Status of fish stocks of key importance for a recreational coastal angling in the south Baltic Sea region

Status stad ryb o kluczowym znaczeniu dla wędkarstwa przybrzeżnego w regionie południowego Bałtyku

West Pomeranian University of Technology

Sławomir Keszka, PhD

Sustainable Coastal Angling Tourism – a Development Chance for the South Baltic Region – final conference of the CATCH project

Date: Friday-Saturday, 5th-6th of April 2019. Venue: Hotel SENATOR, Wyzwolenia 35 St., Dźwirzyno, Poland
Organiser: Green Federation "GAIA". Conference website: www.catch-southbaltic.eu/april-conference-english

The Baltic fish community is dominated by cod, herring, and sprat. These constitute about 95 % of the commercial catch of fish in the Baltic, which has been between 580000 t and 970 000 t per year since 1980 (Sparholt 1994).

The highest abundance of cod (*Gadus morhua*) in the recent history of the fishery in the Baltic occurred during the late 1970s to mid-1980s when the spawning stock biomass reached an estimated 700 000-800 000 tons, followed by a drastic decline (Anon. 1993) to less than 100 000 tons (Bagge et. al. 1994).

The Baltic cod fishery suddenly changed in the 1980s from historically high cod biomass and catches ("cod boom") to a sprat-dominant ecosystem with low cod abundance (Fig.2.). This collapse, generally understood to have been precipitated by deteriorating environmental conditions and overfishing, had substantial negative socioeconomic impact on Baltic Sea fisheries.

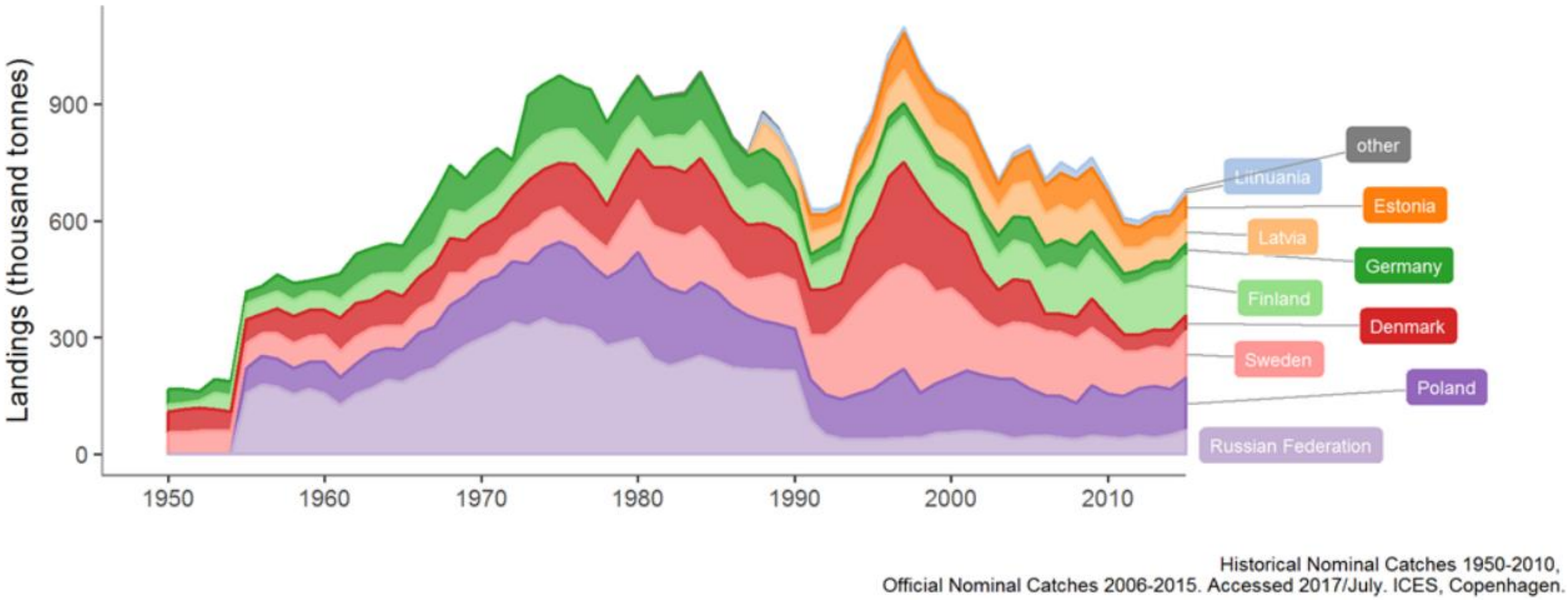


Fig.1. Baltic Sea – Historical Landings (t) by country (ICES 2019)

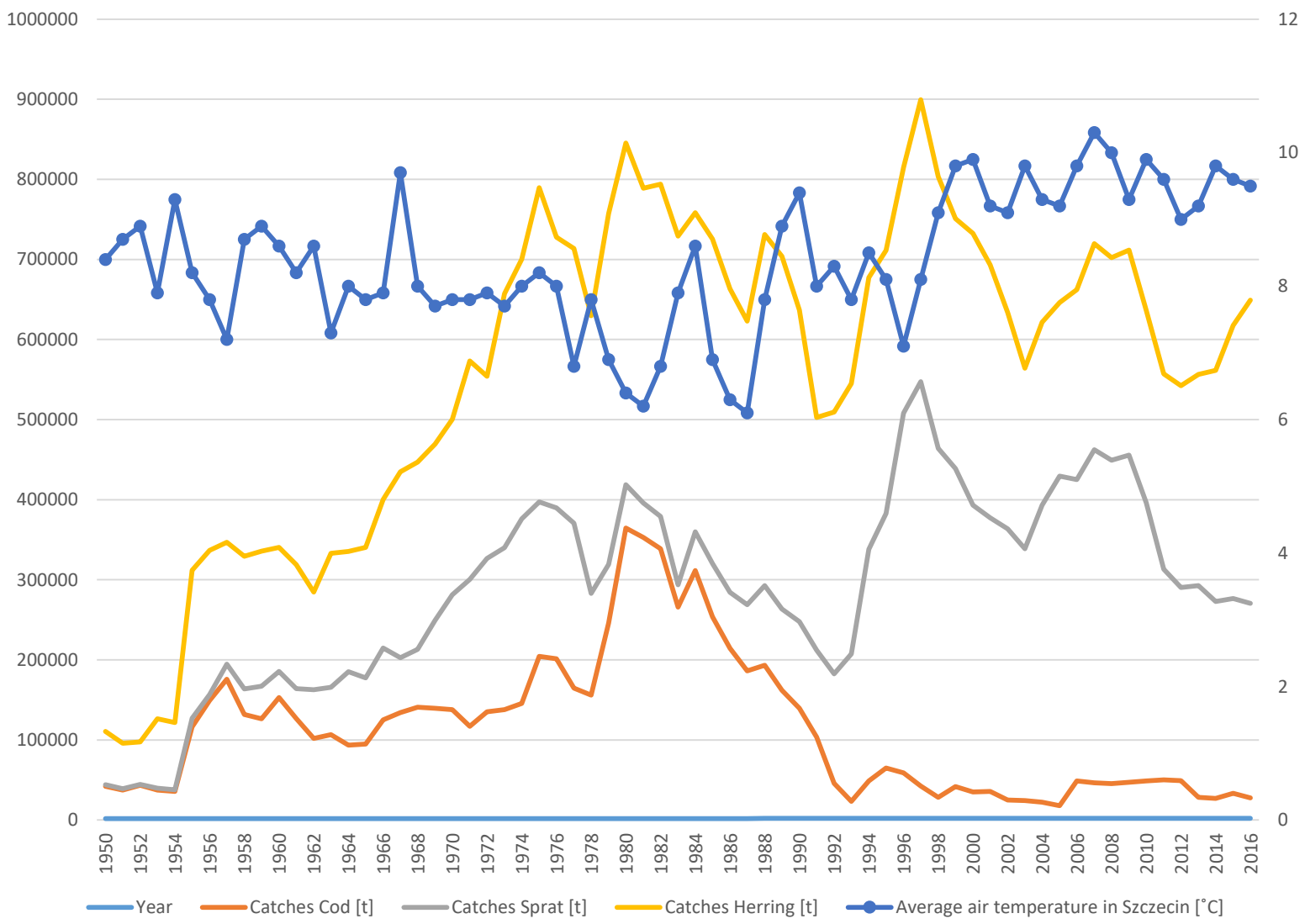
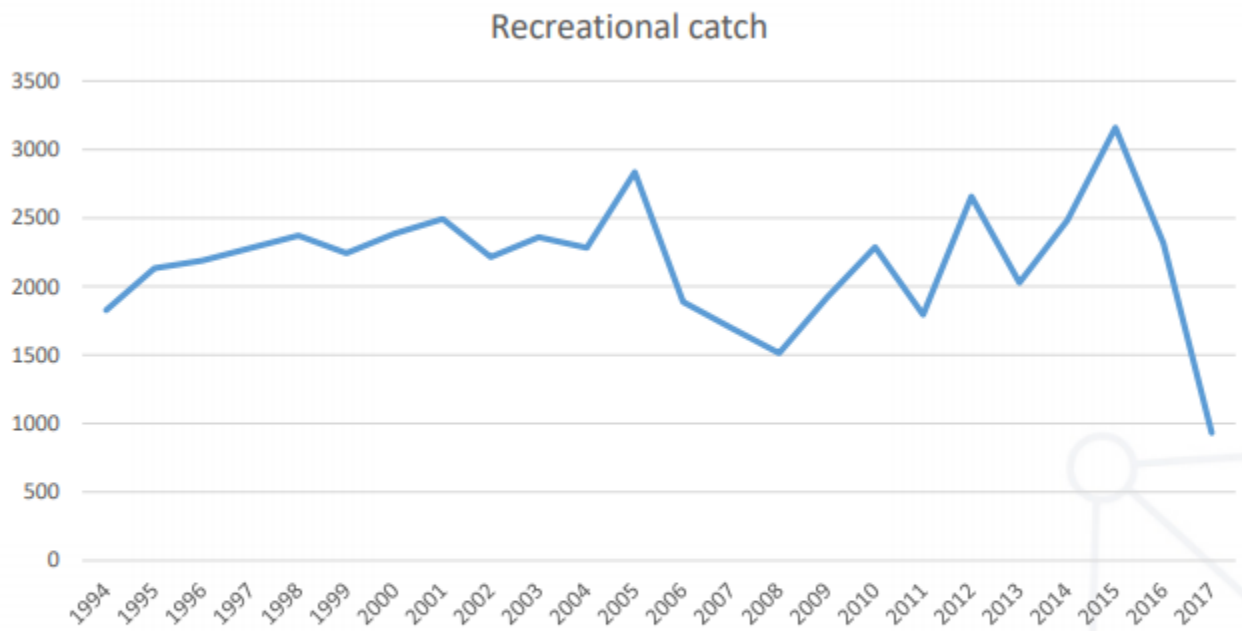
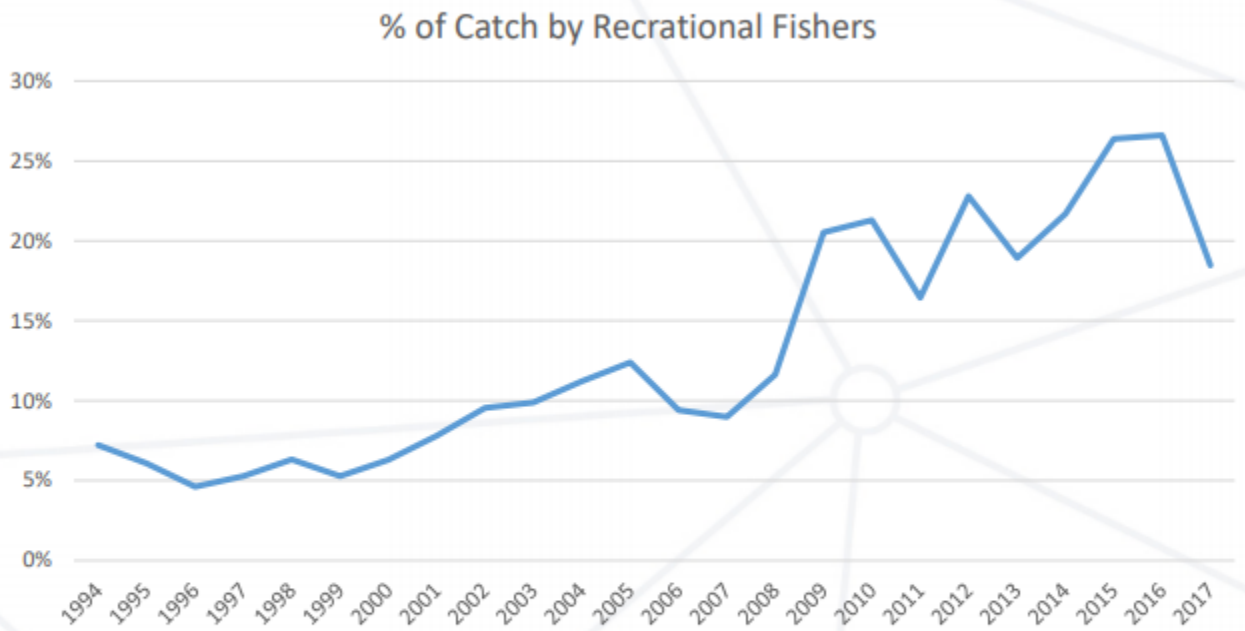


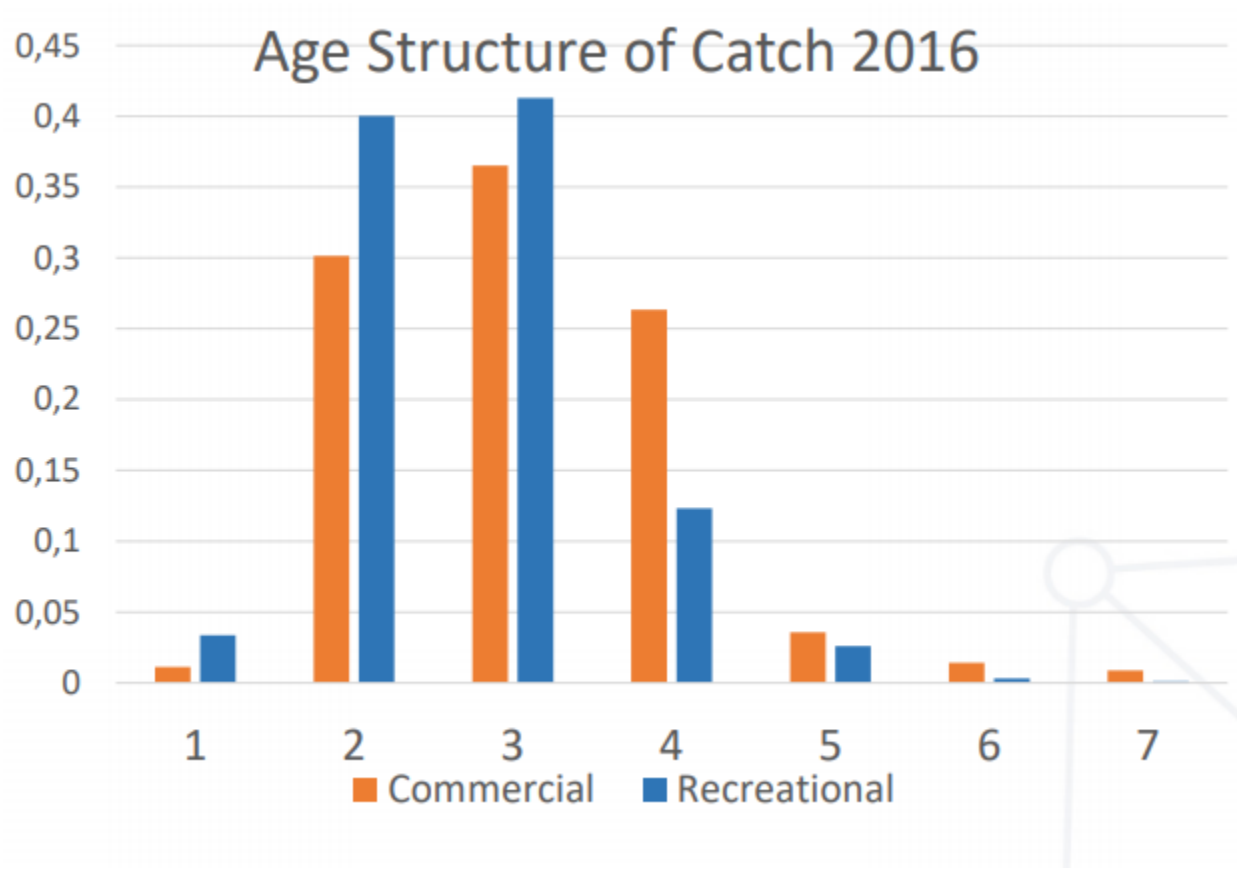
Fig.2. Catches of cod, herring and sprat in area FAO 27 III in years 1950-2016 vs mean air temperature.
Data: ICES Raports, IMGW Poland, ZUT Szczecin





Only Germen data included in the assessment.

Fig. 3. ICES data Western Baltic Cod – Recreational catches



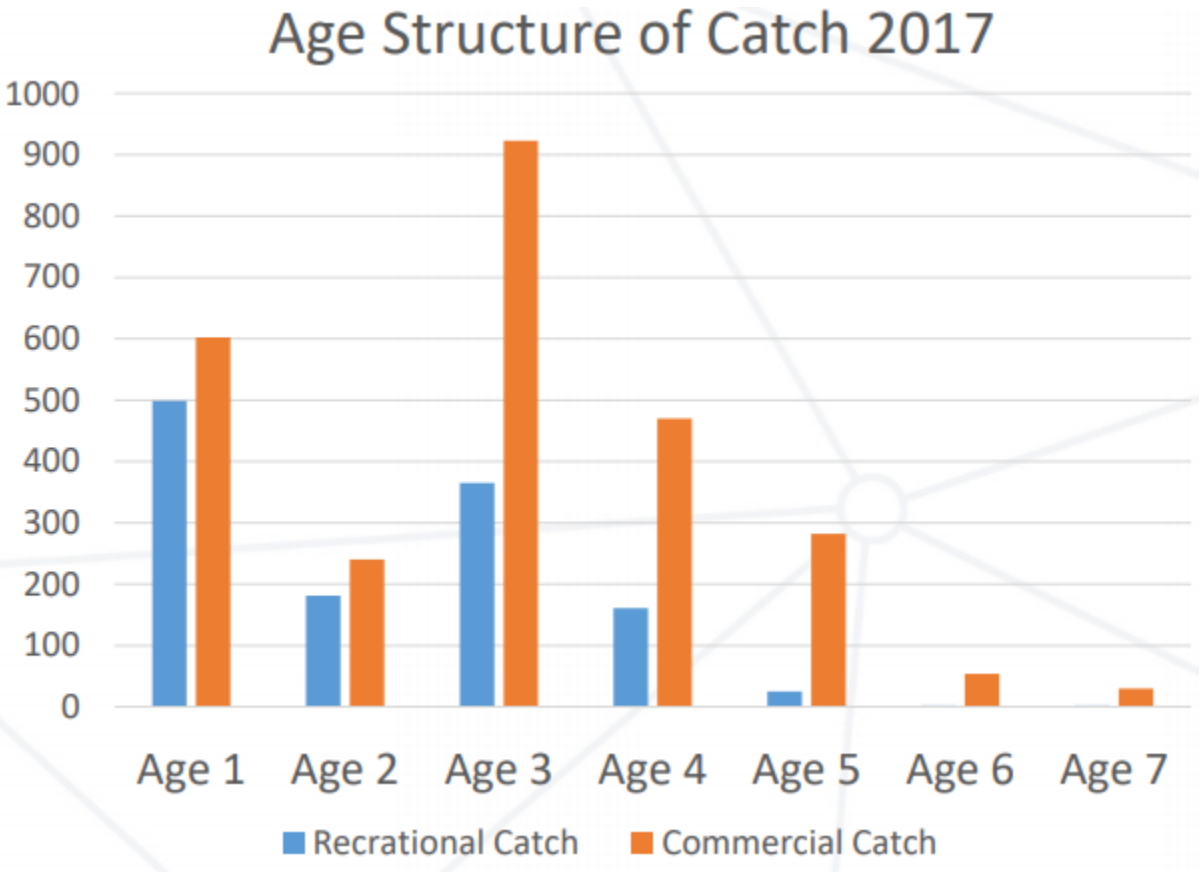


Fig.4. Relative age composition in commercial and recreational catches in 2016 & 2017 (ICES 2019 – German data)

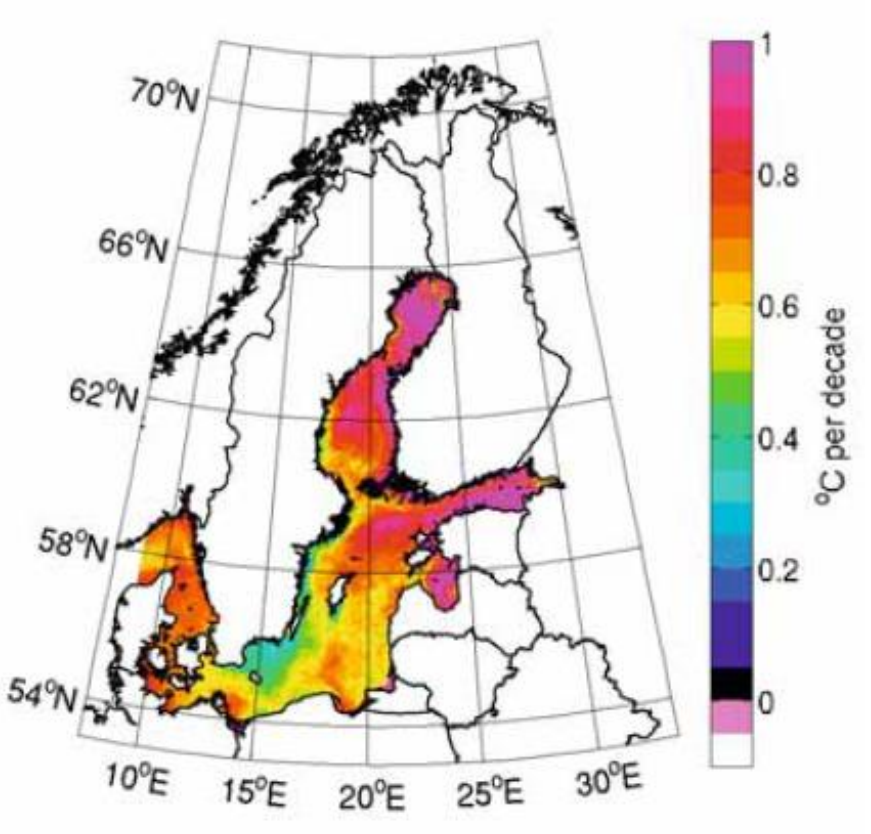
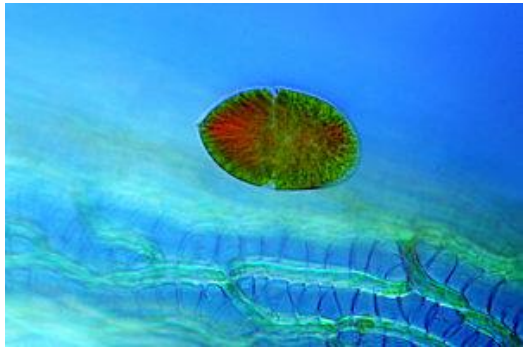
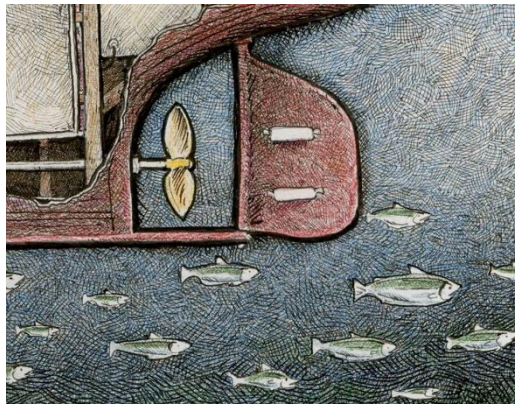
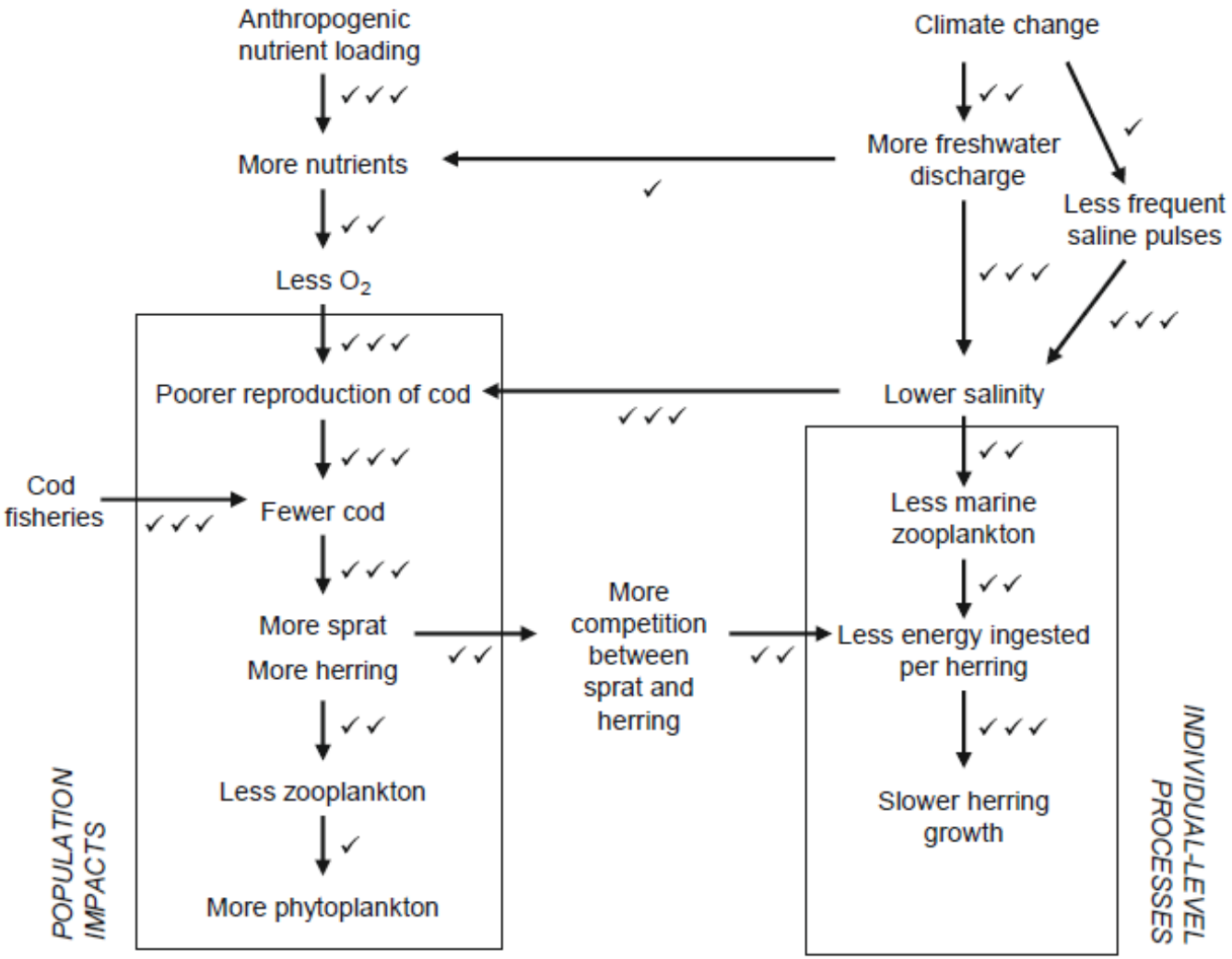


Fig.3. Linear trend of the annual mean sea surface temperature based on infrared satellite data (1990-2008) provided by the Federal Maritime and Hydrografic Agency (BSH), Hamburg (after Lehmnann et.al. 2011).



For phytoplankton, a temperature increase could result in an increasing proportion of dinoflagellates in spring and cyanobacteria in summer. Warmer and possibly less saline surface waters could alter the composition of the zooplankton community, with potentially negative consequences for the food conditions and growth of the main plankton-eating fish, namely, Baltic Herring (*Clupea harengus membras*) and Sprat (*Sprattus sprattus*). A possible decrease in salinity would also have a negative influence on Baltic Cod (*Gadus morhua callarias*).





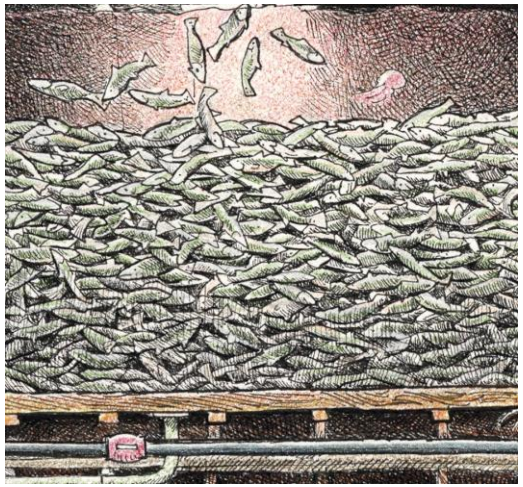


Fig. 5. A schematic presentation of the interactions between different trophic levels and some environmental factors in the pelagic ecosystem of the Central Baltic Sea. Estimated confidence levels depicted as: √: low confidence, √√: medium confidence, √√√: high confidence (HELCOM 2013)

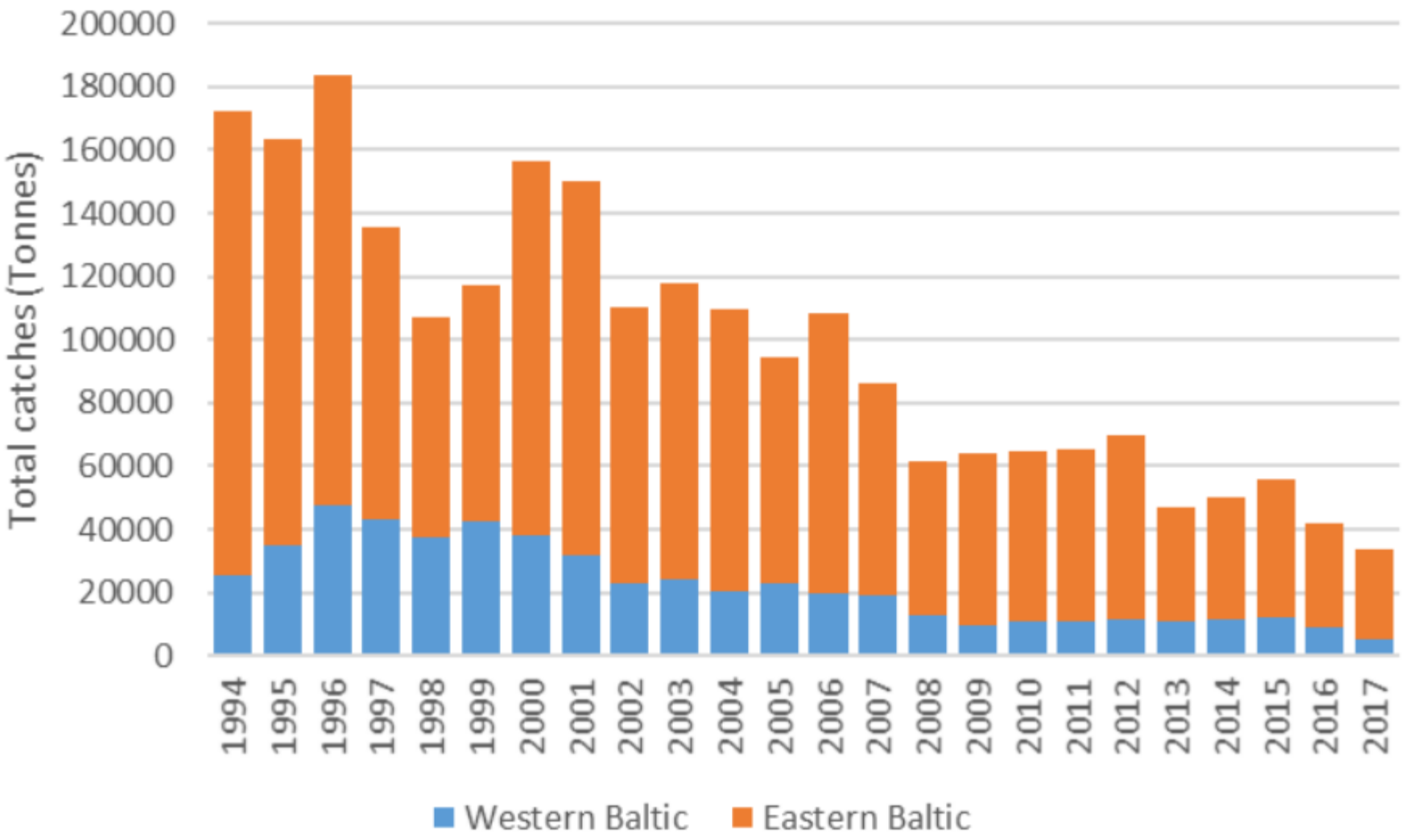


Fig. 6. Baltic cod catches by stock

Rejony rozrodu dorsza

Głębia Gdańska i Gotlandzka – rejony tarliskowe w przeszłości

Głębia Bornholmska – rejon skutecznego rozrodu obecnie

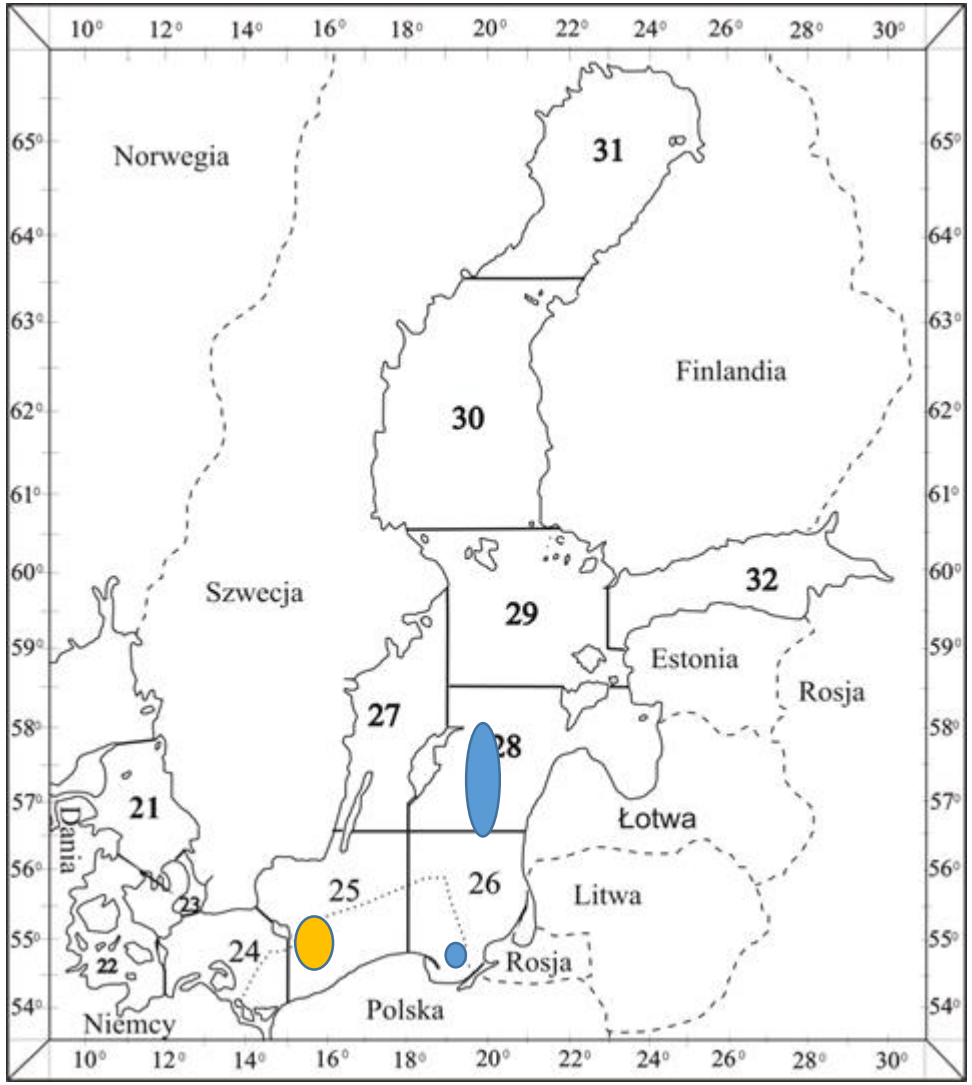


Fig.7. Spawning areas in Baltic Sea

Gdańsk and Gotland Deep – spawning areas in the past

Bornholm Deep – spawning area with effective spawning grounds at present

Generally, characterization of Baltic samples of cod reveals strong difference between eastern- and western samples. Undoubtedly the level of homogenization of eastern samples increases differentiation estimates to some degree as do the geographic isolation and accessibility of spawning areas of appropriate salinity and temperature. Moreover, migration of the Atlantic cod from the North Sea has impact on the status of western Baltic cod population by mixing with "native" fish (Nielsen et al. 2003).

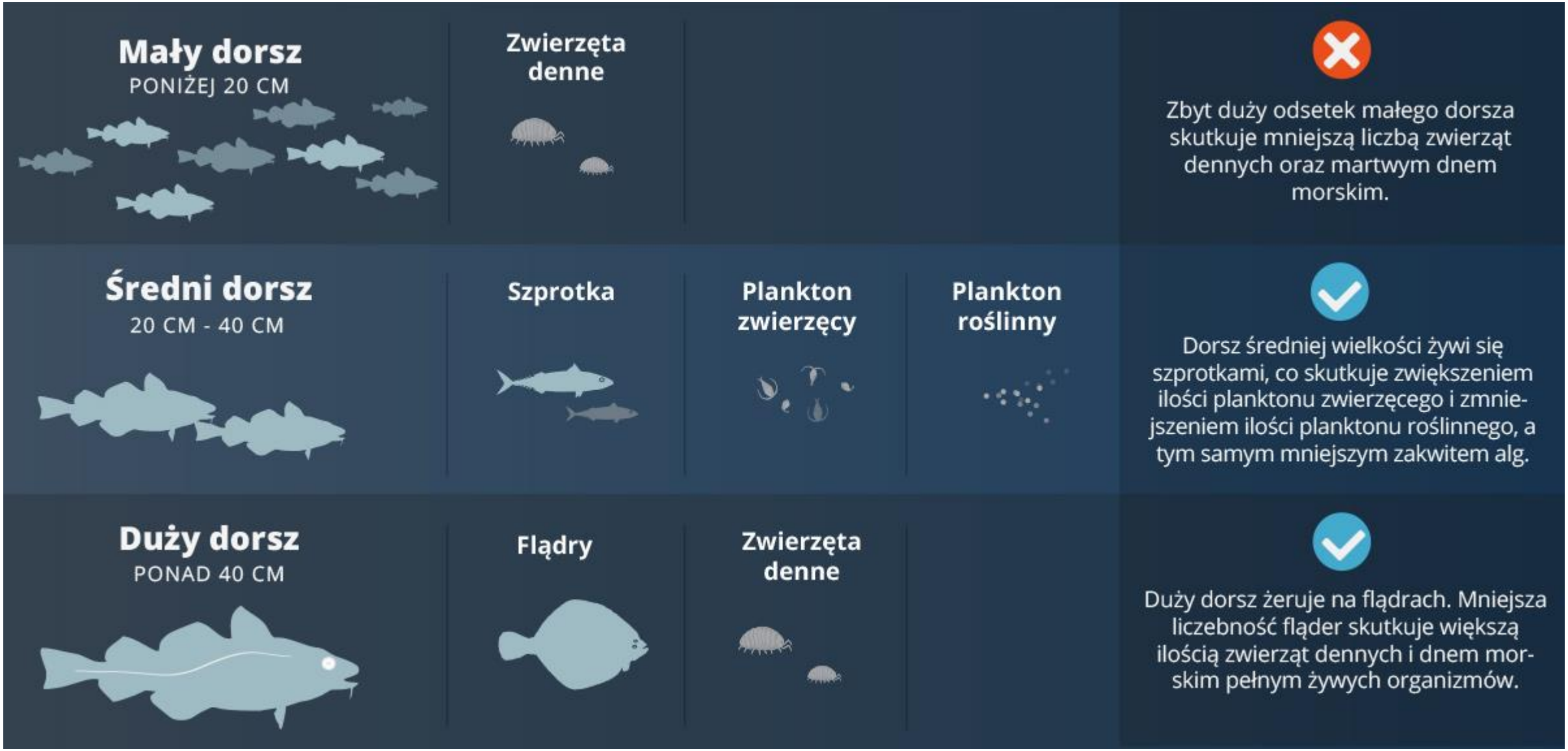
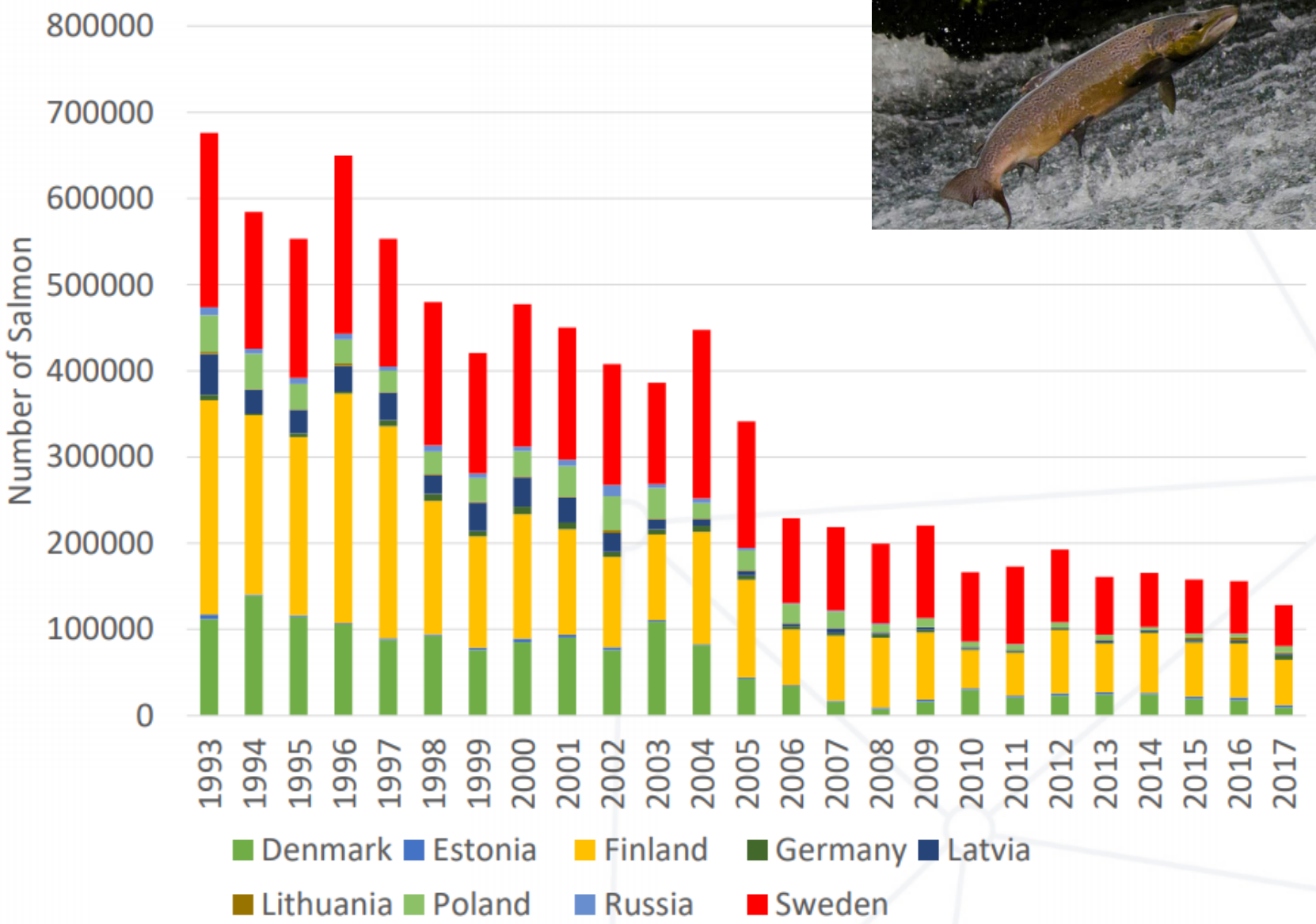


Fig.8. Simple explanation of interactions between different trophic levels and some species in Baltic Sea (after www.ratujmydorsze.pl)



ICES advises that when the maximum sustainable yield (MSY) approach is applied, total commercial sea **catch in 2019 should be no more than 116 000 salmon**.

Applying the same catch proportions estimated from observations in the 2017 fishery, the catch in 2019 would be split as follows: 11 600 unwanted catch (10%; previously referred to as discards) and 104 400 wanted catch (90%; i.e. 55% reported, 6% unreported, and 29% misreported). This would correspond to commercial landings (the reported wanted catch) of 63 300 salmon.

Fig.9. Number of Salmon *Salmo salar* in catches of 9 countries Baltics basin

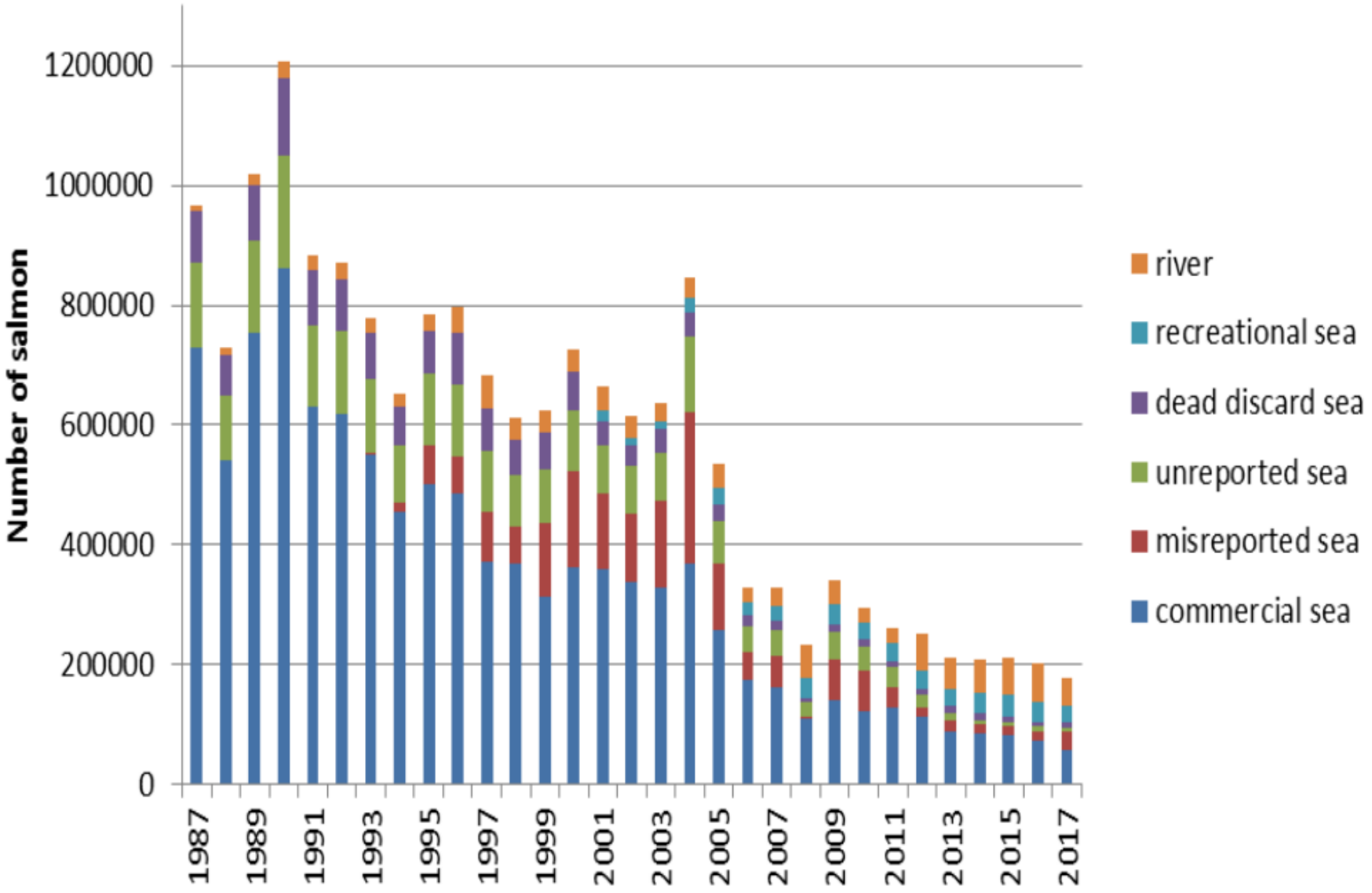


Fig.10. Salmon *Salmo salar* in Subdivisions 22-31 (ICES data)

Table. Comparison of catch quotas for main fish species in Baltic Sea in years 2018-2019 (in tons) according to decision of UE Council (15.10.2018)

(https://eur-lex.europa.eu/legal-content/EN/txt/?uri-COM:2018:608:FIN)

Species/stock	catch quota 2018	ICES Recommendation	BSAC Recommendation	European Commission Proposal	Accepted by Council UE	Change in % in relations to TAC 2018			
						ICES	BSAC	EC	Council UE
Western Herring	17309	0	13425	6404	9001	-100	-22	-63	-48
Central Herring	229355	140987	183484	170360	170360	-39	-20	-26	-26
Western Cod	5597	6694	15021	7340	9515	20	168	31	70
Eastern Cod	28388	**15021**	18168	24112	**24112**	-47	-36	-15	**-15**
Place	7076	14160	14160	10122	10122	100	100	43	43
Salmon stock Central Basin	91132 ind.	113796 ind.	91132 ind.	104996 ind.	91132 ind.	25	0	15	0
Sprat	262310	270772	280121	270772	270772	3	7	3	3

ICES - International Council for the Exploration of the Sea
BSAC - Baltic Sea Advisory Council
TAC - Total Allowable Catch

- Both the fish species and the fisheries (also coastal angling) are strongly affected by climate variations.
- Expected climate changes in northern Europe will likely affect both the temperature and salinity of the Baltic Sea, causing it to become warmer and fresher due to altered precipitation patterns.
- As an estuarine ecosystem with large horizontal and vertical salinity gradients, biodiversity will be particularly sensitive because many fish species in Baltic Sea are living at the **physiological limit** of their geographical distribution (e.g. cod, herring)
- Marine-tolerant species will be disadvantaged, and their **distributions will partially contract**.

Habitats of freshwater species will likely expand (e.g. **Roach, Bream, Perch**).

Dziękuję za uwagę!!!

Paper or material from conference that can be used/cited

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