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Agenda Item	3 - Building up future common regional MSP framework
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Background

HELCOM 40-2019 agreed to develop a HELCOM science agenda, concomitantly with the update of the BSAP. The agenda is to outline existing and foreseen HELCOM regional science needs. It will serve the development of activities in HELCOM as well as to inform external funding mechanisms on the research needs of HELCOM. The development of the agenda will also be an opportunity to provide regional input to the [BANOS CSA process](#) and can also contribute to support processes under the [UNESCO Decade of Ocean Science](#).

To initiate the development of a HELCOM science agenda, a survey on knowledge and research needs has been circulated to HELCOM Working Groups and associated Expert Groups, networks etc. The primary aim of the survey is to harvest knowledge and research needs to support the implementation of HELCOM objectives and strategies, both in terms of shorter-term knowledge needs as well as longer-term research needs.

Once the survey has been completed the results will be summarized to provide an overview that can form the basis for the development of a HELCOM science agenda which is envisioned to take the form of a brief report. Such report will highlight issues of major relevance for HELCOM work and the results of the survey are foreseen to be associated to the report, e.g. as a supplement.

HOD 56-2019 agreed on the steps for finalizing the science agenda, including the formation of a Task Group consisting of 1-2 national representatives from each Contracting Party (para 2.32, Outcome of the meeting). The tasks of the group will consist of:

- 1) check the proposals received through the survey and complement as needed if any central topics are found to be missing
- 2) agree on the outline and content of the final report
- 3) identify issues of particular importance for HELCOM work e.g. in the short-term and longer-term
- 4) identify important external processes that could support the implementation of the Science Agenda
- 5) develop a text proposal on the role of the Contracting Parties in supporting the implementation of the HELCOM Science Plan and on major future policy milestones that could be supported by the plan, as a potential HELCOM voluntary commitment to the UN 2020 Conference

The input to the survey from HELCOM subsidiary bodies will be considered by the Task Group at a meeting to be held in late 2019 (date not set yet). Further information on the Task Group can be found in [document 2.6, HOD 56-2019](#).

The invitation to provide input to the HELCOM science agenda was sent to HELCOM-VASAB MSP in June 2019 with a request to provide proposals according to the predefined format for the survey by 20 September 2019. At this time input has been submitted by:

- Denmark with regard to non-indigenous species,
- Germany (Bfn), focusing on monitoring and nature conservation, with additional input from Germany related to non-indigenous species from shipping,
- Poland, focusing on agriculture,
- EN Benthic; the proposals have been prepared by the chair, and network representatives from Finland, Germany and Sweden. Note that proposals will be discussed and amended at the upcoming meeting of EN Benthic (14-15 November, 2019),
- Litter from the Danish representative of EN marine litter,
- EN ESA, prepared by the chair, Finland, Estonia, Latvia, Lithuania and Germany,
- JWG Birds, prepared by the chair and with input from Germany and Sweden,
- EN Noise, prepared by the chair,
- EG MAMA,
- RedCore/PLC.

Since many of the proposals are cross-cutting all input received by 3 October 2019 is included in Attachment 1. Proposals marked in yellow are indicative of what could be of most interest to consider for the HELCOM-VASAB MSP Group. Input is still expected from EN Hazardous substances.

The document includes a superficial overview of the input received so far and also lists the title of proposals. For more in-depth information see Attachment 1. It can be noted that several proposals can provide contributions to MSP (e.g. spatial information on activities, identification of sensitive/important areas for species and habitats) but at present only three proposals mention a direct link to MSP.

Action requested

The Meeting is invited to

- consider if there are additional knowledge and research needs related to the implementation of MSP objectives in HELCOM,
- consider if some of the proposals are already covered by ongoing projects,
- agree on how the input from HELCOM-VASAB MSP can be completed by 30 November with the view of submitting the proposals as an input to the HELCOM Science Agenda.

Background

The survey on knowledge and research needs to support HELCOM objectives is based on four main areas of work (activities, pressures, state, ecosystem-based management) and a number of fixed categories to facilitate the sorting of responses. The proposals have so far been kept according to the incoming reporting. In future compilations and development of the science agenda some topics could benefit from a coherent presentation of the four areas of work.

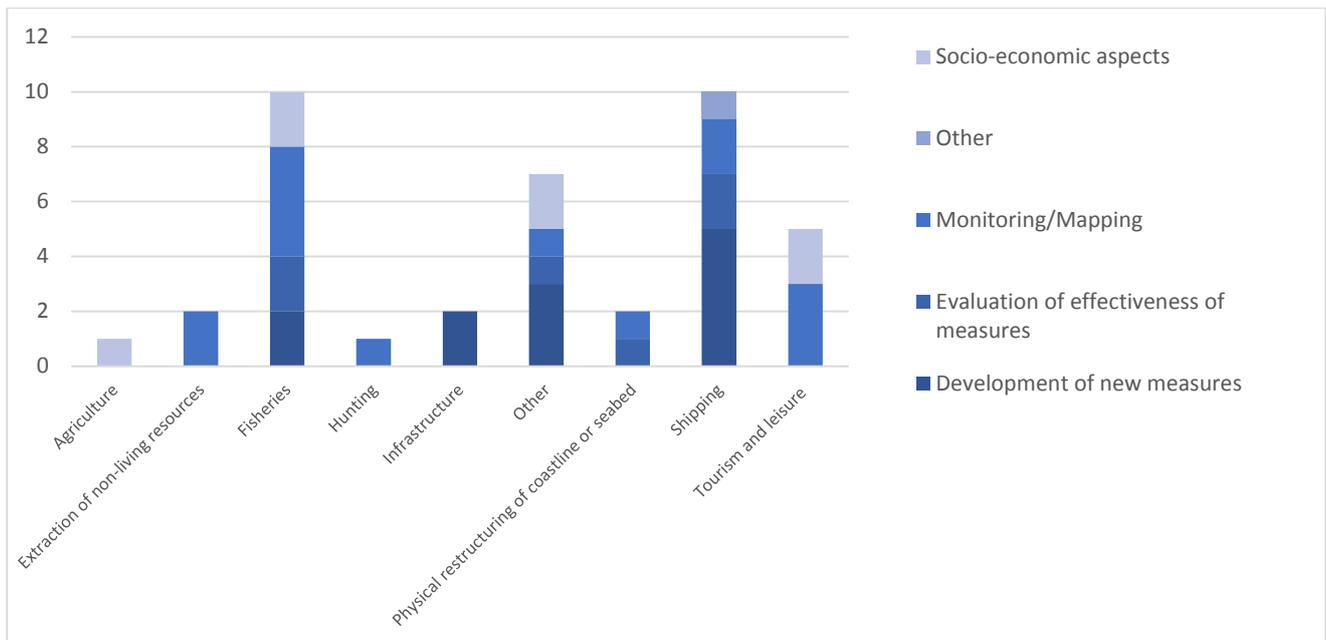
All input received by 3 October 2019 is included in Attachment 1 (excel file). **Note that the top row in each sheet of the attachment can be used to filter the information in the columns with fixed response categories**, e.g. in order to get an overview of all proposals related to fisheries, input of nutrients, indicators and threshold values etc.

HELCOM-VASAB MSP Working Group is expected to review the contributions submitted of relevance to the Group as well as identify tentative needs to resolve overlaps and gaps.

Gaps

Activities

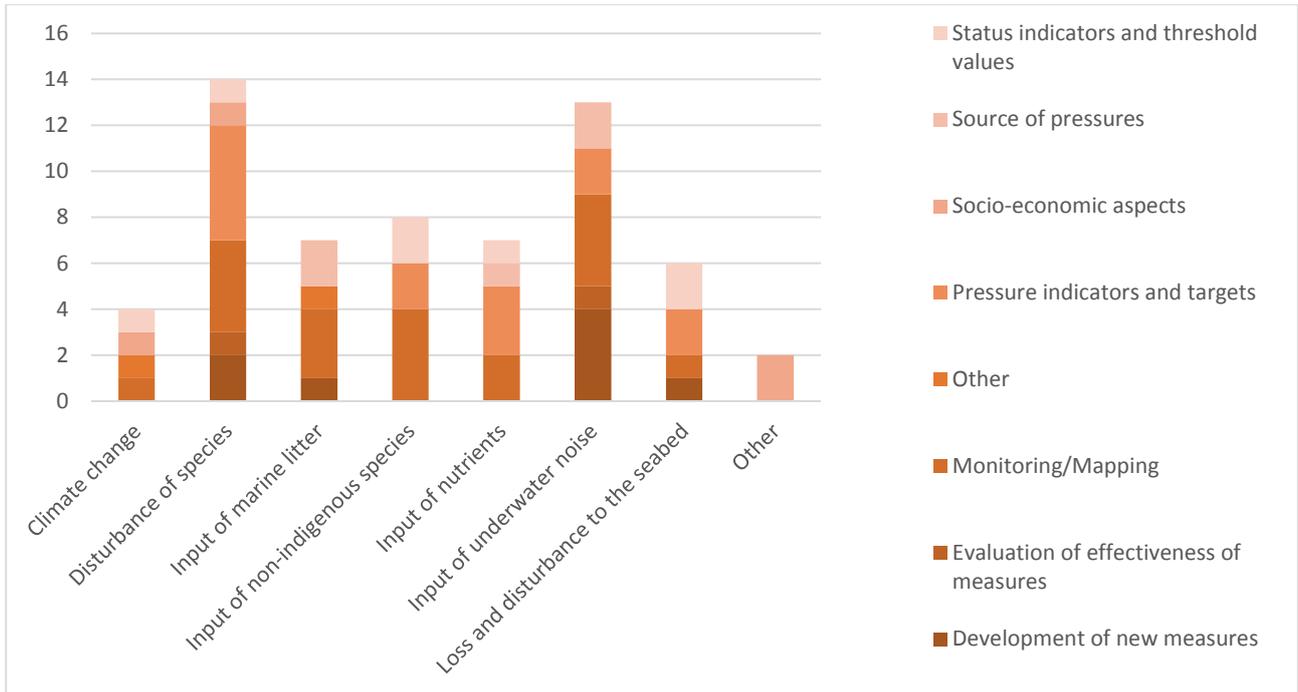
40 proposals are linked to activities. The proposals received are mainly linked to fishing, shipping, and ‘other’. The last category typically refers to studies on multiple activities. Only a few proposals are related to additional activities.



Number of identified knowledge and research needs by different type of activities.

Pressures

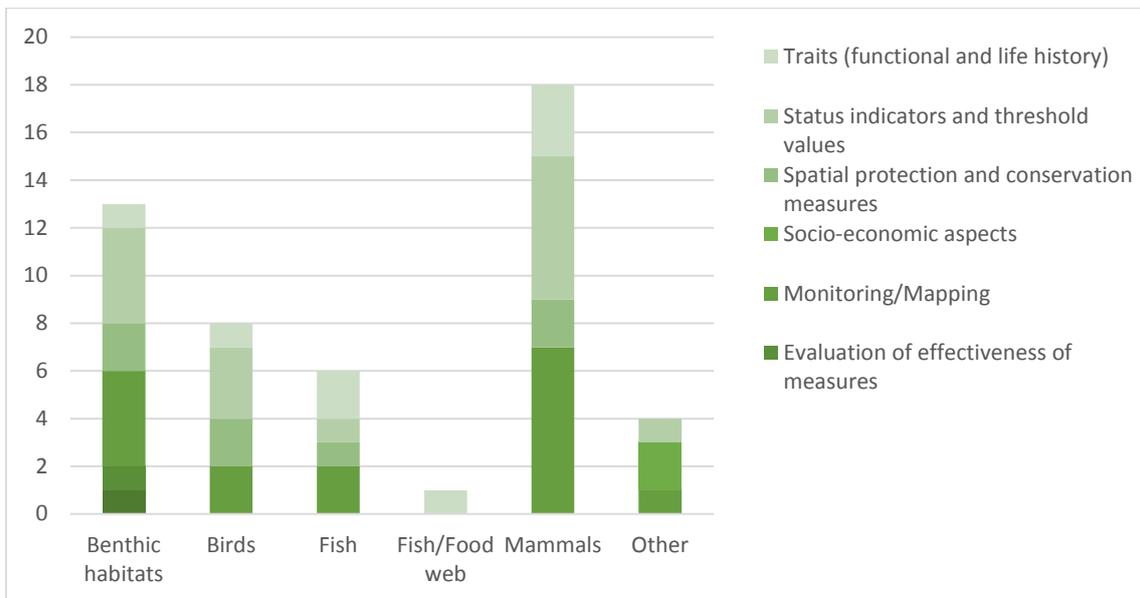
61 proposals are linked to pressures. A majority of proposals are related to disturbance of species and underwater noise. Note that input from EN Hazardous substances is still expected.



Number of identified knowledge and research needs by different type of pressures.

State

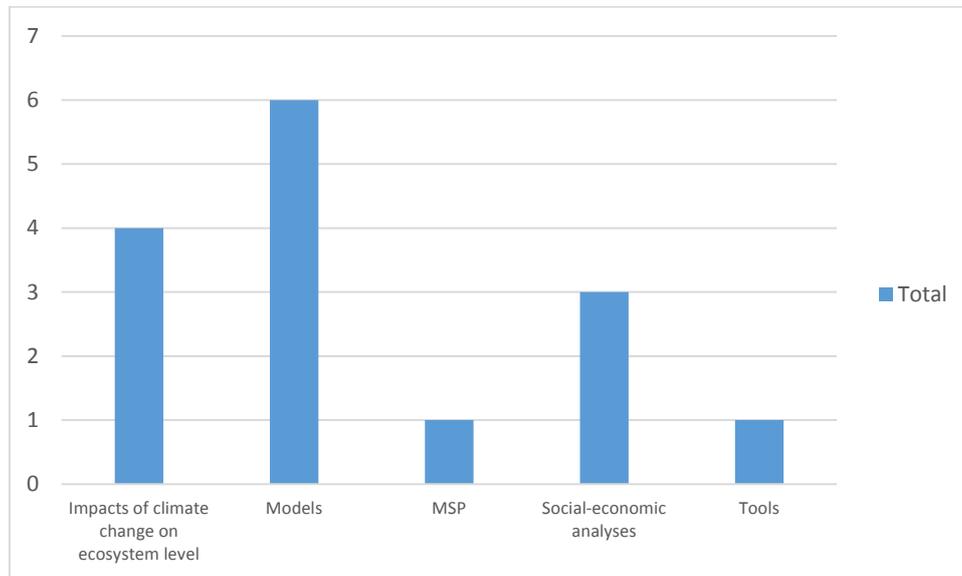
50 proposals are linked to state components. A majority of proposals are related to benthic habitats, mammals and birds. There are notable gaps for migratory fish, coastal fish, phyto- or zooplankton,



Number of identified knowledge and research topics by different type of state components.

Ecosystem-based management

15 proposals have been made as directly related to ecosystem-based management, mainly regarding models (covering nutrient input, food webs, noise, benthic habitats), socio-economic analysis and impact of climate change.



Number of identified knowledge and research needs by different type of state components.

Overlap

Due to late incoming proposals it has not been possible to analyse overlaps in any detail, however, some obvious overlaps exist.

Identical proposals that have been received (e.g. from Germany and JWGBIRD) are only included once in Attachment 1 and both contributors are visible in the column with the heading 'Submitted by'.

A preliminary analysis of the input received so far shows overlaps and potential to merge proposals with regard to "Activities" and associated type "Fisheries". Overlaps include:

- Rows 3 and 23 that both concerns the recovery of benthic habitats after closures to fishing
- Rows 21 and 30 that both concerns need for better and more detailed information on fishing effort to develop the by-catch indicator and to reduce by-catch.
- Rows 22 and 31 that both concerns development of measures to reduce by-catch of seabirds and mammals

Depth of description

It has been recommended that the description of the knowledge/research should use 100-150 words. Several proposals are significantly shorter, and it is doubtful if some of these brief descriptions provide sufficient detail to serve the purpose to inform HELCOM and external funding agencies. If the Working Group finds some of the descriptions too brief it is proposed request the submitting country, network etc for further information.

Summary of type of research needs

The survey asks that the proposals should be linked to a number of pre-defined 'aspects' (for full list of options see Attachment 1). Many proposals are related to monitoring and mapping (32%) or development of pressure or status indicators (18%). Other common proposals are the development of new measures or

assessment of effectiveness of measures, making up half of the proposals related to Activities, 17% related to Pressures, and 20% of all proposals.

The survey has asked whether the proposals are expected to require new research or whether existing data and information already exists. A majority of responses, 80%, have indicated that new research is required.

The survey has also asked for expected time required to achieve the proposal, using categories <1 year, 1-5 years, >5 years. 88% have responded that the time required to achieve the proposals is likely within 1-5 years.

Annex 1. Lists with title of proposals

Note; titles are often brief, please see Attachment 1 for further information.

Activities

Agriculture

Economic impacts of measures

Extraction of non-living resources

Data availability

Loss of habitat

Fisheries

Data availability

Develop and test bycatch mitigation measures

Development of measures to reduce seabird bycatch in fisheries

Effectiveness of fisheries closures

Evaluation of enclosed areas

Evaluation of fisheries affecting benthic habitats and their contribution to livelihood and economy

Record fishing efforts (all métiers and vessel sizes) with the highest possible resolution

Recording fishing effort in high spatial and temporal resolution

Use of acoustic deterrence devices

Use of existing models and data from fisheries economics

Hunting

Spatio-temporal occurrence of seabird hunting

Infrastructure

Assessment of the impacts of OWFs on (migrating) seabirds for coordinated marine spatial planning

Development of miniaturized transmitter

Other

Alternative exploration technologies for seismic surveys

Co-ordinated spatial planning in order to minimize impact of offshore wind farming on seabirds and bird migration

Effects of pleasure boat traffic on breeding coastal birds

Linking activities to measures and cost effectiveness of measures

Mitigation of impact from explosions

Relation between the state of the Baltic and all activities

Spatial distribution of the socioeconomic impacts and values of all activities

Physical restructuring of coastline or seabed

Mapping of constructions

What legal instruments are there to limit/monitor physical restructuring of coastline or seabed?

Shipping

Adaptive use of echosounders

Data availability

Database of ship underwater noise emission

Hull fouling management

Indicative sampling of ballast water for compliance with IMO D-2 standards

Measures for underwater noise reduction

Real-time emission feedback

Reduce noise emission of large vessels

Routing and speed

Technical sonar modification

Tourism and leisure

Boats without AIS

Cruiseships
 Leisure boat traffic
 Relation between the state of the Baltic and tourism and leisure activities

Pressures

Climate change

Climate change effects on marine biota
 Economic impacts from climate change
 species responses to climate change
 Winter distribution of seabirds in relation to climate change

Disturbance of species

Anthropogenic impacts on marine mammals
 Bycatch mitigation measures
 Bycatch risk assessment
 Comparison of historic and current pressure patterns
 Comparison of individual and cumulative anthropogenic impacts on the ecosystem
 Effects of electromagnetic fields on marine biota
 Effects of local populations
 Geographical overlap between activities/pressures and species or biotopes
 Impact of hunting on seabird populations
 Rates of drowned seabirds in fishing gear
 Regional coordinated bycatch monitoring (combined with data collection of fishing effort, see "activities")
 Thresholds for disturbed biotopes
 (blank)

Input of marine litter

Degradation of microplastic
 Determine litter sources and pathways
 Micro-plastic long term studies and standardization of methods
 Population changes caused by marine litter
 Sources of macrolitter
 Sources of microplastic
 Standardized assessment of beach litter abundance and composition

Input of non-indigenous species

Develop standardized monitoring for NIS (also for pelagic species)
 Development of an NIS impact indicator... (considering impact on environment, ecosystem services, health, and economy including socioeconomic aspects. Definition of GES)
 Identification and mapping.
 Impact of non-indigenous invasive mammalian predators on seabird populations
 Improvement of species identification methods for reliable taxonomic lists, especially for non-indigenous species
 Quantitative estimates of non-indigenous species affecting seafloor composition or function
 The use of eDNA for NIS monitoring and risk assessments
 Early detection of NIS and threshold values

Input of nutrients

Alignment of nutrient input reduction targets for individual rivers basins with related targets of BSAP.
 Developing common modelling approach for quantifying nutrient sources in the Baltic Sea catchment
 Hypoxic areas
 Impact of climate change on nutrients retention in inland waters
 integrated system of risk assessment of phosphorus losses from agricultural soils to surface water

Indicator on near-bottom oxygen concentrations in shallow waters

Input of underwater noise

Acoustic traumas of stranded marine mammals
Conduct sonication and sound propagation trials
Cumulative impacts of underwater noise on seabirds and marine mammals
Echosounders and sonars
Geoacoustic instruments
Improve efficiency of monitoring
Improve impulsive noise register
Mapping
Military sonars
Quick hearing screening for harbour porpoise stranded alive
Ramp-up and soft-start procedures
Smart monitoring of underwater noise emission
Technical noise abatement systems

Loss and disturbance to the seabed

Extent and distribution of pressures causing loss and disturbance
Extent of adverse effects
Extent of disturbance from activities.
Measures to counteract adverse effects
Recovery period of benthic communities and changes in sediment composition
Definition of thresholds

Other

Cost effectiveness analysis of measures to reduce pressures
Integrated assessment of pressures and other components of EBA

State

Benthic habitats

Assessment of ecosystem function
Biocenosis on geogenic and biogenic reefs
Biological indicators of ecosystem state
Coherence of MPA network
Off shore habitat maps
Regionally coordinated HELCOM project for habitat and biotope mapping,
Response of biological indicators to measures
Restoration of seagrass beds
Substrate maps
Susceptibility of benthic invertebrates to underwater noise
(blank)
Definition of thresholds
Shifting baselines

Birds

Breeding success in relation to environmental changes
Co-ordinated regional surveys of wintering seabirds
Habitat selection and feeding strategy of sea birds and water birds
Habitat selection and feeding strategy of seabirds and waterbirds
Preparation of underwater-audiograms for diving birds
Regional monitoring programm/surveys of wintering birds
Reproductive success of seabirds

Underwater hearing and use of sound

Fish

Acoustic communication and sensitivity for electromagnetic fields

Distribution and habitat use

Effects of turbidity plumes on (migratory) fish

Population dynamics of migratory species

Reporting and assessment of non-commercial species

Susceptibility to underwater noise

Fish/Food web

Fish population, community and trophic shifts

Mammals

Blubber thickness data evaluation and statistics

By-catch detection

Characterization of parasites of harbour porpoise and harbour seal

Distribution and habitat use

Energetic consequences of exposure to underwater noise

Habitat selection of harbour porpoise and seals

Health indicator and GES development

Integrated management of status and population

Masking of hearing by low frequency noise

Potential impact of increasing seal stock on fish health

Preparation of underwater-audiograms and expansion of stationary acoustic monitoring

Provide guidance on direct takes and other anthropogenic removal, especially bycatch

Provide guidance on establishing an abundance and distribution indicator for porpoises and establish monitoring schemes

Providing at sea distribution maps of marine mammals

Providing correction factors for seal abundance indices

Regional monitoring programme for ringed seal in Gulf of Riga and Gulf of Botnia

Scientific support for the evaluation of PAL.

Subpopulation structure of grey and ringed seals in the Baltic Sea

Underwater hearing and use of sound

Other

Costs and benefits of changes in the state of the environment

Harmful effects of marine litter

Linking state to the provision of ecosystem services

Monitoring methods for microplastic/microlitter

Eco-system based management

Impacts of climate change on ecosystem level

Biogeochemical cycling in a changing climate

Coherence of MPA network

Invasive species

Time lags and Climate change aspects to the HELCOM Nutrient Reduction Scheme

Models

Food web models

Improving the scientific basis for calculation of Maximum Allowable Inputs

Models on species distribution of Seals in Baltic Sea

Population effects of noise exposure

Scenario models for benthic habitats

Combination of existing models (hydrographic and ecosystem model) to reproduce and extrapolate monitoring results, coupled with existing monitoring data

MSP

Identification of spawning habitats of fish species considered as noise sensitive and modelling of noise impact on these. Taking these habitats into account in MSP.

Social-economic analyses

Ecosystem services approach

Internationally coordinated new economic valuation studies

Marine ecosystem accounting

Tools

Soundscape planning tool
