World Water Week

National Academy of Sciences of Ukraine

Institute of Marine Biology NAS Ukraine

Impact consequences of the destruction of the Kakhovka Reservoir Dam on the Black Sea Ecosystem

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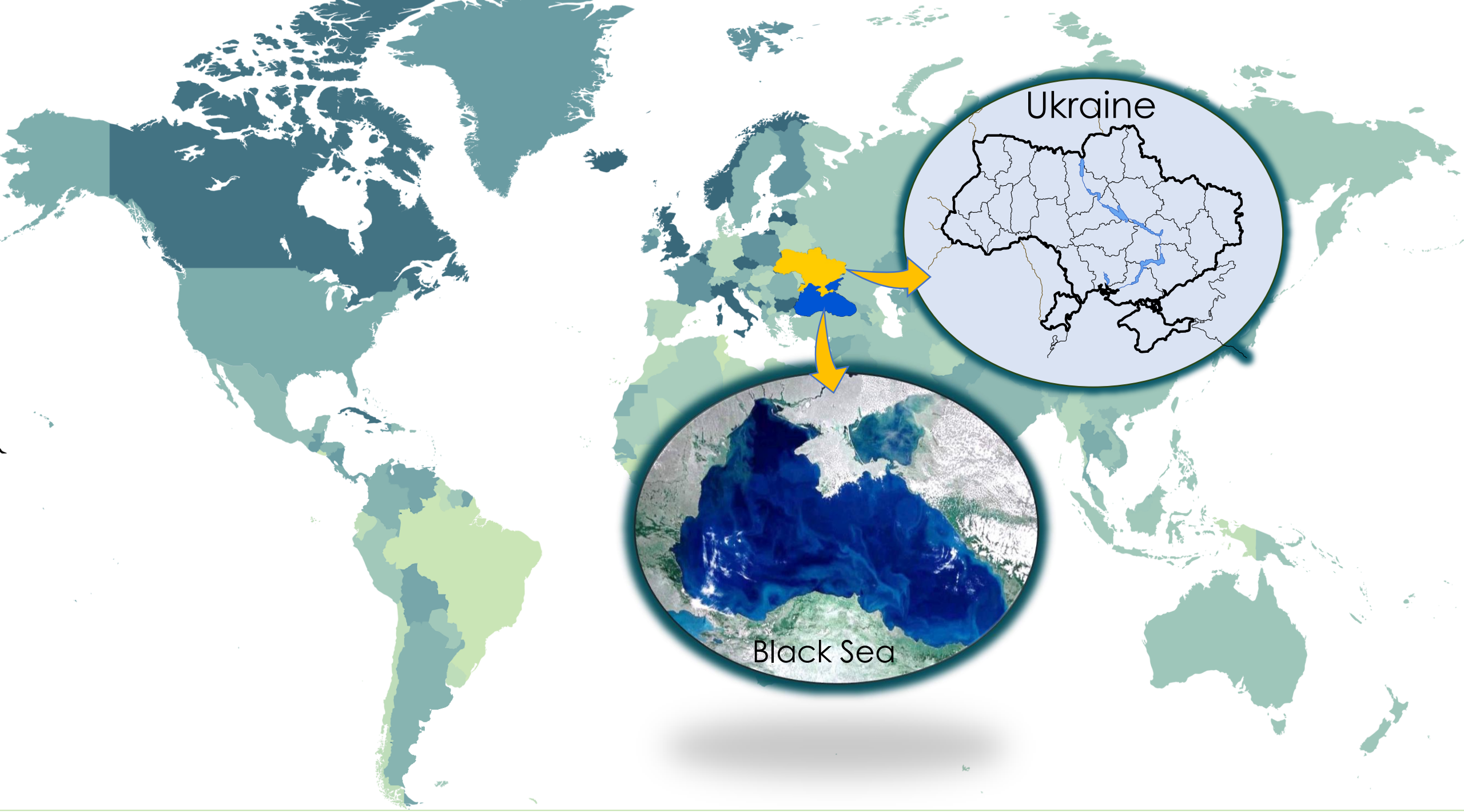

Ukraine
Black Sea


Black Sea
Kakhovska's dam
is located 100 km
from the Black Sea

SHOCK ACTION OF THE FIRST WEEK

June 6,
2:50 a.m.

June 8-9

June 11

explosion of the dam by
the russian military

SHOCK ACTION OF THE FIRST WEEK

June 6,
2:50 a.m.

June 8-9

June 11

water masses with garbage
reached the sea coast

SHOCK ACTION OF THE FIRST WEEK

seawater
salinity drops

from

14.5 ppm

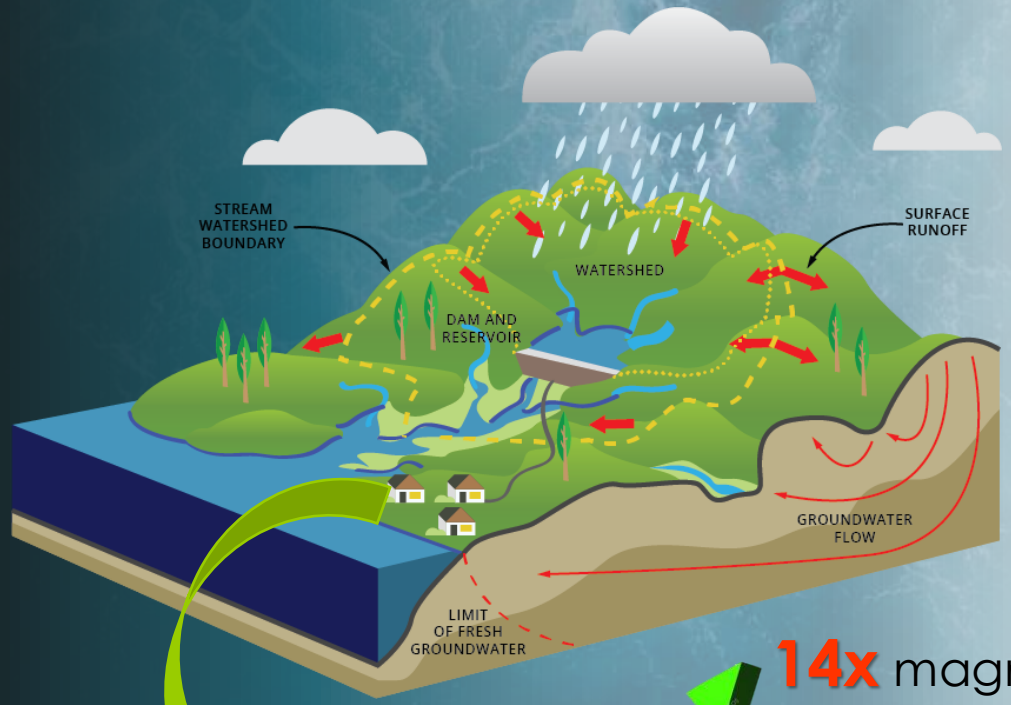
to

3.95 ppm

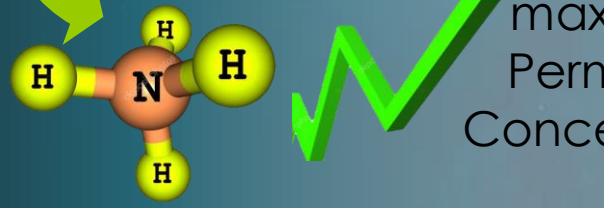
WATER QUALITY IN MARINE ECOSYSTEM

In the Black Sea came about **14 km^2** of polluted surface water with **700 tons** of dissolved inorganic phosphorus and more than **1000 tons** of dissolved inorganic nitrogen

WATER QUALITY IN MARINE ECOSYSTEM



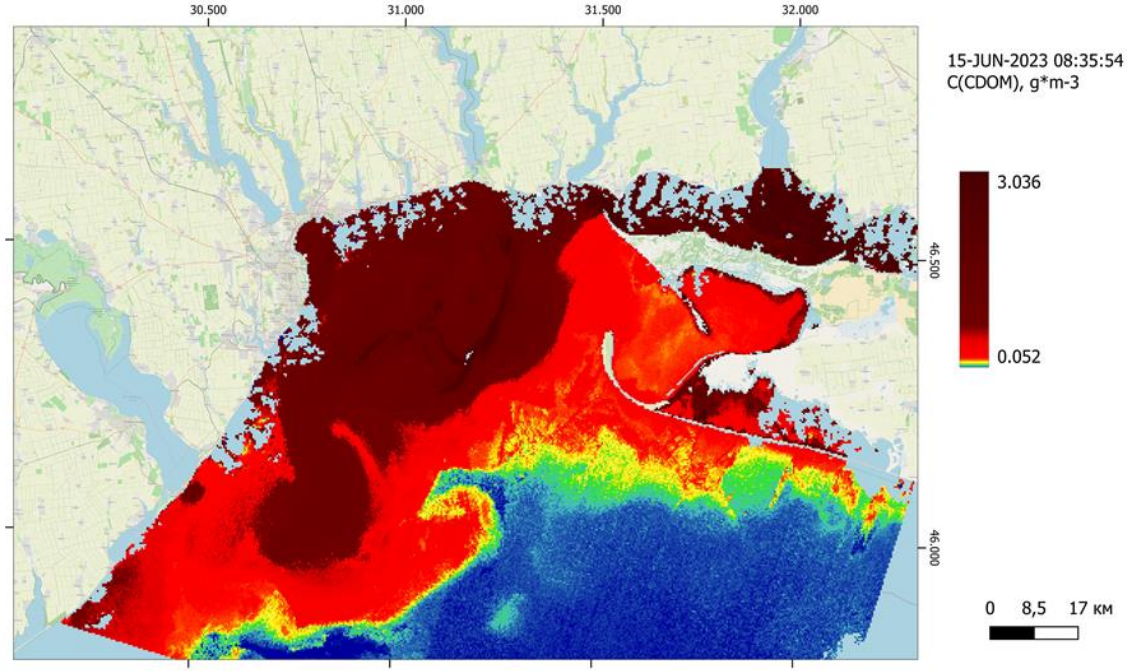
14x magnification



maximum
Permissible
Concentration

ammonia nitrogen
NH_4

the concentration of suspended matter exceeded the average regional level by **100 times**



the average value of suspended matter is 2.61 g.m $^{-3}$
the maximum recorded on June 10, 2023 is **297 g.m -3**

WATER QUALITY IN MARINE ECOSYSTEM

Daphnia magna

daphnia is main test object of the method for determining the toxicity of waters

indicators of **acute lethality** of test objects were **83%**

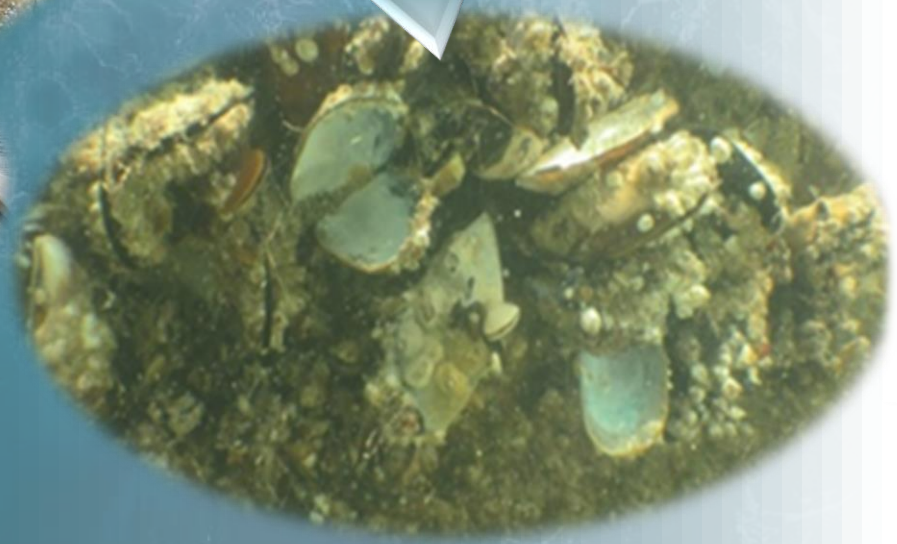
representatives of freshwater flora and fauna on the Black Sea coast

CONSEQUENCES FOR FRESHWATER ORGANISMS

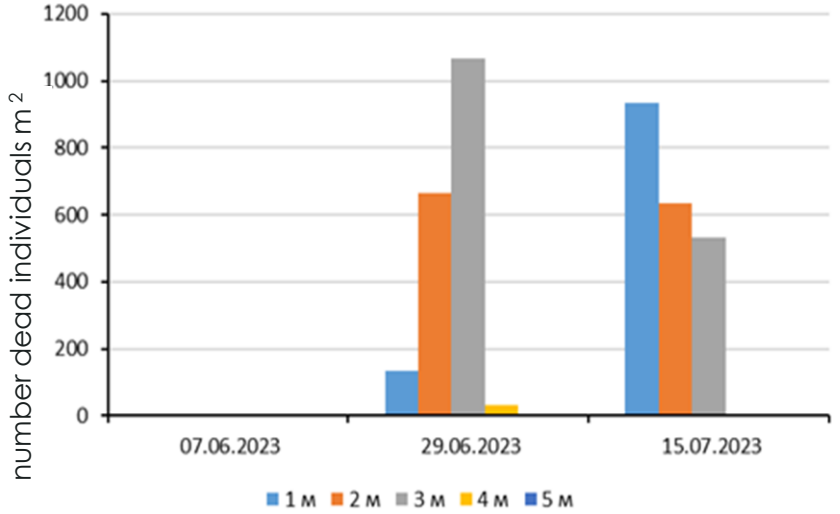
Mytilus galloprovincialis

commercial mollusk mussel

more than a week, the hydrobionts were in fresh water



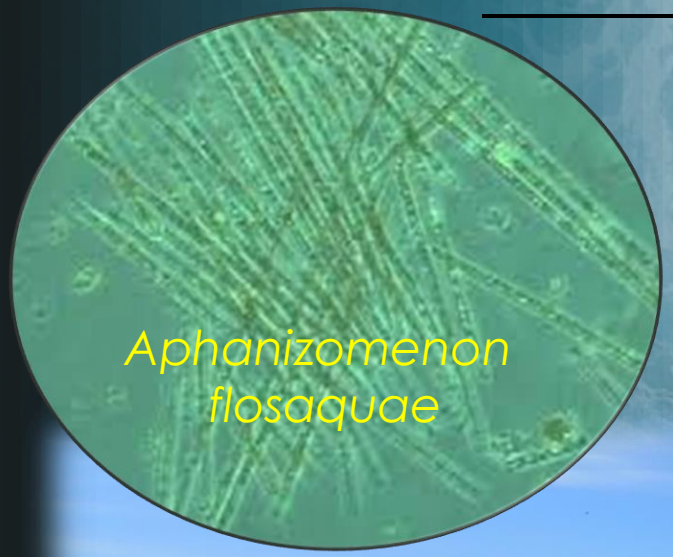
dead clams



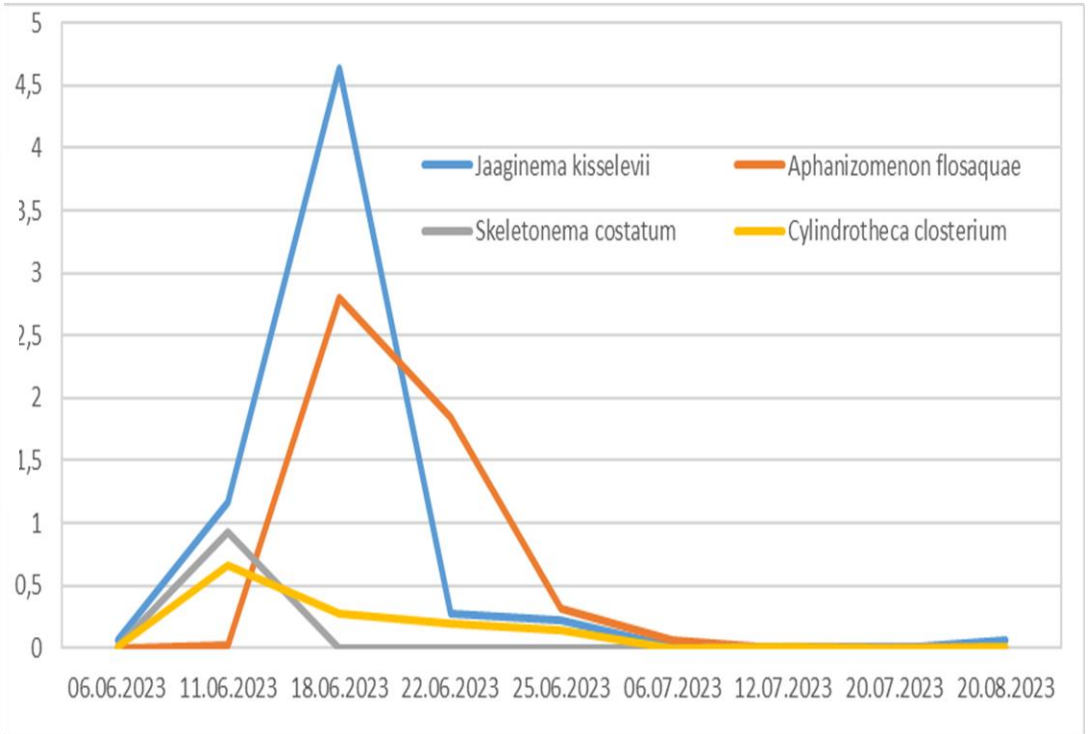
the total number of dead mussel, was about **104,94 million** individuals, Total Biomass – **3,680,000 tons**

CONSEQUENCES FOR MARINEWATER ORGANISMS

ASSIMILATION REACTION OF BIOTA

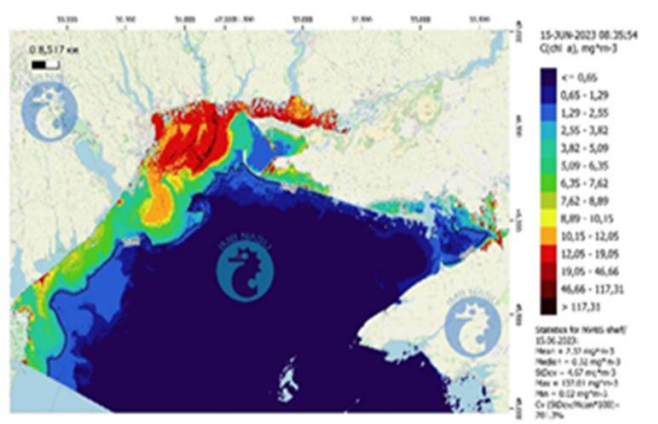


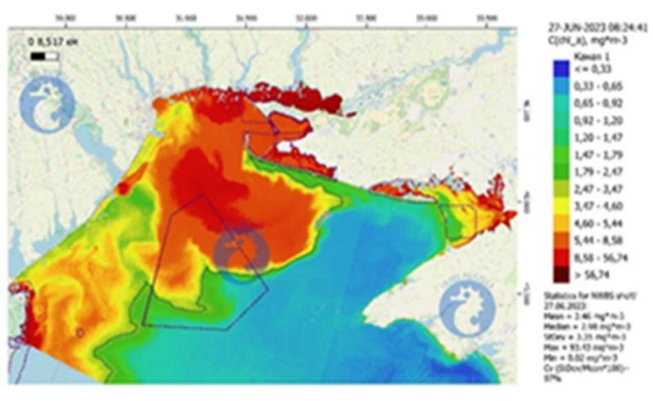
Phytoplankton bloom is like a fire that burns dissolved organic matter

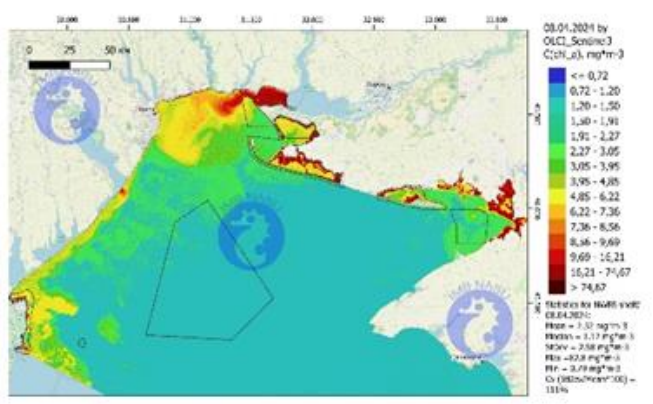


number of blue-green phytoplankton algae increased **2000 times**

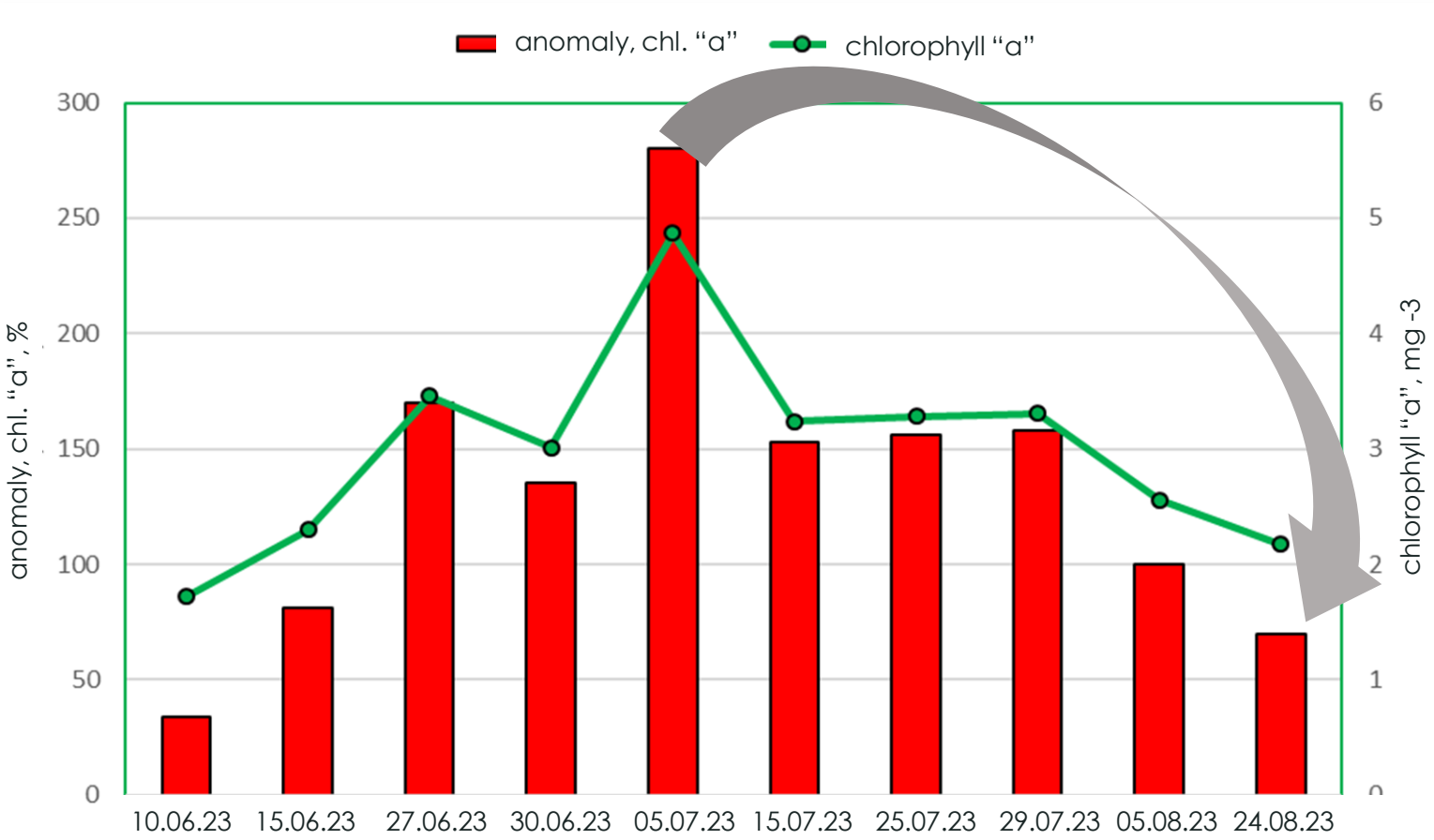
ASSIMILATION REACTION OF BIOTA



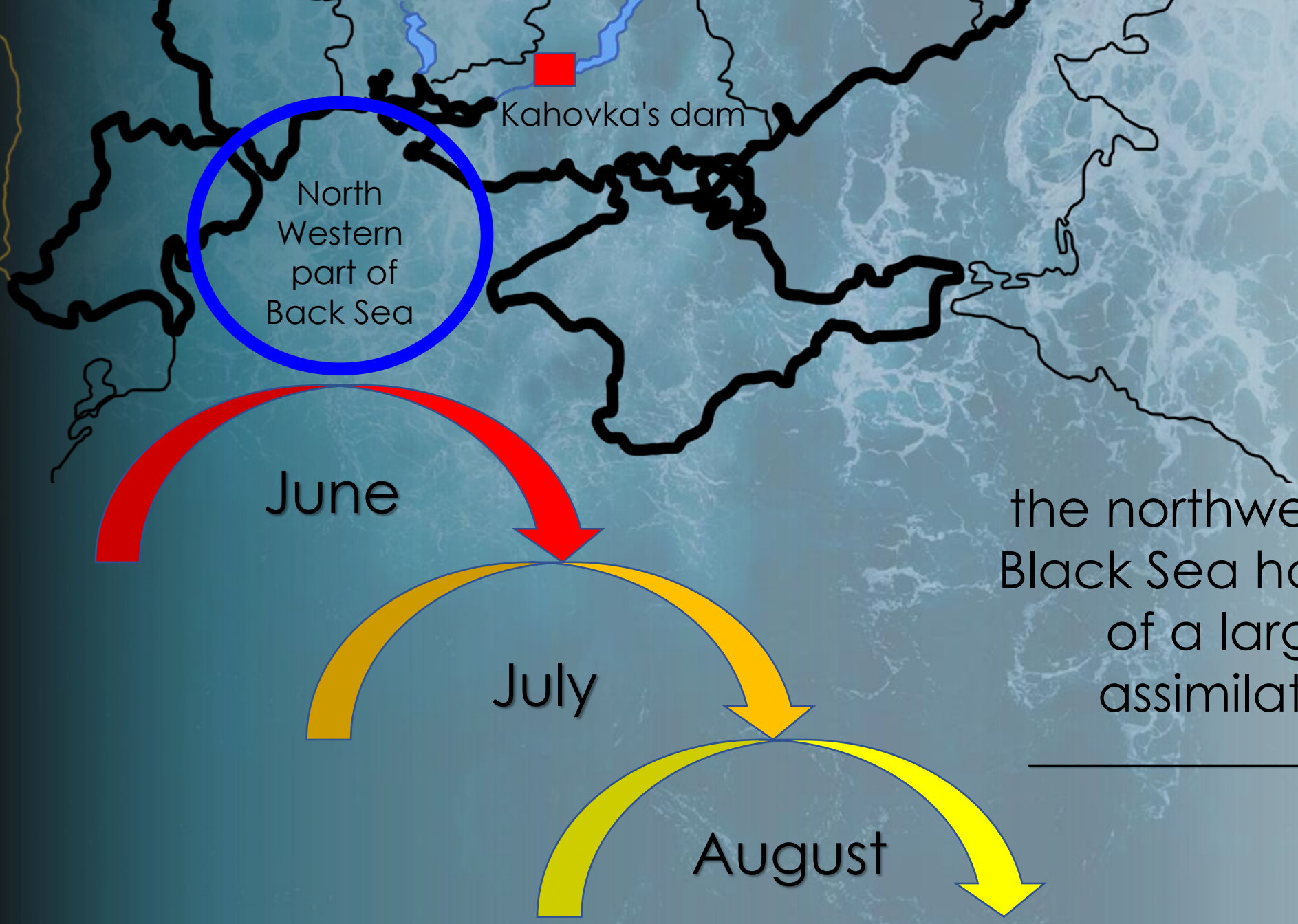




one moth later (July), the concentration of chlorophyll "a" reached to **280%** compared to the regional level



three month later (August) the indicator returned to the regional level



the northwestern part of the Black Sea has done the work of a large biological assimilation machine

ONE YEAR LATER CHRONIC EFFECTS

deposition of pollution from the Kakhovka Reservoir in bottom sediments of the Black Sea

ONE YEAR LATER
CHRONIC EFFECTS

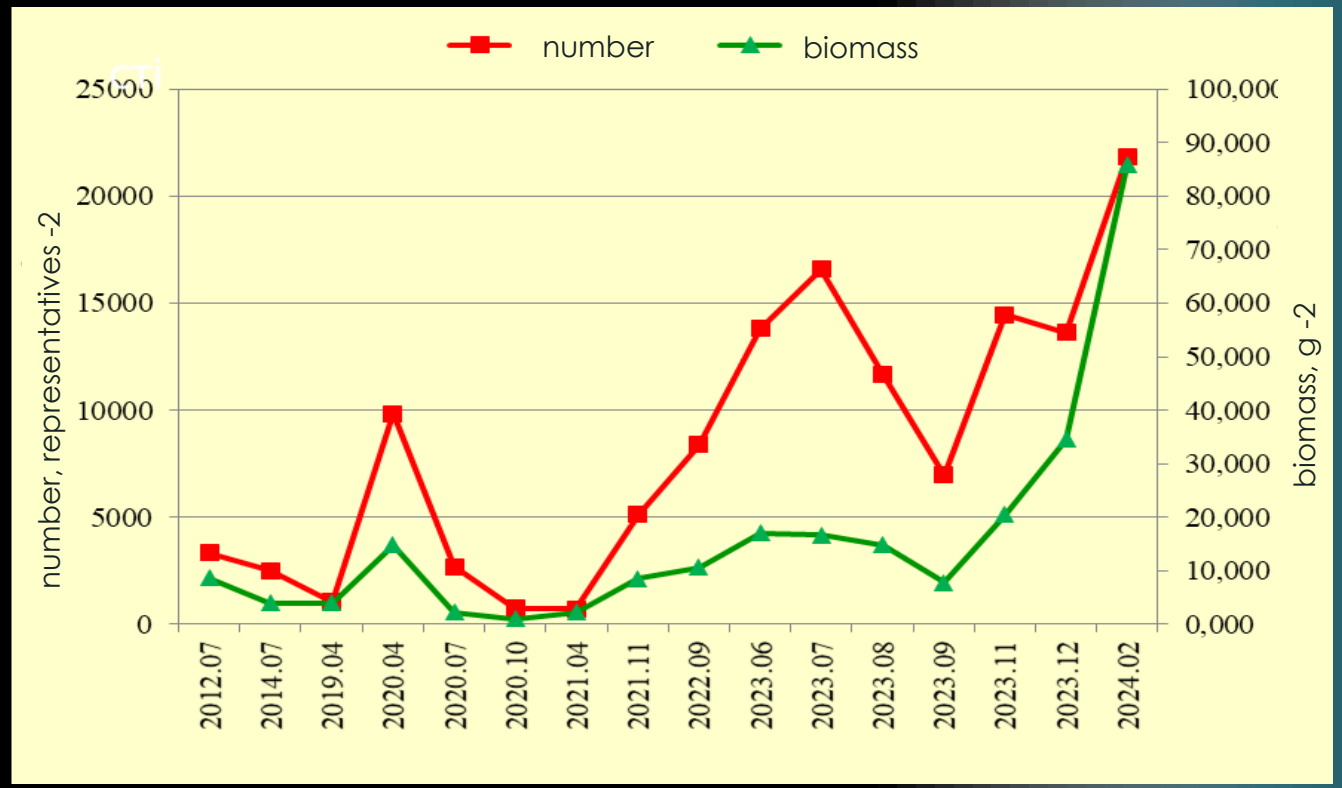
opportunistic organisms

Melita palmata

Chaetogammarus olivii

Polydora cornuta

Alitta succinea

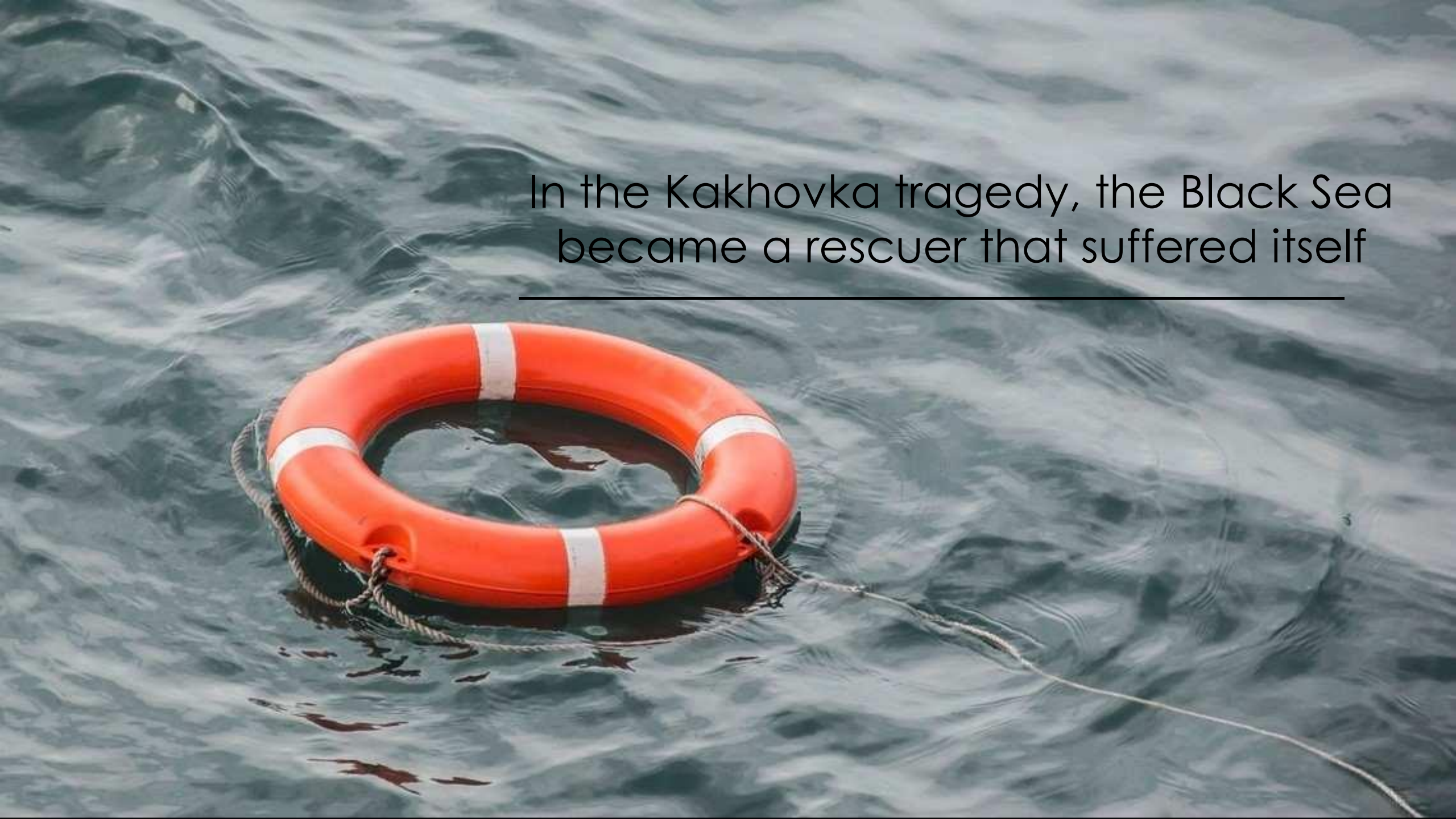


new invaders

Arcuatula senhousia

Macrobrachium nipponense

Nematostella vectensis



In the Kakhovka tragedy, the Black Sea became a rescuer that suffered itself

THANKS FOR ATENTION