APPENDIX

Research advances and gaps in marine planning: towards a global database in systematic conservation planning

Citation: Álvarez-Romero, J. G., M. Mills, V. M. Adams, G. G. Gurney, R. L. Pressey, R. Weeks, N. C. Ban, J. Cheok, T. E. Davies, J. C. Day, M. A. Hamel, H. M. Leslie, R. A. Magris, C. J. Storlie. 2018. Research advances and gaps in marine planning: towards a global database in systematic conservation planning. *Biological Conservation*: in press

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The Conservation Planning Database project aims to create a global database to help track the development, implementation, and impact of systematic conservation planning (SCP) applications, and improve scholarship in the field. Consolidating a global database can play a critical role in advancing SCP theory and practice, thus facilitating more effective area-based conservation initiatives with real benefits for biodiversity and human well-being.

Here we describe the fields currently contained in the marine proof-of-concept database. The database includes exercises following a SCP approach to guide the spatial allocation of limited resources to achieve explicit conservation objectives, and more recently, social and economic objectives. A key component of SCP is spatial prioritization, which involves locating and configuring conservation areas, generally aiming for cost-efficient designs.

We included exercises that met the following four criteria:

1. Define explicit conservation objectives, but can include social and economic objectives;

2. Identify spatially explicit conservation areas (i.e. places where some form of spatially explicit management – from strict reservation to off-reserve management – is undertaken to contribute to defined objectives), sometimes associated with actions;

3. Identify marine conservation areas (including coastal ecosystems) and/or terrestrial or freshwater conservation areas that can have downstream benefits on marine ecosystems (i.e. explicit marine conservation objectives). For example, protect forest areas against erosion to maintain water quality in marine areas; thus, configuration of terrestrial conservation areas reflect marine considerations; and

4. Prioritized spatially using some form of optimization that accounted for complementarity between priority conservation areas and/or actions. This means that plans will necessarily use existing (e.g. C-Plan, Marxan, Zonation) or custom-made (e.g. linear programming, genetic algorithms) DSS.

The marine SCP prototype currently contains 114 database fields and includes information on goals and objectives, geographic scope and location, targeted features, methods and decision-support tools, planning units, threats to features, stakeholder participation, planning outputs, and approaches to incorporating ecological connectivity, climate change, and socioeconomic considerations.

The marine proof-of-concept database is the most comprehensive and systematic compilation of marine SCP studies to date, thus providing a unique opportunity for scientists to access and analyze further aspects of marine planning. It provides a full and consistent coverage of the primary literature on marine SCP, and constitutes an important step towards the development of a centralized repository of key information on planning exercises worldwide.

1. PLANNERS

Provide the given (first) name, last (family) name and contact e-mail of the person leading/co-leading the planning exercise. If unknown, provide the details of the first (or corresponding) author of main paper/report used to document the planning exercise.

Planner name

Planner last name

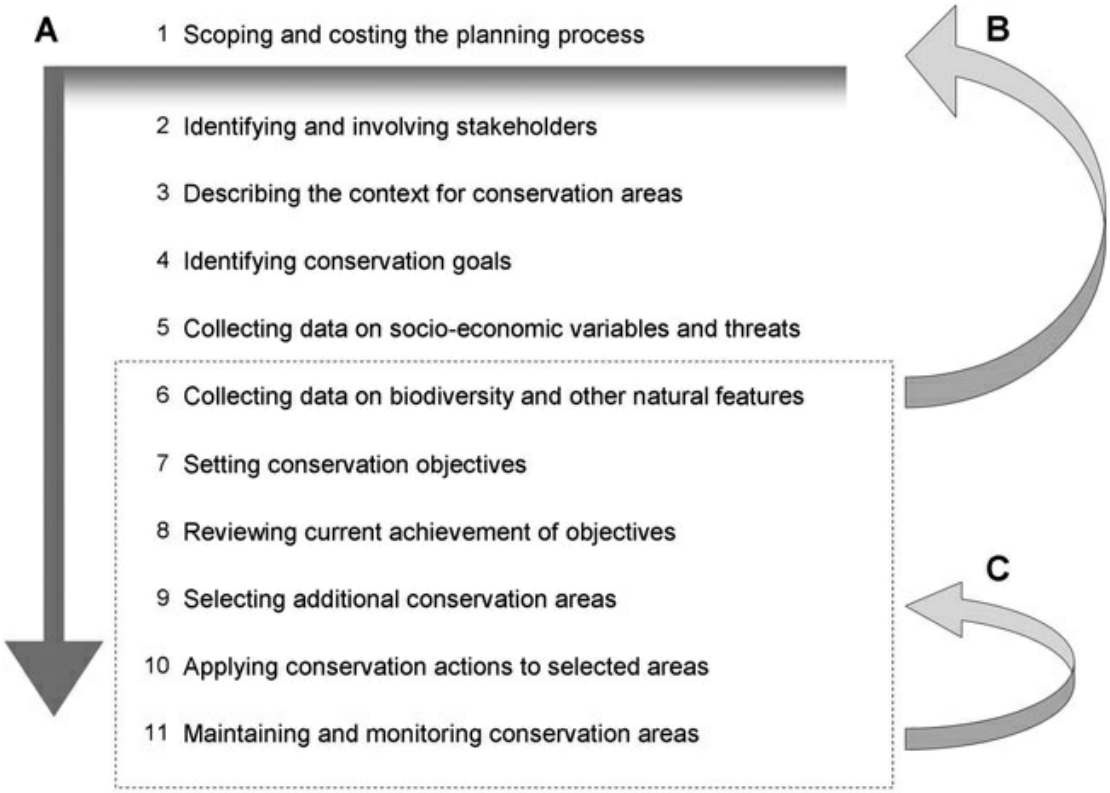
Planner e-mail

Indicate the broad planning stage(s) in which the planning (co-)leader participated. See Bottrill and Pressey (2009) framework (**Figure 1**) as reference: scoping (stage 1), planning (stages 2-9), implementing (stage 10), and monitoring (stage 11).

Planner stages

- [ ] Scoping
- [ ] Planning
- [ ] Implementing
- [ ] Monitoring

Figure 1. Diagrammatic representation of the process of conservation planning (Pressey and Bottrill 2009, *Oryx* 43: 464-475). The process is depicted as a linear sequence but some stages will be undertaken simultaneously and there will be many feedbacks from later to earlier stages. From the time that stakeholders are first involved, they will likely contribute in different ways throughout the process (A). Among the reasons for feedbacks are revisions of the boundaries of the planning region when biodiversity data are collected (B). Another involves lessons for planning decisions (Stage 9) from maintenance (Stage 11) that indicate ways of locating and configuring conservation areas to minimize subsequent liabilities for management (C).



Indicate the role(s) that the planning (co-)leader played along the planning exercise.

Planner roles

- [ ] Board/Executive role
- [ ] Planning leader/co-leader
- [ ] Operations manager/planner
- [ ] Information/data manager
- [ ] Researcher - analyst/modeler
- [ ] Researcher - field studies
- [ ] Stakeholder engagement
- [ ] On-ground manager & support
- [ ] Expert/Consultant/Advisor
- [ ] Administration & Finances
- [ ] Grants & Funding
- [ ] Education
- [ ] Policy & Legislation
- [ ] Advocacy & Communication
- [ ] Other (specify)

Other (please specify)

2. ORGANIZATIONS

Provide the name of the organization leading/co-leading the planning exercise. If the leading organization is unknown or unclear, use the organization of the first author in the paper and/or report.

Note: If part of an international or regional organization, refer to the specific office, branch or program that (co-)lead the planning process. For example, World Wildlife Fund (WWF) Mexico, Gulf of California Program. Also, if the leading organization is unknown or unclear, or if the planning exercise was co-organized by multiple organizations, use the organization of the first author in the paper/report. If applicable, include acronyms in brackets.

Organization name

Is this organization leading the planning exercise?

Organization leading planning exercise

- ◯ Yes
- ◯ No

Select the country of the organization (co-)leading the planning exercise. If the organization is part of an international corporation (e.g. TNC, WWF, CI, WCS), indicate the country where the office, branch or program participating in planning is based; if unknown/unclear, use the place/city where report was published or the main/first affiliation of leading author.

Organization country

Select the type of the organization (co-)leading the planning exercise.

Organization type

- ◯ NGO
- ◯ Government agency
- ◯ Industry association
- ◯ Private consultancy
- ◯ Research center
- ◯ University
- ◯ Other (please specify)

Other (please specify)

3. LIBRARY

Enter all the publications (e.g. papers, reports) used to document the planning exercise. Some plans are documented in both academic paper(s) and technical report(s), or different aspects (e.g. technical details, ecological criteria, stakeholder engagement) are documented in different publications. If more than one publication has relevant information on the process, analyses, inputs, and outputs, or if different reports or papers cover different aspects or stages of the planning process, please enter all publications. These may include peer-reviewed papers, reports, conference proceedings, online documents, etc.

Select the type of publication (e.g. book, journal article, report) used to document the planning exercise.

- ◯ Book
- ◯ Book section
- ◯ Conference proceedings
- ◯ Journal article
- ◯ Report
- ◯ Thesis
- ◯ Web Page
- ◯ Working paper
- ◯ Other (please specify)

Other (please specify)

Enter all authors separated by commas; include last name and initials (e.g. Adams ST, Smith JC, Jones MC)

Enter the title of the paper, report, book section/chapter, etc.

Name of journal, book, conference proceedings, etc.

Publication year

Publication volume, chapter, section

Place of publication

Name of publisher

Page numbers

Publication URL

Publication citation

4. PROJECTS

Provide the name of the planning exercise. If the original name is not in English, use translation and enter original title in brackets. The name of applied planning exercises (e.g. Identification of Priority Sites for Conservation in the Northern Gulf of Mexico: An Ecoregional Plan) can be different to the title of the report or paper describing the planning process (e.g. Ecoregional planning in marine environments: identifying priority sites for conservation in the northern Gulf of Mexico). If unknown, use the title of the main report or paper.

Name of planning exercise

Provide the year of first publication or release of planning exercise results. If planning process is ongoing, indicate year of the earliest related publication or progress report.

Release date

Select the type of plan (intervention category). Systematic conservation plans can be developed for a range of reasons, including plans developed by the end user(s) for direct application (e.g. government agency seeking to create, expand or zone protected areas), plans used to identify priority areas for conservation interventions and sometimes "optimal" spatial and temporal allocation of specific actions (e.g. to influence decisions taken by organizations) or prioritizations used to retrospectively evaluate or examine the efficiency and suitability of an existing protected area network (e.g. gap analysis). In some cases, the intention is purely academic (theoretical) and the outputs of such planning exercises are not designed to guide or inform conservation interventions.

Type of planning exercise

- ◯ Direct application
- ◯ Identify priority conservation actions
- ◯ Retrospectively evaluate
- ◯ Only academic
- ◯ Unknown

Select the current status the project; only mark proposed if the project is at the scoping stage.

Planning status

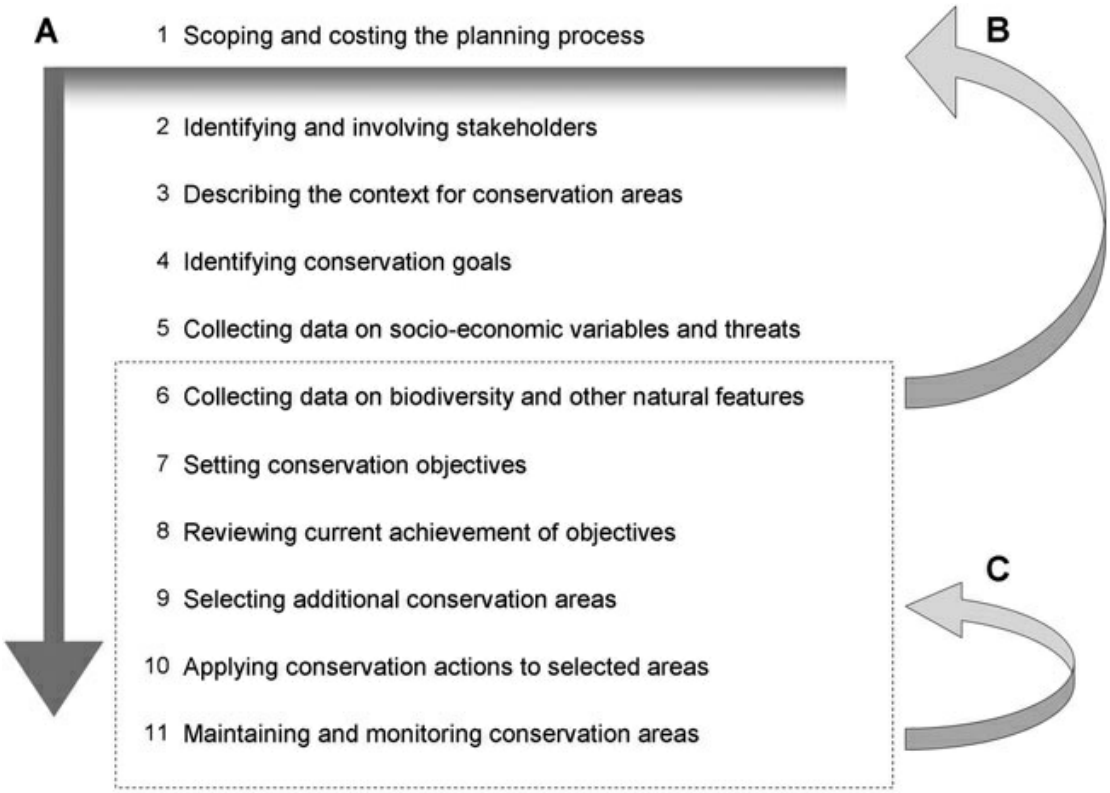
- ◯ Proposed
- ◯ Ongoing
- ◯ Completed
- ◯ Suspended
- ◯ Unknown

Select the maximum stage reached by the project. We assume a sequential progression of planning exercises, thus if the planning process is at the 'monitoring' stage, the scoping, planning, and implementing stages would be considered completed. Please follow Bottrill & Pressey (2009) SCP framework (Figure 1) as reference: scoping (stage 1), planning (stages 2-9), implementing (stage 10), and monitoring (stage 11).

Planning stage

- ◯ Scoping
- ◯ Planning
- ◯ Implementing
- ◯ Monitoring

Figure 1. Diagrammatic representation of the process of conservation planning (Pressey and Bottrill 2009, *Oryx* 43: 464-475).



Timeframe of the planning exercise: estimate the duration of the planning process from the start of the 'scoping' to the end of the 'planning' stages (i.e. stages 1-9 of the conservation planning framework in Figure 1); these stages are known as the 'conservation assessment' phase of planning, which is followed by implementation (stage 10) and post-implementation management and monitoring of conservation actions (stage 11). Provide the duration in years/months (specify), the start-end years, or the start year if planning is ongoing (e.g. 2018-). The purpose of this field is to document the time required to develop a conservation assessment.

Planning duration

[ ]

Cost of the planning process prior to implementation: estimate the total costs (USD) associated with the 'conservation assessment', i.e. stages 1-9 of the planning process (**Figure 1**), including personnel (only salaries corresponding to time allocated to the planning process), operating (hardware, software, data, publications, admin, etc.), travel and fieldwork costs. The intention of gathering this information is to estimate the resources required to develop a conservation plan.

Planning cost (USD)

- ◯ <500,000
- ◯ 500,000 - 1 million
- ◯ 1 - 3 million
- ◯ 3 - 5 million
- ◯ >5 million
- ◯ Unknown

Indicate if this planning exercise is a revision or update of a previous plan. If yes, identify the related plan in the database; if the previous plan is not included in the database yet, we will ask you to document the original plan as another planning exercise before submitting the revision.

Planning revision

- ◯ Yes
- ◯ No

Define the level of access to the information provided for the planning exercise.

Access to project information

- ◯ Open access (allow download)
- ◯ Limited access (allow explore online)
- ◯ Restricted access (only for summary queries)
- ◯ Embargoed (temporal, e.g. ongoing planning)

5. DOMAIN

Provide the name of the planning domain. The name can refer to bioregions (e.g. Sulu-Sulawesi Marine Ecoregion), recognized marine areas/seas (e.g. Gulf of California, Coral Sea, Red Sea, Bay of Bengal, Kimbe Bay), National Economic Exclusive Zones (e.g. Fiji EEZ), marine planning initiatives/programs (e.g. Coral Triangle, Baja California to Bering Sea), Marine Protected Areas (e.g. Great Barrier Reef Marine Park), or custom-defined boundaries (e.g. Northern Gulf of Mexico).

Name of planning domain

Select the spatial scale/extent of the planning domain.

Spatial scale

- ◯ Global
- ◯ Multi-national
- ◯ National
- ◯ Sub-national

Specify the targeted environment(s) where conservation/management areas, zones and/or actions were allocated. For example, a single plan can propose MPAs (marine environment) and identify sites for the protection and/or restoration of riparian vegetation (terrestrial environment) to simultaneously protect marine habitats and mitigate land-based threats (e.g. reduce sedimentation) to marine ecosystems.

Targeted environments

- ☐ Terrestrial
- ☐ Freshwater
- ☐ Estuarine
- ☐ Marine

Specify if other environment(s) were considered, i.e. environments where no management or conservation areas/actions were allocated, but were considered when allocating areas/actions in the targeted environments. For example, a planning exercise can prioritize marine areas only (e.g. design a network of marine reserves), but these can be located considering land-based threats (e.g. away from river plumes) or ecological links to freshwater ecosystems (e.g. protect diadromous species like salmon, which migrate upstream to spawn in rivers). Alternatively, the plan could prioritize terrestrial areas (e.g. subcatchments) to minimize impacts on marine ecosystems, thus targeting terrestrial environments but considering marine ecosystems.

Considered environments

- ☐ Terrestrial
- ☐ Freshwater
- ☐ Estuarine
- ☐ Marine

Provide details on how other environments were considered (if applicable).

Considered environments details

Indicate if the planning domain includes areas beyond national jurisdiction (i.e. high seas, international waters).

High Seas

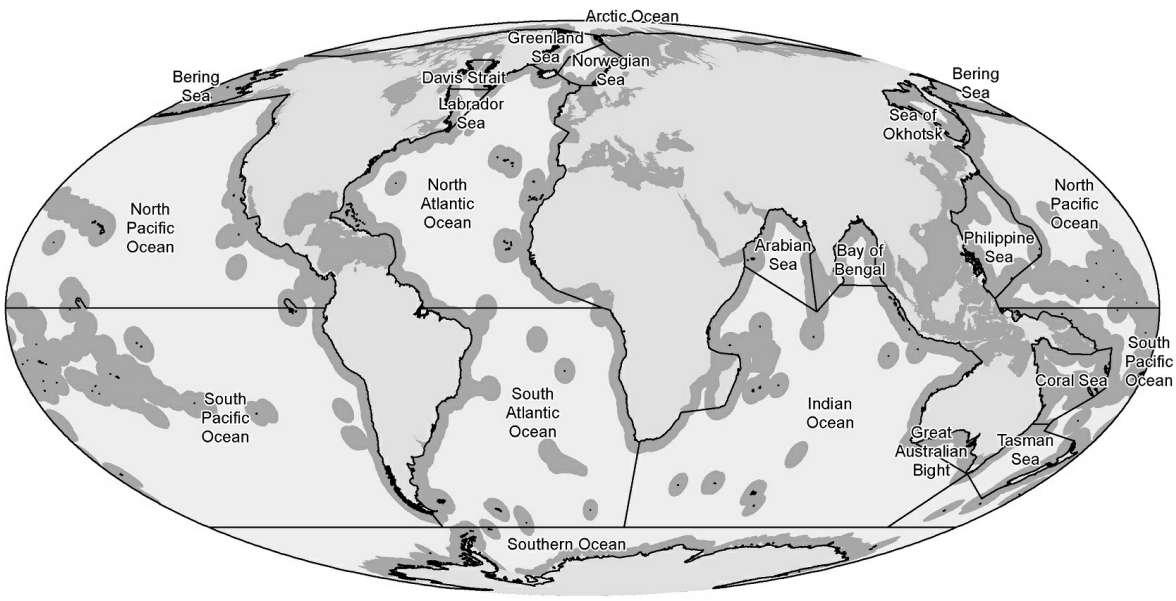
- ◯ Yes
- ◯ No

Select the sea(s) included in the planning domain (mark all that apply); see Figure 2.

High Seas included

- ☐ All seas (global)
- ☐ Arabian Sea
- ☐ Arctic Ocean
- ☐ Bay of Bengal
- ☐ Bering Sea
- ☐ Coral Sea
- ☐ Davis Strait
- ☐ Great Australian Bight
- ☐ Greenland Sea
- ☐ Indian Ocean
- ☐ Labrador Sea
- ☐ North Atlantic Ocean
- ☐ North Pacific Ocean
- ☐ Norwegian Sea
- ☐ Philippine Sea
- ☐ Sea of Okhotsk
- ☐ South Atlantic Ocean
- ☐ South Pacific Ocean
- ☐ Southern Ocean
- ☐ Tasman Sea

Figure 2. High seas of the world, marked in light blue in the map; areas in dark blue correspond to exclusive economic zones.



Is the planning exercise related to one of the following multi-national marine exercises? Select from the following list, which includes past and ongoing multi-national marine protected area (MPA) planning projects or programs identified based on a review of national and regional initiatives to develop ecologically-representative MPA networks (UNEP-WCMC 2008).

Related multi-national exercises

- [ ] America - Baja California to the Bering Sea (B2B)
- [ ] America - Mesoamerican Barrier Reef (MBR)
- [ ] America - Gulf of Mexico 'Islands in the Stream'
- [ ] America - Tropical Eastern Pacific Marine Corridor Network (CMAR)
- [ ] Africa - Eastern African Marine Ecoregion (EAME) Programme
- [ ] Africa - Western Africa Regional Seas Programme
- [ ] Africa - Red Sea and Gulf of Aden Regional Seas Programme
- [ ] Africa - Regional Organization for the Protection of the Marine Environment (ROPME)
- [ ] Africa - Caspian Sea Independent Partner Programme
- [ ] Asia - Coral Triangle Initiative
- [ ] Asia - South Asia Seas Regional Seas Programme
- [ ] Asia - Southeast Asia MPA Network
- [ ] Asia - Sulu-Sulawesi Marine Ecoregion/Seascape MPA Network
- [ ] Europe - European Commission Natura 2000 Network
- [ ] Europe - Emerald Network
- [ ] Europe - Mediterranean Regional Seas Programme
- [ ] Europe - Black Sea Regional Seas Programme
- [ ] Europe - OSPAR Network of MPAs in the North-East Atlantic
- [ ] Europe - HELCOM network Baltic Sea Protected Areas
- [ ] Polar & High Seas - Antarctic Independent Partner Programme
- [ ] Polar & High Seas - Antarctic Treaty - Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR)
- [ ] Polar & High Seas - Arctic Independent Partner Programme
- [ ] Polar & High Seas - High Seas
- [ ] Other (please specify)

Other (please specify)

Indicate the geographic extent of the planning domain; if you mark ‘selected ecoregions’ you will be asked to indicate which ones.

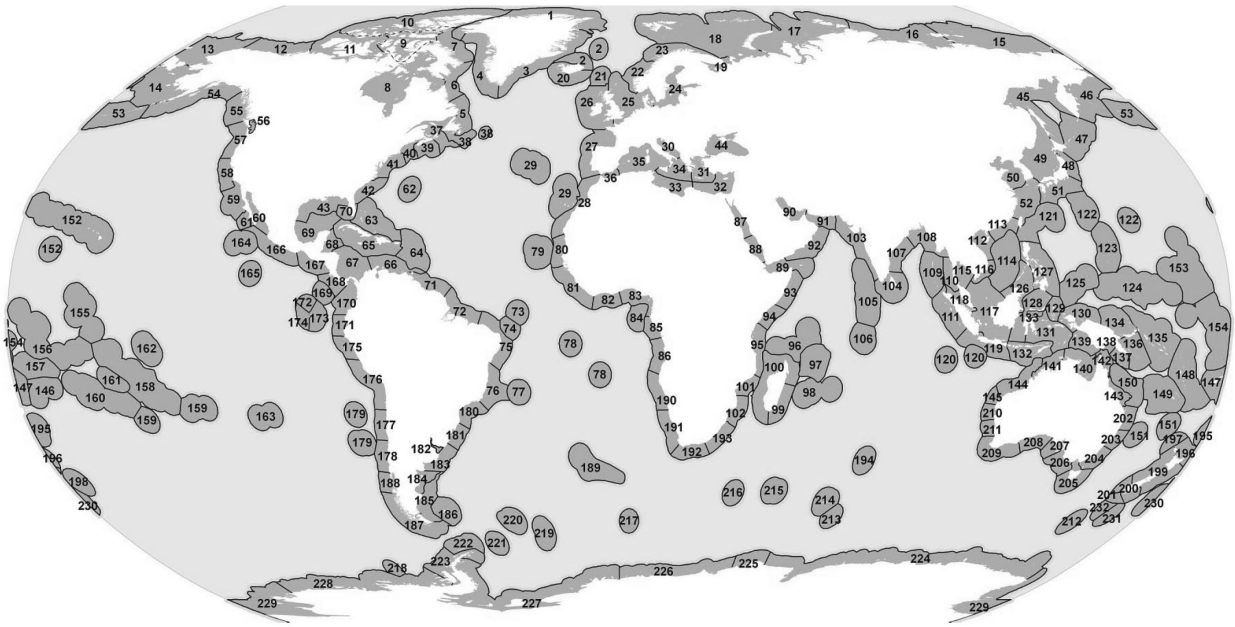
Geographic extent

- ( ) Global (only high seas)
- ( ) Global (all ecoregions)
- ( ) Selected ecoregions (planning domain may also include high seas)
- ( ) Selected areas beyond national jurisdiction (only high seas)

Specify the marine ecoregion(s) overlapping the planning domain; use id numbers from the Marine Ecoregions of the World (Spalding et al. 2007, *Bioscience* 57: 573-583); see **Figure 3**.

Marine ecoregions

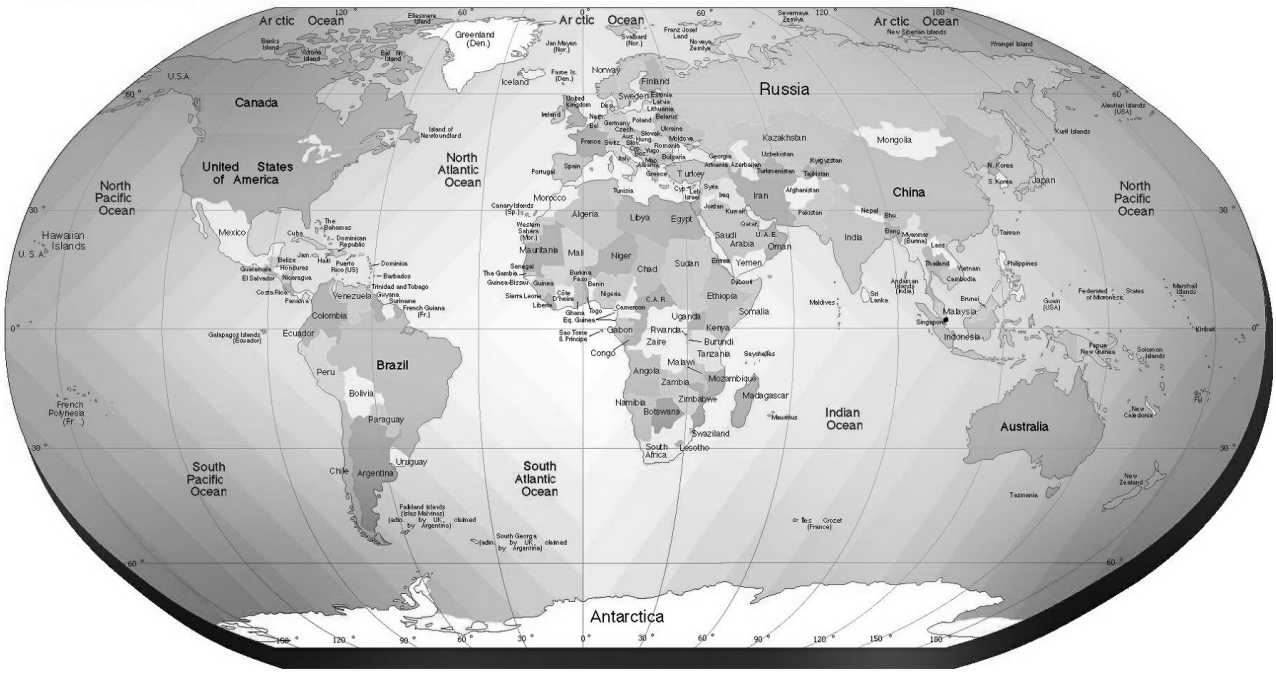
Figure 3. Marine Ecoregions of the World (MEOW) from **Spalding et al. 2007**.



Specify the full name of the country/countries included in (or corresponding to) the planning domain; see **list of countries** for names in English. If the planning is restricted to areas beyond national jurisdiction (High Seas), indicate the countries whose Exclusive Economic Zones (EEZ) share boundaries with the planning domain; see **Figure 2** and **Figure 4**.

Planning domain countries

Figure 4. Countries of the World; see **list of countries** for names in English.



Select all the feature(s) used to define the boundaries of the planning domain.

Planning domain features

- [ ] Administrative area(s) (e.g. EEZ, province)
- [ ] Bathymetry
- [ ] Fisheries Management Area(s)
- [ ] Priority Conservation Area(s)
- [ ] Basin(s)/Catchment(s)
- [ ] Ocean(s), Sea(s), Bay(s)
- [ ] Ecoregion(s), Bioregion(s)
- [ ] Landscape(s), Seascape(s)
- [ ] Large Marine Ecosystem(s)
- [ ] Global Hotspot(s)
- [ ] Ecological Corridor(s)
- [ ] Island(s), Atoll(s)
- [ ] Marine Protected Area(s)
- [ ] Locally-Managed Marine Area(s)
- [ ] Other

Describe the planning domain, including key characteristics and the defining features used to define boundaries (above).

Planning domain description

Specify the total area covered by the planning domain (km ^{2}). If the planning domain is smaller than 1 km ^{2} enter 1. If applicable, include the area of the land and marine components (e.g. integrated land-sea planning exercises), but only if both realms were targeted/prioritized.

Planning domain area (km^2)

NOTE: If the extent of the planning domain is not included in the paper or report (or in related studies), but it roughly corresponds to identifiable marine areas (e.g. seas, ecoregions), then you can use the following Excel spreadsheet, which includes the extension of some common marine areas (e.g. Marine Ecoregions of the World, World Seas, Hotspots, Large Marine Ecosystems, TNC Ecoregional Assessments), or you can estimate the area using readily-available GIS data.

6. GOALS

Describe the goal(s) of the planning exercise. Planning goals describe a collective vision of aspirations and generally include information about aims, strategies and problems addressed by planning (e.g. identify priority areas to guide conservation actions that minimize threats to marine ecosystems; design a network of marine reserves to ensure persistence of threatened species while minimizing costs to fishers; design a multiple-use MPA that takes into account values of diverse users).

Planning goals

Indicate (select) all the broad goals that the planning exercise aimed to achieve. Note that if the planning exercise explicitly aimed to minimize the negative impacts of conservation actions (e.g. marine reserves) on users (e.g. reduce fishing revenue losses), broad planning goals can include both biodiversity and use (e.g. fishing) goals. This would require the use of data (normally spatially explicit) about socioeconomic values, which would be (commonly, but not always) incorporated into the objective function.

Goals types

- [ ] Agriculture, Aquaculture
- [ ] Biodiversity
- [ ] Climate change
- [ ] Cultural heritage
- [ ] Ecological processes
- [ ] Economic sustainability
- [ ] Ecosystem services
- [ ] Education
- [ ] Fishing
- [ ] Forestry
- [ ] Hunting
- [ ] Mining/Energy
- [ ] Recreation/Tourism
- [ ] Research priorities
- [ ] Restoration priorities
- [ ] Soil conservation
- [ ] Species persistence
- [ ] Transportation
- [ ] Urban development
- [ ] Water quality/quantity
- [ ] Other (please specify)

Other (please specify)

Did the planning exercise include academic goals? Mark ‘Yes’ if the planning exercise had an academic goal, exclusively OR in addition to the planning goals described above?

Academic goals

- ( ) Yes
- ( ) No

Indicate the focus research topics of the planning exercise. Only mark those that were the main focus of the research questions; i.e., the research topic(s) that the study contributed directly in terms of conservation planning theory.

Academic goals types

- [ ] Setting objectives/targets
- [ ] Developing algorithms or tools
- [ ] Developing/comparing approaches
- [ ] Developing/comparing surrogates
- [ ] Effects of data resolution
- [ ] Comparing planning units
- [ ] Incorporating socioeconomic costs/objectives
- [ ] Incorporating social/cultural values
- [ ] Incorporating ecological processes
- [ ] Incorporating ecological connectivity
- [ ] Incorporating climate change
- [ ] Incorporating threats
- [ ] Integrating multiple realms (e.g. land-sea planning)
- [ ] Prioritizing/comparing actions
- [ ] Zoning/MSP/Land/Water Use Planning
- [ ] Stakeholder identification/engagement
- [ ] Scheduling
- [ ] Implementation
- [ ] Monitoring/impact assessment
- [ ] Other (specify)

Provide details regarding the **academic goal(s)** of the planning exercise. For academic planning exercises, problem statements can be defined in terms of study aims (e.g. propose a method to design MPA networks that consider connectivity for multiple species with different dispersal abilities).

Academic goals details

Did the planning exercise include a gap analysis? Mark 'Yes' if the planning exercise undertook a review of current achievement of planning objectives based on an assessment of existing/current protected areas and/or other management/actions?

Gap analysis

- ( ) Yes
- ( ) No

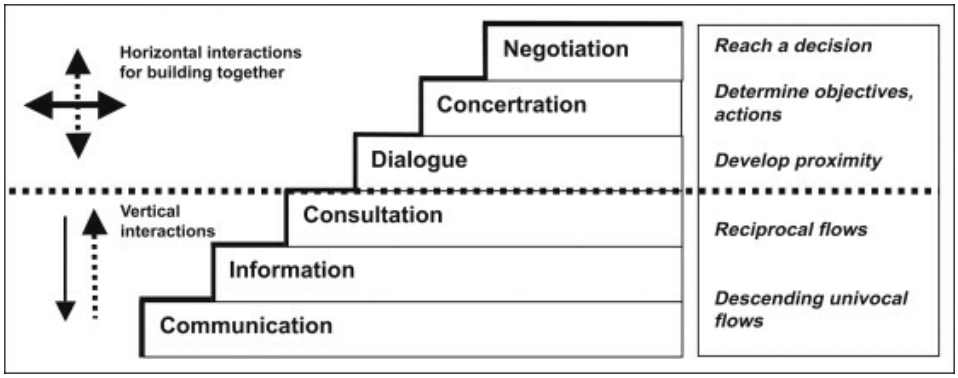
7. PARTICIPATION

Select the maximum level of stakeholder participation achieved in the planning process. Stakeholders are people (e.g. resource users, agencies, NRM organizations, NGOs, experts) who will affect or be affected by conservation actions or contribute to the planning process. Stakeholder participation ranges from informing, where there is no actual participation, to negotiation, where decision-making power is shared among the various stakeholders (Figure 5).

Stakeholder participation

- ◯ None
- ◯ Informed
- ◯ Consulted
- ◯ Dialogue
- ◯ Concertation
- ◯ Negotiation

Figure 5. Levels of stakeholder participation in marine spatial planning (Pomeroy and Douvere 2008, *Marine Policy* 32: 816– 822).



Describe the participation of stakeholders in the planning process. Include information regarding the process of identification and engagement, groups engaged, and broad approach, as well as the use of specific methods or tools (if applicable).

Participation details

8. SCENARIOS

Did the planning exercise develop multiple scenarios, i.e. plans depicting different spatial configurations of conservation/management areas or actions? Planning exercises can generate multiple scenarios by using different sets of objectives, planning units, datasets, climate scenarios, etc. Alternative plans can provide options and be used by planners, stakeholders and/or policy makers to guide decisions or to inform further planning (e.g. select a preferred spatial configuration of marine reserves, which is then further refined and implemented).

Multiple scenarios

- ◯ Yes
- ◯ No

CAUTION: Some planning exercises (mainly academic) create and test multiple scenarios to calibrate parameters, assess the effects of data inputs (e.g. uncertainty), or create tradeoff curves among variables to understand relationships. These exploratory analyses usually involve creating many (dozens or more) spatial configurations, but are not considered final outputs (i.e. alternative plans). If this is the case, then select 'No' and document all the following sections as a single scenario using the final parameters selected (if applicable) or report the variation in parameters used.

See an example regarding **planning for connectivity under global warming**, where three scenarios were created and delivered to managers (i.e. the planning exercise generated three alternative configurations of marine reserve networks). The planning exercise also varied objectives to explore the tradeoff between connectivity and costs, but these were not reported as final alternative outputs (i.e. scenarios).

Scenario parameters

- ☐ Objectives (a.k.a. targets)
- ☐ Design criteria
- ☐ Planning units
- ☐ Algorithms and tools
- ☐ Other (please specify)
- ☐ Environments targeted/considered
- ☐ Conservation features data
- ☐ Threats data
- ☐ Actions
- ☐ Socioeconomic data
- ☐ Stakeholder representation
- ☐ Climate change scenarios
- ☐ Ecological connectivity scenarios

How many scenarios were generated? Indicate the number of unique combinations of planning parameters resulting in different spatial configurations of conservation/management areas or actions. For example, if the planning exercise defined two sets of objectives (e.g. represent 10% or 30% of habitats) and used three alternative habitat maps (e.g. at different spatial resolutions), then the maximum possible number of scenarios is 2 x 3 = 6.

Number of scenarios

9. OBJECTIVES

Provide a detailed description of the planning objectives. Objectives (a.k.a. targets) are statements about how much of each habitat type, species, and/or ecological process of interest should be represented in conservation areas (e.g. protect 30% of each marine habitat type), but can also refer to minimizing threat (e.g. reduce sediment runoff by 30%) or maximizing socioeconomic benefits (e.g. maintain 85% of fish catch for each fishing gear). If the planning exercise generated multiple scenarios, describe the set of objectives for each scenario separately.

Planning objectives

Select all the criteria that were used to define/set objectives. Planning objectives could be set arbitrarily (e.g. no reason provided), follow expert advice (without further explanation of the rationale behind their recommendations) or based on explicit ecological requirements (e.g. ensure persistence of populations), socioeconomic considerations (e.g. fair distribution of costs), legal mandates (e.g. legislation) or national/international commitments (e.g. achieve 10% protection under CBD), etc.

Objectives rationale

- [ ] Arbitrary
- [ ] Socioeconomic considerations
- [ ] Previous plan/study
- [ ] Expert advice
- [ ] Legal mandate
- [ ] Other (specify)
- [ ] Ecological requirements
- [ ] National/international goals

Other (please specify)

Did the planning exercise define targets for conservation features? Mark ‘Yes’ if the planning exercise set conservation objectives in the form of quantitative targets (e.g., percentage, area, number) either exclusively OR in addition to other non-target-based optimization problems such as budget-constrained using continuous benefit functions.

Target-based objectives

- ( ) Yes
- ( ) No

Select all the types of target-based objectives used in the planning exercise.

Objectives types

- [ ] Percentage
- [ ] Area
- [ ] Number
- [ ] Other

10. METHODS

Briefly describe the characteristics and main elements of the objective function (optimization) used in prioritization analyses. An objective function refers to the mathematical expression of the conservation problem that the planning exercise aims to solve, including how the optimization algorithm works (e.g. maximize, minimize) and measures performance in terms of achieving the planning goals/objectives.

For example, Marxan's simulated annealing algorithm attempts to find a reserve system with the minimum (best) value of an objective function that includes how well the system (e.g. network of marine reserves) satisfies the objectives of minimizing costs, minimizing boundary length, and maximizing the amount of conservation features that are protected.

NOTE: If the planning exercise used commonly-used optimization software (e.g. C-Plan, Marxan, Zonation), please indicate (a) software/algorithm used; (b) briefly describe the problem formulation (e.g. what was maximized or minimized); and, if applicable, (c) describe any modifications made to the standard objective function/algorithm of these tools.

Objective function details

Select the type of **objective function(s)** employed in the prioritization (optimization) analysis; conservation planning problems can be solved using two broad types of objective functions:

Threshold functions: Based on predefined amounts or number of occurrences of selected features (e.g. habitats, species) that need to be included within a conservation system (e.g. network of marine reserves); these amounts could be arbitrary or based on ecological and/or socioeconomic criteria. Examples of objectives incorporated into threshold functions include: protect 30% of the current extent of each habitat; include a minimum number of individuals of each species within protected areas (e.g. to maintain functional populations); or include a given number of localities where threatened species are found. The key characteristic of these functions is that they imply no further addition of value after the objective is achieved (i.e. increments of amounts of features beyond the threshold provide no further increments of value for conservation).

Continuous functions: Based on continuously increasing measures of value as amounts of selected features are added to a conservation system. In contrast to threshold functions, these indicate progressively increasing value as amounts of features are increased. The forms of continuous functions include linear, sigmoidal, and diminishing-returns. Effectively, this means that most sites have a value (e.g. for conservation) and can be sequentially added to a conservation system (e.g. network of marine reserves) to increase its overall value and to maximize the achievement of planning goals (e.g. biodiversity representation) within given constraints (e.g. budget). Methods based on continuous functions include return-on-investment, continuous surrogates derived from ordination space, and frontier curves defined by alternative balances between conservation and forgone revenue from natural resources.

Objective function

- [ ] Threshold (e.g. target based)
- [ ] Continuous
- [ ] Other (please specify)

Did the plan include design criteria (e.g. size, spacing, shape)?

Design criteria used

- ◯ Yes
- ◯ No

Provide details of the specific design criteria used to guide the planning exercise, including those included in the objective function, parameterization of decision-support tools, and/or somehow used to adjust the spatial configuration of conservation/management areas or actions (including adjustments made during and/or after optimization analyses).

Design criteria details

If the plan used any design criteria (e.g. size, spacing, shape) select all the relevant considerations or motivations.

Design criteria types

- ☐ Ecological
- ☐ Socioeconomic
- ☐ Other
- ☐ Unknown

Based on your previous answer, briefly describe the rationale behind each of the selected design criteria.

Design criteria rationale

Select all the conservation planning, optimization, and/or decision-support tools used in the planning exercise. Conservation planning software, also known as decision support software (DSS), are commonly used tools that help conservation planners to integrate large amounts of information, incorporate costs and quantitative targets, and produce maps of alternative conservation areas (Sarkar et al. 2006, *Annu. Rev. Environ. Resour.* 31: 123–59). These tools are used by planners to generate and assess draft plans that will guide decision-making with the participation of stakeholders and experts, but not as a stand-alone tool. The use of these tools is advisable, but basic GIS tools can also be employed if information is not suitable for the use of DSS.

Tools used

- [ ] BioRap
- [ ] C-Plan
- [ ] CLUZ
- [ ] ConsNet
- [ ] CPLEX
- [ ] CREDOS
- [ ] Ecopath/Ecosim
- [ ] Ecoseed
- [ ] Marxan
- [ ] Marxan w/connectivity
- [ ] Marxan w/zones
- [ ] MinPatch
- [ ] MultCSync
- [ ] NatureServe Vista
- [ ] PANDA
- [ ] Portfolio
- [ ] ResNet
- [ ] Target
- [ ] TRADER
- [ ] WorldMap
- [ ] Zonae Cogito
- [ ] Zonation
- [ ] Other (please specify)

Other (please specify)

If you selected 'other' above, briefly describe the optimization approach and key features of the new tool/software, including relevant publication(s) and/or website(s). If applicable, please indicate why it was chosen or preferred over more well-known or readily-available DSS.

Other tool details

11. PLANNING UNITS

Indicate if planning units were used to generate planning outputs (e.g. priority conservation areas, protected areas, reserves). Planning units are natural, administrative, or arbitrary subdivisions of planning domains utilized for assessment and as building blocks for systems of conservation areas.

Planning units used

- ◯ Yes
- ◯ No

Indicate if the prioritization analyses used more than one size and/or shape of planning units. For example, different sizes and/or shapes (e.g. squares and irregular) could be used for different parts of the planning domain, types of data or scenarios.

Multiple planning units

- ◯ Yes
- ◯ No

Select the shape(s) of planning units used in prioritization analyses.

Planning units shapes

- ☐ Square/grid
- ☐ Hexagonal
- ☐ Irregular
- ☐ Linear
- ☐ Points

Describe the planning units used in prioritization analyses; for raster-based optimization (e.g. Zonation), indicate the use of a raster grid and its resolution and number of cells.

Planning units details

Provide the number of planning units; if the optimization was raster-based only, provide the total numbers of cells in the raster grid (mask).

Planning units number

Provide the size(s) of the planning units used in prioritization analyses; use square meters for polygonal units (square, hexagonal, irregular) or raster cells and meters for linear units. For raster-based analyses, be careful to provide the area of cells in square meters, not the cell resolution (e.g. if the area covered by a cell is 5 x 5 m, then the resolution is 5 m and the planning unit area is 25 m^2). If planning units were points (e.g. sampling sites), enter zero.

Units size average (m^2)

Units size max (m^2)

Units size min (m^2)

Select all the criteria used to determine the shape and size of planning units. Use the following definitions as guidance:

Data resolution: size determined by spatial resolution of ecological and/or socioeconomic datasets used in planning.

Thematic resolution: size defined relative to the thematic resolution at which features were represented in datasets used in planning (e.g. smaller planning units in sections of the planning domain with greater diversity).

Implementation feasibility: units aligned with administrative, property and/or management boundaries or designed to be similar to the size of existing or viable/feasible marine protected areas or fisheries management units.

Ecological adequacy: size determined by information on species' ecological requirements (e.g. home range size).

Ecological relevance: planning units defined as ecologically meaningful units (e.g. reefs, sub-catchments, bays or estuaries).

Alignment with planning processes: standardized units for planning and/or management or alignment with units used in previous or parallel planning exercises to facilitate output comparison.

Computational efficiency: increasing size reduces the number of planning units in a defined region, reducing processing time.

Planning units criteria

- [ ] Data resolution
- [ ] Thematic resolution
- [ ] Implementation feasibility
- [ ] Ecological adequacy
- [ ] Ecological relevance
- [ ] Alignment with planning processes
- [ ] Computational efficiency
- [ ] Other (please specify)
- [ ] Unknown

Other (please specify)

12. FEATURES (MARINE)

Select all the marine habitats explicitly targeted in the planning exercise; this implies the planning exercise used spatially-explicit data to directly or indirectly represent the presence or distribution of selected habitats in prioritization analyses. Habitats are commonly used as surrogates of biodiversity in conservation planning. We use the term '**habitat types**' (benthic or pelagic) when referring to biological surrogates used as proxies for biodiversity patterns, which are commonly modeled/constructed based on combinations of biotic (e.g. bioregions, species assemblages) and/or abiotic (e.g. depth, temperature, sediment type) factors.

Marine habitats

- [ ] Habitat types (Benthic)
- [ ] Habitat types (Pelagic)
- [ ] Caves
- [ ] Coastal dunes
- [ ] Coastal lagoons
- [ ] Coastal wetlands
- [ ] Algae beds/turfs
- [ ] Coral reefs
- [ ] Rocky reefs
- [ ] Oyster reefs
- [ ] Rhodolith beds
- [ ] Sargassum/Kelp
- [ ] Seagrass meadows
- [ ] Sponge communities/turf
- [ ] Estuaries
- [ ] Mangroves
- [ ] Salt marshes
- [ ] Rocky shores
- [ ] Sandy shores
- [ ] Tidal/Mudflats
- [ ] Seamounts/Pinnacles
- [ ] Trenches/Canyons
- [ ] Vents/Seeps
- [ ] Other (please specify)

Provide details about the targeted marine habitats.

Marine habitats details

Select all the marine species explicitly targeted in the planning exercise; this implies the planning exercise used spatially-explicit data to directly or indirectly represent the presence or distribution of these species in prioritization analyses.

Marine species

- [ ] Algae/Kelp
- [ ] Mangroves
- [ ] Seagrasses
- [ ] Cnidarians
- [ ] Echinoderms
- [ ] Crustaceans
- [ ] Mollusks
- [ ] Sponges
- [ ] Other invertebrates
- [ ] Fish: hagfish, lampreys
- [ ] Fish: sharks, rays, chimaeras
- [ ] Fish: bony fish
- [ ] Sea turtles
- [ ] Sea snakes
- [ ] Marine iguanas
- [ ] Crocodiles
- [ ] Seabirds
- [ ] Mammals: Cetaceans
- [ ] Mammals: Pinnipeds
- [ ] Mammals: Polar bear
- [ ] Mammals: Otters
- [ ] Mammals: Sirenians
- [ ] Other (please specify)

Provide details about the targeted marine species.

Marine species details

Select all the marine special features (a.k.a. special elements) explicitly targeted in the planning exercise; this implies the planning exercise used spatially-explicit data to directly or indirectly represent the presence or distribution of these features in prioritization analyses.

Marine features

- [ ] Breeding areas
- [ ] Feeding areas
- [ ] Nursery areas
- [ ] Spawning areas
- [ ] Migration corridors
- [ ] Staging areas
- [ ] Nesting areas
- [ ] Haulouts
- [ ] Calving grounds
- [ ] Refugia
- [ ] Ocean fronts
- [ ] Eddies and filaments
- [ ] Retention areas
- [ ] Upwelling areas
- [ ] Other (please specify)

Provide details about the targeted marine special features.

Marine features details

Select all the types of data used to represent targeted marine features (habitats, species and/or special features) in the prioritization analyses.

Data types (marine)

- [ ] Bioregions
- [ ] Bathymetric/benthic complexity
- [ ] Coast/Shoreline types
- [ ] Depth
- [ ] Energy/Wave exposure
- [ ] Geomorphic types/classes
- [ ] Habitat types (e.g. coral reefs, mangroves)
- [ ] Sediment types/classes
- [ ] Salinity
- [ ] Temperature
- [ ] Tides
- [ ] Water quality
- [ ] Species: Sightings, occurrences
- [ ] Species: Range maps, area occupied
- [ ] Species: Habitat suitability (e.g. SDMs)
- [ ] Species: Abundance, biomass, density
- [ ] Species: Demographic, genetics
- [ ] Species: Richness, diversity, composition
- [ ] Ecologically important areas: single species
- [ ] Ecologically important areas: multiple species
- [ ] Oceanographic processes (e.g. fronts, upwelling)
- [ ] Other (please specify)

Provide details about the data used to represent targeted marine habitats, species and/or special features; if possible, briefly describe the type(s) of methods to collect (e.g. satellite, airplane, field surveys/sampling) or analyze (e.g. modelled) spatial data on marine habitats, species and/or special features, as well as the source(s) and resolution of used datasets.

Data details (marine)

Indicate the spatial scale/resolution of data used (select all that apply; if there is not an exact match, select the closest). For further reference, see Figure 6 depicting equivalence between arc-second/minutes and spatial resolution in meters (approx. at the equator) for some common raster formats.

Data resolution (marine)

- [ ] 1:1,000/0.5 m
- [ ] 1:5,000/2.5 m
- [ ] 1:10,000/5 m
- [ ] 1:50,000/25 m
- [ ] 1:100,000/50 m
- [ ] 1:250,000/125 m
- [ ] 1:500,000/250 m
- [ ] 1:1 million/500 m
- [ ] 1:2 million/1 km
- [ ] 1:10 million/5 km
- [ ] 1:20 million/10 km
- [ ] 1:100 million/50 km
- [ ] Unknown

Figure 6. Equivalence between arc-second/minutes and spatial resolution in meters (at the equator) for some common raster formats.

sec/min	m/km
1/9 arc-second	3 m
1/3 arc second	10 m
1 arc-second	30m
2 arc-second	60m
3 arc-second	90 m
9 arc-second	250m
15 arc-second	500 m
30 arc-second	1 km
1 minute	2 km
2.5 minutes	4.5 km
5 minutes	9 km
10 minutes	18 km
30 minutes	56 km

13. THREATS

Select all the direct threats to marine ecosystems that were considered or targeted in the planning exercise and that, directly or indirectly, shaped the spatial configuration of conservation/management areas or actions. **Direct threats** are the proximate human activities or processes that have caused, are causing, or may cause the destruction, degradation, and/or impairment of biodiversity objectives (e.g., unsustainable fishing or logging). Threats can also be considered or targeted because they have negative effects on human livelihoods and compromise the achievement of socioeconomic planning goals (e.g. sustainable fisheries). Direct threats are synonymous with sources of stress and proximate pressures. The following list is based on the **Open Standards (OS) threats-taxonomy**.

You should select '*Biological Resource Use*' if planning (a) aimed at reducing/limiting an extractive activity from priority conservation areas, such as excluding fishing (e.g. designing marine reserves, MPA zoning); implicitly, this considers 'resource use' as a threat to biodiversity, even if not explicitly mentioned; OR (b) the "cost" layer (e.g. used in Marxan analyses) included fishing/harvesting level, pressure or costs.

Threats considered

- [ ] Residential & Commercial Development (destruction of coastal habitats)
- [ ] Agriculture & Aquaculture (destruction of coastal habitats)
- [ ] Energy Production & Mining (oil, gas, renewable)
- [ ] Transportation & Service Corridors (roads, shipping lanes)
- [ ] Biological Resource Use (fishing, harvesting, logging)
- [ ] Human Intrusions & Disturbance (recreation, military)
- [ ] Natural System Modifications (dams, water management)
- [ ] Invasive/Problematic Species & Introduced Genes
- [ ] Pollution: Land-based (urban, agriculture, industrial, light)
- [ ] Pollution: Marine-based (marine spills, industrial, garbage)
- [ ] Geological events (volcanoes, tsunamis)
- [ ] Climate Change & Severe Weather (storms, thermal anomalies, SLR)
- [ ] Other (please specify)
- [ ] None reported

Provide details of the types of direct threats considered and/or targeted (if applicable); if possible, briefly describe the type(s) of methods to collect (e.g. satellite, airplane, field surveys/sampling) or analyze (e.g. modelled) spatial data on threats, as well as the source(s) and resolution of used datasets.

Threats details

Indicate whether spatial data on threats was used to represent costs, integrity, risk and/or for other applications in prioritization analyses. Spatial data on threats or human activities can be used in very different forms during planning. For example, data on multiple threats can be combined to represent the likelihood of conservation or management success. Threats can then be combined to represent the spatial variability in ecological integrity of areas for the persistence of species or ecosystems (e.g. species are less likely to occur/persist in areas where certain threats or combination of threats occur) and highly-threatened areas could be excluded from conservation areas to maximize the effectiveness of interventions. Similarly, areas with fewer human activities could be set aside for conservation interventions more easily or be available for protection, thus “threat” data can also be used to represent some form of conservation opportunity cost.

Threats applications

- [ ] Cost layer
- [ ] Ecological integrity index
- [ ] Threat/risk index
- [ ] Other (please specify)
- [ ] None

Provide details on how spatial data on threats was used (if applicable).

Threats applications details

14. SOCIOECONOMIC

Was any spatial data used during the prioritization analyses to reflect socioeconomic considerations/values?

Socioeconomic data used

- ◯ Yes
- ◯ No

Describe the motivations (rationale) for using spatial data on socioeconomic factors.

Socioeconomic data rationale

Select the type(s) of socioeconomic data used in prioritization analyses.

Socioeconomic data types

- ☐ None: Uniform cost
- ☐ None: Area used as cost
- ☐ Effort surrogate: Distance to port/towns
- ☐ Effort surrogate: Human population/density
- ☐ Effort surrogate: Number of users (e.g. fishers)
- ☐ Effort surrogate: Number of units (e.g. boats)
- ☐ Harvest/Catch: CPUE/Quantity (e.g. kg fish)
- ☐ Financial cost ($): Acquisition Costs
- ☐ Financial cost ($): Damage Costs
- ☐ Financial cost ($): Management Costs
- ☐ Financial cost ($): Opportunity Costs
- ☐ Financial cost ($): Opportunity Costs (Fishing)
- ☐ Other values: Cultural
- ☐ Other values: Recreational
- ☐ Other values: Recreational (Fishing)
- ☐ Other values: Tourism
- ☐ Other values: Industry (e.g. aquaculture, shipping, energy)
- ☐ Other values: Infrastructure (e.g. bridges, ports, roads)
- ☐ Other values: Research
- ☐ Other values: Existence/Ethical
- ☐ Other data: Management preferences
- ☐ Other data: Use preferences
- ☐ Other data: Conservation opportunity
- ☐ Other data: Socioeconomic resilience
- ☐ Other data: Socioeconomic vulnerability
- ☐ Other (please specify)

Provide details on the socioeconomic data used in prioritization analyses.

Socioeconomic data details

A key aspect regarding incorporation of socioeconomic data in planning is whether socioeconomic factors are treated as **costs** or as **objectives**, which determines how these data are used in spatial prioritization. The predominant approach has been to treat socioeconomic factors as **costs** in spatial prioritization tools (e.g. Marxan, Zonation), whereby a single index of cost (or multiple costs) is minimized whilst meeting biodiversity conservation objectives. An alternative approach is treating socioeconomic considerations as **objectives** in spatial prioritization, which facilitates design of plans based simultaneously on ecological and socioeconomic objectives. Multiple socioeconomic objectives can be set under this approach (e.g. for different stakeholders), which allows planning for multiple competing objectives simultaneously.

How were socioeconomic factors treated in prioritization analyses?

Socioeconomic data treatment

- [ ] Costs
- [ ] Objectives
- [ ] Other (e.g. manual lock-out/in areas, stakeholders provided alternatives)
- [ ] None (prioritization did not consider socioeconomic factors)

Describe the treatment/use of socioeconomic data in prioritization analyses.

Socioeconomic treatment details

An important aspect regarding incorporation of socioeconomic data in spatial planning regards the explicit identification of different stakeholder groups. In cases where different groups are identified, one or more sectors and subgroups can be recognized. Identifying and representing different stakeholder groups will determine how we used certain socioeconomic data in spatial prioritization. We identify four main forms of stakeholder representation: unspecified, single group, multiple subgroups, and multiple sectors.

Note: Only select 'Not represented' if stakeholders are not represented in any of the forms described below.

Not represented: Stakeholders are not represented in spatial prioritization.

Unspecified: Select to identify planning exercises where the stakeholder sectors or groups are ambiguous. For example, planning exercises using generic proxies to "represent" stakeholders possibly affected by conservation actions (e.g. proximity to coastal population, distance to towns, population density, distance to infrastructure). If these proxies are explicitly used to represent a specific group (e.g. using 'distance to coast' to represent potential use by fishers), do not select this option.

Single group: Select to identify planning exercises that focus their analyses on a single stakeholder group. These type of plans may include exercises representing a single broad stakeholder group, such as 'fishers' (e.g. using number of fishing boats, CPUE, fishing opportunity cost) or a very specific sub-group (e.g. rock lobster fishers).

Multiple subgroups: Select to identify planning exercises that recognize and represent (spatially) different stakeholder subgroups in their analyses, either within a single sector (e.g. fishers represented by different gear types) and/or within multiple sectors (e.g. artisanal and commercial fishers AND foreign and domestic tourists). This option includes four sub-categories:

a) *Multiple subgroups by resource* : Stakeholder subgroups defined based on the resources they target/harvest/utilize (e.g. bottom fish, reef fish, specific species/groups of species) or the gear/equipment that they use to do so (e.g. fishers using purse seine, line fishing, spears).

b) *Multiple subgroups by place* : Stakeholder subgroups defined based on their location, either where they operate or where they live.

c) *Multiple subgroups by economic goal* : Stakeholder subgroups defined based on their broad economic goals, such as commercial, recreational, and subsistence.

d) *Multiple subgroups by other criteria* : Stakeholder subgroups defined based on other criteria.

Multiple sectors: Select to identify planning exercises that explicitly recognize and represent (spatially) different stakeholder sectors (e.g. aquaculture, fishing, tourism, mining, renewable energy).

Stakeholder representation

- [ ] Not represented
- [ ] Unspecified
- [ ] Single group
- [ ] Multiple subgroups by resource
- [ ] Multiple subgroups by place
- [ ] Multiple subgroups by economic goal
- [ ] Multiple subgroups by other criteria
- [ ] Multiple sectors

Provide details on the ways/forms in which stakeholders were represented (conceptualized) in prioritization analyses.

Stakeholder representation details

When spatial data for multiple stakeholders is used to represent them, these data can be integrated in different forms for prioritization analyses (e.g. summing individual costs to different groups of fishers to create a single 'cost' layer).

Identify the methods(s) used to integrate spatial data from multiple stakeholder groups and/or subgroups; only select these options if any stakeholder representation included ‘multiple subgroups’ and/or ‘multiple sectors’ (described before).

Different scenarios: Different scenarios per stakeholder group (e.g. representing different groups in different spatial prioritizations, one scenario per group).

Combine data: Data from different stakeholder groups or sectors is combined to form a single data layer, e.g. values for each stakeholder group are normalized and then summed.

Multiple objectives: Social objectives are treated as objectives in the spatial prioritization and different objectives are specified for each group.

Other: Other forms of integrating data for different stakeholder groups.

Integrating data for multiple stakeholders

- [ ] Different scenarios
- [ ] Combine data
- [ ] Multiple objectives
- [ ] Other

Integrating data for multiple stakeholders details

15. CONNECTIVITY

Select all the strategies/methods used to incorporate ecological connectivity in prioritization analyses.

Connectivity strategies

- [ ] None (connectivity was not incorporated)
- [ ] Design (size, shape, spacing, replication)
- [ ] Location (include/exclude sites)
- [ ] Representation (adjusted)
- [ ] Analysis of dynamics (shifts)
- [ ] Adaptive management
- [ ] Other (please specify)

Provide details on the strategies/methods used to incorporate ecological connectivity in prioritization analyses.

Connectivity strategies details

If connectivity was accounted for in planning, what processes were considered in the analyses?

Connectivity processes

- [ ] Behavior - adults
- [ ] Behavior - larvae
- [ ] Dispersal - adults
- [ ] Dispersal - larvae
- [ ] Genetics
- [ ] Habitat quality
- [ ] Ocean currents
- [ ] Network topology
- [ ] Other (please specify)

Provide details on the processes considered in the analyses.

Connectivity processes details

If connectivity was accounted for in prioritization analysis, how was it analyzed?

Connectivity analysis

- [ ] Across habitats (e.g. between mangroves and reefs)
- [ ] Within same habitat (e.g. among coral reefs)
- [ ] Other (please specify)

Provide details on the connectivity analyses undertaken.

Connectivity analysis details

16. CLIMATE CHANGE

Select all the strategies/methods used to incorporate climate change in prioritization analyses.

Climate strategies

- [ ] None (climate change was not incorporated)
- [ ] Design (size, spacing, replication)
- [ ] Location (include/exclude sites)
- [ ] Representation (adjusted)
- [ ] Analysis of dynamics (shifts)
- [ ] Adaptive management
- [ ] Other (please specify)

Provide details on the strategies/methods used to incorporate climate change in prioritization analyses.

Climate strategies details

If climate change was accounted for in prioritization analyses, what type of processes were considered in the analyses?

Climate processes

- [ ] Ocean acidification
- [ ] Storms, Cyclones
- [ ] Ocean warming
- [ ] Sea level rise
- [ ] UV change
- [ ] Other (please specify)

Provide details on the type of climate change processes considered in the analyses.

Climate processes details

If climate change was accounted for in prioritization analyses, what type of effects were considered in the analyses?

Climate effects

- [ ] Distribution - Species
- [ ] Distribution - Ecosystems
- [ ] Condition/Health - Species
- [ ] Condition/Health - Ecosystems
- [ ] Ecological processes change
- [ ] Abundance
- [ ] Demography
- [ ] Phenology
- [ ] Community composition
- [ ] Species interactions
- [ ] Other (please specify)

Provide details on the climate change effects considered in the analyses.

Climate effects details

17. OUTPUTS

Generic priority areas refer to outputs that are not explicitly associated with intended (potential) or actual actions; for example, plans that identify priority areas for marine conservation. These plans can identify *discrete sites/areas* (e.g. Marxan's best solution) or *spatially-variable priorities* (e.g. Marxan's selection frequency, Zonation's priority ranking), but no actions are proposed or suggested. Some plans depicting generic priority areas also explicitly identify potential conservation actions that could be implemented in these areas; in these cases, the output type still qualifies as generic priority areas, but below you can identify the actions considered (even if they are not spatially explicit). Commonly, planning exercises generate systems of **single-type priority areas** (e.g. network of marine reserves). Finally, some plans comprise **multiple zones**, which represent areas with different levels of protection and/or uses.

Indicate the type of outputs (plan) generated by the planning exercise.

Output type

- [ ] Generic priority areas/sites
- [ ] Single type/zone
- [ ] Multiple types/zones

Select all the **actual/intended action(s)** incorporated or considered in the plan (if applicable). **Actions** are defined as spatially-explicit interventions (from strict reservation to off-reserve management) undertaken by stakeholders (including planning project staff or partners) to achieve defined planning goals and objectives, generally aiming to prevent or mitigate targeted threats. Actions are thus allocated to conservation areas/sites identified through planning. The following list roughly follows the Open Standards (OS) conservation actions taxonomy.

Output actions

- [ ] Site/Area Protection (e.g. MPAs, Marine Reserves)
- [ ] Site/Area Management (e.g. fisheries, forestry, agriculture)
- [ ] Invasive/Problematic Species Control/Eradication
- [ ] Habitat & Natural Process Restoration (e.g. revegetation, reef restoration)
- [ ] Ecosystem Service Management (e.g. carbon sequestration, water quality)
- [ ] Species Management/Recovery
- [ ] Species Reintroduction/Translocation
- [ ] Conservation Payments (biodiversity conservation)
- [ ] Land/Water Use Planning & Zoning (e.g. MSP)
- [ ] Research and Monitoring
- [ ] Other (please specify)

Provide details on the actual/intended action(s) incorporated or considered in the plan (if applicable).

Ouput actions details

Select the type(s) of ‘primary conservation status of areas’ that most closely matches the intended or actual (implemented) actions incorporated or considered in the plan. Choices correspond to the **IUCN protected area categories**. If the plan identified ‘generic conservation priority areas’ or allocated land/water uses (excluding conservation actions), select ‘Not applicable’. If the action(s) match more than one category, select all that apply.

Output IUCN categories

- [ ] Ia. Strict nature reserve
- [ ] Ib. Wilderness area
- [ ] II. National park
- [ ] III. Natural monument
- [ ] IV. Habitat/ Species management area
- [ ] V. Protected landscape/seascape
- [ ] VI. Managed resource protected area
- [ ] Not applicable
- [ ] Unknown