Establishing fish stock recovery areas in the Black Sea Region – a key measure for sturgeon/fish populations revival

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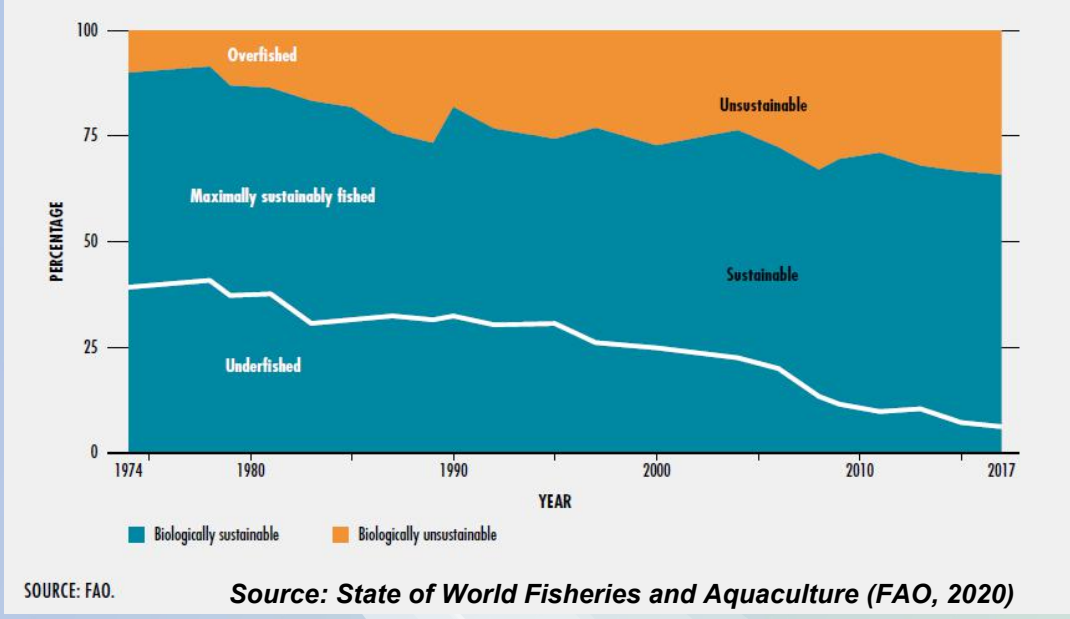
Global fishery

- key contribution to SDGs
- employment > 39 mil. people (2018)
- capture fishery > 150 bil. USD (2018)

Source: FAO, 2020

HOWEVER
Over 90% of fish stocks overfished or exploited at maximum sustainability level



Source: State of World Fisheries and Aquaculture (FAO, 2020)

Black Sea fishery

- 75% fish stocks overexploited in 2018 (a decrease from 88% in 2012)
- Dominance of small pelagic species (low income)
- Top commercial species: European anchovy, whiting, horse mackerel
- Revenue > 250 mil. USD

Source: FAO, 2020

Landings/country	Average 2016-2018, t
Bulgaria	8,503
Georgia	70,869
Romania	8,046
Russian Federation	70,006
Turkey	273,977
Ukraine	7,214
Total	438,615

Perspectives ?

Overexploitation aggravates fish stocks decline – increased CPU, more aggressive fishing tools

Impact on habitats and remaining stocks will increase:

- intensive trawling nearly wiped out bottom living species in the Irish Sea (*Thurstan & Roberts 2010),*

- seabed trawling had severe adverse effects on benthic communities/habitats *(ICES, 2019, Cyrielle et al., 2020)*

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Increasing risk of fishery collapse

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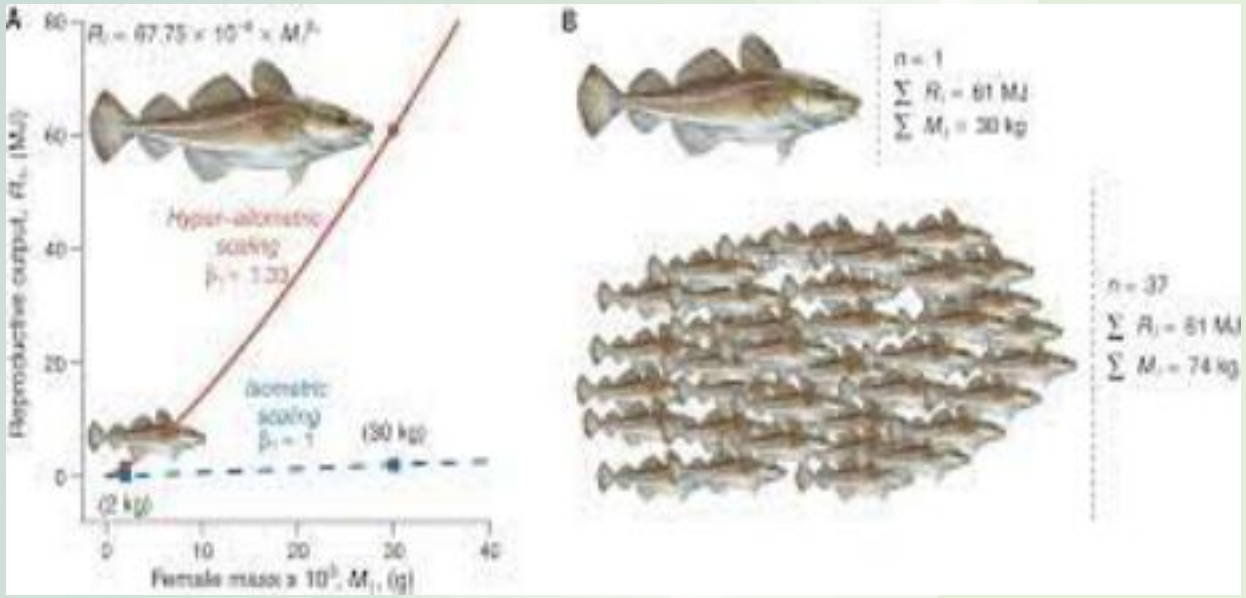
Proposed approach:

Establish fish stock recovery areas (no-take zones) in the Black Sea

Fish stock recovery areas

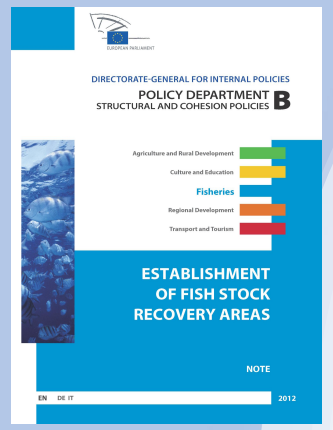
- Provide long term benefits to biodiversity and local economy (e.g enhance fishery, local tourism)
- Protected fish grow larger, support replenishment (more offspring)
- Fish species swim outside the protected area (spillover), contributing to local fishery
- Eggs/larvae supplied also to adjacent areas
- Offspring settle into surrounding fishing grounds
- Protecting habitats from the damage caused by fishing gears enhances species recovery
- More diverse habitats host higher biodiversity and are more resilient to environmental challenges

Larger fish produce more offspring



Barneche et al., 2018. https://science.sciencemag.org/content/360/6389/642

Supportive scientific evidence



Biomass on average 670% higher than in unprotected areas….enhance local fisheries and create jobs and new incomes through ecotourism (Sala & Giacoumi, 2018).

Kenya: fish size, biomass and potential value increase in protected areas (Chirico et al., 2017)

Spain: fish eggs and larvae drifted around a marine reserve **increased abundance for three commercially important species** (López-Sanz et al, 2011)

Mexico: species survived in the reserve to mass mortality induced by severe climate hypoxia**, recovered quicker** through greater reproduction**…larval spillover** to surrounding fishing grounds (Micheli et al. 2012).

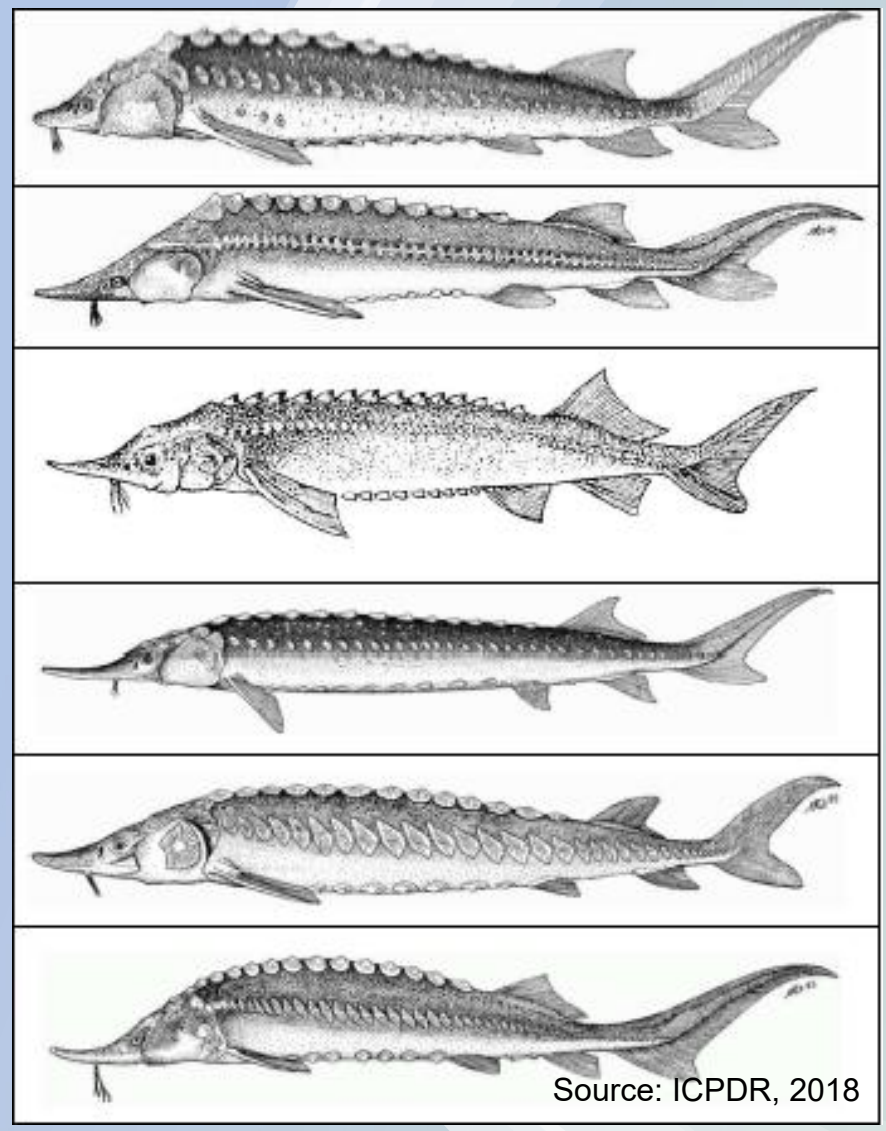
Florida: distribution of **record catches** of large sea fish was **concentrated around the edge of the marine reserve** (nearly a decade of protection) (Bohnsack 2011).

Australia: reef reserves (28%) produced **half of the species replenishment to the whole region** (reserves plus fishing grounds). **The weight of adult fish per unit area was double** (Harrison et al. 2012)

Reef sharks more abundant in no fishing zones, proving that even **mobile species benefit of such areas** (Bond et al., 2012; Dwyer et al., 2020)

Reef fish biomass recover within community-managed no take zones **(Gilchrist et al., 2020)**

Key role for the recovery of endangered species
Danube sturgeon case


Source: ICPDR, 2018

IUCN, 2010 – update ongoing

Russian sturgeon - critically endangered, decreasing

Ship sturgeon – critically endangered, decreasing

Sterlet – vulnerable, decreasing

Stellate sturgeon – critically endangered, decreasing

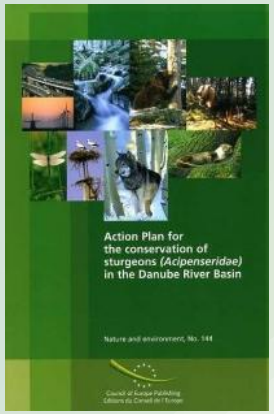
Atlantic sturgeon – critically endangered (EX in DRB)

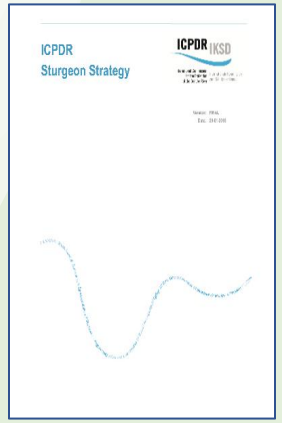
Beluga – critically endangered, decreasing

Conservation efforts in the Danube Region

Strategic actions

- **2005: Action Plan for the conservation of sturgeons (Acipenseridae) in the Danube River Basin adopted under Bern Convention, 2005**
- 2006: Romania ban sturgeon fishery, launch supportive stocking programs
- 2009, 2011: Serbia and Bulgaria ban sturgeon fishery
- **2012: Establishment of Danube Sturgeon Task Force - EUSDR AP 6 – coordinate conservation efforts in DRB**
- 2013: Elaboration of "Sturgeon 2020" program - EUSDR flagship project
- 2016: Sturgeon declared flagship species of Danube Basin (ICPDR)
- **2017: ICPDR Sturgeon Strategy endorsed by Danube water authorities**





Recent projects

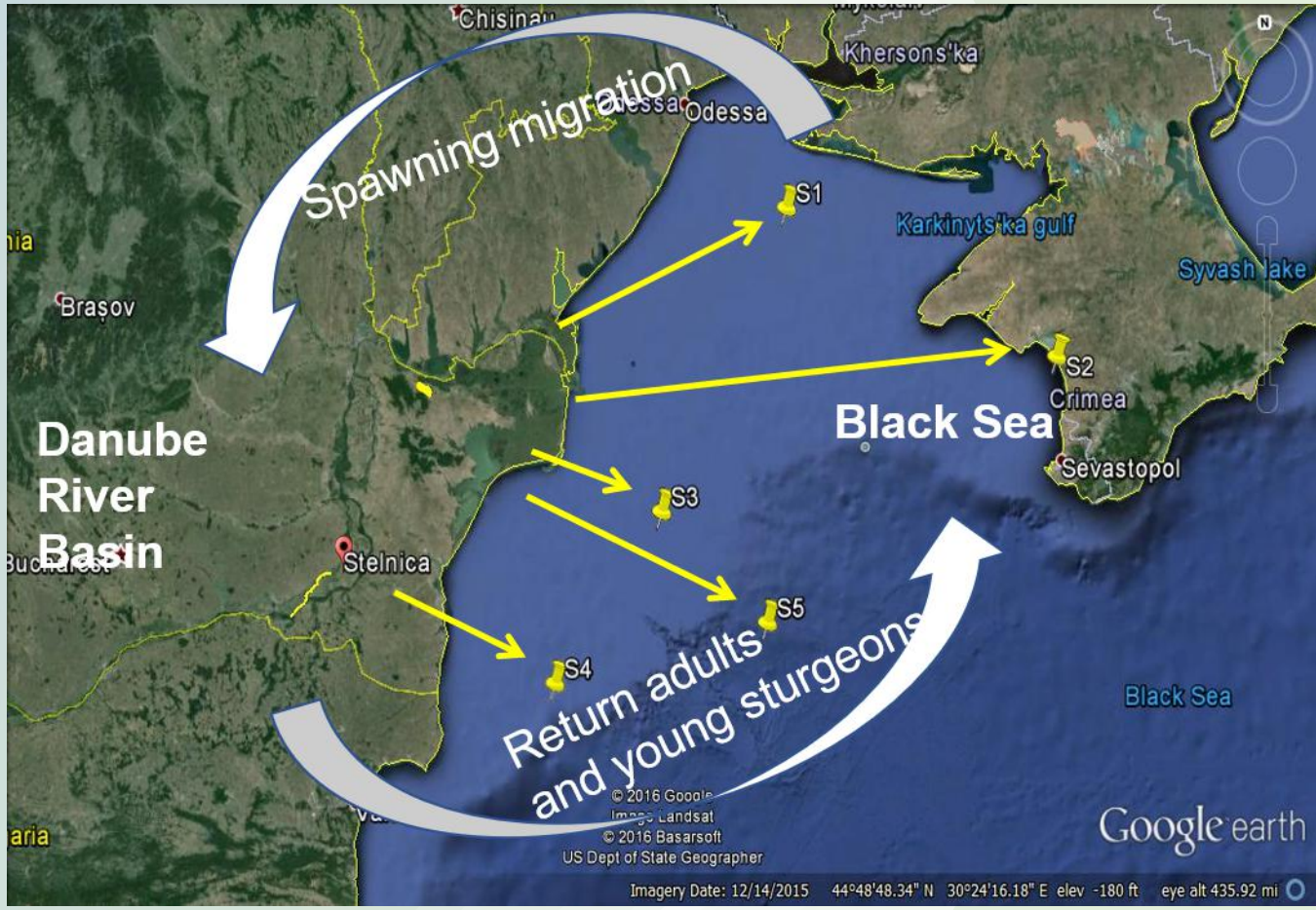
- Distribution of restocked sturgeons in the Black Sea
- Prevention and counteracting poaching and illegal trade
- Creation of aquatic ecological corridors for migratory fish species
- Investigating fish behaviour at the Iron Gates dams
- Restoring fish migration at the Iron Gates

Sturgeon life cycle calls for cooperation between Danube and Black Sea stakeholders

- Spawning migration from the Black Sea to the Danube River
- Need habitat protection and continuity in the Danube and Black Sea regions

Legal frame

- Strategic Action Plan for the Rehabilitation and Protection of the Black Sea, 1996 (amended in 2009)
- International Conventions: Bern Convention, Bonn Convention, CITES, Convention on Biological Diversity
- Pan-European Action Plan for Sturgeons – adopted under Bern Convention, 2018
- EU legislation: HD, WFD, MSFD



Beluga sturgeons tagged and released in the Danube returned to Black Sea (yellow arrows) (data: DDNI, Tulcea)

Urgent conservation measures needed in the Black Sea

- Harmonized monitoring methods (habitat identification/evaluation, assessment of populations and by-catch)
- Key habitats declared strictly protected area (no-take zones)
- Ex-situ conservation facilities established along the Black Sea coast
- Supportive stocking programs, based on scientific advice
- Evaluate efficiency of stocking programs (survival rate, distribution, return rate for spawning)
- Enhance control of sturgeon fishery ban and protection measures in no-take zones
- Support fishermen communities to develop alternative livelihood to sturgeon fishery (aquaculture, ecotourism, guiding)
- Elaborate a sturgeon conservation plan for the Black Sea

Photo: Viorel Gavril, IBB

The way ahead

Establishing a network of fish stock recovery areas in the Black Sea will support not only biodiversity conservation but also revival of depleted stocks

- Identify key habitats to be established as fish stock recovery areas/no-take zones (NTZ)
- Map spatial distribution of human activities in these areas
- Establish the frame for multi-stakeholder dialogue
- Elaborate management plans for NTZ with active involvement of key stakeholders
- Consider compensatory measures/alternative livelihood for lost fishery grounds
- Elaborate a compendium of NTZs case studies and lessons learned (awareness raising)
- Facilitate exchanges and visits of stakeholders to successful NTZs (model)
- Support development of sustainable alternative activities near the NTZs

Take home message

Reduced human impacts favour recovery of marine ecosystems/fish stocks AND provide benefits to coastal communities

The lesson learned during covid lockdown

- Lower human disturbance during spawning period
- Increased fish stocks - dolphins come near the shore – tourism benefits
- Fishermen amazed by the high captures (lower CPU)

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