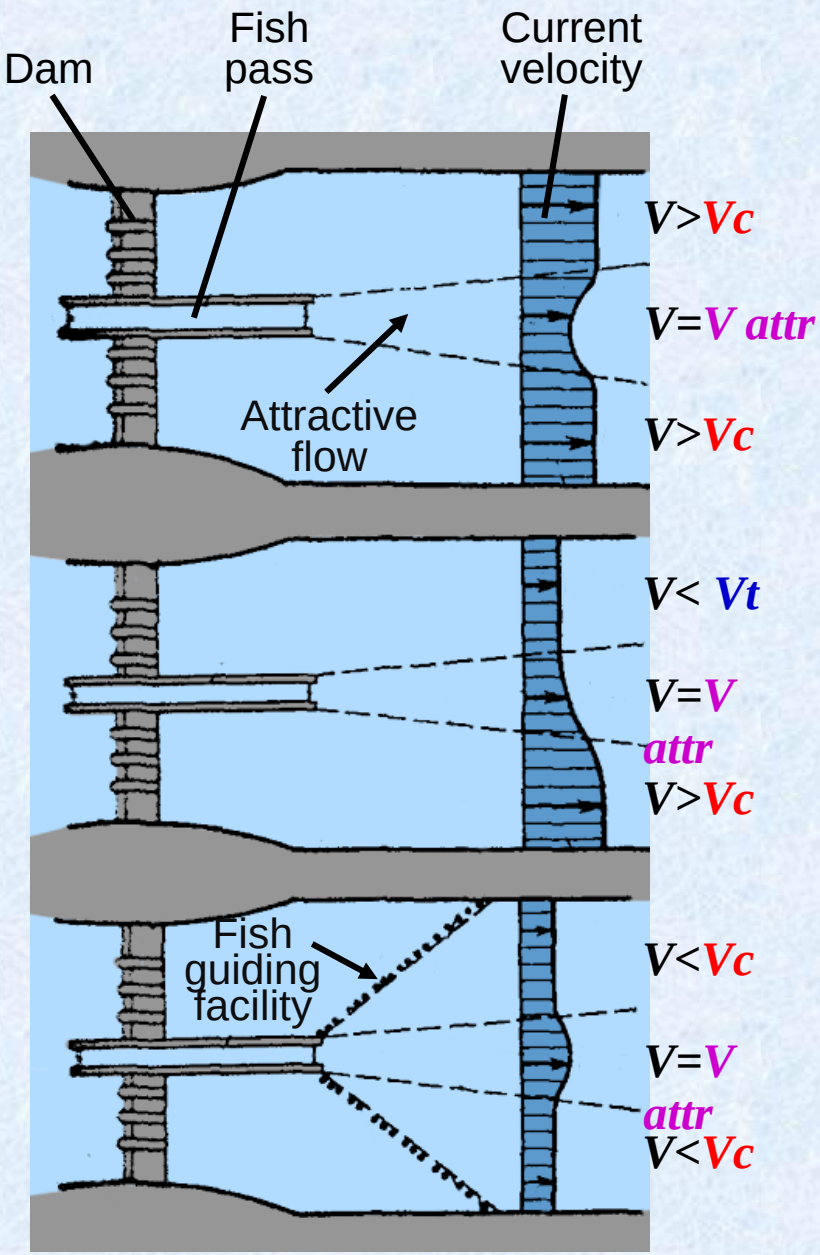
Velocity of attractive flow influences number of passed fish

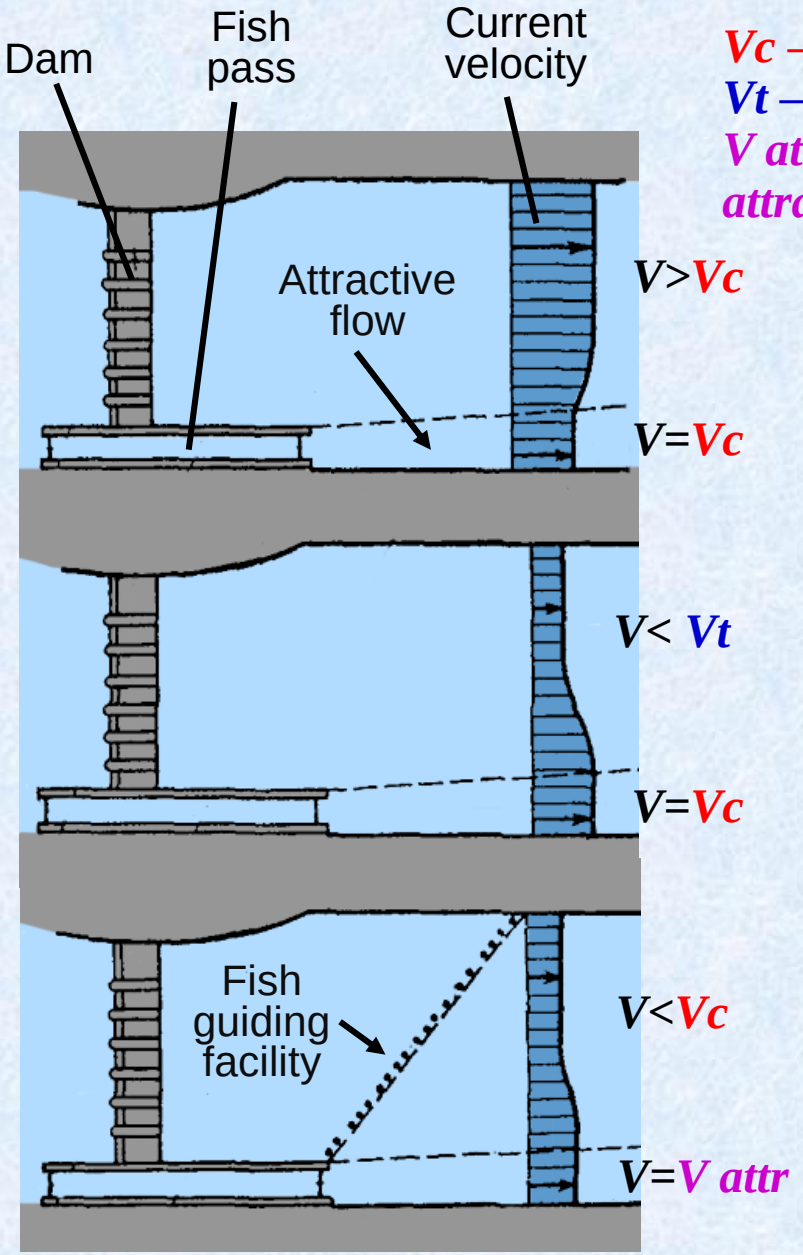


Flow velocity profiles within the fish collector



Hydraulic schemes of fish attraction



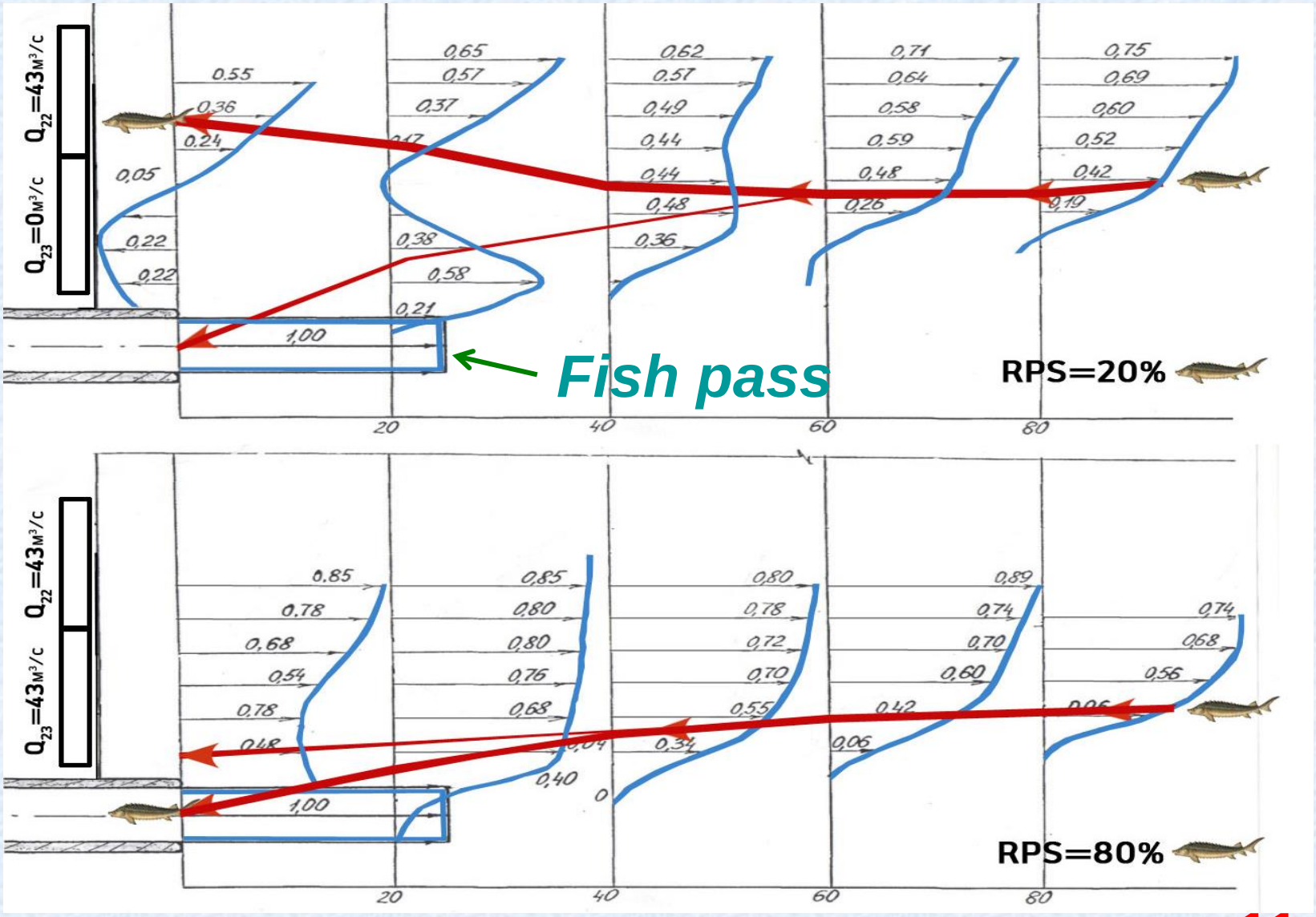


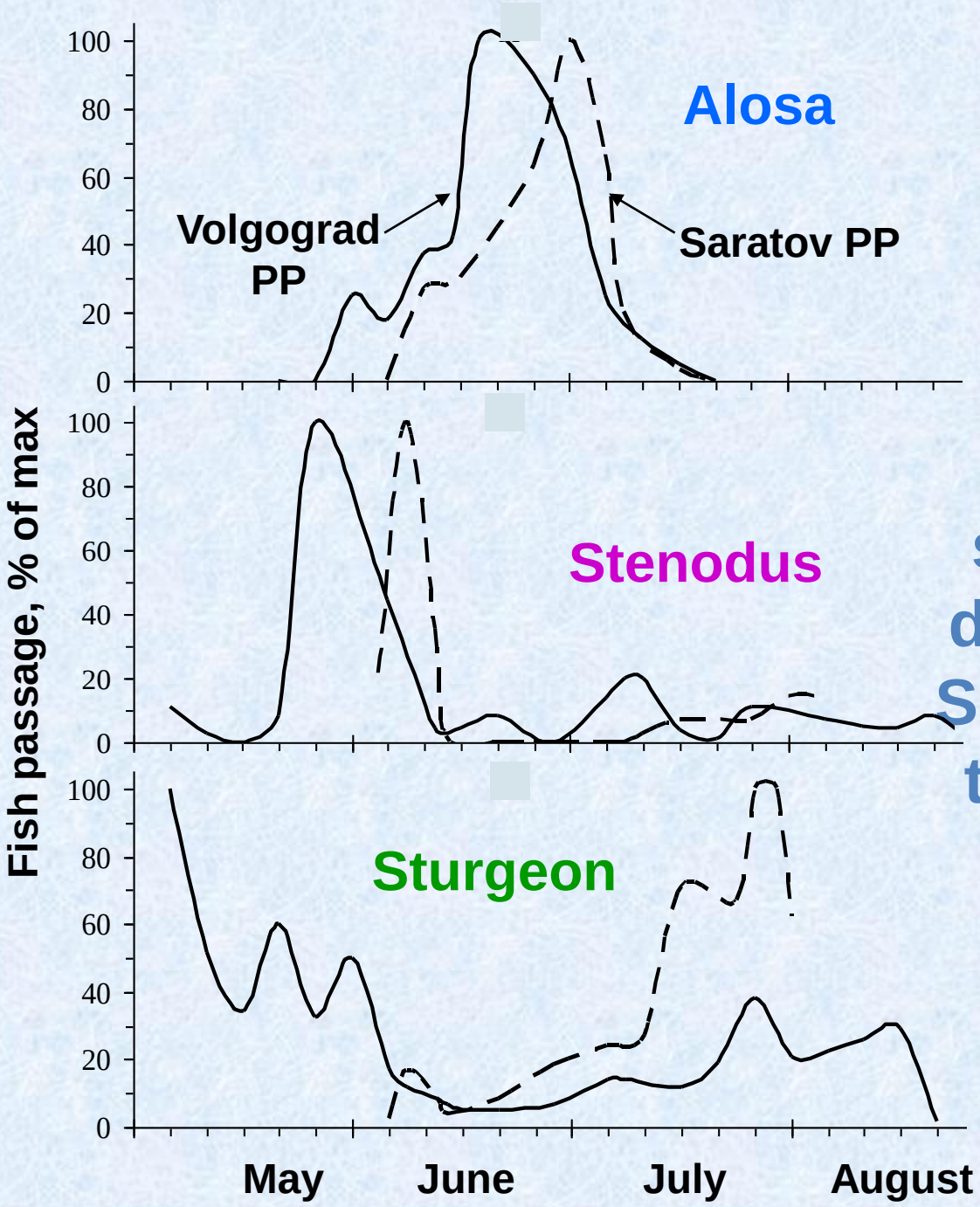
Vc – critical
Vt – threshold
V attr – attractive

Flow velocity patterns in the tale race of Saratov power plant near the fish pass

One turbine works

Two turbines work





Sturgeons move slower between two dams (Volgograd and Saratov Power Plants) than other migrants.

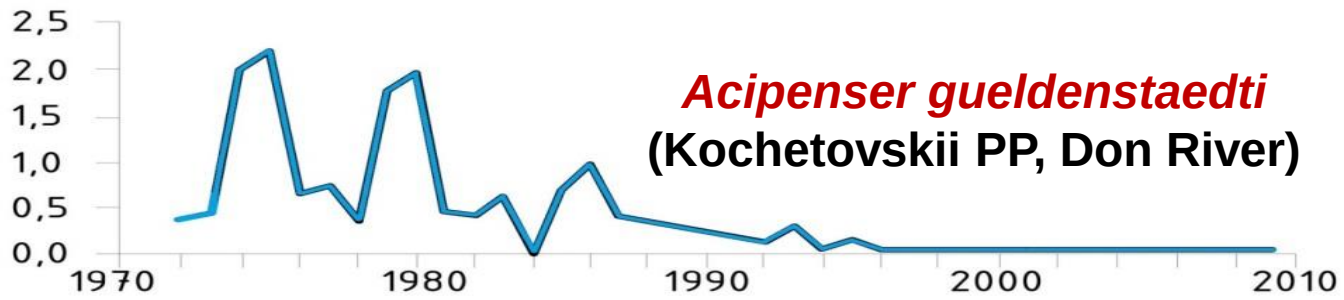
Kuban River. Tikhovskii Power Plant equipped with fish passage locks (2) to pass sturgeons

Kuban River. Fedorovskii (A) and Krasnodarskii (B) Power Plants equipped with fish passage facilities to pass sturgeons

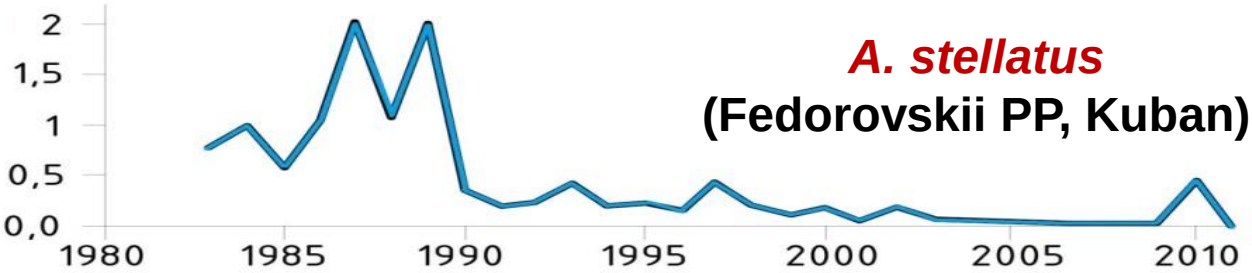
A)

B)

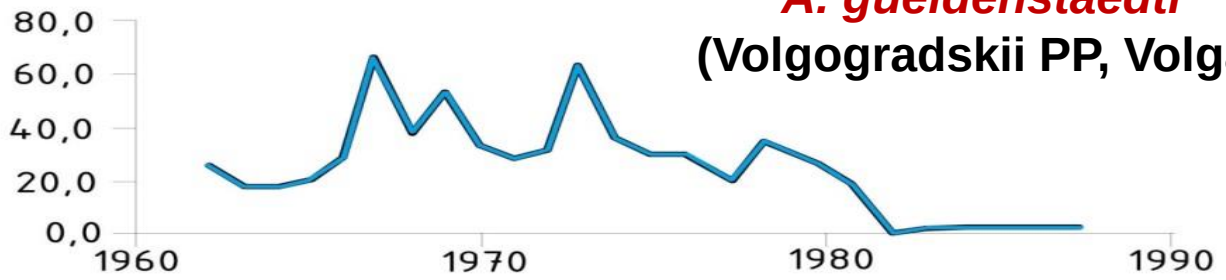
Annual number of passed sturgeons (thousand fish)



Acipenser gueldenstaedti
(Kochetovskii PP, Don River)

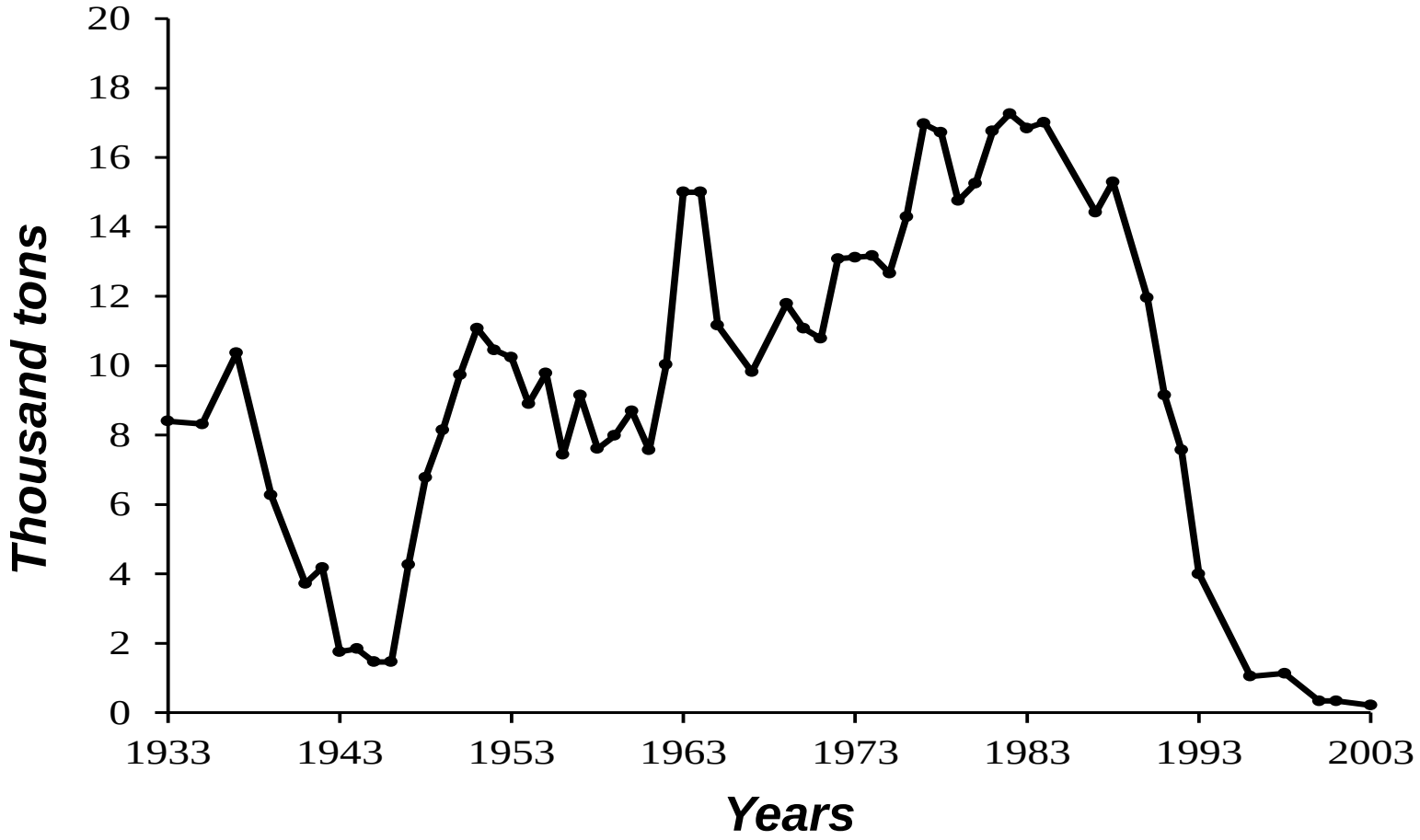


A. stellatus
(Fedorovskii PP, Kuban)



A. gueldenstaedti
(Volgogradskii PP, Volga)

Annual commercial catch of sturgeons in the Russian part of Caspian basin




THANK YOU!