



WIO Symphony tutorial

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The following tutorial will help you learn how to use the WIO Symphony tool. You may work in small groups, alternating the “driver seat”. The different steps will invite you to discover different parts of the tool. Some tasks can be solved in different ways.

When you have completed the tutorial you will:

- Be familiar with the tool and its data content.
- Better understand the method and some of the limitations to the tool.
- Have a good idea of the potential of the tool in relation to your own work in marine planning, management or research.

Let's get started. You should have achieved a personal or organizational username and password. Log in as a user at: <https://symphony.nairobiconvention.org>. If you did not receive a username you can request by email: wiosym@nairobiconvention.org

General

A couple of functions are good to know from start:

- The “eye” symbol use used to visualize data layers, this does not affect the calculations.
- You may always reset everything by refreshing your web browser (press enter). Your completed analyses are saved but everything else is new and fresh.
- The “reset” button in the tool is used to return to default regarding which pressures and ecocomponents are selected for the analysis, and turn all scenario settings (increase/decrease/adding of pressures) back to zero.
- The tool is still Beta version. Some of the layers are insufficient, there might be errors. These will be updated early 2023. If you identify specific errors / inaccuracies in the data layers, please let us know, it might be something we have not yet identified.

Tutorial theme A. Marine Spatial Planning

You work at the *Ministry of Blue Planning* where your team has been tasked to develop MSP solutions based on stakeholder objectives, and analyze different alternatives with respect to environmental impact. You will present your findings to the planning council in the afternoon.

Inventory

1. Browse the ecosystem component list to get an idea of the categories and sorting. A basic difference is Habitat versus Taxa. Habitat is an environment including all its associated organisms. Taxa is a specific species or group. All habitats are pre-selected by default. Another categorization is tropical versus temperate. Each component

represents a map. Upwelling areas are nutrient rich habitats often with a lot of sea life. Where in the region do you find upwelling hotspots?

2. Browse the pressure list to get an idea of included sectors and associated pressures. All pre-selected pressures can be viewed while unticked pressures might not have data yet, or is only for scenario planning (what happens if there is an oil spill). Strictly temporary pressures like seismic surveys are not pre-selected because unsuitable to analyze simultaneously with others. Fishing with floating longline is perhaps the most widespread of fisheries. Where is the most intense fishing with floating longline in the whole region, according to the data?
3. Chose a part of the region where your *Ministry of Blue Planning* is based. Have a look at the different available polygons in the “layer list” under “areas”. Note that you can draw new polygons or upload your own polygons. Find and highlight a *Marine Ecoregion* in your area of interest.

Before you move into *analyses* of your selected ecoregion you must make a choice. All results will be based on which pressures and ecosystem components you include (select by ticking the box) in the analysis. Choose whether your *Ministry of Blue Planning* will consider broad impact on habitats (this is the default, more stringent, option), or will also include the specific taxa (which can be reasoned if particular animals are of certain interest for stakeholders). If you chose to analyze habitats only, no need for action. If you opt to include taxa, you must select these taxa (tick the box) in all forthcoming analyses.

Analyzing cumulative impact

There are two types of cumulative analysis in the tool, the pre-selected regular analysis and the rarity adjusted. You may wish to also include the rarity adjusted impact already now (impact which is relative to the extent of each ecosystem component). In Tutorial Theme B this function is explained in more detail.

4. Investigate the environmental situation in your chosen ecoregion by selecting and calculating cumulative impacts. View results by clicking the report. Having an idea of the baseline situation may guide your planning decisions. Where in the ecoregion are the most severely affected areas? And which are the most influential pressures, and most affected ecosystem components, in this ecoregion?
5. As you might have noted, cumulative impact often appears higher close to land. But offshore associated ecosystem components may still dominate the impact because there is a lot of open sea in any ecoregion. Now have a look at the baseline cumulative impact along the coast of the same ecoregion. You find coastal waters in the layer list. How does the pressures in coastal waters differ from the full ecoregion, considering most affected locations, and most affected ecosystems?
6. Consider the reports from your two analyses (4 and 5). Perhaps widespread pressures such as climate change or pollution have a high impact. But some pressures can be directly related to maritime sectors or coastal activities. Which blue sectors/activities

are more influential in your ecoregion? Which ecosystem components do *they* affect the most?

7. Your stakeholders have filed special concerns regarding seagrass in your ecoregion. Run an analysis of cumulative impact on seagrass only (depending on your area, you may look at temperate or tropical seagrass). What is impacting seagrass?
8. A major oilspill is at risk of occurring from an abandoned ship at the coast of Yemen. Your Ministry have information on predicted reach of the oil spill. Simulate the impact of the oilspill by drawing a polygon in the area (use your judgement) and add pressure “oil spill” as constant (e.g. add constant 50 for half of the pixels in the polygon to be covered with oil). What would the expected impact look like, which ecosystem components are at most risk?

You now have a basic understanding of what is going on in your ecoregion and which parts of it that are more heavily affected by human activities. This understanding can help planners and stakeholders draft more considerate plans from an environmental, thus sustainability oriented, viewpoint. Next step may be to search for suitable locations for new blue industry, and to compare different planning options.

Search for suitable locations

New or expanding sectors may require ocean space to grow. With pre-appointed locations, MSP can help sectors understand where their investments may have greater chance of approval/licensing. Environmental concern is only one of many factors determining site suitability. Other factors may be physical, oceanographic, economic, social, or cultural. Using WIO Symphony, it is possible to get an overview of good locations from an environmental viewpoint, either considering cumulative impact or impact on specific taxa.

This analysis is performed by selecting a search area and removing all pressures but the one or ones representing the specific activity, then adding pressure scores representing full coverage that activity to all parts of the search area (typically by adding constant: 100). Of course this is an unreasonable scenario, to fill a whole search area with a single activity. But the resulting cumulative impact map gives an idea of areas where the activity would generate less versus more environmental impact.

9. Your *Ministry of Blue Planning* wishes to identify suitable areas for coastal mariculture. Use an existing area, such as your ecoregion, or draw a new large polygon in your area of interest and make sure to include part of the coastline (if you are unable to draw the polygon, highlight the “whole grid” under areas and try again). Within this area, find the environmentally most suitable locations for new mariculture exploitation.
10. The blue boom in your area has led to extensive harbor dredging. This has generated a great demand for dumping sediment masses at sea. Use the same method as above for identifying suitable dumping sites in proximity to the coast. Identify some tentatively suitable locations, based on the results.

Create a planning scenario and compare with baseline

The core task for your Ministry of Blue Planning is to draft MSP areas that boost blue economy without challenging environment. Scenarios can be built using the adjustment bar available for each pressure, either by *increasing/decreasing existing pressures* or by *adding a constant for new pressures* (you can add 1 – 100 where 100 means that your selected area is filled with maximum level of the pressure). You may also unselect a pressure to completely remove it from your area of analysis. All changes are done after you have selected an area and started a user scenario (press +).

Stakeholders have requested increased incentives for tourism and other blue businesses. Meanwhile, government has decided to move strongly against unreported fishing.

11. Create or choose a polygon that include both coastal and offshore waters. Run a baseline (no changes) scenario of cumulative impact in this area. Before running the analysis, change its name to *Baseline*. Study the result. Unselect the polygon and select it again, and start a new scenario (+). Now rename it *MSP scenario*. Increase tourism related pressures with 150%, also increase another already present blue economy related pressure. Decrease unreported fishing (“other fishing”) by 90%. Also choose another existing pressure to reduce or eliminate. Run the analysis of this pro-tourism MSP zone and study the result.
12. It is important to have an idea of whether this MSP lead to more or less environmental impact. Compare the Baseline with the MSP scenario, using the comparison function. Would your planning lead to a net increase or net decrease of environmental impact, and is the outcome similar across the geography of the zone?
13. Repeat the analysis (10 and 11) in a different area, try to remember how much you increased and decreased each pressure. Are you getting similar outcomes in this new MSP zone, was outcome better for environment?

This way, planners can build MSP scenarios consisting of numerous zones, analyzing and comparing in order to inform stakeholders and decision makers of the consequences of different options. Several analysis areas (MSP zones) can be grouped and analyzed together to compare full MSP scenarios – although this grouping function is not yet in place in the current version of WIO Symphony.

The *Ministry of Blue Planning* now has a lot to report back to the planning council.

Tutorial theme B. Conservation management and climate risk

You work at the *Ministry of Blue Wildlife*. You have been tasked to draft management measures for an existing MPA. You will also make a screening study of climate risk to marine ecosystems.

14. Select an existing protected area (MPA) of your choice, preferably including both coast and deep water. You may pick from the layer list (“Protected Areas Marine”), or draw your own. Inventory current impacts and take note of which ecosystem components that are under threat and which pressures that affects them.

Rare ecosystems easily “get lost” in analyses where other, more common, ecosystem components dominate the figure. To also capture the relative impact to each ecosystem

component you can analyze “cumulative impact in relation to how common each ecosystem component is”. This is called *rarity-adjusted cumulative impact*, a function found under *Algorithm* in the scenario tab, scrolling down from the default cumulative impact. You can choose whether rarity shall be based on the specific area you are analyzing (the MPA) or if it shall be based on how common it is within the whole region.

15. Use the rarity-adjusted cumulative impact on the same MPA as above (13). Are there new ecosystem components at risk when considering rarity? If so, is the risk local or regional?
16. Based on the result from these analyses, suggest management measures for reducing impact on the most vulnerable habitats. Some pressures can be hard to manage locally, then focus on what can be done. Test your management measures by creating a scenario where you adjust pressures and compare with baseline.

Climate change has global origin and very widespread impact. But impact may still vary a little from place to place. Areas where climate change is expected to have the most impact are certainly at risk. Areas where impact is expected to be comparatively low may constitute valuable safe zones for parts of environment.

17. *Ministry of Blue Wildlife* is tasked to create an overview of climate related risk across an area of your choice. You may take inspiration from analyses above (8-9). Where would future climate change hit hardest? Is there any specific limitations to WIO Symphony tool/method when considering impact from climate change? If so, suggest other investigations that would be needed.
18. As you all know at the *Ministry of Blue Wildlife*, temperature rise is a threat for coral reefs. At this very moment, corals are already exposed to harmful levels of temperature. Create a map of current temperature rise impact on coral reefs only. Where are corals at most risk?

The *Ministry of Blue Wildlife* may have several issues to share with the *Ministry of Blue Planning*, on how to safeguard the ecosystem approach to MSP and how to future-proof the planning by acting towards possible impacts of climate change.

– End of tutorial –

Always keep in mind the uncertainties are major and result shall be interpreted with caution