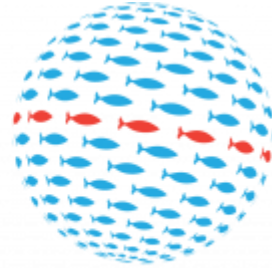


SWIMWAY

wadden sea



Midterm Review

of the Trilateral Wadden Sea Swimway Vision and Action Programme

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Introduction and background

The term Swimway as synonym for the migration of fish and their constraints emerged around 2012, when several initiatives for the restoration of fish migration (from sea to source) emerged and started to be coordinated on a more global scale. The most prominent result was the launch of the World Fish Migration Foundation. Today, there are numerous initiatives running under the Swimway headline, and Swimway Wadden Sea is one of them.

The trilateral initiative in the Wadden Sea was mostly based on activities by some Wadden Sea Quality Status Report (QSR)-authors which spread across the trilateral level. The 2009 Wadden Sea Quality Status Report (QSR, Marencic & Vlas, 2009) was the first to include fish targets for the Wadden Sea (adopted as part of the 2010 Wadden Sea Plan, Common Wadden Sea Secretariat, 2010) which became the main driver for the idea of Swimway Wadden Sea. The QSR drafting team together with the CWSS then developed a grassroot-driven framework to integrate the fish targets and goals and actions in order to improve the status of Wadden Sea fishes. Following positive signals from the Trilateral Wadden Sea Cooperation (TWSC), a drafting group met in fall 2017 with the purpose to develop a Swimway Wadden Sea Action Programme with a view on implementing the fish targets. A vision document as the basis for the further work was integrated to the Ministerial Declaration and approved by the ministers at the 13th Trilateral Governmental Conference on the Protection of the Wadden Sea in May 2018 in Leeuwarden, The Netherlands (Common Wadden Sea Secretariat, 2018).

The Trilateral Wadden Sea Swimway Vision Action Programme was finalised shortly after and adopted by the Wadden Sea Board (WSB) 28 in March 2019 (Swimway, 2019). At the same WSB 28, an ad hoc Working Group Swimway Vision Initiation 2019 (ad hoc WG-Swimway) was adopted. This group was succeeded by a permanent trilateral Expert Group Swimway (EG-Swimway) in 2021 with Terms of Reference approved by WSB 32 in March 2021. The overarching goal of the group is to contribute to improving the situation for fish in the Wadden Sea. This goal is to be achieved by fostering trilateral collaboration on the implementation of the trilateral fish targets as laid down in the WSP 2010 and to provide an overarching Swimway approach as umbrella for initiatives related to achieving the targets according to the Swimway Vision Action Programme and its four pillars. Unless otherwise indicated, this document uses the term “Swimway group” for the trilateral ad hoc WG-Swimway and/or the succeeding EG- Swimway.

The Action Programme contains the task for a midterm review after half of its implementation time (2018 – 2024). The purpose of this document is to review the progress in implementing the Swimway Vision Action Programme halfway through its implementation time 2018 - 2024. Focussing on an assessment of the work done so far against the background of the four pillars identified in the action programme and their aspirations, this

review will develop an outlook for Swimway Wadden Sea and for continued work to implement the trilateral fish targets.

From 2020, adequate expertise and continuity of the work was affected by 1) the absence of the Dutch Rijkswaterstaat (RWS) due to a governmental order (in 2020 for all meetings under the trilateral cooperation), and 2) as a second restriction through summer 2022, the Covid-19 pandemic did not allow for physical meetings, instead meetings had to be held online. In addition, several virtual workshops on trilateral projects and five virtual meetings of a subgroup on monitoring took place. A positive side-effect was that participation of guests which otherwise would have had to pay for their travels were able to participate in the group's work and made valuable contributions.

The action programme and its four pillars

The primary purpose of the Swimway Vision and Action Programme is the implementation of the trilateral fish targets. It describes actions suitable to improve knowledge on relevant processes, optimize population monitoring, adjust policies and develop, realise and evaluate. Therefore, activities such as coordinating, facilitating collaboration, fundraising and project development are part of this action programme. Collaboration with existing activities and programmes that address the Fish Targets is a prerequisite for success. Communication and education are also key elements of the Programme, helping to increase public awareness to facilitate holistic, ecosystem- and evidence-based fish conservation in the Wadden Sea.

The Wadden Sea Board will be responsible for the coordination of the Swimway Vision. The three countries will work together and convey expertise, capacity and resources on a project based approach for the implementation. According to the decision by the Ministerial Conference, the implementation of The Swimway Vision is foreseen to be accomplished within the German Presidency plus two years i.e. in the period 2018-2024.

Swimway activities were performed by the aid of several subgroups:

- The organizers of the 2019 fish conference,
- A sub-group of monitoring experts in order to develop a proposal for a fish monitoring programme under TMAP,
- Tasks were commissioned to individual Swimway experts for a compilation of fish monitoring and long-term research projects, and for a historical reference project
- The QSR drafting group was partly recruited from the Swimway group.

A milestone and major achievement of Swimway was the organization and hosting of the international scientific conference “SWIMWAYS: Understanding connectivity within the life cycles of coastal fish”, held 24 – 26 September 2019 in Hamburg, Germany. The presentations, wrap-up and breakout sessions and workshops of the conference supported all aims of the Action Programme in all four pillars.

While the primary purpose of the Swimway vision is the implementation of the trilateral fish targets, the action programme contains the individual work packages against which to assess the work of the group since 2018. The targets and the vision will be reviewed in separate sections. The vision can be viewed here: [Leeuwarden Declaration 2019 \(Common Wadden Sea Secretariat, 2018\)](#). The Swimway Action Programme can be viewed here ([SWIMWAY 2019](#)).

Action Programme: Research and monitoring

Based on the fact that knowledge of the factors driving fish population dynamics in the Wadden Sea was largely insufficient to establish measures for improvement, the following goals were identified (2019):

- Overview of gaps in knowledge and subsequent identification of funds, time and capacity needed for generating the knowledge;
- Develop a Swimway research approach which contains applied research essential for deriving management recommendations in addressing the trilaterally defined targets;
- Connect with other initiatives, such as the Trilateral Research Agenda and the Trilateral Task Group Climate Change Adaptation.

A major milestone and achievement of the Swimway group was the organization and hosting of the international scientific conference “SWIMWAYS: Understanding connectivity within the life cycles of coastal fish”, held 24 – 26 September 2019 in Hamburg, Germany. In addition to gathering a considerable expertise on fish in the Wadden Sea and adjacent waters and producing notable scientific progress and knowledge, the conference was particularly successful in producing recommendations for the progress of Swimway in implementing the trilateral fish targets (Dänhardt, 2019). Theme sessions were followed by summaries and conclusions, which were finally condensed and distilled in a closing session. Two main issues became evident: First, the lack of science-policy-integration in the political area of the Wadden Sea, due in part to problems of language and terminology. Scientists may adopt story-telling as a way to improve communication and get their messages across to stakeholders involved in key processes, and ultimately to decision-makers. As an example, fish should be part of management targets for instance at EU-level (the role of fish in Water Framework Directive (WFD) vs. Marine Strategy Framework Directive (MSFD)). Second, science is to agree on goals for improved scientific knowledge and its use in management. This may cover better and multiple use of scientific data, indicator and monitoring schemes, decision support tools for e.g., natural resource management. As of today, neither of the two issues has been addressed by the Swimway group. Especially improved exploitation of available data and tools, and identifying and prioritizing examples for story-telling of scientific knowledge relevant for management and ultimately improving the situation for Wadden Sea fish should be on the future agenda.

Another outstanding result of the closing session was the formulation of key recommendations in order to facilitate progress of Swimway towards the trilateral targets. These were fairly general with respect to developing and applying the right science for management purposes at the various spatial and temporal scales in the Wadden Sea (and adjacent waters). They include criteria, new avenues and interactions mostly based on examples from the presentations. But what is more, they form the foundation of eleven bullet

points of specific actions with immediate relevance for management, describing the way ahead. Even more specific, the conference report makes reference to the four pillars of the Wadden Sea Swimway action programme, linking them to individual presentations. The specific Swimway research approach which is an explicit goal of the group's work may have its programmatic guidance reflected in these eleven bullet points, complemented by the reference chapters.

A key element of the Wadden Sea Swimway research approach was the connectivity and the role of habitats during the life history of Wadden Sea fish. It can be summarized as the *bottleneck approach* and be considered as one of the key concepts of Swimway work (next to the *windows of opportunity* concept, see below). It has implications for the other three pillars and is an excellent example for the storytelling work. Further, it is well related to the overall fish target in the 2017 QSR which calls for a Wadden Sea free from anthropogenic bottlenecks (Tulp et al., 2017).

As it normally is the case for scientific conferences, the increase in knowledge has also produced new questions and as such has increased the lack of knowledge. Notably, it has resulted in the emergence of new context and the identification of new research hypotheses, research questions and ways to translate scientific knowledge into action. The aforementioned reference to the Swimway pillars lists some gaps of knowledge that emerged during the conference. In conjunction with the recommended actions, the account may serve as the foundation for a yet to be refined overview of gaps.

Another achievement of the Swimway group was the overview of monitoring and research projects in the Wadden Sea (Walker, 2020), and the proposal for a revised monitoring programme for Wadden Sea fish under the TMAP (Walker et al., 2022). A temporary subgroup of experts developed the proposal in a series of five online workshops.

At some point a discussion emerged on a statement that is frequently being encountered in the public but during internal discussions as well: Wadden Sea fish are declining, sometimes assigning this to overfishing. The Swimway group reaffirmed the idea of a fact-check workshop because the expertise for adequately discussing this statement is with the group. However, due to the Covid-19 pandemic such a workshop never materialized because the topic is difficult to discuss and conclude in an online meeting. Clearly, the fact-check should be attempted soon as the statement is still being made. In general, communication needs to be improved that status assessment of Wadden Sea fish is a central topic of Swimway.

Research proposals under Swimway: In 2018, the Netherlands granted *Waddentools*, a major multi-year research project in the Dutch Wadden Sea including field work as well as literature evaluation. *Waddentools* was designed to be open for external input during the

course of the project, so Swimway decided that also in Denmark and Germany initiatives could be launched to develop complementary projects in these parts of the Wadden Sea. Plans were developed and coordinated by Swimway ad-hoc group members. This resulted in a Danish proposal submitted by a consortium of governmental agencies and a University to a private foundation. Unfortunately, this proposal has been rejected. However, the substance of the proposal may provide the basis for the development of new proposals in the future. In Germany, a project sketch is still under development, which addresses multilevel bottlenecks topic identified during the 2019 conference as one of the main research topic to be tackled and which also exploits the windows of opportunity approach (see below). Fish life cycle connectivity in the Wadden Sea and between the Wadden Sea and upstream spawning and nursery habitats as well as communication and environmental education are focus of the sketch, which will be submitted for evaluation to a German federal programme. Moreover, an ongoing trilateral research project supported by trilateral funds is fathoming the availability and the utility of historical fish data in the Wadden Sea to inform contemporary fish conservation. The preparation of this “Systematic review for historical reconstruction of the Wadden Sea fish assemblage – Swimway historical reference” (SHIRE) commenced in late 2021 and will be finalized in fall 2022. The consortium consists of CWSS (lead) plus institutes from Germany (Kiel University), Denmark (DTU Aqua) and The Netherlands (Groningen University), and Swimway members. The goal is to gain an overview on fish present in historical data by means of a systematic review with four students from the trilateral countries. Where feasible, links to freshwater habitats will be explored. This pilot project is intended to compile a comprehensive basis for a larger project on the subject. Related activities include a series of meetings with interested collaborators (as sub group) and a living document with candidate modules for a future proposal. Amongst these modules are a graduate school, historical reference, and interconnectivity.

Action programme: Policy

Swimway Wadden Sea acts within a framework of international, European, trilateral, national and regional policies and regulations, including the UN World Heritage Status, European Directives such e.g., the Marine Strategy Framework Directive (MSFD) or the Water Framework Directive (WFD), and National legislation and the National Park Laws of the provinces and federal states. Wadden Sea fish include life stages of commercial species, making the European Common Fisheries Policy (EU Fisheries Directive) and implications of fishing the adult stock of e. g. plaice, sprat and herring potentially relevant for the Trilateral Fish Targets. The aim of the Swimway vision action programme is to:

- Make an inventory of existing policies and regulations relevant to the Trilateral Fish Targets at the European, trilateral, national and regional level
- Analyse their contribution to the realisation of the Trilateral Fish Targets
- Following the analysis, the next steps can be identified

Early in the process of Swimway, there was funding provided by the trilateral budget for selected Swimway activities (projects). Some of that was used to support the requested analysis of existing national and international policy regulations relevant to the implementation of the trilateral fish targets and protection of migrating and other Wadden Sea fish. A first draft of the report was presented and discussed at the Swimway conference in September 2019. During the further production and review by the Swimway group, it became clear that the level of detail of policy reviews on the national level differed substantially. This discrepancy could naturally only be cured by additional work to be invested by participants from the regions themselves. A missing element caused by the complexity of the topic and the limited time available was fisheries. This was mostly due to the discrepancy between the validity of the Common Fisheries Policy of the EU and the actual fishery activities in the regions. In spite of these deficits, it was possible to draw priority recommendations resulting from the summary of the report, which was converted to a policy statement by the Swimway group (WG-Swimway, 2021) and submitted to the trilateral Task Group Management.

The policy statement provides a good overview of available legislation and shows that trilateral fish targets go well beyond national legislation. One conclusion is therefore that for implementation of fish targets, national legislation would need to be enhanced, offering an opportunity to influence on a national basis. In addition, this could be strongly linked to the Marine Strategy Framework Directive (MSFD) or the Water Framework Directive (WFD), as this is legally binding in the regions (unlike trilateral fish targets). An action that still needs to be fulfilled is presenting this information to TG-M and asking for advice as decided at 2019-01.

The policy statement offers a number of recommendations related to the trilateral fish targets and their implementation (Annex 2). These need to be reviewed and evaluated by Swimway with a view on translating them into tasks and action.

Action Programme: Measures

Considerable progress towards a mechanistic understanding of processes determining fish distribution in space and time has been achieved in recent years. However, major knowledge gaps remain, hampering the implementation of the trilateral fish targets. Thus, a challenge for the action programme is to facilitate the development of knowledge-based conservation measures. At various locations conservation measures have already been carried out to improve living conditions for and to mitigate threats to fish. An integrative and comprehensive overview of such measures, together with a review of their contribution to the realisation of the Fish Targets, will help to evaluate the dos and don'ts and identify the "lessons learned". Combining this with the analysis of the bottlenecks will help gain insight into where measures might be developed in a participatory process with stakeholders.

The Swimway group discussed a number of measures, including opening passages and enabling interconnectivity with inland waters as well as salt marshes, mitigating the effects of climate change and other external pressures, and protecting subtidal structural habitats. The first discussion of a general, conceptual template for measures emerged at the 2019 fish conference, when measures to improve fish migration at pumping stations, sluices and tidal gates were presented using case studies from the Netherlands, Lower Saxony and Schleswig-Holstein. The presentation concluded that the best opportunity for installing structures to facilitate fish migration in a dam or sluice is during restoration and overhauling existing buildings. Changing things afterwards is difficult to impossible. Many dams and sluices are 40–50 years old and will soon have to be renewed. An additional complication is the implications caused by climate change, rising sea-levels and increased precipitation. They may require a balanced review of measures with interconnectivity and coastal defense at eye-level, however this may change over the next decade. Consequently, a template for identifying suitable measures to improve living conditions for fish and ultimately implementing the targets may be the concept of *Using windows of opportunity* to redesign sluices and other flood protection structures fish-friendly presented at the 2019 Swimway fish conference. In order to provide information about how technical adaptations can be made fish-friendly, a subgroup of authors of the EG Swimway is currently (summer 2022) preparing a review of the current setup and planned reconstructions of pumping stations, tidal weirs etc. along the trilateral Wadden Sea coast. The review will be published in a peer-reviewed international science journal. After publication, which is foreseen for autumn 2022, the information will be translated and condensed into position papers to be made available to authorities and institutions responsible for maintenance of the buildings. The work will also be presented the WSB with a view on dissemination in the regions of the Trilateral Wadden Sea Cooperation (TWSC).

In parallel, at least one project proposal is under development which integrates the scientific (life-cycle) bottleneck concept, mitigation of blocked fish passages, the role of shrimp fisheries as source of mortality with developing concrete measures with direct participation of stakeholders (administrations, fishers, regional water authorities as well as NGOs). The Dutch *Wadden Tools Project* will produce results which may allow for similar approaches to develop recommendations for measures. In addition, German Swimway members are engaged in the *Coastal Futures* research endeavor which combines basin-scale modelling with existing knowledge from several marine disciplines and addresses future use scenarios.

In recent years, The Netherlands have carried out several projects in order to rebuild coastal protection infrastructure and enable landward passages to freshwater. Denmark has carried out a large-scale restoration project in its Wadden Sea estuaries in the 2000s. The main river mouths have been opened for tidal exchange and their tributaries have been cleared off major barriers and other modifications in cooperation and even close involvement of stakeholders. This has led to the restoration of many diadromous fish populations with however contradictory results when it comes to individual species. Planning such measures is on the

way in Germany. Natural predation, species interactions and other factors have to be analyzed so follow-up research and evaluations are needed. Swimway could take the role of initiating and coordinating such a joint venture of disciplines.

Action Programme: Stakeholder involvement, communication and education

The trilateral working group Swimway operates within a multi-level and multi-factorial framework due to the mobile feature of its clients, the Wadden Sea fish. The Wadden Sea is in open exchange with the North Sea while access to the estuaries is open only in the four major estuaries (albeit affected by past and recurrent dredging) while otherwise governed by water management. Life cycles and migrations require free passage, and success and failure of closing life cycles from egg to successful spawning depend on human impacts in addition to natural factors such as predation. It is therefore of utmost importance to have all relevant stakeholders involved in the work and decision-making processes of Swimway and communicate the essential knowledge required to improve the situation of Wadden Sea fish. The action programme lists the following priorities:

- Raise awareness amongst stakeholders: Collate and communicate the existing knowledge of fish using the Wadden Sea and promote the knowledge about the exchange of fish species beyond the Wadden Sea including inland waters and North Sea and beyond.
- Engage and activate stakeholders: Inspire people to share knowledge and experience and connect trilaterally with each other.
- Foster international partnerships, dialogue and cooperation: Stimulate communication between countries and sectors about fish in the Wadden Sea.
- Develop tools to enhance the communication between the different focused stakeholders
- Perpetuating and optimizing the interaction between all stakeholders, including scientists.

Stakeholder involvement – The Swimway group discussed its constituency and how to widen it by relevant stakeholders at an early stage (e. g. 2019-04). The ad-hoc group was made up of representatives of national ministries and authorities, scientists from public and private research institutes, administration civil servants and employees, NGO representatives, and freelance scientists. In addition, the working group has now representation of the regional water authorities, which has greatly benefitted its work. The role of fisheries as a mortality and bottleneck factor for Wadden Sea fish is undisputed, however, the group has yet to develop a common view on involvement in mutual and balanced exchange of knowledge and experience of all mentioned stakeholders, including commercial and recreational fishermen. Although there were fishermen present at the 2019 Swimway fish conference,

communication with this stakeholder group was and still is less than limited. In 2019, Swimway decided to organize a workshop with participation of fisheries in order to explore common grounds and fathom readiness of that group to become involved in the work of Swimway. Alternatively, it was suggested to consider involvement of the new partnership hub in Wilhelmshaven. However, both options never materialized i. a. due to the restrictions of the Covid-19 pandemic.

The Terms of Reference (ToR) of the Expert Group Swimway (EG-Swimway) explicitly exclude a mandate to deal with the implementation of the [Framework Sustainable Fisheries Tønder Declaration](#) and other issues related to fisheries.

However, both the trilateral fish targets and thus also the Swimway Vision substantially relates to fisheries, e. g., as structuring force of fish habitat and a mortality factor of fish in the Wadden Sea. Therefore, Swimway discussed in their meeting 2021-01 on 17 November 2021 how to deal with and what to communicate for the relation of Swimway to fisheries. Both the trilateral fish targets and the Swimway action programme contain multiple aspects, questions and tasks, which cannot be sensibly addressed without considering certain aspects of the different forms of fishery occurring in the Wadden Sea and adjacent waters.

Each of the four pillars of the Swimway action programme needs to consider fisheries to be successfully addressed. Research and monitoring has the aim to detect population change and to generate a sound process understanding to identify conservation options. For this task, it is imperative to consider all factors potentially affecting fish life cycles. In addition to the policies relevant for fish conservation, synergies should be explored with fisheries regulations in order to address the fish targets. Trilateral exchange on measures for fish conservation should ideally be communicated with the fishing sector. A dialogue that integrates conservation objectives and the needs of the fishermen is a prerequisite for the success of measures. The aim of stakeholder involvement, communication and education is to gain commitment from all stakeholders, raising awareness, activating practitioners and facilitating knowledge exchange. The Swimway action programme focusses on professionals having direct or indirect impacts on fish through their work, such as researchers, commercial and recreational fishermen, water authorities, relevant governmental agencies and NGO's. Based on this reasoning, Swimway noted that not all relations to fisheries above are the responsibility of EG-Swimway, but considers the context of fisheries as an ecosystem effect (rather than an economic activity) with the trilateral fish targets and the Swimway action programme clearly obvious. EG Swimway thus proposed to include the following concrete aspects of fisheries to the mandate of EG-Swimway:

- (By)catch as source of mortality (predator-prey relationship) e.g. (by)catch of recreational and commercial fisheries or cooling water extraction;
- (By)catch as source for record of species occurrence in the Wadden Sea;

- Fisheries induced bottlenecks on the food-web and life cycles of fish;
- Knowledge of fisherfolk on species (e.g., presence of sharks and rays);
- Explore synergies with fisheries regulations in order to address the fish targets.

Swimway proposed an open discussion on these aspects with a view on a possible amendments of the ToRs of the group. Options to discuss the involvement of fishery stakeholders should also consider the trilateral Partnership Hub and engagement via the Wadden Sea Forum.

Communication – it was noted during the work of Swimway, that there is a considerable number of webpages/URLs which can be found using the search term SWIMWAY. This underscored the need to develop a Swimway-specific webpage under that name in order to showcase and disseminate the (milestone) activities and messages of the group and provide easy access for stakeholders and other private and public entities, dealing with policies, environmental information, public education and (applied) science in our sector. The website is also to ensure that the trilateral Swimway activities have a “unique identifier” which will be associated with the trilateral entity. The CWSS has set up a Swimway webpage as microsite of the Wadden Sea World Heritage webpage, similar to the web presentation of the Quality Status Report (QSR) and the International Wadden Sea School (IWSS) which is publicly available under <https://swimway.waddensea-worldheritage.org>. One of the aims were an alignment of Swimway Wadden Sea along other global and local activities. Unfortunately, the Swimway Working Group is still not easy to find on the CWSS homepage.

Another communication pathway is the development of smartphone apps to attract younger user groups and especially visitors and tourists. A fish-related app is the Citizen Science App FishExplorer, which was supported by the Swimway group in 2019. The software of the former Beach Explorer has been converted to a FishExplorer which may be used as separate app by anglers and other interested citizens to report on migratory fish. The main aim of the app is for educational purposes.

Cooperation with the World Fish Migration Foundation (see introduction) is ongoing and contacts are made regularly on the occasion of the World Fish Migration Day, usually taking place in spring of each year. Work of the WFMF deals much on restoration projects (restoring connectivity), and is clearly focused on dissemination of environmental information and education. Swimway should use this opportunity to strengthen its activities in the latter two fields.

The only prominent activity of Swimway Wadden Sea, explicitly labelled as being educational was during the 2019 fish conference. In addition to the topic sessions, a workshop on education, communication and ocean literacy was held. The workshop held in cooperation with WWF Germany & International Wadden Sea School (IWSS) provided valuable

information related to the need for public education on fish and Swimway, including the identity of target groups and multipliers, the content of educational and communication programmes, and the means of information provision. The “Eel Migration Game”, developed by IWSS network partners, provided a playful introduction to the topic of “fish education”. More information and educational resources can be found at www.iwss.org.

In conclusion, education should be emphasized in future Swimway activities. A target could be that Wadden Sea issues would be included in school curricula within the next ten years. Cooperation with competent partners in the field of environmental education is a must.

The Trilateral Fish Targets

The targets as specified in the 2010 Wadden Sea Plan are still valid although there is a more recent proposal for new targets in the 2017 QSR and a review carried out and a revision proposed during the 2019 Swimway conference. Another version was proposed in the 2017 QSR with an overall target “There should be no human-induced bottlenecks in the Wadden Sea for fish populations or their ecosystem functions” and more specific targets supplemented by subtargets (Tulp et al., 2017). The 2019 Swimway fish conference has offered the way forward (Dänhardt, 2019, page 27/28), based on the statement that “It was widely agreed that the trilateral fish targets adopted by the ministers in 2010 are not SMART (specific, measurable, achievable, realistic and timely) in their present form. There is more to success than SMART targets, but if the targets are intended to guide monitoring and research, they have to be SMART. Moreover, a huge problem is fact-free, emotional politics and decisions. If emotions shall be overcome, generic overarching goals are needed which everybody can agree upon. In conclusion, despite the urgent need for testable targets, generic targets such as these are also required to generate as wide a support as possible. It was thus agreed, that first stating the big ideas, then specifying them into rigorously testable objectives and hypotheses is a feasible approach to implementing the fish targets. A three level approach was suggested to SMARTen the targets: 1. The trilateral fish targets as they have been adopted by the minister’s conference in 2010 should be maintained. Generic as they are, everybody can agree that they should be implemented. 2. [...] The generic targets should be specified to a level of detail so they can provide a framework for answerable questions and testable hypotheses to be specified in a third step. Eventually, 3. the generic targets specified through concise definitions will allow to formulate research questions and hypotheses, which then form the backbone of dedicated, hypothesis-driven, cooperative and interdisciplinary research.”

Revised targets may call for a revised vision as it directly relates to the implementation of targets.

The vision was theoretically signed by a number of signees, however no physical hard copy signed version exists though. Green NGOs did explicitly not sign the document, due to the emphasis on knowledge gaps hampering effective fish conservation (while the NGOs deem the knowledge sufficient to take dedicated action to protect fish immediately) and the missing link to fisheries as cause of fish mortality. Furthermore, the Swimway action programme was considered insufficiently ambitious (e.g., a statement that fisheries are a primary threat in the ecosystem is missing). What is more, the term of Swimway is limited to six years while the aim should be to continue beyond. Swimway should work towards a revision of the vision based on revised new targets.

Terms of Reference

The ToRs should be expanded by fisheries (see above). Further, during the development of the proposal for a fish monitoring program under the TMAP, the issue of monitoring methods and the lack of coordination over the past decade was discussed. Methods were sometimes changed in the regions due to perhaps small adjustments, however in the course of time this may lead to a set of methods which produces incompatible results. The Swimway group would be the natural structure with the TWSC to prevent this and to regularly perform a methods and metadata check.

Risk analysis and risk assessment

The group performed a SWOT analysis including the strengths and weaknesses, as well as opportunities and threats of the Action Programme (?). Selected strengths identified were the common understanding of the issue, Swimway being embedded in trilateral cooperation and the timely topic, matching other activities and frameworks, while some recognized weaknesses were the largely invisible topic (subject fish), the lack of fish as research priority for the Wadden Sea and the differences between priorities in the three countries (DK, D, NL). Opportunities were seen in the Flyway initiative as inspiration to tell our story and the increase awareness, while threats were insufficient funding for genuine Swimway projects, economic and political interests that may block initiatives, and opposing trends in future coastal protection which may generate new opposition. In summary, there are a considerable number of strengths, about the same amount of weaknesses, a lot of opportunities and only few threats. The risk assessment exercise will be continued in 2022 and completed by a risk mitigation and management exercise.

Resources

The practical work of Swimway is grounded on the contributions of the delegates from the regions plus guests from various sectors, and the work of the secretariat and the chair. Together, they are indispensable actors and key to success. The available budget was sufficient to support the activities of the group albeit it is hard if not impossible to judge whether more funds would have generated more results. However, genuine Swimway projects like e.g. SHIRE turned out to be very productive given the limited funds and there should well be increased seed money for such activities in the future. Trilateral cooperation would really benefit from trilateral projects. It would be very helpful if there were resources to initiate and draft project proposals to make use of European funding. For activities such as the Swimway conference numbers are dynamic as the required funding is specific in terms of location, host and sponsorship. The approximately 52K € represent the minimum required and should be increased to 60K € for the 2024 conference. Support for coordinating and chairing the group declined during the 2020-22 period in spite of a constant time budget and the 30K € invested in 2021 represent the minimum compensation for 30 days work. The secretariat support was adequate and contributed much to the success of the group.

Lessons learned and recommendations by pillars

Research and monitoring

Lessons learned: it was quite difficult to develop a trilateral research proposal as there was a mismatch between the available funding and how the national institutes could access this. A proposal was made for a modular approach so that each of the questions could be addressed separately. This seems to be feasible for three of the modules as specific funding can be found for each: historical perspective SHIRE (pilot project already funded), future scenarios (INTERREG) and grad school (EU funding for doctoral networks <https://ec.europa.eu/research/mariecurieactions/actions/doctoral-networks>). Recommendations: focus on finding funding for a larger historical project as well as setting up the grad school

Policy

Lessons learned: differences in implementation of policy directives between the three countries meant that it was not straightforward to provide a coherent trilateral overview.

Recommendations (from the policy document): for implementation of fish targets, national legislation would need to be enhanced, offering an opportunity to influence on a national basis. In addition, this

could be strongly linked to the Marine Strategy Framework Directive (MSFD) or the Water Framework Directive (WFD), as this is legally binding in the regions (unlike trilateral fish targets). An action that still needs to be fulfilled is presenting this information to TG-M and asking for advice as decided at TG-M 2019-01.

Measures

Lessons learned: differences in the implementation of policies and directives (e.g. WFD) in the regions (states, provinces, communities etc.) leads to different perceptions of the issues related to Wadden Sea fish and to different priorities when it comes to concrete measures to improve the situation for migrating fishes.

Recommendations: the windows-of-opportunity concept developed by Swimway seems to be a promising concept as it offers the avenue to integrate requirements that come with climate change and coastal defence, and smart solutions to enable the completion of life cycles of Wadden Sea fish. Solutions developed in The Netherlands may serve as examples.

Stakeholder involvement, communication and education

Lessons learned: confining the remit of Swimway to the Wadden Sea is not adequately covering the spatial and topical area, and thus stakeholder representation in the group and its sphere of activity is incomplete. However, opening dialogues with some stakeholders (e.g. fisheries) meets with political and administration issues. Communication and education may require more expertise to include in the group.

Recommendations: as a first step, willingness and readiness of stakeholders which are considered relevant for Swimway may be explored in order to learn about the potential of cooperation. Future focus should broaden activities in communicating the messages of Swimway to stakeholders and to the public-at-large, e.g. schools and interested public education entities. This may well be based on national or regional activities which are more adequate to tackle the specific requirements of regions and which are coordinated by Swimway.

Summary and conclusions

- The Swimway work 2019-2022 can be regarded as a success story, consisting of quite a few milestones and achievements. However, progress in concrete terms towards improving the situation for Wadden Sea fish is slow (e.g. improving access of migrating species to inland waters), but visible in Denmark and The Netherlands, where several projects have enabled landward passages to freshwater (see above).
- A milestone and major achievement of Swimway was the organization and hosting of the international scientific conference “SWIMWAYS: Understanding connectivity within the life cycles of coastal fish”, held 24 – 26 September 2019 in Hamburg, Germany. The conference laid the foundation across all goals and pillars of the Action Programme.
- Swimway produced an overview of major research and monitoring programmes in all regions of the Wadden Sea, and a proposal for a fish monitoring programme in the Wadden Sea under the TMAP, including a template for harmonized data. Several research initiatives and projects resulted from the work of the group. However, a larger-scale trilateral research initiative still awaits to be developed and suitable funds to be identified.
- The idea of a fact-check workshop to clarify frequently made statements such as “Wadden Sea fish are declining” has to be realized because the expertise for adequately discussing this statement is with the group. The key function of Swimway for the assessment of the status of Wadden Sea fish needs to be better communicated.
- A key element of the Swimway research approach is the role of connectivity and of habitats during the life history of Wadden Sea fish, summarized as *bottleneck approach*, in conjunction with the *windows of opportunity* concept, demanding actions within a window defined by climate change, sea level rise and water management requirements.
- Wadden Sea fish researchers and thus the Swimway group should put more emphasis on science-policy integration in the political area of the regions. They need to improve communication and get their message across to stakeholders involved in key processes and ultimately decision-makers. Further they have to elaborate and agree on goals for improved scientific knowledge and its use in management. This may cover better and multiple use of scientific data, indicator and monitoring schemes, decision support tools for e.g., natural resource management. A key role of Swimway could be to provide guidance on best practise to individual scientists.

- An analysis of fish-relevant policies and regulations was carried out which made it possible to draw priority recommendations resulting from the summary of the report. These recommendations were converted to a policy statement which provides a good overview of available legislation and shows that trilateral fish targets go well beyond national legislation. One conclusion is therefore that for implementation of fish targets, national legislation would need to be enhanced, offering an opportunity to influence on a national basis.
- Given that the role of fisheries as a mortality and bottleneck factor for Wadden Sea fish is undisputed, the Swimway group has yet to develop a common view on involvement in mutual and balanced exchange of knowledge and experience of all mentioned stakeholders, including commercial and recreational fishermen. Communication with this stakeholder group was and still is limited. Swimway should consult with TG-M with a view on obtaining a mandate to organize a workshop with participation of fisheries in order to explore common grounds and fathom readiness of that group to become involved in the work of Swimway.
- Cooperation with the World Fish Migration Foundation (see introduction) should be enhanced and Swimway should use this opportunity to strengthen its activities in environmental information and education. Especially the latter field needs more emphasis.
- The term of Swimway is limited to six years while the aim should be to continue beyond. Swimway should work towards a revision of the vision based on revised new targets once available.

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