



October 2018/ Turku, Finland: National Scientific Forum on sea-based measures discussed what we should know before testing new measures

Some new, so called sea-based measures have already been tested to help the Baltic Sea, such as regulated management fishing of cyprinid fish or small-scale oxygenation pilots on coastal bays. Some of the measures such as binding phosphorus into sediment and removal of active top layer of sediment, are also currently being studied or tested in ongoing projects, like the SEABASED.

In October 2018, a National Scientific Forum in was arranged in Turku, Finland, to discuss and evaluate the potential effects of so-called sea-based measures. A dozen Finnish researchers representing different fields of natural sciences, especially related to Baltic Sea marine ecology, biology and geochemical ad physical processes in the sea, were invited to the workshop.

Focus of the discussion

In the workshop, the focus of the discussion was in scientific facts related to the marine ecosystem and its processes, however, also the potential risks, as well as possible added values of some of the sea-based measures were discussed and different aspects that should be taken into account when assessing the risks of such measures were evaluated.

For the time being, the discussion on the effects of new measures brought up more questions than answers, from the processes of the seabed and sediment to marine food webs and interactions between physical and biological parts of the ecosystem: which mechanisms affect the different fractions of nutrients to bind permanently into the sediment, or to be released from sediments? How does removal of the active, organic top layer of the bottom sediment affect the processes in the exposed sediment layer? How long lasting could the effects be? What is the impact mechanism of marl for binding phosphorus? What are effects of marl to the pH value in the target area? What are the wanted and unwanted effects of different measures to the food webs of the sea? How would it affect the food webs if chemical binding of large amount of soluble phosphorus in the bottom water leads to having phosphorus permanently out of circulation?

Assessing of the effects of the measures

Several potential risks were brought up by the scientists, most of them related to application of measures before knowing their mechanism of impact. Unwanted, irreversible or very slowly recovering impacts to the ecosystem could for example include release of toxins from sediment, destruction of locally significant habitats or populations or increasing the internal nutrient loading instead of decreasing the load by changing the stratification of the sea with large scale oxygenation attempts. To mitigate the risks, there is a clear need for further research to be able to reliably assess the potential effects of the proposed sea-based measures.

When entering into practical pilots, to avoid any damage e.g. to endangered species or important breeding grounds, it is essential to know the test areas well. Physical, chemical and biological monitoring should be in place before, during and after the measures. The impact mechanisms of the measures should also be understood before entering to applications even in local scale.

Different measures can be found suitable for different types of areas - mapping the coastal areas by their qualities will be required to gather information and to be able to find suitable areas where different measures could potentially be applied.

Conclusions

Tackling the external sources of nutrient load has been kept as a priority in decreasing eutrophication of the sea, however the results might be seen only after several decades. According to some scientists, the recovery of the Baltic Sea can already be seen from the data and is expected to continue if the external load can be cut further. The ecosystem's response in the marine environment is slow and cannot be artificially accelerated, and the scientists agreed on the fact that simple "quick-fix" solutions cannot be achieved by any means. On the other hand, there is a lack of consensus whether the external load reductions will be enough to tackle the increasing load caused by the impacts of global warming. The ecosystem and processes of the Baltic Sea are constantly changing, but maybe we could try some of the new measures to mitigate the most negative changes?

Several questions remained to be unanswered. For example, is the lack of knowledge a strong enough argument against testing a measure? If so, who decides about that? Which one is a bigger risk for the environment, no action or the implementation of new measures? Is it right to interfere the marine ecosystem at all?

Although there are no prerequisites for large, whole Baltic Sea scale or the open sea scale pilots, carefully monitored small scale local pilots could give more information on the effects of different measures. However, the workshop agreed that the information gained from such pilot tests cannot be applied to deep waters as such due to differences of the ecosystem processes in these different environments. As a general conclusion, more research is needed on the processes of the sea to be able to assess the effects of the new measures. Even though it is worth studying and piloting also the new measures, the most important measure to decrease eutrophication is still to continue decreasing the nutrient load from land-based sources.

Next steps

The discussion facilitated by SEABASED will continue with scientists in Sweden, and also internationally in the coming years.

For more information on SEABASED Project, please visit <https://seabasedmeasures.eu/>