

Bottom-set gillnet fisheries and harbour porpoises in the Black Sea: high-tech against cetaceans

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Cetacean bycatches take place annually in all Black Sea countries and represent the major threat to local population of harbour porpoises (*Phocoena phocoena*). Most cases of incidental entanglement in fishing nets occur in shallow waters of the continental shelf. Traditional areas of coastal artisanal fishery could be considered as the hotspots of cetacean mortality in fishing gear. Some fishing sites in which bycatch occurrences are frequent were revealed in Bulgaria (inshore waters from Shabla to Balchik and from Bjala to Cape Emine), Georgia (between the mouth of Chorokhi river and the Turkish border), Romania (all waters of the exclusive economic zone), Russia (area from Anapa to Sochi), Turkey (south-western coast of the Black Sea) and Ukraine (waters off the Crimean peninsula near Sevastopol and Feodosia, and between Chernomorskoye and Evpatoria).

Harbour porpoises almost always represent the majority of cetacean by-catches recorded in different places around the Black Sea. However, the absolute numbers of the population losses are not estimated yet for the basin as a whole. Generally, the annual rate of incidentally captured porpoises amounted to 90-100%, while the shares of other cetacean species - common dolphins (*Delphinus delphis*) and bottlenose dolphins (*Tursiops truncatus*) - tended to zero. According to the results of more or less regular studies in different countries, during the previous decade (1990-1999) a total of 448 accidentally entrapped cetaceans were recorded in the Black Sea, including 425 harbour porpoises (95%), 10 common dolphins (2%) and 13 bottlenose dolphins (3%). In other words, out of 20 by-caught cetaceans on record, 19 consisted of porpoises. This estimation strongly suggests that the direct impact of Black Sea fisheries is affecting mainly harbour porpoises, and the intensity of this impact is probably 30-40 times higher compared to the adverse influence of fisheries on the other two species.

Bottom-set gill nets for Black Sea turbot (*Psetta maotica*), sturgeons (*Acipenser* spp., *Huso huso*) and spiny dogfish (*Squalus acanthias*) cause up to 99-100% of cetacean bycatches. These nets are dangerous for harbour porpoises because of their large mesh size - from 8-11 cm (dogfish nets) to 12-15 cm (sturgeon nets) and 18-22 cm (turbot nets) - provo-

king easy entanglement. The height of these nets varies between 1.5 and three metres, and their length may reach 70-100 metres. Fishermen usually tie together some tens to 200 nets making a single line. Other fishing gear, including purse seines, trammel, trap and trawl nets, seem to be of secondary importance as far as cetacean bycatch is concerned.

Almost all (99.9%) recorded bycatches were lethal. Annual period from April to June appears the principal season which is particularly hazardous for harbour porpoises, due to extensive fishing on turbot. Such fishing occurs in spite of a temporary specific prohibition by most Black Sea countries in view of turbot spawning time. Turbot fishing in May - June could be defined not only as a significant anthropogenic factor of Black Sea harbour porpoises mortality, but also as a factor limiting their reproductive output. The presence of near-term pregnant, postpartum and lactating females among the bycaught animals indicates that the turbot fishing season coincides with porpoise parturition and nursing period. Furthermore, the state of mature male and female gonads (except pregnant individuals) indicates that the breeding period also occurs in spring and early summer.

Illegal, unreported and unregulated (IUU) exploitation of marine biological resources is one of the major environmental, economic and social problems concerning the entire Black Sea region. The amount of the unauthorized fisheries is not evaluated officially on the national and international levels, but at present it possibly exceeds the combined value of legal coastal fisheries.

As a rule, modern poachers are equipped much better than law-abiding fishermen, fish protection officers and coastal guards. The use of high-tech satellite navigating, radio-locating and echo-sounding devices, disposable monofilament nets and speedy boats with powerful engines enables illegal fishermen to conduct concealed operations in any maritime area, at any time (mainly at night) and under any weather conditions. In that way, cetacean bycatches due to illegal gillnet fishery on Black Sea turbot and sturgeons may have a very considerable magnitude. 🐟

