The Plaice Box: Executive summary

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Executive summary plaice box project

The Dutch government plans to scale up offshore wind farm production in the North Sea from 957 MW (2017) to 11.5 GW in 2030, with further additional areas for a total of 20-40 GW for the period up to 2050. To achieve a balance between nature, wind energy production and food production (fisheries) the government, environmental NGOs and the main economic users agreed on a covenant. This so-called North Sea Agreement (NZA) lays down a roadmap for future spatial allocations in the Dutch Exclusive Economic Zone. The NZA (article 4.44) includes the following commitment: *"Parties agree to nullify the existing restrictions in the Dutch part of the Plaice Box, with the exception of Borkumse Stenen* (See Figure 1)*. This means existing European agreements will need to revisited; this hence requires international dialogue".*

Current restrictions in the Plaice Box (PB) are part of regulations under the Common Fisheries Policy (CFP). Regionalisation procedures under the CFP imply that dialogue about the future of the (Dutch) Plaice Box should be prepared by the relevant regional group, which in this case is the Scheveningen Group. The CFP also stipulates that management decisions and joint recommendations by regional groups should be based on the best available scientific advice .

In this context, the ministry of Agriculture, Nature and Food Quality has asked Wageningen Marine Research to advise on the ecological function and effectiveness of the PB including new insights since the last evaluation in 2009, and how to proceed to address potential knowledge gaps. To address this request, Wageningen Marine Research proposed a step-wise approach in which the current knowledge base and data availability would be addressed including a stakeholder consultation as well as developing a rough outline of the field experiments. Four tasks were undertaken in this study:

1. Summary of plaice box goals and results from previous evaluations[1]
2. Inventory of current available data[2]
3. Stakeholder consultation[3]
4. Options for evaluation research[4]

For each task a factsheet was produced [see references 1-4]. The key results of these tasks are summarized below.

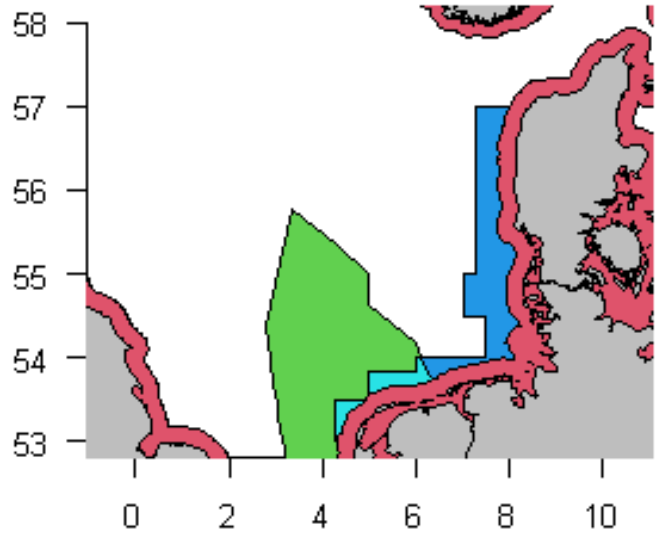

Figure 1. Area of the plaice box including the 12nm zone (in red), the plaice box outside the 12nm zone (in blue), the Dutch EEZ (in green) and the relevant study area outside the 12nm zone, within the Dutch EEZ and plaice box (in light blue).

Summary of plaice box goals and results from previous evaluations[1]

The PB management measures initially explored by the ICES Flatfish working group in 1987 were intended to lead to two phenomena:

i. An increase in the Spawning Stock Biomass (SSB).
ii. A decrease in the quantity of undersized plaice discarded in comparison with the discard rates occurring in 1987.

Over the years, three more evaluations were undertaken, each with increasing amounts of data analyses (See Table 1).

Table 1. Summary of all evaluation investigations and the 1987 pre-assessment from the North Sea Flat Fish working group, based on Beare et al., 2013[5]. In italic processes that were recommended for further investigation were added.

	ICES (1987)	**ICES (1994)**	**ICES (1999)**	**Grift et al. (2004)**	**Beare et al. (2010)**
Ecological feedback processes					
Growth	No	Yes	Yes	Yes	Yes
Mortality	No	No	No	No	Yes
Distribution	No	No	Yes	Yes	Yes
Density-dependence	No	No	No	No	Yes
Ecosystem changes					
Recruitment	No	No	No	Yes	Yes
Eutrophication	No	No	No	Yes	Yes
Trawling impacts benthic productivity	No	No	No	Yes	Yes
Trawling impact flatfish diet	No	No	No	No	No
Climate change	No	No	No	Yes	Yes
Predation (seals and cormorants)	No	No	No	No	No
Fleet dynamics					
Redistribution of fishing effort after PB	Yes	Yes	Yes	Yes	Yes
Developments in fleet capacity	No	No	No	Yes	Yes
Competition among fleets	No	No	No	No	Yes

All evaluations indicated a major difference between the original ICES working group advice (full closure) and the management measures implemented for the PB (closure for part of the fleet). All evaluations

also highlighted the lack of clear objectives and experimental design at the PB implementation and how difficult it was to evaluate its performance. Data available and factors explored to estimate these performances progressively increased along the four evaluations.

The first evaluation suggested an 8% increase in SSB could be achieved by closing the PB (compared to an initial estimate of 25%). The improvements of the SSB and discards rates observed could not be attributed to the PB. The second evaluation found that cumulative discard mortality until cohorts reached the minimal landing size did not change significantly from 1989 to 1999. Moreover, a decrease in undersized plaice numbers within the PB was observed between the first two evaluations of the PB (1995-1999). The third evaluation concluded that despite a decrease in fishing effort (69% from 1989 to 1994 and a further decrease of 23% from 1995 to 2003), the plaice total recruitment, SSB and yield have all decreased since 1989. The discard rates have increased inside and outside the PB (from 77% to 87% inside the PB and from 31% to 77% outside the PB, 1976-2003 period). However, the difference in discard rates between the inside and outside of the PB decreased (46% of difference in 1976 and 10% in 2003).

Stakeholder perceptions presented in the fourth evaluation emphasized the PB as a management failure. In addition, the plaice SSB reduction in the area is often attributed to the PB implementation itself. However, the last PB evaluation explored this possibility, and no evidence supports a negative impact of the PB at this time. Furthermore, model-based approaches consistently indicated positive impacts of the PB on the SSB. The fourth evaluation suggested an experimental design that would allow the determination of positive and/or negative effects of the PB on plaice biomass. A scientific question was defined: "Is the decrease in yield and spawning stock biomass of plaice caused by the establishment of the plaice box or caused by natural processes, or a combination of the two?". Although the plaice stock has been rebuilt to record high levels, the scientific underpinning for the functioning of the PB remains relevant.

Inventory of current available data[2]

An inventory of data availability for a new evaluation was undertaken, summarizing the availability of fisheries dependent data such as landings, discards and effort, all being routinely available from Statutory Task programs. Fisheries independent data such as distribution and biomass of key species such as plaice, are available from scientific surveys such as the IBTS, BTS, DFYS, SNS and the plaice box survey. Environmental data such as temperature, nutrients, salinity and chlorophyl could be sources from several open-source platforms that provide observed and modelled variables. Other tropic levels of the food web such as benthic species and top predators could be obtained from on-going benthos surveys, shellfish surveys, bird count data and spatial modelling exercises of seal populations. To assess the impact of fishing on ecosystem functioning, there is often the need to rely on theoretical modelling. In the past decade, the scientific understanding of how fishing alters the ecosystem has increased tremendously and these models are now available to more accurately predict how closures such as the PB may change the impact of benthic composition.

Stakeholder consultation[3]

Stakeholders were consulted to identify research gaps and current views on the Plaice Box as well as issues that need to be addressed before a balanced decision can be made about the restrictions in the Plaice Box. Individual interviews and two focus group meetings were conducted. Individual interviews were held with government representatives from the EC, Germany and Denmark, environmental NGOs and focus group interviews were held with the following stakeholders:

i. Fishers currently fishing in the Plaice Box.
ii. Beam trawl fishers who formerly fished in the Plaice Box.
iii. North Sea Advisory Council.
iv. Environmental NGOs
v. Scheveningen group
vi. Government representatives

The fishers indicated that the PB was said to have lost its relevance as a fishing area because catches of plaice (and sole) in the box have declined. The reason for this in their view is a reduction of nutrients

because the sea bottom is no longer 'ploughed' i.e. whirled up by the chains of the heavy beam trawls. From their observations soon after the closure of the Plaice Box the sea bottom deteriorated and is now considered 'dead'. The large beam trawlers are primarily interested in the area between the 12m zone and the outer Plaice Box boundary. Within this area they do not foresee conflicts with other métiers and in particular shrimp fishers. The fishers in the focus group expressed disappointment that, despite the absence of the predicted results, the regulations in the Plaice Box were never lifted. They were interested in an experimental approach though the design should also contain a provision that if - after a given time period of, for example 5 years, the evaluation results would indicate a particular result, the measures would need to be revised accordingly. Fishing sector representatives indicated that the German and Danish parts of the Plaice Box are more interesting to the fishers than the Dutch part as fish productivity in the other areas is higher. It is therefore expected that Germany and Denmark will oppose a lifting of the measures and that they wish to keep the large Dutch beam trawlers out of their waters. This view was later confirmed by the German and Danish government representatives. They furthermore brought up the issue that the Dutch fishing sector consists of various métiers that do not necessarily share the same interest in increased access of large beam trawlers in the Dutch part of the Plaice Box. It was therefore suggested to inventory fishing activities and interests of the 'in-between' fleet, which consists of all métiers except the large beam trawlers and the shrimp fishers. This would help to decide whether the process of adapting the regulation is worth the effort, as the opening at the moment is merely a matter of principle.

The North Sea Advisory Council (NSAC) members participating in the meeting consisted of representatives of the producer organisations from the EU countries bordering the North Sea. The discussion opened with a clear statement that: "If the closure of the Plaice Box has not reached its objective, then the measures should be lifted". A dissonant view was voiced by the German representative who felt that after 30 years, the role of the Plaice Box has changed and that the area now presents a habitat not only for plaice, but for multiple species. It represents a protected area with natural values that need to be maintained. A decision on lifting the measures therefore should be based on the ecosystem characteristics of the Plaice Box at this point in time.

NGOs indicated that the priorities in marine governance have shifted from protective measures for single species to an ecosystem approach based on the precautionary principle. The NGOs stress the relevance of the Plaice Box as important spawning- and nursery grounds for various marine species, as well as its relevance for migratory fish. In combination with the current poor state of the ecosystem and overall lack of protection, the admission of heavy beam trawls (>300HP) needs thorough consideration. For the NGOs, it is therefore imperative to obtain an in-depth understanding of the effects of increased bottom trawling in the Plaice Box both in terms of the wider ecosystem as well as cumulative impacts before a decision is made.

Participants in the Scheveningen group were informed for the first time of the ambition of the Dutch government to look into the PB reopening. It was brought forward that there are issues with opening up the PB for large beam trawlers, particularly in the light of recent insights on the effects of bottom trawling on the marine benthos and in the EU context where the ecosystem approach has been adopted.

A government representative from Germany at the NSAC meeting had already stated that over the past 30 years the fishery had adapted to the new situation and are in balance with the carrying capacity of the system, and that this situation would be disturbed if bottom trawling would be allowed. A warning was uttered for 'caution' in the decision to lift the ban. The Danish government stated that Denmark holds the view that as long as it concerns the Dutch part of the Plaice Box, it is up to the Dutch government to decide. Having said that, the Danish government does not support the lifting of the measures in the Danish part of the Plaice box. According to them, the fishery in the Plaice Box is small scale and 'environmentally friendly', which is also a clear aspiration of the Danish FSK PO that promotes the use of non-intrusive fishing gear, i.e. gear that has no impact on the sea bottom. The current Danish political climate is also working towards sustainable fisheries and the large Dutch beam trawlers are seen as detrimental to the marine environment. Therefore they do not wish for them to gain access to the Danish part of the Plaice Box.

Options for scientific evaluation[4]

To advise on the ecological function and effectiveness of the PB including new insights since the last evaluation in 2009, WMR proposes the following research consisting of three phases:

i. Take a **snapshot** comparative assessment of the current condition and functioning of different ecosystem components, at small spatial scale, both within the Dutch part of the plaice box outside the 12nm zone and adjacent areas that are, to date, still open to all trawlers.
ii. Evaluate the **long-term** changes to ecosystem functioning under changes in fishing pressure over time in areas that have remained open and areas that were closed to large trawlers since 1995.
iii. Prepare **advice** through ICES, including reflections of relevant stakeholders, that presents the trade-offs between nature conservation vs food security/socio-economic considerations.

For the snapshot phase, focus would be on the area in the ~green rectangle as shown in Figure 2. There would be a need for research on sediment composition to allow the assessment of trawl effects on organic matter quantity and quality, research on bioturbation as these processes have strong links to several biogeochemical functions. In addition, secondary productivity needs to be assessed, while sampling for benthic composition will be used to illustrate differences in development of the benthic community, in terms of sensitivity and recoverability. During the same sampling events, fish resources will be sampled to understand the interaction between food available to fish, benthos composition and consumption of foraging fish. Top predator presence will be monitored through readily available seal and bird tracker data and RWS monitoring data. The role of fisheries will be studied using VMS, AIS and logbook data to identify the spatial and temporal presence of bottom trawling. During the field work, environmental variables such as temperature, salinity, wind speed will be collected as variables that can explain the variance in observations in the topics listed above. Stakeholder consultation will be integral part of the snapshot phase to ensure stakeholders are well informed of the process and can contribute to the field work where necessary. All results will be reported, published and communicated through presentations and factsheets when ready. Rough estimates of the budget needed indicate that around 265 working days and 150k€ in material would be needed for this snapshot research.

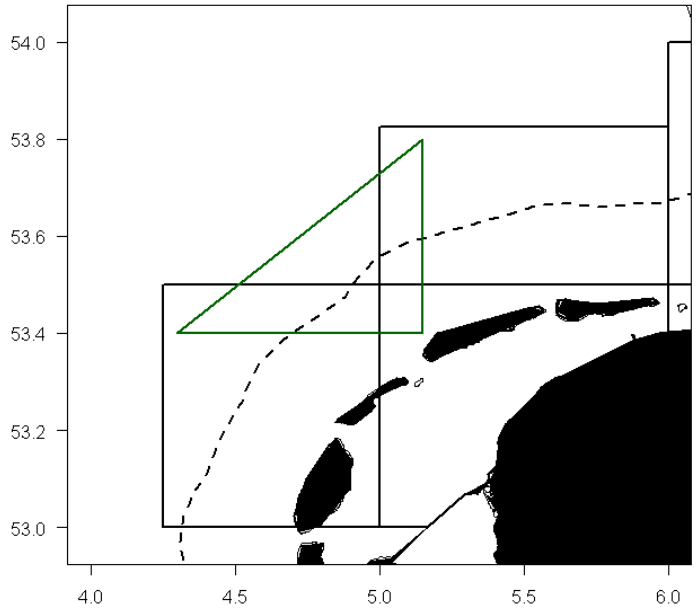

Figure 2. Area of focus for snapshot research denoted by green triangle. The area includes areas within and outside the Plaice box, mostly situated outside the 12 mile zone.

The long-term monitoring, planned to be continued for at least 5 years, takes similar activities as under to the snapshot research, although results are tailored to investigate the changes in the ecological functioning when experimental fishing trials take place. Results should indicate if there are any

differences in ecological functioning prior to date between areas within and outside the Plaice Box and how ecological functioning changes when fishing would be allowed in the area again. Close stakeholder outreach is part of the process to ensure timely uptake of the activities and retrieval of feedback to improve on the research design and analyses. Rough estimates of the budget needed indicate that around 1745 working days and 760k€ in material would be needed for this for the 5 year period total.

Finally will WMR contribute to ICES advice to review the role of MPAs in ecosystem based fisheries management, working from a strong scientific basis.

References

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