

Call for research proposals for the study of Marine Protected areas in Israel

General Background

The state of the oceans is a rising global concern. Research has demonstrated that Marine Protected Areas (MPAs) are often the most effective means to protect and restore marine ecosystems, habitats and biodiversity. International assessments of key biological variables consistently show that well managed MPAs have a positive impact on marine ecosystems and extended beneficial effects (both economic and ecological), even beyond the designated areas.

Currently, declared marine reserves – the only recognized subset of MPAs in Israel thus far – occupy only 5.7% of the Israeli Mediterranean territorial waters. In addition, 2% of the area is already approved marine reserves (not declared yet), and a detailed strategic plan for marine reserves in the territorial waters was already assessed by the planning authorities. In addition, 2.3% of the Exclusive Economic Zone (EEZ) was declared as MPA. However, scientific gaps still remain in our understanding of MPA function, influence and effective management. This will be achieved through support of applicable research, focused on questions that underpin the establishment and management of effective MPAs.

Following discussions with scientists, several knowledge gaps have been identified regarding marine reserves. While we prioritize proposals addressing these topics, other topics related to the establishment, functioning, planning, management, and monitoring of marine reserves, will also be considered.

Grant structure

This call has three components:

1. Call for Research Proposals: Basic and applied research on Marine Nature Reserves. Winning proposals will be granted up to a total of 500,000 NIS for up to three years.
2. Call for Research Proposals: Characterizing New Habitats in the Israeli Mediterranean Sea. Winning proposals will be granted up to a total of 480,000 NIS for up to three years.
3. Call for Research Proposals: Evaluating the effectiveness of the selective removal of lionfish (*Pterois miles*) and sea urchin (*Diadema setosum*) in Israel's marine nature reserves. Winning proposals will be granted up to a total of 480,000 NIS for up to three years.

Eligibility

1. Only researchers in Israel who are employed at higher education institutions accredited by the Council for Higher Education (CHE) or governmental research institutions and possess the ability to conduct scientific research independently throughout the entire grant period are eligible to apply.
2. A single researcher can lead up to one proposal and participate in up to two additional proposals across all calls.
3. Only Israeli researchers are eligible to lead and receive funding.

Review Process

A scientific steering committee will prioritize and oversee the review processes, monitor the progress of the selected proposals and guide the implementation of the results within local marine reserves. The evaluation of the proposals may be carried out, inter alia, by international experts invited by the scientific steering committee.

Timeline

Submission – 15 February 2025.

Responses are expected by mid-July.

Other Conditions

- The applicants must agree to publicly share their proposals and waive any claims to confidentiality of the information contained therein and allow access to gathered data. All data should be deposited in a public domain.
- The principle investigator of the funded proposals will be required to present the progress, findings and results to the scientific steering committee. An extended final report, including the data and other products, must be submitted at the end of the grant term.
- The committee has the authority to determine whether research progress is satisfactory, to request a new work plan and timetable or to choose not to renew the funding between years.

Contact for Submission

Proposals should be sent by e-mail to
Ori Frid Landau, Israeli Nature and Parks authority to the following address:

orif@npa.org.il

The proposal should be attached as a single PDF file.

1. Call for Research Proposals: Basic and applied research on Marine Nature Reserves

Background

Along Israel's Mediterranean coast, MPAs offer the potential to counteract growing pressures from coastal development, pollution, overfishing, and climate change. However, MPA successful establishment and management require a robust scientific foundation that addresses knowledge gaps, particularly regarding MPA ecological effectiveness, capacity to support ecosystem rehabilitation, and sustainable interactions between humans and the environment.

Goal

We seek to create a solid scientific underpinning for the establishment and management of Israel Mediterranean MPAs, their ecological effectiveness and their role in the rehabilitation of ecosystems and biodiversity. The emphasis will be on local, applicative, high quality and forward-looking research that fills major knowledge gaps, and having a direct and clear impact.

Research Focus Areas

We encourage proposals on the following topics:

Ecosystem health and response to stressors of marine reserve

Currently, there is a lack of fundamental data enabling an accurate assessment of the ecological condition of the reserves, a baseline "zero state", and the impact of environmental stressors (such as pollution, soil quality or climate change) on the health and survival of marine fauna and flora. To address these gaps, we will consider projects that tackle the following questions, among others:

- What is the population structure (e.g., ratio of juveniles to adults) and reproductive status of species within the reserve?
- How do factors such as sewage, aquaculture pollution, and desalination plants affect water quality and seabed conditions, and what implications do these changes have for the marine species and ecosystems within MPAs?

Connectivity Between Habitats Within and Among Nature Reserves and Characterization of Habitats

As marine nature reserves expand, they are expected to encompass a wider variety of habitats and a greater range of depths. To ensure the protection of species inhabiting these reserves, it is essential to characterize the habitats within the reserves and assess the degree of connectivity between different habitats. For example, juveniles of certain species reproduce in shallow waters during the early stages of their lives but move to deeper waters as they mature. Alternatively, there are species that inhabit one reserve during their juvenile stages and transition to another reserve at later stages of their life. To address these gaps, we will consider projects that tackle the following questions, among others:

- What are the habitats characteristic of each MPA?
- How do species utilize the habitats within the reserve at different life stages?
- What are the connectivity patterns between shallow and deep waters within the reserves?
- How does the distribution of species vary along a north-south gradient within and among the MPAs across Israel?
- What are the patterns of connectivity in ecological processes between different habitats within MPAs?

Mapping Habitats, Monitoring Physical Conditions, and Understanding Ecological Processes in the Marine Nature Reserves of Shikmona and Rosh Carmel

The Rosh Carmel Reserve was declared in 2021 and serves as a continuation of the Shikmona Reserve located near the coastline. Rosh Carmel is a young reserve, and knowledge about its habitats is still limited. Understanding the reserve and characterizing its habitats, including those in its deeper areas, is crucial for effective management and enforcement in regions of high biodiversity. To address these gaps, we will consider projects that tackle the following questions, among others:

- What are the different habitats within the Shikmona and Rosh Carmel reserves, and how can they be classified?
- How do environmental conditions influence ecological systems within these reserves?
- How do environmental gradients, such as depth, affect biodiversity in the reserves?

The Relationship Between Marine Nature Reserves and Human Visitor Groups

Marine nature reserves serve a dual role: protecting marine biodiversity and preserving ecosystems, while also offering leisure, educational, and cultural experiences for visitors. In Israel, marine nature reserves attract a diverse range of visitors, such as recreational athletes, divers, anglers, and beachgoers, each with unique characteristics, behaviors, and environmental impacts.

The increased presence of visitors in these reserves raises challenges such as ecological damage from human activities (e.g., trampling on reef flats, plastic pollution, and noise). At the same time, the presence of diverse species and unique landscapes enhances the visitor experience and underscores the need for thoughtful management strategies to balance environmental protection with visitor enjoyment.

The research aims to fill knowledge gaps regarding the relationship between marine nature reserves and visitor groups, with the goal of developing sustainable management practices that minimize human impact while maintaining visitor experience. To address these gaps, we will consider projects that tackle the following questions, among others:

- How do various factors, such as touristic coastal infrastructure, accessibility, presence of rare species, biodiversity, and landscape diversity, influence the visitor experience? How does this change across different visitor groups (e.g., water sports enthusiasts, divers, anglers, and beachgoers)?
 - How can human footprints (e.g., trampling on reef flats, plastic pollution, noise) be reduced while preserving a positive visitor experience in the reserves?
- ✓ **Preference will be given to proposals that include quantitative experiments.**
- ✓ **Research submissions must involve collaboration between experts in social sciences and ecology.**

The Impact of Fishing in the Context of Marine Reserves

Fishing is a significant factor affecting fish populations. The success of a reserve largely depends on the effectiveness of enforcing fishing bans within its boundaries. This research seeks to understand the balance between the positive effects of the reserve and fishing impacts on fish populations in nearby fishing areas. Specifically, how does the lack of fishing within the reserves affects both natural populations within the reserve and the success of fishing efforts in the surrounding areas. To address these gaps, we will consider projects that tackle the following questions, among others:

- What is the extent of spillover from the marine reserves to the adjacent fishing areas?
- What is the effect of spillover on fishermen income?
- What is the optimal location, shape and size of no take marine reserves that maximizes fish population sizes while benefiting fishermen income?

Identifying Action Strategies to Address Future Changes in Species Diversity and Reserve Function Due to Risk Factors

Anthropogenic changes significantly impact marine populations and communities. We must better understand these changes to guide conservation efforts. To address these gaps, we will consider projects that tackle the following questions, among others:

- What are the predicted changes in species distribution under different future change scenarios?
- What changes are expected in the reproduction of marine species under different scenarios?
- How should these predicted changes reflect the network of marine MPA?

Other Subjects

We encourage proposals on additional topics that are relevant to the planning, management, or monitoring of marine reserves. Proposals should address knowledge gaps that are critical for advancing the conservation and management of marine ecosystem.

Grant Structure and Duration

Winning proposals will be granted up to a total of 500,000 NIS for up to three years.

Evaluation criteria:

- a. Potential benefits to applicable management of marine reserves in Israel Med. Sea.
- b. Feasibility and originality.
- c. A clear data management and dissemination plan.
- d. The scientific output relative to the budget.

In the case that none of the proposals fit the call criteria and scientific excellence, no proposal will be funded.

2. Call for Research Proposals: Characterizing New Habitats in the Israeli Mediterranean Sea

Background

In alignment with the recently updated goals of the Convention on Biological Diversity, to which Israel is committed, the protected area via marine nature reserves should be expanded from the currently suggested 15% to 30% declared marine nature reserves by 2030.

The research will focus on a detailed characterization of habitats classified as unique according to international criteria and/or are inadequately represented in current Mediterranean marine conservation policies.

Some of these habitats lack sufficient information regarding their spatial distribution, relative sensitivity, biodiversity, and areas critical to ecosystem functionality. Such data are essential for advancing habitat protection. Expanding research in these areas is necessary to assess how spatial protection should be proposed.

An analysis of the representation of habitats within existing and proposed reserve areas in Israel's Territorial waters has identified 100 km² of unique habitats not currently designated as reserve search areas (Rothschild et al., 2023). Similarly, vulnerable marine ecosystems in the exclusive economic zone require finer characterization to advance the planning and establishment of marine reserves in these areas.

Goal

Ecological and spatial characterization of habitats critical to ecosystem functionality, such as reproduction zones, nursery areas, and biodiversity hotspots. The result of this research will be used for data-driven expansion of conservation policy in Israel's Mediterranean marine environment.

Grant Structure and Duration

Winning proposals will be granted up to a total of 480,000 NIS for up to three years.

Review Process

A scientific steering committee will prioritize and oversee the review processes, monitor the progress of the selected proposals and guide the implementation of the results within local marine reserves. The evaluation of the proposals may be carried out, *inter alia*, by international experts invited by the scientific steering committee.

Evaluation criteria:

1. Potential benefits to applicable management of marine reserves in Israel Med. Sea.
2. The extent and diversity of habitats assessed.
3. Feasibility.
4. A clear data management and dissemination plan.
5. The scientific output relative to the budget.

In the case that none of the proposals fit the call criteria and scientific excellence, no proposal will be funded.

3. Call for Research Proposals: Evaluating the effectiveness of the selective removal of lionfish (*Pterois miles*) and sea urchin (*Diadema setosum*) in Israel's marine nature reserves

Background

P.miles lionfish has invaded the Mediterranean Sea, and its population is spreading throughout the Levantine basin. In recent years, we have witnessed a growing number of sightings of this species in the waters of the Israeli Mediterranean Sea, indicating its establishment along the shores of Israel and within marine nature reserves.

One way to address *P.miles* invasion is to reduce its impact on the environment by selective removal of individuals through targeted eradication. However, it is not known what culling method is most efficient, and whether implementing a culling management strategy for lionfish would be sufficient to reduce lionfish densities in marine nature reserves.

An additional invader is the sea urchin *Diadema setosum* which appears in growing numbers in the Mediterranean Sea, specifically within marine reserves. *D. setosum* can significantly modify habitats by altering the composition and structure of algal communities. These changes can disrupt the balance of native flora and fauna, ultimately impacting biodiversity and the overall health of the marine environment.

Goal

We are interested in a comprehensive test of the efficiency of *P.miles* and *D.setosum* culling in Israel's marine nature reserves, in terms of the relationship between culling effort and reduction in *P.miles* and *D.setosum* density and the relationship between *P.miles* and *D.setosum* density and the state of the ecological community.

Grant Structure and Duration

Winning proposals will be granted up to a total of 480,000 NIS for up to three years.

Evaluation criteria:

1. Feasibility and originality of the target specific culling methods proposed.
2. Ability to test several levels of culling effort, producing an estimate of the relationship between culling effort to *P. miles* and *D. setosum* density.
3. Clear demonstration of how *P. miles* and *D. setosum* impacts marine community.
4. Sampling duration, intensity, and temporal coverage (e.g. seasonal, diel)
5. Ability to extend the results into a long-term management plan
6. A clear data management and dissemination plan
7. The scientific output relative to the budget.

In the case that none of the proposals fit the call criteria and scientific excellence, no proposal will be funded.

Specific guidelines – relevant to all three calls

Cover page should include:

- Title
- Author names and affiliations
- Contact details
- Abstract. Up to 300 words summarizing the research proposal, including applicability to marine reserves.

Up to ten-page description of the proposed research:

Proposals should be written in a 12 pt font; 1.5-line spacing; normal margins (2.54cm). Footnotes should be avoided.

- Short Introduction providing rationale for proposal and its specific objectives and hypotheses.
- Detailed sampling methodology.
- Description of the research team and their ability to execute the proposed research.
- Specific deliverables, with direct relation to the objectives described, along with clear millstones to assess success.
- Data management plan.
- Timeline.
- Detailed budget (Budget should include 10% overhead).
- Detailed structure of the planned report.

- Figures and tables should be included in the 10-page limit.
- Reference list (does not count within the 10-page limit)

References

Rothschild A., Shabtai A., Oren D., and others. 2023. The Extent of Representation of Mediterranean Seafloor Ecological Units in Protected Areas within Territorial Waters – The Current State and Recommendations for Updating the Marine Spatial Policy Document. *Ecology and Environment* 14(4).