



BioProtect

BioProtect Marine Planner

Solution description

NUIG



Summary

The BioProtect Marine Planner is a tool that will allow users to visualise the cumulative impacts and pressures from human activities in the marine environment but also to identify potential priority areas for conservation measures, such as establishing marine reserves or other effective area-based conservation strategies.

Detailed description of what it is

The BioProtect Marine Planner is a system designed for systematic conservation planning, consisting of various components that work together to offer tools for spatial analysis and decision-making. The system is divided into two primary parts: the server-side software and the client-side software. These components interact through web services, with the server managing data storage and processing, while the client provides the user interface that runs within a web browser.

The server is built with Tornado, a lightweight web server that supports asynchronous processing and secure communication through Secured Socket Layer (SSL). It uses Python to implement REST API endpoints, which allow interaction between the client and server. The server is responsible for handling all spatial data and performing complex analyses. A PostGIS database is used to store and manage spatial information, serving as the main engine.

The client side of the BioProtect Marine Planner is built with React, a widely used JavaScript framework developed by Facebook, which is designed to build dynamic user interfaces. MapboxGL, a high-performance mapping library, is used for mapping within the client. MapboxGL provides several advantages for conservation planning, including the ability to render and manipulate large datasets with high performance. It allows users to restyle maps dynamically and can map large datasets directly in the browser—something that traditional web GIS systems cannot easily achieve.

Mapping data displayed in the BioProtect Marine Planner is delivered through Vector Tiles sourced from providers like Mapbox and ESRI. These tiles, built on OpenStreetMap data, include spatial feature attributes that can be styled and queried in real-time by users in their browsers.

What it provides

The BioProtect Marine Planner provides several services.



Data Collection Service

To engage and support stakeholders, the BioProtect Marine Planner includes a data collection service. This online web application enables users to create and add their own data directly onto a map interface. Once submitted, the data is integrated into the PostGIS database, making it available for use across the broader BioProtect platform. This feature allows stakeholders to contribute local knowledge and update the application in real time, ensuring that the system remains current and reflective of on-the-ground insights.

BioProtect Marine Planner UI

The User Interface (UI) is the primary interactive component of the BioProtect Marine Planner (BPMP). Built with React JS, this web application provides users with access to all BPMP's functionalities in an intuitive environment. Users can create and manage projects, as well as upload, view, and interact with various data layers, including features, pressures, and planning grids. The UI also allows users to combine these layers to execute conservation projects, integrating features and pressures in specific regions with planning grids and cost layers to visualize the outcomes of conservation and restoration algorithms.

The UI simplifies the process of interacting with complex GIS data and workflows, enabling users to see the results of their conservation efforts directly within their browser, visualized on a map of the selected region.

BioProtect Marine Planner Server

The BPMP server forms the core of the BioProtect Marine Planner, acting as the business layer responsible for managing all data interactions and processing. It communicates directly with the PostGIS database to handle data entry, querying, and spatial processing tasks. This asynchronous service exposes API endpoints that the UI can query. When a request is made, the server retrieves the relevant data, performs the required processing, runs any necessary algorithms, and then sends the results back to the UI.



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