

Baseline Assessment for all pilots

An initial activity of WP2 is a description and baseline assessment of each study pilot that will be used as the baseline to assess progress during the project and can aid in the future cooperation between the study pilots. The assessment also serves to establish the status of mainstreaming of NbS into the pilots. The assessment survey is divided up into three parts: 1) Description of the pilots, 2) Questions concerning how the enablers are currently addressed in the pilots, and 3) Brief questions about the MANABAS framework (inspired by ISBAM).

Please fill in this word document and return to Berry <u>berry@resiliense.nl</u> by 1 September 2023.

If you have questions about this or need help feel free to contact Per <u>Per.Sorensen@kyst.dk</u>, or Lisa <u>lisa.vanwell@sgi.se</u>.

All questionnaires will be used in the project, but only condensed information will be made publicly available

Part 1: Pilot description

Our aim is to mainstream nature-based solutions on the different coasts of northwest Europe. Therefore we need a description of the coastal system. This is divided into two sections: A) description of the coastal (natural) system of the pilot, and B) description of the governance system.

Name of pilot: Lodbjerg-Nymindegab

Name of person(s) filling out assessment: Per Sørensen

Location of pilot:

445792 EAST, 6228585 NORTH WGS 84 UTM 32N





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Figure 1 Study pilot. Light green areas are flod proned.



Pilot aims/objective:

1: Updating the future nourishment needs by analyzing the coastal development in relation to the sand nourishments carried out, as well as future projection including climate changes.

2: Optimization of sand nourishments with a focus on larger nourishments and optimized design based on monitoring.

3: Further analyzes of the erosion and deposition conditions when narrowing the Thyborøn channel by extending the jetties (Follow-up on project Vestlige Limfjord and C2CCC project C9 Thyborøn channel and Vestlig Limfjord)

4: Analysis of the possibility of dredging sediment in the depositional areas north of Horns reef and Nissum fjord

5: Preparation of a long-term risk management plan using nature-based methods, including an assessment of which passive coastal protection measures should be preserved.

6: Guidance and stakeholder involvement to gain a greater understanding of coastal dynamics and the need for a holistic view.

7: Capacity building around the use of nature-based coastal protection

Which nature-based solutions will you be working with in MANABAS?

A. Description of the coastal system

Please briefly describe those areas that are relevant for your pilot:

1. The landscape including geology, morphology, and biology.

The landscape consists of sandy marine deposits from a thin layer to a thick layer on top of glacial deposits(clay) At Bovbjerg there is a glacial cliff. Most of the stretch is a narrow sandy barrier.

The sediment is mainly sand (d50 from 0.2-0.35 mm), with lobes of gravel. No rocks are present.

2. The hydrodynamic forcing from tide, water level, wind and waves. If possible, include some statistical values.





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The tide is diurnal and the tide range is approximately 0.40 m to the north to 0.75 m to the south. The 100 years water level ranges from 3.5 m to the north to 4.5 m towards the south.

The wind climate is dominated by northwesterly low pressures coming from the Atlantic ocean, which gives storm wind speed up to 40 m/s. Most of the year the wind is directed towards the coast.

The wave climate is a mixed system and consists of wind waves generated in the North sea and more swell dominated waves generated in the Atlantic ocean. The $H_{s,12}$ is approximately 7 m and the corresponding wave period is 9 seconds Swell period can be up to 15-20 s. Á Jonswap spectrum fits the wave climate best.

- 3. Which current NBS solutions are already present (it ca be a non-engineered original landscape)
- 4.

Sand nourishments has been the main coastal protection for 30 years. Dune reinforcements with sand are used when needed.

In case of infrastructure in areas of aeolian sediment transport marron grass or straw is used to reduce the sediment transport. In one stretch the sediment is moved from the back of a dune system to the front to prevent a road from being covered by sand.

At two ports, Torsminde and Hvide sande, the sediment is bypassed by dredgers.

5. Describe how study pilot is monitored.

There is a yearly coastal profile monitoring system which consists of transects from the hinterland to approximately 4 km offshore. The spacing between the transects are 1 km. Offshore the transects are parallel to the coasts because of the main direction of sediment transport. Specific research areas is monitored more densely. Typically 4 times a year with line spacing of 200 m, and full coverage on land.

The width of the protective dunes are monitored yearly by red laser scan to identify possible week stretches.

6. Describe the sediment dynamics: Macro or micro sediment budget, conceptually or detailed volumetric monitoring. Include any dredging

The wave active profile range from 10 m water depth to the top of the cliffs (5-30m).



The longshore sediment transport ranges from 0 to 2,100,000 m³/year. The sediment transport goes northwards from Agger. Between Agger and Bovbjerg the sediment goes towards Thyborøn and into Nissum Bredning. From Bovbjerg the longshore sediment transport goes towards south

The coastal system is a 1-3 bar system depending of the location. The bars are highly dynamic, and the outer bar can move 200 m cross shore during a single storm. In some places there is a clear rhythmic pattern.

The background retreat of the coastal profile varies from 0.5 to 8 m/year.

The navigation channels at Thyborøn, Torsminde and Hvide Sande are dredged regularly. The dredged sediment is bypassed down stream. In Torsminde and Hvide Sande there is a fixed bypass system installet which makes the dredger capabable of pumping the sediment downstream at the beach.

7. Long term trends. These could be chronic erosion, long-term subsidence or trends in mean sea level.

Generally the whole stretch is subject to chronical erosion from o-8 m/year. It is just upstream Torsminde and Hvide sande habor jetties where the coast is stable for now.

Generally the land is upliftning from 1.2 mm/year at Agger in the North to 0,7 mm/year and Nymindegab to the south. Locally the land can be subsiding, if the land is reclaimed or due to the local geology

8. Describe the current coastal protection being used in the study pilot. In the 1870'ies the coastal protection started by building groins and revetments. After a severe storm in 1981 a number of breakwaters and dune reinforcements with sand was installed. The first test with sand nourishment was I 1976. Since the Interreg project Nourtec in the yearly 1990'ies sand nourishments has been the primarily coastal protection with a yearly nourishment volume of 2-3 mio m³,

At present 80 groins, 88 shoreparallel breakwaters and 28 km revetment is installed. In MANABAS it will be analyzed if any is still needed.

9. Describe the current risk of flooding and erosion. During severe storms the retreat of the dunes can be up to 30 m. In one case a retreat of 60 m has been recorded. The agreed safety level in generally 1/100 year return water level event, and 1/1000 year at Thyborøn.





Xx houses is protected and the protected value is approximately xx bill. Euro.

- 10. Which human activities impact your coastal system? Dredging of the navigation channel at Thyborøn, Torsminde and Hvide sande is the biggest influencers, Human impact when walking in the dunes is visible but negligible.
- 11. Describe important culture and historical aspects in the study pilot The land has been subject for erosion for long which has resulted in an awareness of the impact of chronical erosion. But due to the positive risk reduction of sand nourishments the awareness is decreasing in some parts resulting in an increase of the risk by building houses and other vulnerable infrastructure in the low lying hinterland.

B. Description of the governance context

Please briefly describe those areas that are relevant for your pilot:

- 12. Who are the landowners of the land? The land owner are primarily private persons. The Danish state is owning nature areas.
- 13. What are the main land uses in the pilot area (ie agriculture, nature reserve, infrastructure)

Holiday houses are very large in numbers and local economy. There are some agricultural land, and a lot of lowlying hinterland, which is very important for nature.

There are some cities Agger, Thyborøn, Harboøre, Torsminde, Søndervig, Hvide sande, Ringbkøbing and Bork that are protected.

14. What are the current laws and regulations that govern the use of naturebased solutions in the pilot (i.e Natura 2000, planning)? The coastal protection act is governing coastal protection. The Coast protection act has a very holistic approach which supports the use of nature based solutions, since coastal protections impact on nature must be assessed.

Spatial planning has for many years has an inherent focus on not increasing the risk in flood proned and erosion proned areas. However practice Interreg North Sea



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shows that the intensions of the law have not been met in real world planning, since much of the vulnerability is relatively new.

There are 3 marine Natura 2000 and 5 terrestic areas in the study pilot.

There are also a marine plan agreed on in june 2023 that is a marine plan for the next 10 years. It supports the marine strategy for Denmark.

The are also some nature areas that are protected permanently or in specific periods of the year due to their eco system services.

15. What is the current status of using nature-based solutions in your pilot area (ie to what extent are they mainstreamed into existing policy?)

Sand nourishments has been used for long, but there are a large potential for optimizing the use of nourishments to reduce risk of erosion and flooding and support natural biodiversity and enhancing the recreational values.

The old inactive passive protection must be reassessed because they have negative impact on erosion, biodiversity and recreational value.

16. What are the current goal conflicts (ie protecting cultural vs natural areas, or protecting private land vs municipal-owned land, or agricultural uses vs nature preservation?) How are these dealt with?

Since 1982 there has been 5 years costal protecting agreements between the State (DCA) and the municipalities. In MANABAS we focus on a long term risk management plan incorporating the long term effects of climate change.

Stakeholders will be involved to support a long term holistic approach.

At present there are no real conflicts. Some focus points are however present. The knowledge of natural variability in morphology and the associated biology is to little, resulting in a Environmental Impact Assessment that is not aligned with the existing conditions at the coast. The knowledge is lacking behind, so the levels of different indicators are sometimes set lower that the background level.

17. How are the stakeholders identified and involved The stakeholder are identified by analyzing the land use, by talking to the municipalities, and by using our long term knowledge on the pilot area,





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We intend to involve the in workshops focusing on an understanding of the challenge, definition of aims/objectives and on possible solutions on different timescales, using the dynamic adaptation policy pathways (DAPP) concept.

18. Briefly describe the socio-economic development in the area. The economy is growing in the area due to growth in tourism. It is expected that the socio-economic will grow in the coming years due to many local activities supporting tourism.

Activities related to renewable engery, especially wind, will also grow because 3 big offshore windturbine parks will be installed in the comin years.

Farming in the lowlying areas are under pressure due to sea level rise and the associated rise in ground water level.

Fisheries are very hard to predicts since it is heavily regulated, At present Brexit has resulted in a decrease in economy.

19. What do you experience as the main barriers to mainstreaming NbS in .your pilot?

The main barrier in understanding the coastal system including morphology and the associated biology and regulations. The knowledge gabs must be filled in. The length of the coastal protection agreement of 5 years gives limited opportunities for optimal use of NBS

C. Implementation scheme

Please describe your timeline for implementing NbS during MANABAS and beyond (i.e. starting point, estimated finalization, monitoring period)

Part 2: Enabler Assessment

Please consider the barriers identified in Part 1B (question #18). The enablers below are meant to be ways to overcome these barriers. However, these enablers are not set in stone and will be further developed, augmented and /or changed during the MANABAS Coast project. There may be other enablers that are more important in certain pilots or for mainstreaming NBS. We will explore these during our project. In this assessment we want to get an initial idea of how these proposed enablers by EcoShape play out in your pilot and for mainstreaming NBS on a large scale.





Enabler 1: Technology and system knowledge

• Which types of technology or systems knowledge are important in your pilot? (i.e. Sediment cell, salt marsh protection, salt marsh dynamics, sand nourishment, enhanced dune development) The understanding of sediment cells, the morphology and the associated biodiversity is important.

Long term effect of climate change of the water system (ground, pluvial, fluvial and sea)

• Are there any knowledge and technology gaps in your pilot that need to be addressed? Please briefly describe.

The natural variability of the coastal systems in both short and long term needs to be further analyzed and communicated.

Enabler 2: Multistakeholder approach

• Who are the main stakeholders in your pilot?

The stakeholder are identified by analyzing the land use, by talking to the municipalities, and by using our long term knowledge on the pilot area, They are landowners, municipalities, farmer, fishermen, business and Ngo's



• How will you engage your stakeholders in the project?

We intend to involve the in workshops focusing on an understanding of the challenge, definition of aims/objectives and on possible solutions on different timescales, using the dynamic adaptation policy pathways (DAPP) concept.

Enabler 3: Management, monitoring, and maintenance

• What routines does your pilot have in place for management, monitoring and maintenance of the NbS? We will continue with the existing monitoring.

The monitoring of nature is the responsibility og the Environment agency, which we know will be increased (Maritime plan)

• How do you measure the success of your pilot? Do you have any indicators for successful mainstreaming of NbS?

One of the objective of our participation of MANABAS is to extend these from solely risk management based to have a broader and more holistic scope

Enabler 4: Institutional embedding

• How do current institutional arrangements already facilitate mainstreaming of NbS? Please describe and mention the key institutions

We have a strong relationship with the universities in Denmark and the Netherlands. Furthermore we are working with the Nature agency and environment agency on specific NBS projects

• How committed is your organization to mainstreaming NbS within MAN-ABAS Coast and after the project ends?

Our institutions is expected to be committed, and we hope that the politicians who allocate the necessary funding is also committed.

Enabler 5: Business Case





• Do you face problems with funding in your pilot? Please briefly describe, including the general sources of funding.

Our funding has only a 5 year focus which makes optimal risk management including NBS impossible. One on the objectives for us in MANA-BAS is producing the necessary documentation for the positive effects on socio-economics of having longer funding agreements,

• How will your pilot and/or continued mainstreaming be funded after the MANABAS Coast project?

It is up to the politicians to decide.

Enabler 6: Capacity building

• What types of capacity building would your pilot need in order to facilitate mainstreaming of NbS? There must be a strong focus on describing the variability of the coastal systems, the many ecosystem services that a NBS supports compared tio the traditional grey coastal protection solutions.

Hopefully there will be some more good examples implemented in the future on an even bigger scale,

Enabler ranking

To what extent are the above enablers important for mainstreaming NbS in your region? Please rank (1 is least important, 10 is most important)

Enabler 1: Technology and system knowledge

1 2 3 4 5 6 7 8 9 <u>10</u>

Enabler 2: Multistakeholder approach

1 2 3 4 **5** 6 7 8 9 10

Enabler 3: Management, monitoring and maintenance

1 2 3 4 5 6 7 8 9 <u>10</u>

Enabler 4: Institutional Capacity



1 2 3 4 5 6 7 8 9 <u>10</u>

Enabler 5: Business case

1 2 3 4 5 6 7 <u>8</u> 9 10

Enabler 6: Capacity Building

1 2 3 4 5 6 7 8 9 <u>10</u>

Suggestion for additional enablers

Are there any aspects of mainstreaming enablers from your pilot that you can already suggest? If so please briefly state these:

Part 3 MANABAS mainstreaming framework (inspired by earlier work e.g. ISBAM)

Within MANABAS Coast we are working on a framework that helps in mainstreaming NBS. To develop this framework, we need information on the pilots as well as the ambitions and goals of the different organization involved. We build on work already done in the past such as the ISBAM approach, which was developed in the Interreg BwN project (see also the brochure in the appendix for a further explanation or online). Just as the enablers, the MANABAS mainstreaming framework is still a work in progress.

As a starting point for the MANABAS framework, 3 leading principles from ISBAM are evaluated. We would like to know if these principles can also be applied across the entire northwest Europe coasts and how they can be improved.



Three leading principles have been identified that are deemed important to enable mainstreaming of NBS:

MANABAS Coast principle 1: "Act at a landscape (system) scale, including both the natural and socio-economic system/context"

• Do you identify with this principle?

Yes, indeed

• Is this principle applied (to a certain degree) within your pilot? And within your organization? If yes, how?

Yes, for long we have focused on using NBS on a longer scale, but there is room for improvement

• In managing your assets, how are the system-wide effects and benefits taken into account?

Until not it is limited how these has been taken into account.

• On a scale from 1 (room for improvement) to 10 (superb), do you think your organization adheres to this principle? Why?

1 2 3 4 5 6 7 8 9 10

The landscape/system scale is not widely used in our organization.

MANABAS Coast principle 2: "Integrate management of multiple assets and functions within the landscape system context"

• Do you identify with this principle?

Yes, indeed

• Are relevant organisations/institutions efficiently cooperating to jointly address system-wide challenges? If yes, which challenges and how?

We have tried to engage the challenge but in a less jointly way, which is planned to be improved during the MANABAS project

• If you see room for improvement in the integrated management of multiple landscape assets, what would be the necessary steps to take according to you? Briefly state



We have to be better to imbed in in our institutions and communicate it in public.

• On a scale from 1 (room for improvement) to 10 (superb) how much is this principle applicable to your organization?

1 2 3 4 **5** 6 7 8 9 10

MANABAS Coast principle 3: "Embrace and leverage upon the natural dynamics of the system"

• Is this principle applicable to your situation/organization?

Yes indeed

• What are the main natural processes that should be considered? Are these well-known with all the stakeholders?

Natural dynamics of the morphology and biology. The long term effects, and the effect of different coastal protection measures.

• How are using natural processes incorporated in the management practices within your organisation?

It is in most cases quite inherent, because the basic understanding is present at all levels.

• On a scale from 1 (room for improvement) to 10 (superb) how much is this principle applicable to your organization?

1 2 3 4 5 6 7 8 9 10

Additional MANABAS Coast mainstreaming questions:

• In your view, what is essential in the mindset or way of working of people (policy makers, managers, professionals, general audience) to promote mainstreaming of NBS? Do stakeholders need more information on mainstreaming?

There is a need of communication the basic dynamics of a coast and reaching the large number of various stakeholders which rapidly change over time.



A politician is elected for only 4 years at the time.

• What other leading principle(s) would you suggest?

Always compare NBS to what stakeholders thinks is the alternative (grey solutions)

• How can we make these principles more applicable to the context of pilots?

Find out how to reach and keep reaching the various stakeholders, i.e. rising the awareness

• Finally: What does mainstreaming mean for your pilot? Please briefly describe.

It will result in a more optimized long term risk management strategy that supports biodiversity and the socio-ecomics of the coastal area.