Interreg
Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

EU STRATEGY FOR THE BALTIC SEA REGION
FLAGSHIP

COMPLETE

WORKSHOP
THE EARLY WARNING SYSTEM (EWS) ON FINDINGS OF HARMFUL AQUATIC ORGANISMS AND PATHOGENS (HAOP) IN THE BALTIC SEA AND ITS IMPLEMENTATION IN THE AQUANIS INFORMATION SYSTEM

Online workshop on January 19th 2021

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HELCOM
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KEEP THE ARCHIPELAGO TIDY FINLAND
LATVIJAS HIDROEKOLOĢIJAS INSTITŪTS
SYKE
Klaipeda University
UNIVERSITY OF HELSINKI
CHALMERS UNIVERSITY OF TECHNOLOGY

Project COMPLETE - Completing management options in the Baltic Sea Region to reduce risk of invasive species introduction by shipping

Workshop

The Early Warning System (EWS) on findings of harmful aquatic organisms and pathogens (HAOP) in the Baltic Sea and its implementation in the AquaNIS information system

(January 19th, 2021, online)

Summary

An online workshop was organized in the framework of an INTERREG Baltic Sea Region programme project COMPLETE (www.balticcomplete.com) to present an Early Warning System (EWS) on findings of harmful aquatic organisms and pathogens (HAOP) in the Baltic Sea and its implementation in the AquaNIS information system. The workshop was organized by the Marine Research Institute, Klaipėda University and attended by 39 participants from 13 countries and intergovernmental organization HELCOM.

The aim of the EWS is to reduce the risk of spreading HAOP by minimizing the uptake and discharge of ballast water which could be harmful to the recipient port or area. The EWS consists of Detection of a HAOP, Warning Service, and Response. The criteria to issue a warning signal is based on the concept of the Target Species (TS). Technically, the EWS is embedded in AquaNIS (an international information system, which stores and disseminates information on alien species introductions, recipient regions, taxonomy, biological traits, impacts, and other relevant documented data (www.corpi.ku.lt/databases/aquanis)). AquaNIS is linked to the TS data in the specialized HELCOM database (https://maps.helcom.fi/website/RA_tool). The EWS automatically produces a warning signal if data which meets criteria for the warning signal is entered into AquaNIS. The signal goes to the Editorial Board of AquaNIS and then is distributed to relevant stakeholders.

The participants were introduced to a model agreement that defines the roles and responsibilities of those who send and receive the alert. Then a “Fast Track” was demonstrated, the goal of which is to simplify the entry of the data required to send a warning signal. A discussion was then organized in which participants were asked to answer questions (“Do you know what to do when you receive a warning signal?” and “Do you know which institutions in your country will you send a warning signal to?”). Finally, participants were asked to complete a questionnaire to summarize their views on how the EWS can help implement the Ballast Water Management Convention.

Time	January 19th, 2021 at 14:00-16:00 EET (13:00-15:00 CET)		
Venue	Online meeting		
		Institution	Country
Organisers	Sergej Olenin, Greta Srėbalienė, Aleksas Narščius	Marine Research Institute, Klaipėda University	Lithuania
Participants	Marie-Lucie Susini	FPS Mobility and Transport	Belgium
	Kim Lundgreen	Danish Environmental Protection Agency	Denmark
	Kim Larsen	Danish Environmental Protection Agency	Denmark
	Kaspar Anderson	Estonian Ministry of the Environment	Estonia
	Anastasiia Kovtun-Kante	Estonian Environment Agency	Estonia
	Agnes Pilv	Estonian Transport Administration	Estonia
	Kerli Pettai	Environmental Board	Estonia
	Mats Björkendahl	Finnish Shipowners Association	Finland
	Maiju Lehtiniemi	Finnish Environment Institute	Finland
	Ville-Veikko Intovuori	Finnish Transport and Communications Agency	Finland
	Emilia Luoma	University of Helsinki	Finland
	Manuel Sala	HELCOM	
	Stephan Gollasch	GoConsult	Germany
	Māra Melnbārde	Ministry of Environmental Protection and Regional Development	Latvia
	Anete Fedorovska	Latvian Institute of Aquatic Ecology	Latvia
	Māra Kostanda	Latvian Institute of Aquatic Ecology	Latvia
	Solvita Strake	Latvian Institute of Aquatic Ecology	Latvia
	Iveta Jurgensone	Latvian Institute of Aquatic Ecology	Latvia
	Ieva Putna-Nīmane	Latvian Institute of Aquatic Ecology	Latvia
	Ieva Barda	Latvian Institute of Aquatic Ecology	Latvia
	Agnė Lukoševičienė	Ministry of Environment	Lithuania
	Aiste Kubiliute	Environment Protection Agency, Marine Environmental Assessment Division	Lithuania
	Saa Kabuta	RIJKSWATERSTAAT, Min I&W	Netherlands
	Jakub Bednarek	Ministry of Infrastructure	Poland
	Dominika Dłutek-Malinowska	Ministry of Infrastructure	Poland
	Monika Normant-Saremba	University of Gdańsk	Poland
	Joanna Hegele-Drywa	University of Gdańsk	Poland
	Dagmara Wójcik-Fudalewska	University of Gdansk	Poland
	Katarzyna Parafińska	Chief Sanitary Inspectorate in PL	Poland
	Magdalena Wesołowska	Maritime Office in Szczecin	Poland
	Beata Woźniak	Regionalna Dyrekcja Ochrony Środowiska w Olsztynie	Poland
	Piotr Gruszka	Gdynia Maritime University	Poland

Maria Pogojeva	State Oceanographic Institute	Russia
Julio de la Cueva	Spanish National Ports Agency	Spain
Lena Granhag	Chalmers University of Technology	Sweden
Maria Karlberg	Swedish Meteorological and Hydrological Institute	Sweden
Marie Johansen	Swedish Meteorological and Hydrological Institute	Sweden
Erland Lettevall	Swedish Agency for Marine and Water Management (SwAM)	Sweden
Mikhail Son	Institute of Marine Biology, NAS of Ukraine, Odessa	Ukraine

MINUTES

The COMPLETE project in a nutshell and aim of the Workshop

An INTERREG Baltic Sea Region programme project COMPLETE (www.balticcomplete.com) works towards minimising the introduction of harmful aquatic organisms and pathogens[1] (HAOP) by developing a consistent and adaptive management system for the Baltic Sea region. The project is focused on three main tasks: 1) development of the harmonized monitoring of non-indigenous species; 2) regionally harmonized implementation of IMO Ballast Water Management Convention (IMO BWMC, 2004); and 3) development of a roadmap for a regional biofouling management strategy.

[1] ***Harmful aquatic organisms and pathogens (HAOP)***.
Aquatic organisms or pathogens which, if introduced into the sea including estuaries, or into fresh water courses, may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas (IMO, International Convention on the control and management of ships' ballast water and sediments. International Maritime Organisation. 2004).

The aim of the Workshop is to present one of the outcomes of the COMPLETE project: An Early Warning System (EWS) on HAOP in the Baltic Sea region, familiarize the participants with the concept of EWS, its practical implementation, the roles of the involved institutions (national focal points), and also discuss the direction of its further development.

Aim and policy relevance of the Early Warning System

The aim of the EWS is to reduce the risk of spreading HAOP by minimizing the uptake and discharge of ballast water which could be harmful to the recipient port or area. This is achieved by issuing a warning signal to:

(1) vessels to prevent loading of ballast water when critical biological conditions occur in ports and surrounding areas, i.e. mass development or blooms of HAOP, and

(2) environmental and health authorities when Target Species[2] or other organisms, which can be identified as HAOP, are present in ports or port vicinity to enable early response and implementation of remediation measures.

> [2]***Target Species (TS)***.
> *2Species identified by a Party that meet specific criteria indicating that they may impair or damage the environment, human health, property or resources and are defined for a specific port, State or biogeographic region (IMO, 2007).*

The EWS is developed for the Baltic Sea area in accordance with the International Maritime Organisation International Convention on the control and management of ships' ballast water and sediments (BWMC, 2004). It serves for timely communication of findings of HAOP to all relevant authorities in the HELCOM countries and international shipping in the Baltic Sea. The EWS *inter alia* addresses the issues with relevance to the activities of the HELCOM/OSPAR TG Ballast (https://helcom.fi/helcom-at-work/groups/maritime/tg-ballast/).

The policy relevance of the EWS is based on:

- the IMO Ballast Water Management Convention (BWMC, 2004) Regulation C-2 declaring that "States should notify mariners of areas under their jurisdiction where vessels should not uptake ballast water, if they are known to contain outbreaks, infestations or populations of HAOP" and
- the EU Regulation on the prevention and management of the introduction and spread of invasive alien species (1143/2014) indicating that Member States may establish mechanisms for cooperation including "exchange of information and data, action plans on pathways and exchange of best practice on management, control and eradication of invasive alien species, early warning systems and programs related to public awareness or education".

The concept of the EWS

The concept of the current EWS is based on a theoretical model developed earlier for the Adriatic Sea (Magaletti et al. 2018) with addition of the practical implementation steps, which includes three main components (Fig. 1):

- Detection of a HAOP as a result of a Port Baseline Biological Surveys or non-indigenous species (NIS) monitoring;
- Warning Service, where criteria to issue a warning signal are clearly identified and shared among the EWS participants and
- Response, which includes, e.g. notification to vessels prevent loading or discharge of ballast water when critical biological conditions occur in ports.

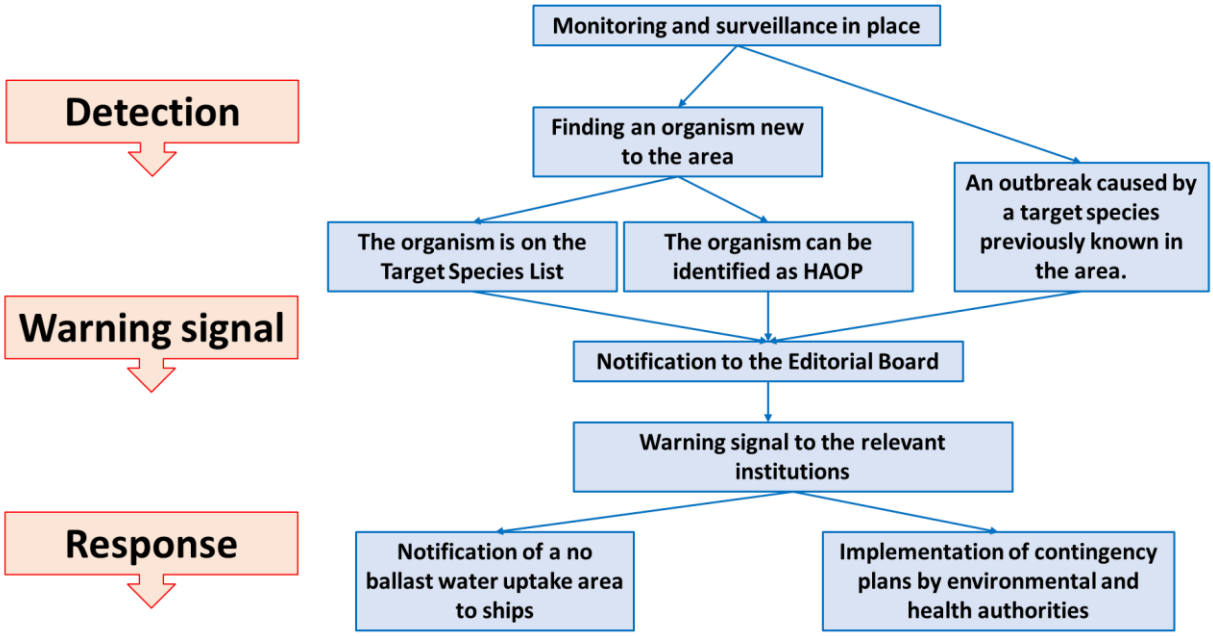


Fig. 1. The principal structure of the early warning system for communication of findings of harmful aquatic organisms and pathogens

The Detection of HAOP and NIS includes a wide range of different activities and methods, most of which are addressed in the COMPLETE project.

Criteria for a warning signal

The criteria to issue a warning signal is based on the concept of the Target Species (TS) (IMO, 2007; Olenin et al. 2016; Gollasch et al. 2020). The selection of species for the TS list is based on criteria:

- Criterium 1 Relationship with the transport vector ballast water
- Criterium 2 Impact and its severeness
- Criterium 3 Evidence of earlier introduction(s) elsewhere
- Criterium 4 Current distribution in its native biogeographic region and in other biogeographic regions

The TS selection criteria were developed in the COMPLETE project primarily for risk assessment based exemptions of ballast water management requirements (Gollasch et al. 2020); the TS data is stored in a specialised HELCOM database within the Ballast Water Exemptions Decision Support Tool (HELCOM, 2021) (Fig.2).

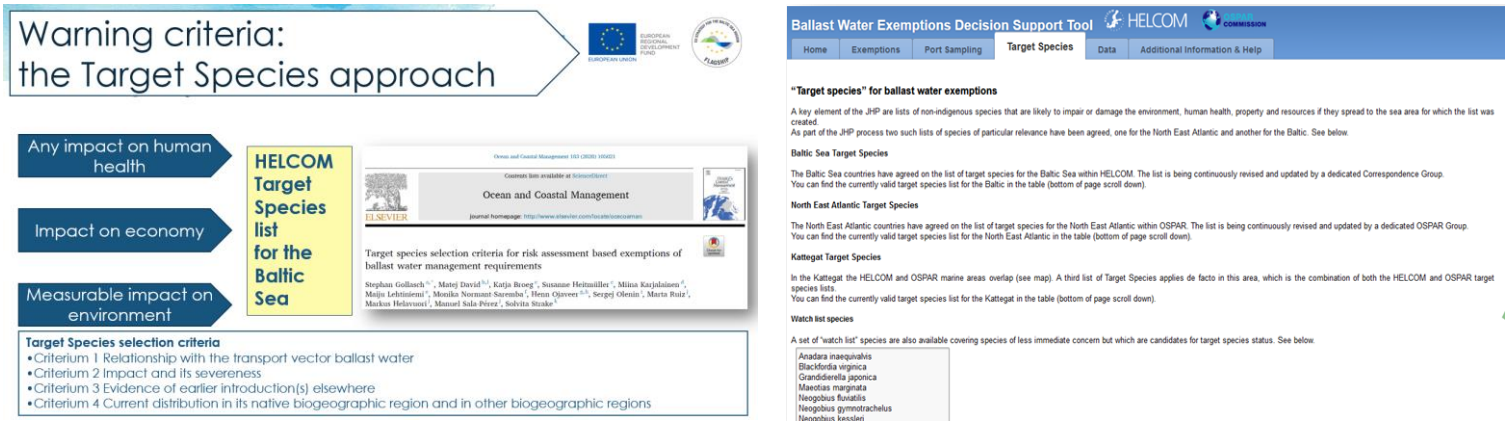


Fig. 2. The Target Species are selected based on the clearly defined criteria, the TS list is primarily designed for risk assessment based exemptions of ballast water management.

Technical implementation of the EWS in AquaNIS

The EWS is embedded in AquaNIS[3], which is linked to the TS data the specialised HELCOM database. The EWS automatically produces a warning signal if data is entered into the system (Fig. 3). This will happen if:

- the arrival of a new target species for the port is observed,
- an outbreak of a previously known TS (rapid exponential population growth that may pose a risk to human health, the economy or the environment) is detected, or
- the arrival of a species that can be classified as a HAOP (known to pose a threat to human health, has an economic impact or an undesirable effect on the environment) is noticed.

[3] ***AquaNIS***
An information system on aquatic non-indigenous and cryptogenic species. This international database stores and disseminates information on alien species introductions, recipient regions, taxonomy, biological traits, impacts, and other relevant documented data (www.corpi.ku.lt/databases/aquanis).

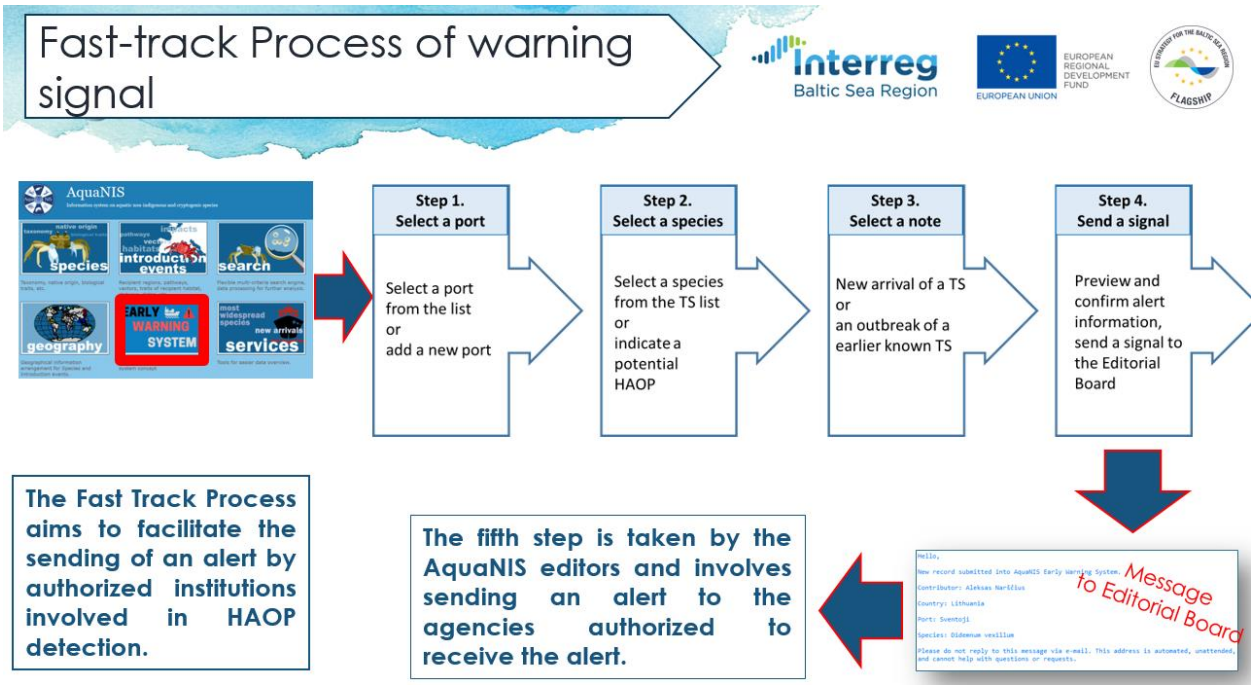


Fig. 3. The scheme showing the process of sending a warning signal from an authorized institution involved in monitoring and surveillance of HAOP to the Editorial Board of AquaNIS.

The role of the EWS participants

A warning signal can only be sent by authorized organizations that have signed an agreement with the AquaNIS Editorial Board to participate as a focal point in the HAOP Early Warning System in the Baltic Sea Region (Fig. 4). Such consent is also required from institutions that have agreed to receive a warning signal of HAOP detection elsewhere in the Baltic Sea ports for transmission to the relevant national and regional authorities (focal points).

Agreement
on the transfer and receipt of data
in case of detection of harmful aquatic organisms
and pathogens (HAOP)

The undersigned party agrees to participate as focal point in **the Early Warning System (EWS) on findings of HAOP in the Baltic Sea region**, which was developed in the framework of the Baltic Sea Regional Project COMPLETE (www.balticcomplete.com) and implemented at AquaNIS, an information system on aquatic non-indigenous and cryptogenic species (www.corpi.ku.lt/databases/aquanis). The EWS is **aimed for timely communication of HAOP findings, which may adversely affect human health, economy or environment**.

The undersigned party agrees to serve as a national focal point to the EWS and:

- promptly send a warning signal on detection of HAOP in a port or port vicinity, where ballast water operation are taking place to the Editorial Board of AquaNIS using the EWS platform
  and/or
- receive a warning signal on finding of HAOP elsewhere in the Baltic Sea ports and transfer it to the relevant national and regional authorities.

The AquaNIS Editorial Board, upon receipt of a warning signal from the undersigned party, undertakes to immediately transmit it to other EWS participants.

Information about institution

Name of the institution
(and department, where relevant)
.....

Contact details
(email, phone)
.....

Signed on 2021-XX-XX

On behalf of the Institution	On behalf of the AquaNIS Editorial Board

Fig. 4. A draft of the Agreement on the transfer and receipt of data in case of detection of harmful aquatic organisms and pathogens.

Practical exercise using the “Fast Track Procedure”

Then a “Fast Track” was demonstrated, the goal of which is to simplify the entry of the data required to send a warning signal using AquaNIS platform. The fast-track process involves selecting the country and port for which data is presented, then selecting a TS from the provided drop-down list or other species not included in the TS list, then selecting a note on the status of the species in question with additional information added, and finally sending an alert (Fig. 5).

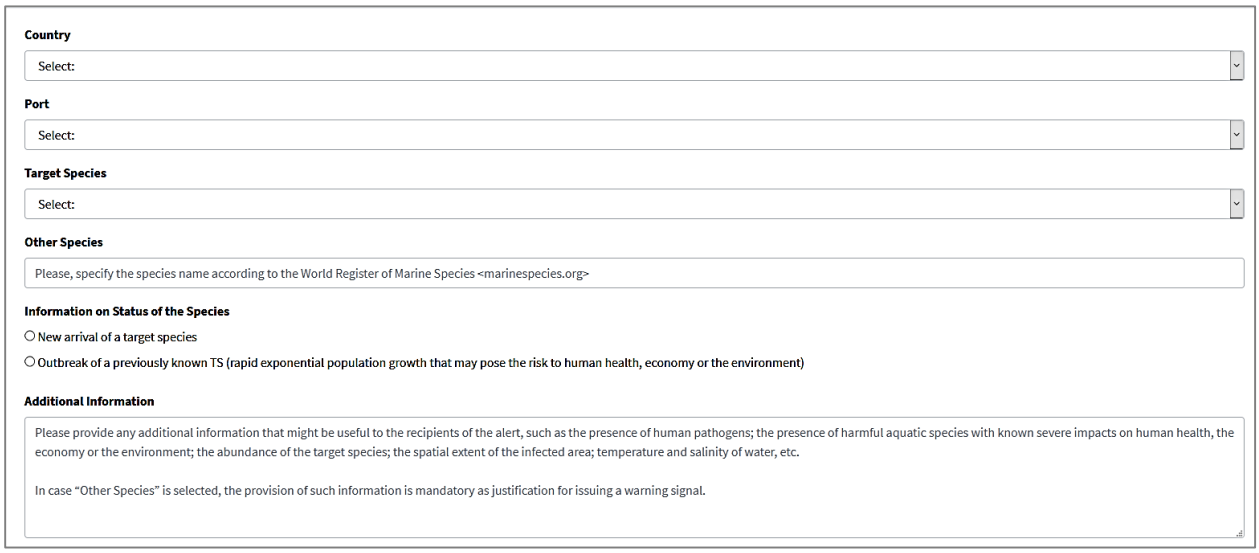


Fig. 5. The Fast Track procedure to report detection of harmful aquatic organisms and pathogens implemented at the AquaNIS platform.

To complete the presentation of the procedure, one of the participants familiar with the AquaNIS system (Dr. S. Gollasch) was asked to enter data that would trigger the sending of a warning signal. The received signal was analyzed, the validity of the warning was "weighed" by the organizers, and based on this, a notification was sent by e-mail to all workshop participants (acting as "focal points" in this exercise).

Round table discussion

After receiving of the warning signal, the participants were randomly divided into five virtual groups and then a discussion was organized in which participants were asked to answer questions:

- Do you know what to do on receiving of a warning signal?
- Do you know which institutions in your country you will send a warning signal to?

The results of group discussions were presented by Stephan Gollasch, Monika Normant-Saremba, Lena Granhag, Ieva Putna Nimane and Julio de la Cueva. Additional comments and suggestions were received in the ZOOM chat from the participants during the presentations of the results. Below is the summary of the discussion.

1. What to do? The answer to the first question ranged from "*yes, there is a complete understanding what to do on receiving of a warning signal*" to "*no, we do not know what to do*." It should be noted that sometimes representatives of the same country, who participated in different discussion groups, gave different answers to this question.
2. Who receives a warning? Likewise, the answer to the second question varied greatly from "*yes, we have signal management schemes in our country and a clear vision of who will receive a warning*" to "*it is still unclear which institutions should receive a warning and act accordingly*".

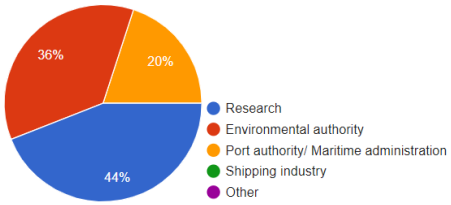
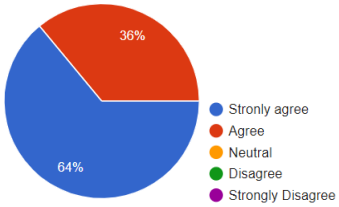
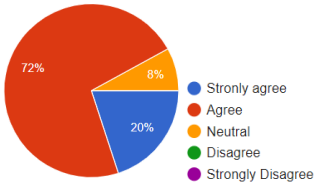
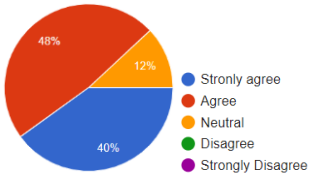
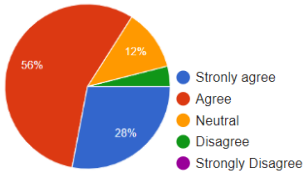
Participants agreed that there should be clear communication paths indicating who to contact, which institution and contact person.

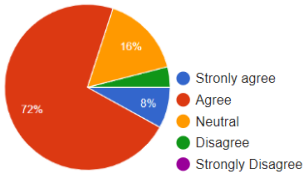
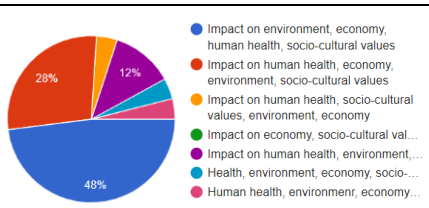
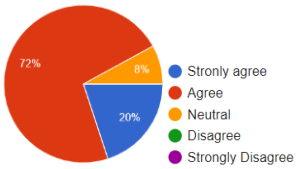
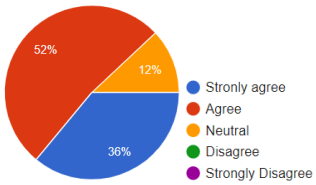
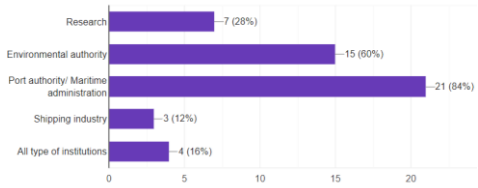
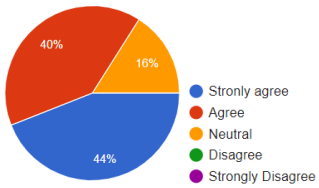
3. Ongoing process on the national level. Finland, Estonia and Sweden indicated that they have developed schemes for national actors responsible for receiving warnings of HAOP detection and taking appropriate action, although some additional efforts may be needed to optimize the scheme. Most of the other Baltic Sea countries and Spain indicated that they have started discussions, the process is ongoing and should lead to an appropriate list of institutions, indicating their roles. Maritime and/or environmental authorities were mentioned as the recipient of warnings in countries where national schemes have not yet been fully developed. For example, in Germany, BSH (Bundesamt für Seeschifffahrt und Hydrographie) under the Federal Ministry of Transport, Building and Urban Development has a leading role implementing the Ballast water management convention, and most likely should act as a focal point on receiving a warning. It was indicated that in some cases, the signal should go to the Ministry of Health (Poland).
4. The Finnish decision. Ville-Veikko Intovuori commented: "as the EWS is related to BWMC Reg. C-2 "Warnings Concerning Ballast Water Uptake in Certain Areas and Related Flag State Measures", the responsible Administration should be defined in national legislation. E.g. this is how it is stated in Finnish legislation: "*The Finnish Transport and Communications Agency shall in accordance with Regulation C-2 of the Annex to the Ballast Water Management Convention notify seafarers and the relevant coastal states of area(s) where ships should not uptake ballast water. The provisions in section 6, paragraphs 1–3 on discharging untreated ballast water and sediments in exceptional circumstances also apply to the uptake of ballast water in areas referred to in subsection 1*."""
5. Warning alert and ballast water management exemptions. It was stressed that if the warning indicates that a species identified as HAOP is found in the port, a decision may be taken to revoke the ballast water management exemption permit. This can affect the interests of ship owners and have serious economic consequences, therefore the relevant agency must have sufficient authority to make such a decision (it may be, for example, the port authority).
6. Quality of the warning signal. In the existing scheme, the AquaNIS editors decide whether or not to transmit the warning signal further. On the one hand, editors are needed to ensure signal quality control (so as not to send false alarms that could have economic consequences), on the other hand, the members of the Editorial Board are scientists not associated directly with maritime and environmental administrations and have no formal obligations. The idea was proposed that the signal (after quality checks by editors) should go to HELCOM and then to the appropriate administrations. Another suggestion was for the first signal to go, among other contacts, to certain experts from the HELCOM working group(s), who deal with the management of alien species in the Baltic Sea, which are usually also nominated by states.
7. Link to the IMO. The proposal was made that the EWS can be further developed by including automatic or semi-automatic notification to the IMO GISIS system.

Summary of the questionnaire

The questionnaire included 11 questions and was distributed to all participants of the seminar. The responses were anonymous, they were received from 26 participants (67 %) and are summarized in table 1.

Table 1. Anonymous answers to the questionnaire. Comments to Question 11 have not been edited.

Question	Result	Comment
Please indicate your association with one of the following		Most of the participants associated themselves as researchers (44 %), others belonged to environmental authority (36 %), port authority/maritime administration (20 %).
1. Do you agree that close collaboration between developers and end-users of an early warning system (EWS) on harmful aquatic organisms and pathogens (HAOP) is needed?		All participants agree that close collaboration between developers and end-users of an early warning system (EWS) on harmful aquatic organisms and pathogens (HAOP) is needed.
2. Do you agree with the EWS concept on HAOP presented at the workshop?		Out of all participants, 20 % strongly agree, 72 % agree, 8 % are neutral, with the EWS concept on HAOP presented at the workshop
3. Do you agree that the EWS will assist stakeholders in the implementation of the Ballast Water Management Convention in the Baltic Sea region?		Out of all participants, 40 % strongly agree, 48 % agree, 12 % neutral, that the EWS will assist stakeholders in the implementation of the Ballast Water Management Convention in the Baltic Sea region.
4. Do you agree that the EWS will assist stakeholders in the implementation of the Ballast Water Management Convention in your country?		Out of all participants, 28 % strongly agree, 56 % agree, 12 % neutral, disagree 1 %, that that the EWS will assist stakeholders in the implementation of the Ballast Water Management Convention in their country.

5. Do you agree that the EWS will help prioritize and target preventive action in your country?		Out of all participants, 8 % strongly agree, 72 % agree, 16 % neutral, disagree 1 %, that the EWS will help prioritize and target preventive action in their country.
6. Please, indicate which of the following sequences you would choose to assess the impact of the target species (the first category is the most important, then in order of priority)		Impact on environment, economy, human health, socio-cultural values – 48 %; Impact on human health, economy, environment, socio-cultural values – 28 %; Impact on human health, environment, economy, socio-cultural values – 20 %; Impact on human health, socio-cultural values, environment, economy – 4 %
7. Do you see the AquaNIS EWS as a decision tool that can be applied in practice?		Out of all participants, 20 % strongly agree, 72 % agree, 8 % neutral, see the AquaNIS EWS as a decision tool that can be applied in practice.
8. Do you agree that the EWS will bring more awareness and will give more valuable information to stakeholders about HAOPs?		Out of all participants, 36 % strongly agree, 52 % agree, 12 % are neutral, that the EWS will bring more awareness and will give more valuable information to stakeholders about HAOPs.
9. Please indicate the type of institution that would be the most appropriate to use the developed EWS on HAOPs in your country?		The most appropriate to use the developed EWS on HAOPs according to participants: - port authority (84 %) - environmental authority (15 %) - research (7 %)
10. Do you agree that the developed EWS system will benefit from extension to other regional seas (e.g. North Sea, Black Sea)?		Out of all participants, 44 % strongly agree, 40 % agree, 16 % are neutral, that the developed EWS system will benefit from extension to other regional seas (e.g. North Sea, Black Sea).

11. How the EWS developed by the COMPLETE project and presented at the workshop can be improved?	- EWS would create certain guidelines what to do further when the signal is received; - Need to be developed more in national level; - Communication with relevant national authorities, need of continuation in development of national procedures, legal requirements; - Better coordination between stakeholders and end-users is needed; - Success of EWS is very dependent of ports NIS monitoring, thus low-tech, low-cost monitoring should be developed for NIS monitoring. Otherwise data flow will be very scattered and sparse; - Appoint one agency in each country to be the leading agency to address these questions so that there is an easier way of knowing which agency to contact. Later that appointed agency can inform the others; - One concern, is the total time the signal will take from monitoring to it reach the relevant authority; - In deep analysis of real and practical actions to be taken once the EW is received; - By organising a follow-up workshop in a year or so where countries can share experiences and be inspired to improve their own national systems. Some countries might have issues that other countries do not experience due to organisational differences regarding agencies/authorities. Knowledge sharing between countries with similar organisation would then be a possibility to optimise each individual country's EWS setup; - The role of AquaNIS Editorial Board should be reduced to quality check only. Members of Editorial Board should be not responsible for forwarding information to national focal point. This should be done by an official body, like HELCOM in the BSR, etc., which is (or should be) linked to national focal points; - EWS can be further developed by including automatic or semi-automatic notification to the IMO GISIS system. BWMC Regulation C-2 - "Warnings Concerning Ballast Water Uptake in Certain Areas and Related Flag State Measures" requires that Party shall notify the IMO and affected coastal States. This notification to the IMO is conducted today manually; - Include how the communication goes with IMO, establish a regional EWS approach and lastly, each country needs to have clear guidance who needs to be contacted when a critical species is find, which means which institute/authority and which person. Also, imagine when the port with the new species found was involved in an exemption from BWM requirements, these exemptions need to be reconsidered... this requires to set up a process. - Joint functions with EU Single Window system and HELCOM/OSPAR tool; - More information is needed about the HAOPs (justification - why a warning signal should be sent); - The system looks good and the principles presented, to be operational the system needs to have different types of signals in the alerts as different authorities would be the receivers in the countries for e.g. health hazards or target species found; - The idea and effort made is amazing. Now we need to construct a net of authorities at national level to make it all work; - The key factor is an efficient (which also means FREQUENT) monitoring system in ports and adjacent areas, approved by state maritime authorities. The way some well-known target species (TS) are handled in the proposed EWS will show how this system is going to be approached by the relevant authotrities. What about e.g., *Marenzelleria neglecta* as a species triggering warning signal? In autumn, there can be as many as millions of early developmental stages, i.e. eggs and larvae, per cubic metre in a water column in some coastal areas, also in harbours. And this is a TS for both HELCOM and OSPAR areas! Will the system be able to detect such larval outbreaks e.g., in late autumn? What density should trigger the signal? Anybody is going to bother with that?

Conclusions

- All participants agree with the EWS concept and ideas expressed at the workshop. The workshop participants proposed to include HELCOM and IMO in the EWS system. The development of automatic or semi-automatic signaling to IMO should be continued.
- The EWS system should be improved in terms of the national communication mechanism while maintaining a harmonized regional approach. Certain framework principles for national authorities can be developed to clarify what to do when a signal is received; who should be contacted when a critical view is found, which institution / authority should be involved.
- The AquaNIS Editorial Board should be responsible for quality control of a warning alert, but the decision should be made by administrative authorities. Further development of the Target Species concept and criteria for a warning alert is needed.

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