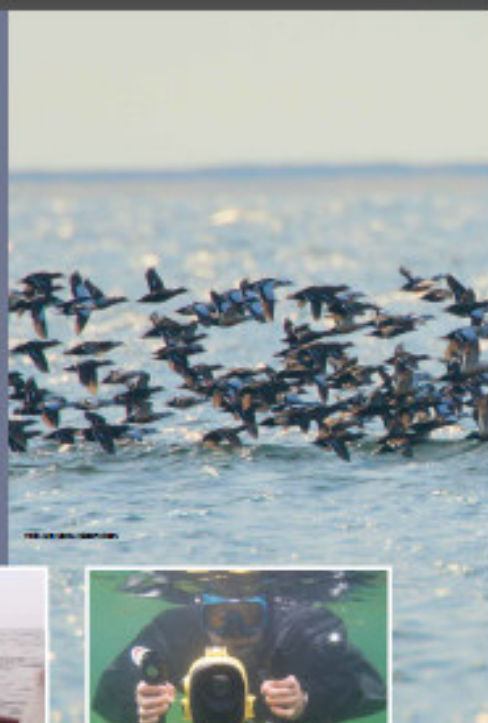# MARINE BIODIVERSITY MONITORING

WHAT IS MONITORING? – observing a situation for any changes which may occur over time using fixed methodology, timeline, sampling system and protocol.

BIODIVERSITY means all variety of living organisms and their habitats. Biodiversity of the Baltic Sea includes about 100 fish species, 450 macroalgae species, 1000 zoobenthos species, 3000 plankton species, four species of marine mammals and more than 150 bird species related to the Baltic Sea.

WHY WE NEED TO MONITOR THE CHANGES IN MARINE BIODIVERSITY? – Knowing about the status of biodiversity and factors influencing it enables us to plan our activities so that they would not harm natural environment and timely react to various threats.

CAN I PARTICIPATE IN MONITORING? – As monitoring has to be carried out according to the standardized methodology, it usually requires skilled observers. However, everybody can contribute by collecting important background information, e.g. participate in bird counting events or report nature observations (e.g. oiled birds, rare species, by-catch of seals and birds). Also catch data reported by fishermen can be used as additional information for assessing the status of fish in a certain sea area.

ISN'T MONITORING DISTURBING NATURE? – Scientists try to invent less disturbing monitoring methods to avoid damage to the environment. Also nature friends contributing with their observations should always take care that they would not disturb the observed species or damage the visited places.

HOW TO COUNT ALL BIRDS OF THE BALTIC SEA?

Seabirds can be monitored from ships, planes or land. Counts have to be carried out in all seasons to get information about wintering, migrating, nesting and moulting birds.

Radar is a tool for monitoring of the movements of birds or other organisms (bats, insects) in the air during the day, or at night in range of typically up to 10 km. When observing bird migration with radar, it is also necessary to simultaneously carry out observations with **spotting scope** and/or **binoculars** to identify the species and number of birds in the flock.
With the **laser binoculars** also the distance of birds and flying height can be measured.
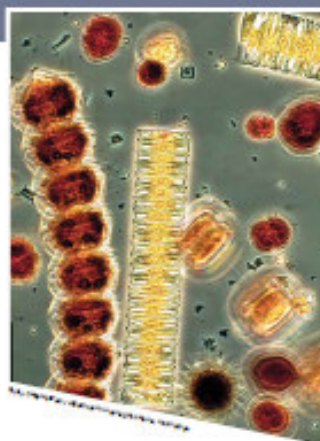
Aerial photography is used to study spatial distribution and numbers of birds. Photos are made from plane with ca 4 cm resolution and software code is used to recognise birds in these images. This technology will probably replace the classical bird counts in future because:

- Imaging takes place at much higher altitude than classical plane counts (ca 400m vs 76m) – thus causing less disturbance to birds.

- The result is more precise compared to standard plane or ship counts and not affected by counter-specific visual abilities.

- In future unmanned planes – **drones** – can be used for aerial photography, which is safer and cheaper than using manned planes.

HOW TO STUDY ANIMALS AND PLANTS LIVING IN DIFFERENT WATER LAYERS?

HOW TO STUDY INVISIBLE PLANKTON?

Plankton is formed of drifting organisms (microscopic animals, plants or bacteria) that inhabit the water layer. Plankton provides a crucial source of food to larger aquatic organisms such as fish. Scientists study plankton with help of **automatic data collection systems** installed on ferries.

HOW TO KNOW THE STATUS OF FISH IN THE BALTIC SEA?

Gill net fishing is the main method of research of fish. A gill net station consists of nets with different mesh sizes. The caught fish is measured and weighted. Also the food found in the stomach of predatory fish is analysed (in order to identify small fish species. **Hand seine** or **beach seine** is a net for catching small fish, which is operated from the shore.

HOW TO STUDY THE SEABED AND CREATURES LIVING THERE?

Animals burrowing into sediments can be studied with **bottom grab**. The samples taken with the bottom grab are put in a plastic bag and labelled. Samples are stored in a fridge and analysed later in a laboratory.
Animals living and plants growing on the surface of the sea bottom are studied by **divers** or with **remote photo or video equipment**.

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