



**Khaled bin Sultan  
Living Oceans  
Foundation**

## STANDARDS

- **CCSS:** RI.6.8-8.8, RST.6-8.1, RST.6-8.8, RST.6-8.10, SL.6.1-8.1, SL.6.4-8.4, SL.6.5-8.5, WHST.6-8.8, WHST.6-8.9; RST.9-10.1, 2, 4, 5, 7, 8, 10; RST.11-12.1, 2, 4, 10; RI.9-12.8, SL.9.1-12.1, SL.9-12.4, SL.9-12.5, WHST.9-10.8, WHST.11-12.8, WHST.9-10.9, WHST.11-12.9
- **NGSS:** MS-LS2-3, MS-LS2-4, MS-LS2-5; HS-LS2-7, HS-LS-4.D, HS-ESS3-3, HS-ESS3.C, HS-ESS3.D, HS-ETS1.A-B, HS-ETS1-2, HS-ETS1-3
- **NGSS Practices:** 6, 7, 8
- **OLP:** (grades 6-8): 5.A.1, 5.A.3, 5.A.4, 5.A.6, 5.A.16, 5.A.21, 6.A.1-A.11, 6.B.1-B.4, 6.C.1-C.4, 6.D.1-6.D.21, 6.E.1-6.E.15; (grades 9-12) 6.A.1, 6.A.3-A.6, 6.B.1-B.6, 6.C.1-C.3, 6.D.1-D.19, 6.E.1-.14

## ONLINE CONTENTS

- [\*My Wish: Protect Our Oceans\*](#) Dr. Sylvia Earle discusses the rapid decline of the ocean and the need for more protection.
- [\*Corals and MPAs\*](#) Learn about Marine Protected Areas and how they can help protect coral reefs.

# CONSERVATION

This lesson is a part of the *Conservation* unit, which describes different actions that people can take to manage and conserve coral reefs. Below is a summary of what is included in the entire unit.

## UNIT CONTENTS

### A. [Background Information](#)

- Introduction
- Mitigating Threats
- Stakeholder Involvement
- Education & Outreach
- Monitoring
- Enforcement
- Restoration

### B. Lessons

#### [Watch It! My Wish](#)

- A worksheet to accompany the [\*My Wish: Protect Our Oceans\*](#) video

#### [Watch It! Corals and MPAs](#)

- A worksheet to accompany [\*Our Living Oceans, Episode 5: Corals and MPAs\*](#) video.

#### [Lesson 1A: Explore a Hope Spot](#)

- An activity that explores an existing Hope Spot. Students learn about ecosystem disruptions and services, and the reasons that make this place special.

#### [Lesson 1B: Nominate a Hope Spot](#)

- An activity where students nominate a new Hope Spot that needs protection. Students present their proposed Hope Spot to their classmates who act as the “Hope Spot Council,” deciding if it should be approved.

#### [Lesson 1C: Advocate for MPA](#)

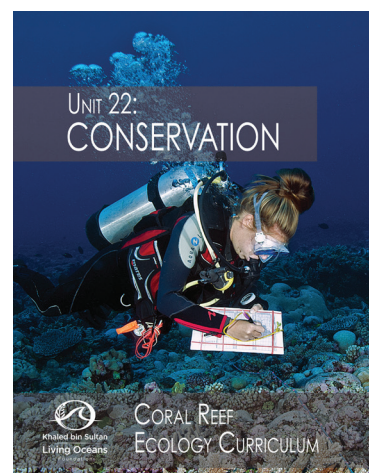
- Write a compelling letter that advocates for the creation of their proposed MPA to a stakeholder or group of stakeholders.

#### [Lesson 1D: Manage an MPA](#)

- An activity that creates a management plan for the three most important actions that are crucial to conserve their proposed MPA.

#### [Read It! Maori Conservation](#)

- A worksheet to accompany the [\*Traditional Māori Conservation Methods Help Protect Reefs in the Cook Islands\*](#) blog.



# LESSONS 1A-1D

# TEACHER'S NOTES

## PRE-KNOWLEDGE

Before beginning these lessons, students should have a good understanding of the natural and anthropogenic threats to the ocean and the actions that can be taken to reduce these threats. They should also be able to explain the various ecosystem services that the ocean provides.

## ADDITIONAL INFORMATION

Ocean conservation efforts vary around the world. Perhaps one of the most effective ways to protect the ocean is by establishing Marine Protected Areas (MPAs). The path to creating an MPA is not always the same; however, the activities in Lessons 1A-1D illustrate one path that can lead to the creation of one.

Lesson 1 consists of four different activities:

- **Lesson 1A: Explore a Hope Spot**
- **Lesson 1B: Nominate a Hope Spot**
- **Lesson 1C: Advocate for MPA**
- **Lesson 1D: Manage an MPA**

Lessons 1A-D are meant to be completed consecutively as knowledge builds upon the previous lesson; however, lessons 1A and 1B are similar. Lesson 1A has students exploring an existing Hope Spot; whereas, Lesson 1B requires that students nominate a Hope Spot that does not yet exist. The latter lesson requires a solid comprehension of the background information and advanced skills in researching information. Depending on the abilities of the students, instructors may find that it is not necessary to complete Lesson 1A before beginning Lessons 1B-D. For individuals who need further differentiation, Lesson 1A is a good introductory lesson that exposes students to the information before they attempt more difficult activities.

Before beginning Lesson 1B, it is important that students understand the difference between Hope Spots and MPAs. A Hope Spot does not designate an area as an MPA. This can be confusing because some Hope Spots are already established MPAs that apply to be a Hope Spot because they require additional protections. For Hope Spots that are not existing MPAs, this designation can be the first step towards creating one. Hope Spots provide additional funding and support, and create global awareness for the protection of an area. The creation of a Hope Spot can lead to further pressure on the country(s) authorities who have the ability to create an MPA. In classes where Lessons 1C and/or 1D will be completed, inform students that they need to nominate Hope Spots that are not existing MPAs.

Once students have nominated a Hope Spot (Lesson 1B), and was hopefully approved by their classmates, they are ready to take the next step – advocate for the creation of an MPA. During Lesson 1C, students will be asked to write a letter to a stakeholder or group of stakeholders, advocating for the creation of their MPA. To aid students in writing their letter, you may choose to use the *The Message Box*, a tool that aids in effectively communicating scientific information to a specific audience. This tool can be especially useful when trying to distill a lot of information into a meaningful and impactful message such as a letter to a stakeholder(s).

In Lesson 1D, the students' MPA has been approved. Students will be asked to create a management plan for their MPA. Before writing their plan, students will be asked to use the knowledge learned from the previous lessons to choose three actions that are most important to the protection and preservation of their MPA. Students will incorporate these actions into their management plan. If time is limited, it is suggested that only one or two of the actions are included in their plan.

Grading rubrics are included for Lessons 1B-1D to evaluate these activities. Together, these lessons will require time to complete, so it may be best to think of them collectively as a long-term project that may extend throughout the duration of the entire course.

# LESSON 1D

# TEACHER'S NOTES

## AUTHOR

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## LEARNING OBJECTIVES

- Create a plan to manage an MPA.
- Evaluate resources for credibility.
- Cite sources as textual evidence.
- Communicate information in an organized, logical sequence.
- Write in a formal, objective, technical writing style.
- Communicate information clearly and comprehensively.
- Create a plan with accurate information relevant to the audience.
- Use standard English conventions of usage and mechanics.

## KEYWORDS

- Adaptive management
- Anthropogenic
- Area closure
- Artificial coral reefs
- Bleaching (coral)
- Catch and release
- Citizen science
- Climate change
- Coastal development
- Conservation
- Conservation enforcement officer
- Coral farming
- Coral gardening
- Corallivore
- Derelict fishing gear
- Destructive fishing practice
- Dynamite fishing
- Ecological monitoring
- Ecosystem-based management
- Ecosystem services
- Enforcement
- Eutrophication
- Exclusive Economic Zone
- Fish poisoning
- Fishing gear restrictions
- Fishing quota
- Functional group
- Ghost gear
- Hard enforcement

- Indigenous Knowledge
- Invasive species
- License (fishing)
- Long-term monitoring
- Management plan
- Mangrove
- Marine debris
- Marine Managed Area
- Marine manager
- Marine Protected Area
- Mass bleaching
- Methodology
- Micro-fragmentation
- Mitigate
- Monitoring
- Mooring ball
- Native species
- No-take zone
- Ocean Acidification
- Overfishing
- Patrol
- Permit (fishing)
- Pollution
- Post-disturbance monitoring
- Protocol
- Resilient
- Restoration
- Run-off
- Seagrass
- Sedimentation
- Single-use plastic
- Size limitation
- Socio-economic monitoring
- Soft enforcement
- Species ban
- Stakeholder
- Surveillance
- Traditional Knowledge
- Water quality

## MATERIALS

- Our Living Oceans Episode 5: Corals and MPAs* video (<https://video.earthx.tv/shows/our-living-oceans/season/1/episode/5>)
- Watch It! Corals and MPAs** student worksheet
- Lesson 1D: Manage an MPA** student worksheet
- Internet
- Appendix A: Management Plan Grading Rubric**

## EXTENSION

- Ask students to present their management plan to the rest of the class. The **Appendix A: Grading Rubric** from **Lesson 1B: Nominate a Hope Spot** could be used to evaluate the presentation.

## STANDARDS

- **CCSS:** RST.9-10.1, RST.11-12.1, RST.9-10.10, RST.11-12.10, WHST.9-10.2, WHST.11-12.2, WHST.9-10.4, WHST.11-12.4, WHST.9-10.8, WHST.11-12.8
- **NGSS:** HS-LS2-7, HS-ESS3-3, HS-ETS1-2, HS-ETS1-3
- **OLP:** 6E.2-.13, 7B.1-.4

## PROCEDURE

1. Students should remain in the same groups that they were assigned to when conducting **Lesson 1B: Nominate a Hope Spot** activity.
2. Teach *Unit 22: Conservation Background Information*.
3. Watch *Our Living Oceans Episode 5: Corals and MPAs* video (<https://video.earthx.tv/shows/our-living-oceans/season/1/episode/5>) and complete corresponding **Watch It! Corals and MPAs** student worksheet. A script has been included for students who are hearing impaired and/or have learning disabilities.
4. Then introduce the *Background Information* on the **Lesson 1D: Manage an MPA** student worksheet. The actions listed on this page are a good reference for the students to use while creating their management plans.
5. Explain to students their MPA has been created. Now the difficult part begins – managing their MPA. Students should choose three of the most important actions that are crucial to the preservation and protection of their proposed MPA. There is a list of potential actions on their worksheet; however, inform students that this list is not all-inclusive. Students should analyze their answers to questions #1-10 from the **Lesson 1B: Nominate a Hope Spot** before they answer these questions. If necessary, consider prompting students with questions to get them to think critically about their answers. Where possible, they should also cite sources when using textual evidence. The citations can be listed on a separate page.
6. After brainstorming the actions that they will take, students should write a management plan. If time is limited students can choose one of the three actions to write about in their management plan. Use **Appendix A: Management Plan Grading Rubric** to assess the students' plans.

**NOTE:** Depending on the abilities of the students, it may be necessary to provide students with examples of MPA management plans. It is important to inform students that their plans do not need to be as comprehensive as these examples. Here are links to various management plans:

- Ascension Island Marine Protected Area Management Plan 2021-2026: <https://www.sainthelena.gov.sh/wp-content/uploads/2021/03/MPA-Management-Plan-2021-26-Final.pdf>
- Glover's Reef Marine Reserve & World Heritage Site Management Plan: [https://rris.biopama.org/sites/default/files/2021-02/Glovers%20Reef\\_MR\\_MP\\_%202008-2013.pdf](https://rris.biopama.org/sites/default/files/2021-02/Glovers%20Reef_MR_MP_%202008-2013.pdf)
- Florida Keys National Marine Sanctuary Revised Management Plan: [https://nmsfloridakeys.blob.core.windows.net/floridakeys-prod/media/archive/mgmtplans/2007\\_man\\_plan.pdf](https://nmsfloridakeys.blob.core.windows.net/floridakeys-prod/media/archive/mgmtplans/2007_man_plan.pdf)
- Hawaiian Islands Humpback Whale National Marine Sanctuary: <https://nmshawaiihumpbackwhale.blob.core.windows.net/hawaiihumpbackwhale-prod/media/docs/2020-hihwnms-management-plan.pdf>





# LESSON 1D

# MANAGE AN MPA

## BACKGROUND INFORMATION

Once your Hope Spot becomes a Marine Protected Area (MPA), the difficult work begins. Actions must be taken to preserve and protect the MPA from current and potential threats. These actions are outlined in a **management plan**, a document that guides and controls the management of the protected area over a set period of time (e.g., 5, 10, 20 years). The plan should include realistic objectives that can be attained. A budget (cost and resources needed), timeline, parties involved, actions, and evaluating the identified actions are also components of the plan.

Here is a list of potential actions that can be taken to ensure that the MPA is safeguarded:

- **Promotion, outreach, and awareness:** Help everyone understand the purpose of your Hope Spot, so that they can aid in protecting and conserving it. Consider how to best promote the successes and remaining challenges of the Hope Spot. Ideas may include but are not limited to forming partnerships with other organizations, collaborating with other Hope Spots, and developing media (photography, films, social media, websites, etc.). It is also important to engage in direct outreach with stakeholders to listen their feedback (negative or positive) regarding the MPA. This could occur one-on-one or via stakeholder meetings. What people or groups do you need to provide this outreach and awareness (e.g., government, general public, fishers)?
- **Improving the management of your Hope Spot:** Once your Hope Spot is established, you will need to decide how you will manage it. Management plans must often balance the relationship between humans and nature. What types of human activities are taking place in your Hope Spot? Are any of those activities causing damage? Many times, management plans include one or more of the following items: reducing threats, involvement of the people using the resource, education and outreach, monitoring, enforcement, and restoration. What types of things would you include in your management plan to tackle day to day issues on your Hope Spot or support the implementation of the existing plan?
- **Monitoring and enforcement:** You will need to come up with a monitoring plan that uses standardized tools and methods to assess how well your Hope Spot is being protected. This can range from specific studies on species, to surveys and observations, repeated year after year. What aspects of your Hope Spot do you need to monitor to show success? For example, you decided that no fishing was allowed in the Hope Spot so that you could increase the number of all fish species. Did the number of all fish species increase? Once a new regulation is implemented, how will you enforce this regulation? Using the previous “no fishing” example, how will you ensure that people do not fish in your Hope Spot? You will need to decide how you will enforce regulations and laws in your Hope Spot. Will you need to hire enforcement officers (e.g., park ranger, game warden, fisheries officer)? If so, how many will you need? Where will they be located?
- **Science, research, and exploration:** What scientific surveys, studies, and/or exploration would support the protection of your Hope Spot? How and when will they be carried out? Who would conduct these surveys, studies, and explorations? What type(s) of information would you have to collect (e.g., determine the species, number of species, types of pollution)?
- **Government engagement:** Governments have the legal authority to put laws and policies in place that will protect your Hope Spot. Create a strategy to engage government and gain support for the actions necessary to protect your Hope Spot.
- **Industry support and engagement:** Create a strategy to engage local industry and gain their support for the agreed-upon actions. This can include creation or expansion of no-take areas, local vendors to cease selling sunscreens that are not coral-friendly, working with local eco-tourism operations on getting the message to the community.
- **Community engagement:** You don't have to protect the Hope Spot alone. Make sure to engage your community, so that they too will want to help protect your Hope Spot. Create a strategy and plan to engage

the community. Assess what the best options are for doing this. What groups make up the community (e.g., fishers, farmers, tourism, boaters, government, indigenous communities, conservationists)? What are the best ways to involve them? You could create citizen science programs, engage with local clubs and associations, and/or hold meetings and write newsletters that provide updates about the newest scientific discoveries. Keep in mind that multiple strategies must often be implemented because not everyone will be interested in the same activities.

- **Education:** Chances are that not everyone is educated about your Hope Spot. Create a plan to raise awareness of the Hope Spot and ocean conservation with different groups in your community. What groups make up the community (e.g., youth, fishers, farmers, tourism, boaters, government, indigenous communities, conservationists)? Develop an outline of the issues and the user groups that may be causing these issues. Activities can include educating youth in schools, creating curricula for individual classrooms, and developing fieldwork projects and visits, science lecture series, and volunteer projects.
- **Restoration:** Some Hope Spots may have ecosystems that have been damaged or destroyed. Restoration efforts can attempt to return an ecosystem to its original condition. Do you have any organisms or ecosystems that can be restored? Here are two examples of restoration: 1) growing and planting mangroves to replace ones that have been removed and 2) creating artificial reefs, which are man-made structures to promote the growth of coral reefs.

**INSTRUCTIONS:** A management plan can take up to a year to create because there are many steps involved. You and your team will be involved in the pre-planning phase, which is one of the most important phases. During pre-planning, you will come up with a management plan for your MPA that describes the three most important actions that need to be taken. Before you begin, reflect on your answers to questions #1-10 from **Lesson 1B: Nominate a Hope Spot**. Use the table below, to brainstorm and prioritize the top three actions that you will implement when your MPA is established. List your top three actions (second column) in order of importance (1, 2, and 3). Use the final column to explain the specific activities that you will take for these actions. You may use bullet points in this section. Don't forget to cite evidence where necessary. Your citations can be listed on a separate page.

Prioritize your top three actions	Action (can be from list above or an action that is not listed)	What activities will you plan or would like to plan to help achieve these actions?
1 (most important)		



Prioritize your top three actions	Action (can be from list above or an action that is not listed)	What activities will you plan or would like to plan to help achieve these actions?
2 (second most important)		
3 (third most important)		

**INSTRUCTIONS:** Now that you have identified your top three actions, it is time to write your management plan. Your plan will cover a 10-year period. You should include the following items in it:

1. **Action:** Describe the detailed activities that you will include in the plan to achieve the three most important actions that you identified. In most cases, there will be more than one activity that should be completed for each action. Make sure to fully explain these activities in your plan.
2. **Whose involved:** What stakeholders are involved in the management plan? Describe their role(s) and the activities that they will be involved in. Good management plans involve many different stakeholders, not just the people writing the plan or the managers who will implement it. Remember that involving stakeholders can provide them with a sense of “ownership” which may aid in their commitment to protecting the MPA and supporting the plan. Look at the stakeholders that you identified in **Lesson 1C: Advocate for MPA**. Think about what each stakeholder group could contribute to the plan. Who are the most important stakeholders that should be included in it?
3. **Timeline:** How long will it take for these activities to be carried out? Keep in mind that some activities may be ongoing. Make sure to include a timeline for each activity over the length of the plan (10 years). Keep in mind that budget constraints may determine how often activities are conducted.
4. **Budget:** Provide the cost for the resources needed to complete these activities. Resources could include the salaries of the people carrying out the plan, the equipment needed to conduct research, the boats needed for enforcement, creation of a public outreach materials, etc.
5. **Evaluation:** How will you evaluate the proposed activities? It is important to measure the positive and negative outcomes of the activities being conducted. If activities are not benefiting the MPA, then managers will need to come up with other solutions. For successful outcomes, managers will want to promote them to show how these activities are aiding in the protection of the MPA.

The management plan that you create should be realistic and achievable. Unrealistic plans will only set your MPA up for failure. Your management plan should be well-organized and professional, and written in a way that anyone can read it, not just managers. To aid in creating an understandable document, make sure to properly format and label the plan sections so that information is easily searchable. When writing your plan, do not include personal opinions and biases. Rather, write it in a formal and objective tone that does not include jargon. When you finish writing your plan, reread it and ask yourself, “Is this plan concise and comprehensive? Did I include enough information to fulfill the actions that I identified? Did I include unnecessary information that takes away from the plan?”

See the **Appendix A: Management Plan Grading Rubric** to understand how you will be graded for this assignment.





MANAGEMENT PLAN GRADING RUBRIC					
Criteria	Beginning 1	Developing 2	Achieving 3	Mastering 4	Score
<b>Action</b>	The activities were <b>barely developed</b> and <b>didn't</b> address the need of the MPA.	The activities were <b>undeveloped</b> and <b>rarely</b> addressed the need of the MPA.	The activities were developed and addressed the need of the MPA.	The activities were <b>fully</b> developed and <b>completely</b> addressed the need of the MPA.	
<b>Parties Involved</b>	<b>Lacks enough</b> stakeholders that were identified for <b>few to none</b> of the given activities.	A <b>minimal number</b> of stakeholders were identified for <b>some</b> of the given activities.	An <b>adequate number</b> of stakeholders were identified for <b>most</b> of the given activities.	<b>All necessary</b> stakeholders were identified for <b>all</b> the given activities.	
<b>Timeline</b>	The timeline was set up to cover the relevant time period for <b>few to no</b> activities.	The timeline was set up to cover the relevant time period for <b>some</b> activities.	The timeline was set up to cover the relevant time period for <b>most</b> activities.	The timeline was set up to cover the relevant time period for <b>all</b> activities.	
<b>Budget</b>	The suggested resources and budget estimate is <b>not able to be determined</b> or <b>not present</b> .	The suggested resources are <b>unreasonable</b> and an <b>incomplete</b> budget estimate is provided.	The suggested resources are <b>reasonable</b> and a budget estimate is provided.	The suggested resources are <b>more than reasonable</b> and a <b>complete</b> budget estimate is provided.	
<b>Evaluation</b>	Management plan implements a <b>few to no</b> evaluation methods for activities.	Management plan implements <b>few</b> evaluation methods for <b>some</b> activities.	Management plan implements a <b>mostly detailed</b> evaluation methods for <b>most</b> activities.	Management plan implements <b>detailed</b> evaluation methods for <b>most</b> or <b>all</b> activities.	
<b>Achievable &amp; Realistic</b>	The proposed plan is <b>not</b> achievable and realistic.	The proposed plan is <b>somewhat</b> achievable and realistic.	The proposed plan is <b>mostly</b> achievable and realistic.	The proposed plan is achievable and realistic.	
<b>Organization</b>	The sections <b>lack</b> formatting or labelling and are <b>not</b> organized in an understandable way and/or are <b>unprofessional</b> .	The sections have <b>multiple</b> errors in formatting and labelling and is <b>somewhat</b> well-organized and professional.	The sections have <b>few</b> errors in formatting and labelling and is <b>mostly</b> well-organized and professional.	The sections are <b>properly</b> formatted, <b>clearly</b> labelled, well-organized, and professional.	

Criteria	Beginning 1	Developing 2	Achieving 3	Mastering 4	Score
<b>Comprehensive &amp; Clear</b>	<ul style="list-style-type: none"> <li>There is <b>no</b> apparent plan being communicated.</li> <li><b>Unable</b> to follow and ideas are not discernible</li> </ul>	<ul style="list-style-type: none"> <li>The plan is <b>underdeveloped</b> and <b>rarely clearly</b> communicated.</li> <li><b>Difficult</b> to follow; ideas are mostly discernible but not obvious</li> </ul>	<ul style="list-style-type: none"> <li>The plan is developed and <b>mostly clearly</b> communicated.</li> <li><b>Fairly easy</b> to follow</li> </ul>	<ul style="list-style-type: none"> <li>The plan is <b>fully</b> developed and <b>clearly</b> communicated.</li> <li><b>Easy</b> to follow</li> </ul>	
<b>Conventions</b>	The text illustrates <b>inaccuracy</b> in standard English conventions of usage and mechanics.	The text demonstrates <b>some accuracy</b> in standard English conventions of usage and mechanics.	The text <b>demonstrates</b> standard English conventions of usage and mechanics.	The text <b>intentionally</b> uses standard English conventions of usage and mechanics.	
<b>Voice</b>	The plan is <b>mostly</b> influenced by personal feelings or biases, and <b>never</b> presents an objective and formal tone.	The plan is <b>often</b> influenced by personal feelings or biases, and <b>seldom</b> presents an objective and formal tone.	The plan is <b>sometimes</b> influenced by personal feelings or biases, and <b>mostly</b> presents an objective and formal tone.	The plan is <b>not</b> influenced by personal feelings or biases, and <b>always</b> presents an objective and formal tone.	
<b>TOTAL SCORE</b>					

