Introduction to Ecological Assessment of Marine Environments

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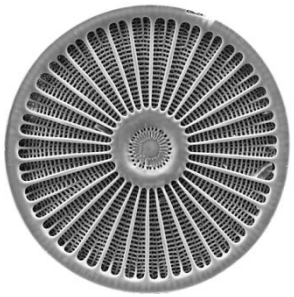
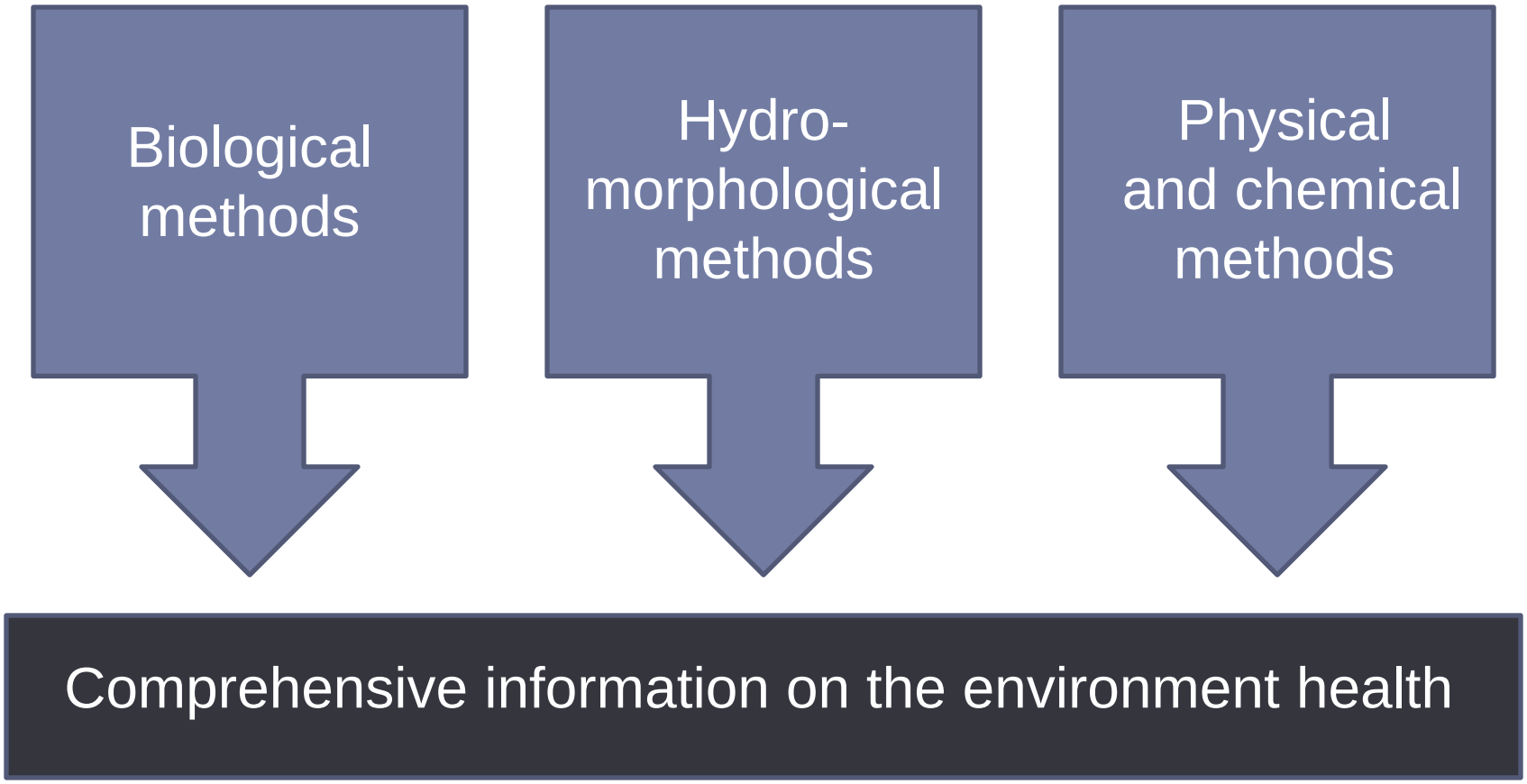
Presentation 3

In this presentation you find some of essential definitions and concepts dealing with bioindicators…

…it is also a summary of previous presentations.



Methods used for assessment of aquatic environments



Do you know why aquatic pollution is recognised mainly as biological problem which can be best addressed using biological methods?

??????????????????????????????????????

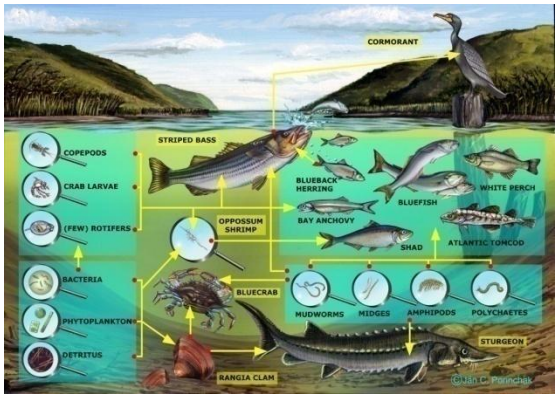
Click the link below to hear the answer (Link 1. All links are transcripted at the end of presentation)

http://www.voki.com/php/viewmessage/?chsm=3572395c35d0f7dc2354e709216b2dee&mId=2477165

Bioindication
is a method to assess changes in environment induced by anthropogenic influences with a use of bioindicators (Odum, 1982)

So, what a bioindicator is?

Bioindicators...



are organisms or communities of organisms, which reactions are observed representatively to evaluate a situation, giving clues for the condition of the whole ecosystem.

Click links below to learn more from recognised gentelmens

Link 2:
http://www.voki.com/pickup.php?scid=11009938&height=267&width=200

Link 3:
http://www.voki.com/pickup.php?scid=11010029&height=267&width=200

Bioindicators can reflect both:

biotic components of ecosystem (state of biocenosis)

- ✓ processes in biocenosis
- ✓ stages of development
- ✓ structure of biocenosis
- ✓ type of synecological unit

features of biocenosis

abiotic components of ecosystem (physical and chemical parametrers of waters)

- ✓ physical
- ✓ physico-chemical
- ✓ chemical

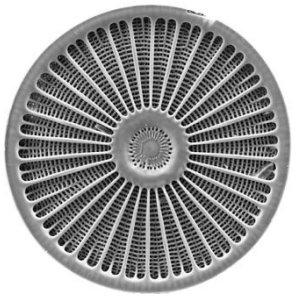
water parameters of natural origin and derivative of pollution

Building on information presented earlier can you point out differences between biological indicators and measurements of physical and chemical parameters of waters?

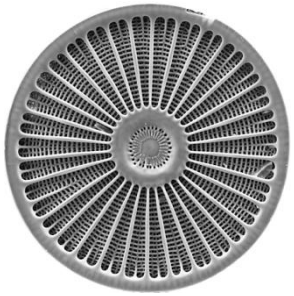
??????????????????????????????????????

To answer the question use knowledge from previous presentations also. A couple of points which were not adressed earlier are on next slides.

Organisms, in contrast to abiotic parameters, provide information not only about the environmental status in the very moment of taking samples/making measurements but reflect changes undergoing for a longer period of time…



… but measurements of physical and chemical parameters as e.g. dissolved oxygen, pH, biogenic compounds, should complement information gained from analysis of organisms



Which of these are essential features for operational bioindicator?

Select features that you think describe best a good bioindicator

- Wide distribution,
- High abundance and wide-spread in a certain type of environment,
- Restricted mobility,
- High tolerance towards variuos kinds of pollution,
- Site specificity,
- Low genetic and ecological variability i.e. should have narrow and specific ecological demands and tolerances,
- Easy sampling, sorting and storage,
- Large volume of the organism,
- Easy identification features enabling recognition by a nonspecialist,
- Robust during handling,
- Easily culturable in the laboratory,
- Low cost and low man power effectiveness,
- The response of the bioindicator should be representative to responses of other taxa and even the ecosystem,
- High metabolic rate.

Which of these are essential features for operational bioindicator?

Now you can check your answers. The highlighted features are recognised as the most significant criteria for ideal bioindicator

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Transcripts of the links:

Link 1: Aquatic pollution is recognised mainly as biological problem because it strongly affects aquatic organisms and land organisms using water to satisfy basic needs. Life on the earth depends on clear water resources which are more and more limited due to human activity.

Link 2: Other words, bioindicators are species or group of species that readily reflect the abiotic or biotic state of an environment, represent the impact of environmental change on a habitat, community or ecosystem or are indicative of the diversity of a subset of taxa or the whole diversity within an area.

Link 3: The bioindicator has particular requirements with regard to a known set of physical or chemical variables such that changes in presence/absence, numbers, morphology, physiology or behavior of that species indicate that the given physical or chemical variables are outside their preferred limit.

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