

# MARINE SPATIAL PLANNING (MSP) CHALLENGE 2050

## SIMULATION BACKGROUNDER

### MSP CHALLENGE BACKGROUND:

This simulation challenge, designed by Breda University of Applied Sciences, Academy for Digital Entertainment, combines role-play, game technology (Unity), and real-world geospatial data as a tool for **designing and implementing marine plans, allocating finite ocean resources to achieve wise use at the basin scale**, and moving plans through consultative processes. **Data layers include human-use, ecology, and administrative.** The simulation runs science-based models for shipping, energy, and ecology outcomes arising from marine plans. The MSP Challenge 2050 is used around the world by **planners, scientists, teachers and students** alike, exposing users to spatial distributions and patterns of physical, ecological, and human features of this basin ecosystem.

### SIMULATION SCENARIO:

The **Sea of Colours** is a simulated version of the **North Sea** in Europe. Key policies such as the MSP Directive, OSPAR Convention, and the INSPIRE Directive have enabled the availability of interactive data layers from which your plans are created. Countries active in the Sea of Colours include (top, moving clockwise): **Purple** (Norway), **Blue** (Denmark), **Yellow** (Germany), **Orange** (Netherlands), **Pink** (Belgium), **Lime** (France), **Red** (England), and **Green** (Scotland). **A meeting is declared** for members of the Sea of Colours to discuss regional cooperation, knowledge sharing, collaboration, and relevant policy convergences for achieving **MSP for two key plans**: development of **offshore wind farms** and the establishment of **marine protected areas** with multi-level protections.

The Sea of Colours spans an area of approximately 750,000 square kilometers with an average depth of 90 m. This basin is characterized by multiple habitats including **fjords, estuaries, deltas, banks, beaches, sandbars, mudflats, marshes, rocks, and islands**, along with **highly urbanized watersheds**. The **socio-economic value** of the Sea of Colours is significant, from fisheries, aquaculture, shipping, oil and gas, offshore wind, cables, recreation, tourism, and conservation. Meanwhile these **competing interests** require distinct features of the marine environment. From special bottom types, depths, currents, wind speeds, diversity, distance to shore and from ports, habitat characteristics, etc. Planning in the marine space therefore requires **many considerations**. Such considerations are informed by available **data layers that help you make the best decisions**.

Your job as marine (planners/scientists/stakeholders) is to **find the best location for:**

1. **Marine Protected Areas** with different levels of fishing gear-type restrictions
2. **Offshore Windfarms**

You must **solve any issues** that arise when accepting the above plans. Try your best to find solutions to these issues, and others, on your own. When satisfied with your plan, move your plan **from “Design” to “Consultation”** if you wish other countries to see your plan. Finally, move your plan to **“Approve”** when you are happy with it. Your plan will be simulated, and outcomes shared. To obtain your grade, **answer key questions** during the session to guide your reflection paper.

# MARINE SPATIAL PLANNING (MSP) CHALLENGE 2050

## SCHEDULE OF EVENTS

To participate in the virtual simulations, **you must be able to access a Windows computer** to download and launch the MSP Challenge software. **Download link will be provided Monday.**

If you **do not have access to a Windows computer (Mac only)**, you are still required to write and submit a **critical reflection paper on the Key Reflection Questions**. To assist with this, you are encouraged to participate in the Virtual Classroom experience. Same if you cannot attend the virtual classroom experience, you are expected to submit a critical reflection paper, nonetheless.

**Reviewing this document and required readings and downloading the software must be completed in advance of the simulation.** When you arrive to the simulation, you will have the MSP Challenge 2050 software open in the background, if applicable, ready to begin.

**Tip:** Press Alt + Tab to toggle between the software and your internet browser.

### WEDNESDAY, MARCH 25<sup>TH</sup> FROM 11:30-12:45, Mini Session Brightspace Virtual Classroom

- ➔ **11:35- 11:45-** Lydia Ross to kick-off the simulation with welcoming remarks and provide context for why this simulation is important for environmental management.
- ➔ **11:45-12:00-** Unstructured time where you are able to click buttons and explore. Ask questions. Begin the tutorial when you feel ready.
- ➔ During this time, I will assign you into your respective Country Teams based on attendance (Pink- Belgium, or Lime- France) so you know who you are working with.
- ➔ **12:00-12:45-** Follow the MSP Tutorial to create your windfarm and marine protected area.
- ➔ I am available to help answer questions.

### FRIDAY, MARCH 27<sup>TH</sup> FROM 9:00-11:30, with Special Guests! TBD: Brightspace Virtual Classroom OR Microsoft Teams

- ➔ **9:00-9:10-** Lydia Ross to kick-off the simulation with welcoming remarks and provide context for why this simulation is important for environmental management.
- ➔ **9:10-9:20-** Harald Warmelink, Breda University of Applied Sciences, to speak to the drivers which led his team to develop the MSP Challenge 2050 software.
- ➔ **9:20-9:30-** Catalina Gomez & Anna Serdynska, Fisheries and Oceans Canada, to share why MSP is important to their work and that of the Canadian Federal Government.
- ➔ **9:30-9:45-** Unstructured time where you are able to click buttons and explore. Ask questions. Begin the tutorial when you feel ready.
- ➔ During this time, I will assign you into your respective Country Teams based on attendance (Purple: Norway, Blue: Denmark, Orange: Netherlands, Yellow: Germany, Red: England, Green: Scotland) so that you know who you are working with.
- ➔ **9:45-11:00-** Follow the MSP Tutorial to create your windfarm and marine protected area.
- ➔ **11:00-11:30-** MSP Challenge Key Question Reflection Discussion (**all welcome to join**)

# MARINE SPATIAL PLANNING (MSP) CHALLENGE 2050

## IMPORTANT INFORMATION

### SIMULATION OBJECTIVES:

- ➔ As a country, increase number of **Marine Protected Areas (MPA)** in your country. Implement MPAs with a combination of permitted fishing gear-types within each plan (no bottom trawl, no industrial and pelagic trawl **and/or** no drift and fixed nets)
- ➔ Increase **offshore windfarm** production in your country's waters, or in collaboration with other countries

### SIMULATION RULES:

- ❖ **To Pan** (navigate the map), hold down the right-click button while moving the mouse.
- ❖ **When implementing windfarms**, you must consider: bathymetry (20-40 m); wind speeds (-> Management Layers -> Environmental Conditions); and shipping lanes
- ❖ **Fishing activities and windfarms** are mutually exclusive activities (cannot co-exist)
- ❖ When building windfarms, try to **lay cables perpendicular** (right-angled) to shipping lanes
- ❖ **Lay cables** using the **shortest and most direct route** from shore
- ❖ Implement **500 m buffers** between shipping lanes and any activity (use measure tool)
- ❖ Implement **500 m buffers** between windfarms and any activity (use measure tool)
- ❖ **Protected Areas should include** areas with more biodiversity and less pressures (use data)

### SIMULATION OUTCOMES:

- ✓ Understand the **complexity of using human-use and ecology data** to inform and make **planning decisions** for coastal and marine areas and activities
- ✓ Exploring and **co-designing scenarios** for windfarms and marine protected areas
- ✓ See how plans affect **shipping efficiencies and trophic structures** at Basin level
- ✓ **Validating policy measures and best practices** (measuring/ validating distances between human use activities such as wind farms and marine protected areas)
- ✓ Observe how marine plans affect **secondary performance indicators** such as shipping efficiency and biomass levels.

### REQUIRED READINGS:

Simulation Platform **Video Tutorials** (x4):

[https://community.mspchallenge.info/wiki/Basic\\_features](https://community.mspchallenge.info/wiki/Basic_features)

North Sea **Food Web** Modeled Using Ecopath-with-Ecosim (EwE) technology:

[https://community.mspchallenge.info/nsfr\\_img\\_auth.php/c/c1/Poster\\_North\\_Sea\\_Food\\_web.pdf](https://community.mspchallenge.info/nsfr_img_auth.php/c/c1/Poster_North_Sea_Food_web.pdf)

North Sea **Fishing Fleets** (Important for MPA development):

[https://community.mspchallenge.info/nsfr\\_img\\_auth.php/0/01/Poster\\_Fishing\\_Fleets\\_Final.pdf](https://community.mspchallenge.info/nsfr_img_auth.php/0/01/Poster_Fishing_Fleets_Final.pdf)

MSP Challenge 2050 **Website**: <https://www.mspchallenge.info/>



# MARINE SPATIAL PLANNING (MSP) CHALLENGE 2050

## KEY REFLECTION QUESTIONS

### REFLECTION QUESTION 1

What were some of the challenges and considerations you faced when siting (deciding on a location) for, and implementing your offshore wind farm plan?

### REFLECTION QUESTION 2

Generally, what sort of criteria might you use to evaluate whether an issue *must* be resolved, or whether it can be ignored during plan implementation? Consider the incompatibility of certain activities that do not actually prevent plan approval (artificial substrate arising from cables reduces the ecological integrity of a Marine Protected Area, but can exist in MPAs, in some cases).

### REFLECTION QUESTION 3

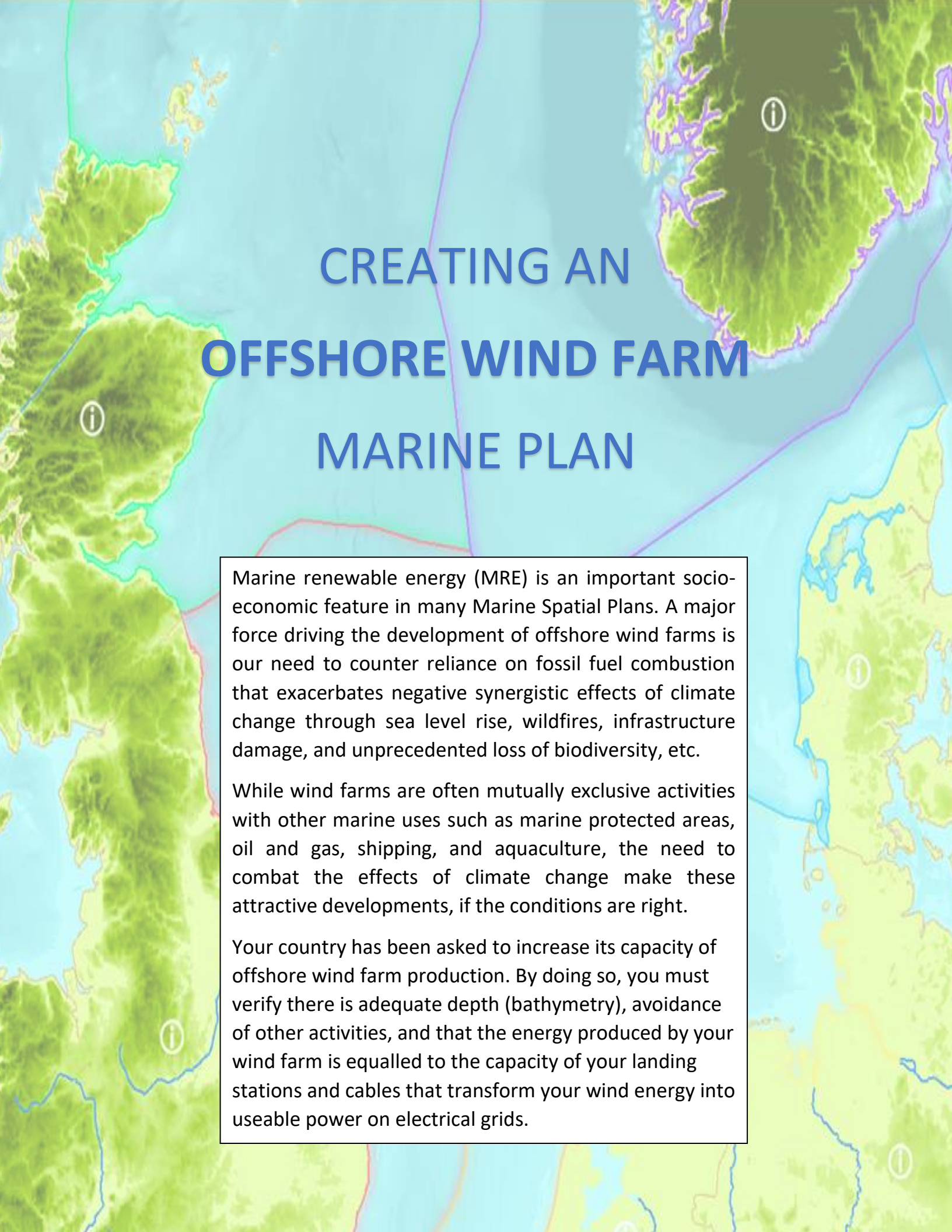
Who is missing from the table when deciding whether to approve plans? What additional information do you think broader groups would want to know if and when approving your marine plan?

### REFLECTION QUESTION 4

How would you prioritize between the implementation of marine protected areas or the development of offshore wind farms, as the primary activity in your country's waters? What considerations would you give to choosing which activity to rely more heavily on, if one more than the other?

### REFLECTION QUESTION 5

What opportunities or challenges exist for using MSP Challenge 2050 as a marine spatial planning tool? How has the program helped develop your understanding of MSP? How could it be improved to help even further?



# CREATING AN OFFSHORE WIND FARM MARINE PLAN

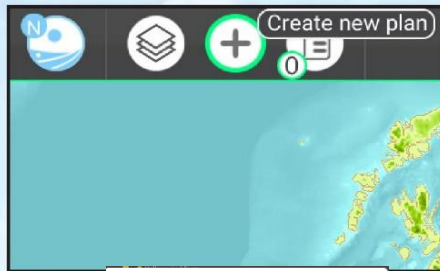
Marine renewable energy (MRE) is an important socio-economic feature in many Marine Spatial Plans. A major force driving the development of offshore wind farms is our need to counter reliance on fossil fuel combustion that exacerbates negative synergistic effects of climate change through sea level rise, wildfires, infrastructure damage, and unprecedented loss of biodiversity, etc.

While wind farms are often mutually exclusive activities with other marine uses such as marine protected areas, oil and gas, shipping, and aquaculture, the need to combat the effects of climate change make these attractive developments, if the conditions are right.


Your country has been asked to increase its capacity of offshore wind farm production. By doing so, you must verify there is adequate depth (bathymetry), avoidance of other activities, and that the energy produced by your wind farm is equalled to the capacity of your landing stations and cables that transform your wind energy into useable power on electrical grids.

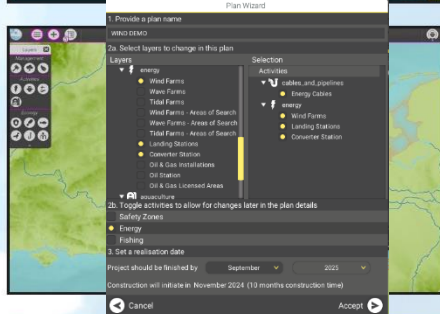


# WIND FARM: THE BASICS



## STEP 1: CREATE A NEW PLAN

To start designing a new wind farm, one has to create a new plan. This can be done by clicking  in the top-left corner.



## STEP 2: PROVIDE DETAILS




In the plan wizard, details need to be added.

- A: Give the plan a name (e.g. Wind Farm).
- B: Select the layers you wish to include in your plan.  
(e.g. Wind Farms, Landing Stations, Converter Stations, Energy Cables)
- C: Set a realisation date and click accept.

2025



## STEP 3: THE PLANS MONITOR

The Plans Monitor  will open, showing the plan that was just created. Click on the  next to the plan name to view it and click on  Start editing plan to enable editing.

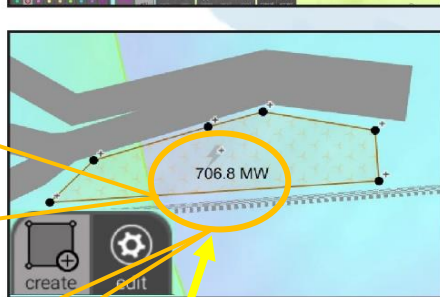
*Tip: Click on the  next to  to enlarge/shrink the window*





## STEP 4: EDITING THE PLAN(S)

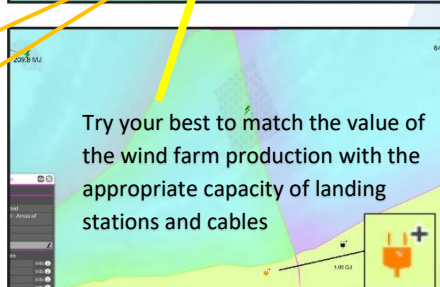
In the bottom-left corner, a new menu will appear. In this menu you can select which layer you wish to edit. Here it is also possible to create new geometry (see Step 5).

*Note: Editing is usually done at a later stage.*



## STEP 5: CREATING A WIND FARM

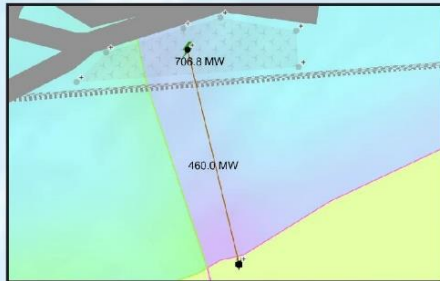
- A: Select the Wind Farm layer and the desired type below it.
- B: Click  in the bottom-left corner to create a new area.
- C: Click anywhere to start forming a shape.
- D: To finish the shape, double-click your last point or click on your first point again when your cursor looks like this .



## STEP 6: ADD A LANDING STATION

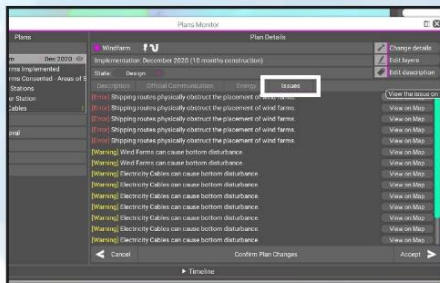
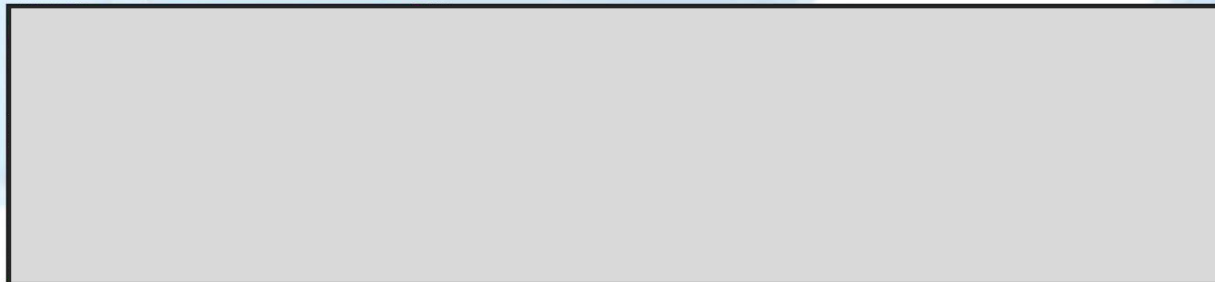
- A: Select the Landing Station layer.
- B: Select the type of Landing Station.
- C: Click Create in the bottom-left corner and place a Station.  
(Place it anywhere on land.)

*Note: You can also skip this step and reuse an existing station.*



## STEP 7: ADD THE ENERGY CABLES

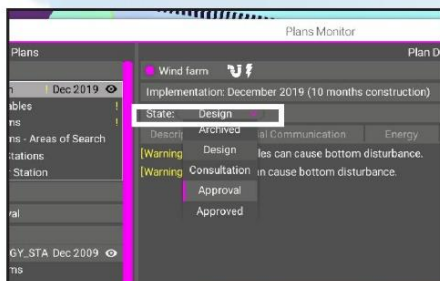
- A: Select the Energy Cables layer.
- B: Select the type of MW cables you would like.
- C: Click Create.
- D: Click on the landing station and connect it to the center of your wind farm ⚡. Once connected, click accept.



## STEP 9: SOLVE ANY ISSUES

Check the Issues tab in the Plans Monitor to see if there are any issues. An **Error** will prohibit you from implementing your plan. A **Warning** will not. So make sure you solve the errors.

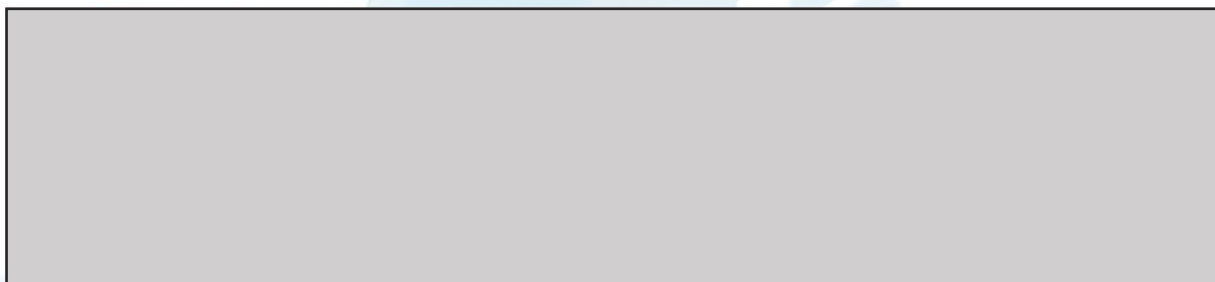
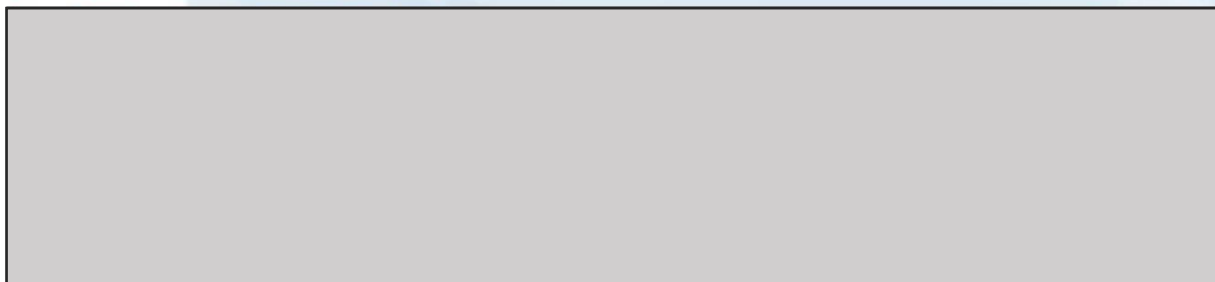
*Note: Click on View on Map to see where an error occurs.*



## STEP 10: FINALISE THE PROCESS

Once you think your plan is ready for implementation, make sure you've clicked Accept under Confirm Plan Changes. Finally, change the plan's state. In the end, only plans that are Approved will be implemented.

*Note: Consultation will make your plan visible to others.*







# CREATING A MARINE PROTECTED AREA MARINE PLAN

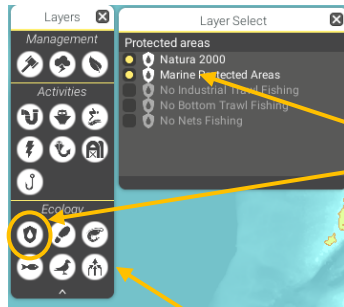
In Europe, some Marine Protected Areas are part of the OSPAR Convention and have **established protective, conservation, restorative and/or precautionary measures** in place to protect and conserve important species, habitats, sensitive ecosystems, or ecological processes of the marine environment.

The OSPAR **maritime areas extend beyond** the limits of national Exclusive Economic Zones (EEZs). These transboundary areas aim to achieve implementation of an **ecologically sound and well-managed network of MPAs** that span nations, operational at the basin scale.

Contracting Parties to the OSPAR Convention must carry out annual reporting for the management actions laid out in their respective marine protected area plans, such as fishing gear-type restrictions established to protect groundfish or pelagic fish species. Increasingly important for an ecosystem approach to achieving sustainability.



## STEP 1: PLANNING MARINE AREAS TO SUPPORT ECOLOGY OBJECTIVES



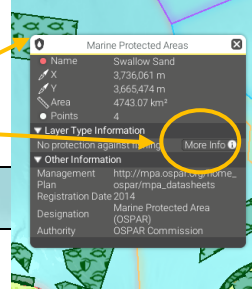
You can reach your ecology objective by creating a **Marine Protected Area**.

Different levels of protection are permitted under **Marine Protected Areas**:

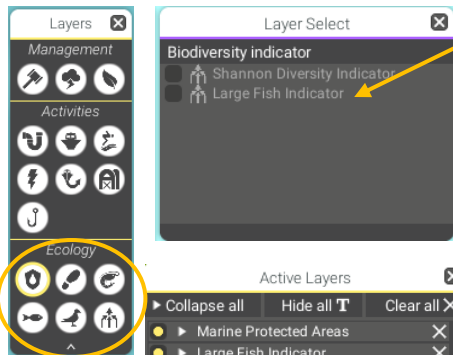
- ➔ No Protection Against Fishing
- ➔ No Bottom Trawl Fishing
- ➔ No Industrial and Pelagic Trawl
- ➔ No Drift and Fixed Nets Fishing

To explore these areas further, select the **Protected Area** Layer under the **Ecology Layers** to view the Marine Protected Areas.

Click the green polygons (the protected areas) to produce an attribute table with **More Info**. Click. **Patience** while Info loads, very helpful still.



## STEP 2: MARINE PLAN CONSIDERATIONS



In the Ecology Layers in the upper left corner, select:

1. Select Layers- **Biodiversity Indicator**
  - ➔ Layer Select- **Large Fish Indicator**

In the Upper Right Corner, click the Active Layers

Expand the Large Fish Indicator layer. Note the difference in values between blue and green.

2. Select Layers- **Pressure**
  - ➔ Layer Select- **Noise**

In the Upper Right Corner, click the **Active Layers**

- ➔ Expand the Noise layer.
- ➔ Note the difference in values between blue and red

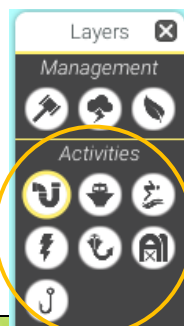
3. Select Layers- **Pressure**
  - ➔ Layer Select- **Artificial substrate**
  - ➔ Note the difference in values by expanding Active Layers.

Tip: Click the coloured dots in the upper right Active Layers window to turn **layers on and off** for visual clarity. Pressing **Clear all** X clears the screen of layers. Layers **can be added again** using the left Layers window.

**Tip:** If you do press Clear All, select the **EEZ Layer** under Management to return to default view with coloured country waters.


4. **Each country's objective is to protect as much reasonably healthy marine space as able.**

Reasonably healthy marine space = In addition to considering the presence of "Large Fish Indicators", look for areas that are **absent or lower in pressures**. Pressures such as pipelines, telecom cables, fishing, oil and gas installations, wind farms, and shipping intensity. **Explore these layers** by turning them on and off in the layers list.



5. Are there areas in your country that are free of pressures AND that also have large fish? Concentrate protection efforts there.

### STEP 3A: CREATE A NEW PROTECTED AREA

Create a new plan to start designing a new protected area. This can be done by clicking the  in the top-left corner.

In the **Plan Wizard**, details need to be added.

**1. Name your plan** (Include the plan's objective in the name, i.e. MPA No Take, MPA Bottom Trawl Only, Natura No Protection)

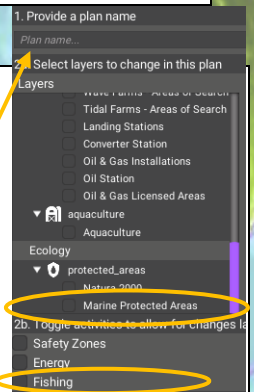
**2a. Select the following layer** under Ecology:

protected\_areas **Marine Protected Areas**

**2b. Include the Fishing option**

**3. Set a realization date of 2025**


**4. Press Accept**




### STEP 3B: OPEN AND ACTIVATE YOUR MARINE PLAN

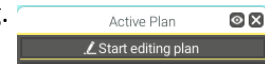
#### THE PLANS MONITOR

1. The Plans Monitor will open, showing the plan that was just created.

2. Click on the  next to the **plan name to view it**.

3. Click on the **pencil icon** in the Active Plan window .

4. Click **'Start editing plan'** to enable editing.



### STEP 4A: PROTECTED AREA: MARINE PROTECTED AREAS

1. In the Active Plan window, choose **Marine Protected Areas** layer to edit.

2. Select **one or any** of the Layer Types:

- a) No protection against **fishing**
- b) No **bottom trawl** fishing
- c) No **industrial or pelagic trawl** fishing
- d) No **drift or fixed** net fishing

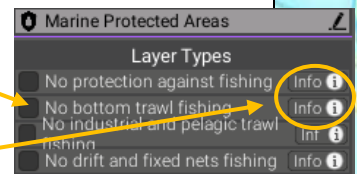
Click the **Info** to learn more about each layer.

If selecting **No Fishing for...** ensure that 'No Protection' is not also selected.

2. **To create the geometry for your plan:**

Begin by clicking once and continuing to click to create your shape. Close your polygon by **'double clicking'**. Click **Edit** to reposition the points if necessary.

- Hint: If geometry 'gets stuck', **press undo** button until geometry was never created, and start over.



### STEP 4B: ACCEPTING THE MARINE PROTECTED AREA

When satisfied with your plan, **select Accept** in the Active Plan along bottom

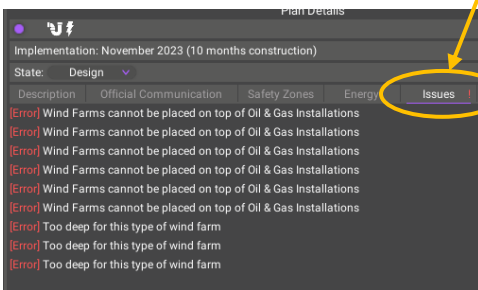


and **again, select Accept** in the Plans Monitor





## STEP 4C: SOLVING ISSUES



If **warnings appear** after you have accepted your plan, they will appear under the Issues tab.

If solving issues is required to proceed, Edit the plan by clicking the pencil icon on the layer you wish to edit. Then click the edit button along the bottom to edit layer.

Don't forget to accept your plan twice!



## STEP 5: PUTTING YOUR PLAN TO CONSULTATION/ APPROVING YOUR PLAN

If you would like other countries to see your plan (maybe you've created a plan in another country's waters), move your plan **from Design to Consultation** in the Plans Monitor window. Once you are completely satisfied with your plan, **move it to Approved**.

