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3 **PROTECTING AMERICA’S MARINE ENVIRONMENT:**
4 **A REPORT OF THE FEDERAL ADVISORY COMMITTEE**
5 **ON MARINE PROTECTED AREAS**

6
7 January 30, 2005

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10 I. Introduction

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12 The report of the U.S. Commission on Ocean Policy (USCOP, 2004), and the report of the Pew
13 Oceans Commission (Pew Oceans Commission, 2003), document significant problems with
14 many marine ecosystems of the United States. Both reports stress the need for prompt action.
15 Problems identified by the USCOP report include, but are not limited to, poorly planned coastal
16 development, pollution from both land-based and ocean-based activities, and unsustainable
17 exploitation of many living and non-living natural resources. The USCOP report also calls for
18 improved cooperation among Federal, State, territorial, tribal, and local entities to enhance and
19 protect the **marine environment**¹ for present and future generations. A uniform theme in the
20 USCOP report is the need for **ecosystem-based management**, of which marine protected areas
21 (MPAs) are acknowledged components. A national system of MPAs is one important approach
22 for addressing concerns about marine ecosystems, as well as improving protection and
23 conservation of the nation's marine environment. In this report, we: (1) elaborate the idea of a
24 national system of marine protected areas; (2) develop a plan for the establishment of such a
25 system; (3) develop guidelines for monitoring and evaluating the effectiveness of such a system
26 (and its constituent parts); (4) offer guidelines to make sure that local, state, regional, national,
27 and tribal interests and authorities are considered and utilized to ensure that any such system of
28 MPAs is established and managed in a way that avoids unnecessary administrative costs; and (5)
29 urge that such a system be planned, implemented, and managed so as to reduce, to the maximum
30 extent practicable, social and economic harm for those with an interest in America’s marine
31 environment.

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34 II. Creating A National System of Marine Protected Areas

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36 In Section 1 of Executive Order 13158 (May 26, 2000), creating this Federal Advisory
37 Committee, there is a call for:

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39 ...strengthening and expanding the Nation’s system of marine protected areas (MPAs).
40 An expanded and strengthened comprehensive system of marine protected areas
41 throughout the marine environment would enhance the conservation of our Nation’s
42 natural and cultural marine heritage and the ecologically and economically sustainable
43 use of the marine environment for future generations (p. 34909).

¹ The report contains a number of terms and key words whose clear understanding is essential. Terms in bold print appear in a Glossary at the end of the report.

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A. Goals:

It is the considered view of this Federal Advisory Committee that a national system of marine protected areas (MPAs) is indeed an essential and prudent step at this time in the history of our nation. Such a system would:

1. Promote **stewardship** of the nation's marine environment with particular reference to natural and **cultural resources**;
2. Enhance multiple conservation objectives by implementing three broad categories of MPA:
 - a. **natural heritage MPAs**;
 - b. **cultural heritage MPAs**; and
 - c. **sustainable production MPAs**.
3. Create effective and lasting protection through input from **stakeholders** and use of the best available information from the natural sciences, the social sciences, and **customary knowledge**;
4. Recognize both on-site and off-site influences (i.e., freshwater, terrestrial, and atmospheric), including linkages between watersheds and the sea;
5. Recognize opportunities for regional and international cooperation that are compatible with international commitments of the United States in accordance with international law; and
6. Strengthen existing ocean management frameworks of the United States (i.e., Federal, State, territorial, tribal, or local laws and regulations).

The approach spelled out here would bring coherence to the current ad hoc arrangements for protecting the marine environment. Further, these steps would respect and involve states, tribes, and other regional and local groups, and various Federal agencies in the creation and management of threatened marine habitat. Financial and other incentives will encourage and enhance inter-governmental coordination. There will be a uniform and standardized planning approach while allowing for regional differences. Finally, the nomination process can be designed to enhance the protection of existing MPAs, and it can be modified and expanded depending upon funding.

90 B. Objectives:

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92 Objectives should be clear and measurable, and they should consider and address local values
93 and perceptions. In general, pertinent objectives would include:

- 94
95 1. Conserving, enhancing, and/or restoring marine **biodiversity**;
- 96
97 2. Conserving, enhancing, and/or restoring **representative examples of the nation's**
98 **major marine ecosystems and habitats** in all geographic regions;
- 99
100 3. Protecting areas vital to the conservation of particular species, such as spawning and
101 nursery grounds, or unique habitats;
- 102
103 4. Promoting ecologically and economically **sustainable use** of marine resources;
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105 5. Enhancing the conservation, sustainable use, and enjoyment of the nation's natural
106 and cultural marine heritage;
- 107
108 6. Raising awareness and knowledge of marine and coastal resources; and
- 109
110 7. Accomplishing these goals and objectives such that current and incremental
111 administrative costs are as low as practicable, and adverse social and economic
112 impacts on citizens and interest groups are minimized to the extent practicable.

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115 C. Program Activities:

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117 The activities of one or more MPAs would include:

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119 1. Management programs to conserve biodiversity in general as well as particular
120 species, such as:
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122 a. **species at risk, threatened, or endangered and their critical habitats**;
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124 b. species for which concern exists about their status, but for which there are
125 insufficient data regarding their populations and habitats;
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127 c. **ecologically significant species and processes**;
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129 d. species taken incidentally by commercial and/or recreational fisheries; and
- 130
131 e. commercially and/or recreationally important species.
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133 2. Participation in **networks** designed to enhance the conservation of species distributed
134 in local populations linked by dispersal or other movement;
- 135

- 136 3. Management programs to protect **unique biophysical and geological features**;
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138 4. Management programs to protect cultural resources and provide appropriate access
139 and sustainable use of such resources; and
140
141 5. Management programs to provide opportunities for sustainable and non-harmful
142 recreational use, for scientific research, and/or for educational purposes.
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145 The meanings of key words in the definition of MPA provided by Executive Order 13158 should
146 be explicit, so it can be determined whether existing candidate sites qualify to be MPAs and thus
147 eligible for the national system. In the attached Glossary we define key words underlined in the
148 following definition of MPA from the Executive Order:
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151 ...any **area** of the **marine environment** that has been **reserved** by Federal, State,
152 territorial, tribal, or local laws or regulations to provide **lasting protection** for part or all
153 of the natural and **cultural resources** therein (p. 34909).
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155
156 While existing sites may not have been established with explicit goals, objectives, and other
157 desirable characteristics, it is essential that they consider the issues raised here. It is also
158 important to offer specific criteria for the decision to add new sites to a new national system.
159 That is, once a national system of MPAs is established, new sites may qualify as part of that
160 system on the basis of supporting information regarding need, design, and implementation.
161

162 163 D. Adding New Sites: 164

165 The following factors would be essential components of the necessary information:
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- 167 1. An assessment of the need for, and benefits from, an MPA based on supporting
168 materials from the natural sciences, the social sciences, and **customary**
169 **knowledge**. This will include an assessment of the ecological, biological,
170 social, and cultural resources and values to be protected. This will also include
171 an assessment of the threats to valued resources and a determination of
172 whether an MPA can address them and/or whether the MPA could be
173 subverted by external threats;
174
175 2. A statement of clearly defined and articulated goals and objectives to address
176 identified needs, and an approach to measure attainment of those goals and
177 objectives. This will include a plan for, and the estimated costs of, effective
178 implementation, monitoring, and enforcement. This will also include an
179 assessment of alternative means of achieving stated MPA goals;
180

- 181 3. A determination whether the site should be an independent MPA, part of a local or
182 regional system, or part of a national system;
183
184 4. An identification of the broad range of stakeholders at the beginning of the process,
185 using surveys, meetings, and “snowball sampling”—identifying influential and
186 well-connected stakeholders and asking for names of others who should be
187 contacted;
188
189 5. An assessment of the national interests, including national security issues;
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191 6. A characterization of the MPA using geological, oceanographic, biological, cultural,
192 and socioeconomic data, ideally in a user-friendly and on-line Geographic
193 Information System with multiple layers. The creation of data layers presents
194 an opportunity for participatory research—interviews with knowledgeable
195 stakeholders to elicit, collect, and use local, traditional, and experience-based
196 knowledge;
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198 7. For MPAs designated principally to conserve living marine resources, an assessment
199 of the processes important to **ecosystem structure and functioning**, and of the
200 **ecological linkages** between MPAs and the broader environment; and
201
202 8. An assessment of the economic effects, including both monetary and non-monetary
203 effects. This will include evidence that the adverse social and economic
204 implications for users of the marine environment have been considered and
205 are, to the extent practicable, minimized.
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208 Special efforts should be made to identify both **effecting parties** and **affected parties** of MPA-
209 related decisions, whether or not they express an interest in them. Effecting parties would be
210 individuals or industries whose action or inaction may cause changes to the marine or social
211 environment that affects an MPA and hence can make a difference to its effectiveness. One
212 example is the owner of a foreign oil tanker that spills oil in an area designated as an MPA;
213 another would be coastal developers and residents, upstream farmers, municipal water
214 authorities, or businesses the activities of which affect water quality or other ecological processes
215 important to maintaining the ecological integrity of an MPA. Examples of affected parties
216 would include nearby communities dependent on tourism or fishing, but not heretofore involved
217 in marine conservation activities.
218

219 Special efforts also should be made to identify these parties and invite them to participate in the
220 planning process. Doing so will remind agencies and others of the need to reach out to potential
221 participants, many of whom previously may not have been involved in formal decision-making
222 processes. Such outreach also may increase constituencies for the MPA and prevent or reduce
223 conflict later arising from perceptions of exclusion.
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226 E. Other Considerations:

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The process of adding new marine habitats to protected status can be initiated at a variety of levels—a State or Federal government agency, a tribal entity, an NGO, or an individual. The above list of factors that must be considered should be seen as a key part of any nomination process. In addition, there will need to be:

1. A review and discussion of relevant governmental (including tribal) jurisdictions and authorities;
2. A proposed structure of authority and decision-making. This would indicate which organization or agency shall take the lead and, in general terms, which roles and responsibilities will be assigned to which parties. These agreements must be stipulated in Memoranda of Understanding;
3. A communications network dedicated to informing all agencies and stakeholders of developments in the process;
4. Planning grants to organizations or coalitions of organizations proposing to nominate MPAs to the national system. These grants would pay some portion of the cost of stakeholder engagement and planning for the nomination;
5. Additional funding for entities managing MPAs accepted into the national system. These may be matching funds, or special allocations of categorical funding from participating programs. It is not envisioned that the national MPA program would be the primary financial supporter for sites entered into the national system. A sustainable source of funding for the program must be established;
6. Additional protection for MPAs accepted into the national system. This would come from Federally required notifications of potentially harmful actions by other Federal agencies, regulatory proceedings, establishment of legal standing, NEPA procedures, Coastal Zone Management consistency finding requirements, and similar measures. Being part of the national system would prevent a reduction in the level of protection for various kinds of existing MPAs; and
7. A requirement that other government agencies undertake efforts to coordinate their activities with those of the MPA, including assisting in monitoring, enforcement, emergency response, and threat abatement.

F. Summary

The processes of designing, implementing, monitoring, and adapting MPAs should be interactive and participatory, involving the full range of stakeholders and authorities. A general rule for

273 controversial, complex policy-formation is to involve the stakeholders early, often, and with a
274 genuine commitment to recognize and, where possible, respond to their ideas and concerns.
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276 In order to involve a broad set of stakeholders, the initiating groups and authorities must be
277 engaged in research and outreach activities early in the process. Research is required not only to
278 identify the biological and ecological aspects of a particular marine area, but also to identify the
279 full range of potential stakeholders and their specific interests. Who is causing the problem(s)
280 affecting a marine area or a particular ocean habitat? Who will be affected by attempts to deal
281 with those problems by restricting activities in particular areas? Who is able to contribute to
282 these solutions? These are questions that may be answered easily where there is a long history of
283 research and activity, but good answers may require dedicated research in other cases. This
284 research must involve both the natural and social sciences since the answers to questions about
285 the human dimensions of cause and consequences form the crux of management measures and
286 approaches.
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288 MPA goals and objectives may be achieved by undertaking different management plans. Choice
289 among these alternative plans should be based on efforts to minimize the adverse social and
290 economic consequences for communities, individuals, and firms that are affected by the MPA
291 process. Natural science research is required to make sure that biological and ecological goals
292 are met, while social and economic research is required to assess the reasons for the observed
293 adverse effects on marine habitats, and the plausible consequences of alternative management
294 scenarios. Decision-support tools—Geographical Information Systems coupled with simulated
295 annealing algorithms—are useful for generating multiple scenarios for MPA siting that might
296 meet ecological criteria. These aids are also valuable for assessing the socioeconomic impacts
297 associated with each scenario, and for allowing stakeholders to identify those scenarios that
298 minimize adverse impacts. A corollary to this principle is that new MPA policies (or new
299 MPAs) should not compromise those protection measures already in place in state or federal
300 waters. **Adaptive management** is the appropriate mechanism for changing management
301 measures to reflect new data and understanding. More will be said on this below (section IV.C.).
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303 To be effective, MPAs and MPA networks should be considered and implemented through
304 carefully designed processes, and should be tailored to fit local ecological, cultural and economic
305 settings and circumstances.
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309 III. Assuring Administrative Efficiency and Coherence

310 A. General Principles:

311 The creation and management of a national system of MPAs should be based on several guiding
312 principles. These include:
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- 315 1. Primary responsibility must lie with existing legal, statutory, and legislative
316 authorities. While we offer a new approach to creating a national system and
317 its constituent parts, the actual designation and establishment of individual
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- 319 MPAs within the system should be accomplished under existing provisions of
320 law;
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- 322 2. Citizens and governmental agencies at the local and regional level must be an integral
323 part of the nomination and planning process;
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 - 325 3. The system of nomination, selection and planning of a national system of MPAs
326 (including individual MPAs within a system) must be clearly delineated,
327 understandable by the public, and based on the best scientific and objective
328 data and analysis;
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 - 330 4. There must be incentives for participation and networking by government agencies
331 and by stakeholders; and
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 - 333 5. There must be awareness of, and respect for, the sovereignty of states and tribes and,
334 as appropriate, local jurisdictions.
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338 B. Procedural Issues:
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340 The above principles support a process for establishing a national system of MPAs composed of
341 existing and new sites that are intended to work as follows. At the national level, and in
342 accordance with the vision, goals, and objectives of a national system, the Secretaries of the
343 Departments of Commerce and the Interior, in consultation with other pertinent federal agencies
344 (or working with or through any national ocean agency that might be established through
345 legislation or executive order), would:
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- 347 1. Establish guidelines, objectives, and policies for the national system based upon
348 existing authorities (unless those authorities are changed through legislation);
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- 350 2. Utilize existing or new regional entities to assist in implementation of these
351 guidelines;
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- 353 3. Work with Congress to provide funding for the system; and
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- 355 4. Conduct periodic review and evaluation of the national system and develop national
356 priorities to be considered by regional entities.
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359 From a regional perspective, and in accordance with national guidelines, existing or new regional
360 entities composed of Federal and state agencies, tribes, and other groups could:
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- 362 1. Establish regional goals and priorities, develop a planning process, and provide
363 technical support for the MPA process, all of which should be consistent with
364 the goals of a national system;

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2. Utilize existing legislative and judicial authority to implement a process that identifies and nominates those sites to the national system that meet regional goals;
 3. Facilitate continued managerial coordination among MPAs across regional and national boundaries;
 4. Coordinate research and monitoring at various levels of government;
 5. Provide mechanisms for cooperation in enforcement efforts among participating agencies; and
 6. Create a framework for informing and educating stakeholder groups about MPAs and encouraging their active participation in the nomination, approval and management of MPAs.

384 C. Nomination Process:
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386 We envision the national system being created from existing and new marine sites meeting the
387 criteria spelled out above (section I.C.). State and/or federal agencies, tribes, groups of agencies,
388 non-profit organizations, commercial and recreational fishing interests, other ocean-based
389 industries, or individual citizens could nominate existing or potential sites. New MPA sites must
390 be reviewed and approved in accordance with existing legal procedures, and would be subject to
391 this review process if they are to become part of the national system. Existing MPAs would
392 become part of a national system through the process described here. In both cases, nomination
393 will require:
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1. Identification of a site and the specific purposes to be served by its inclusion in a national system—natural heritage, cultural heritage or sustainable production;
 2. A description of contributions to achieving regional and national goals including achieving representation of nationally significant natural heritage, cultural heritage and sustainable production resources;
 3. A description of administrative links to other regional marine management activities;
 4. A description of existing or proposed authorities that protect—or would be used to protect—the site including a description of current levels and sources of protection for those sites, and how those existing authorities might be affected;
 5. A description of the current site status including identification (and a priority ranking) of existing or potential threats to the resources identified, the sources of those problems or threats, strategies to address problems and threats, and necessary

411 measures to achieve the goals that have been identified for the proposed MPA;

412

413 6. A proposed action plan to establish the level of protection for the proposed site, and a
414 management plan that includes monitoring in accordance with regional and
415 national site goals, including the specific contributions of each governmental
416 partner (and NGO if appropriate); and

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418 7. A draft Memorandum of Agreement that describes the roles and responsibilities of the
419 regional and national partners in establishing the site as part of a national
420 system.

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423 D. Implementation and Management:

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425 Upon acceptance of a particular MPA into the national system:

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427 1. Implementation of the plan of action would occur via a draft Memorandum of
428 Agreement (MOA) or contract among the participating agencies. This
429 document would define roles and responsibilities. The MOA would stipulate
430 the goals for the MPA, set out specific, quantifiable performance measures for
431 achieving those goals, and include a timeline for carrying out the plan of action
432 The duration of the MOA or contract would be established depending upon the
433 authority for creation of the MPA and by negotiation with the regional entity;

434

435 2. The parties to the agreement would commit themselves to a governance process that
436 builds upon the principles identified above, as well as to internal and external
437 monitoring of performance and adaptive management strategies for the MPA.
438 Monitoring protocols and performance indicators should be designed, insofar
439 as possible, to establish transparent and objective measures of success of
440 MPAs in meeting their goals and objectives, and in using this information to
441 guide subsequent management decisions; and

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443 3. Individual MPAs would receive financial, technical and logistical support to achieve
444 the goals of each MPA as well as the entire national system.

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IV. Assuring Effective Stewardship

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451 A. Stewardship:

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453 Each MPA should implement a specific plan for **monitoring and evaluation**. This evaluation
454 and monitoring will make use of the natural sciences, the social sciences, and **customary**
455 **knowledge** where appropriate. Such evaluation will be necessary to determine whether or not
456 the objectives of individual MPAs are being met, but also how well the national system is

457 meeting its goals. Monitoring and evaluation shall be required for adjustments to MPA design
458 and management in accordance with the general principles of an **adaptive-management**
459 framework. Explicit criteria will be required for the de-commissioning of MPAs that have not
460 met their goals and objectives.

461
462 We suggest that the effectiveness of marine protected areas in accomplishing their goals and
463 objectives is heavily dependent on the development of the shared concept of individual and
464 collective stewardship. Stewardship requires the commitment of all stakeholders—members of
465 the general public, users of the marine environment, individuals or organizations whose activities
466 can affect the integrity of an MPA, scientists, government agencies, and others. Stewardship
467 entails considerate and discerning use and management of areas designated as MPAs for the
468 benefit of future as well as present generations. Stewardship is dependent on the quality and
469 character of decision-making processes, and on the extent to which prior commitments are
470 honored. Stewardship is essential to the long-run effectiveness of all MPAs.

471
472 *Individual stewardship* depends on public awareness, educational programs, personal ethics,
473 individual and group incentives, and culture. *Collective stewardship* entails the exercise of
474 governmental actions to achieve the goals and objectives of a national system. But collective
475 stewardship also entails the individual creation of formal and informal networks and
476 organizations that have some responsibility for a particular MPA, or for a system of MPAs. As
477 above, the ultimate effectiveness of the national system depends on high levels of collective
478 stewardship.

479
480 Successful stewardship requires collaborative partnerships among public and private
481 organizations, and including local as well as more distant interests. The “top-down” approach to
482 marine conservation, where a government agency uses its authority to impose rules, is unlikely to
483 succeed where there are complicated jurisdictional issues. This is particularly germane to many
484 inshore and near-shore areas, and applies with equal force at the boundaries of states and nations.
485 The top-down approach is also unlikely to succeed where definitive knowledge is uncertain or
486 contested, and where monitoring and enforcement promise to be difficult.

487
488 The bottom-up approach can often be promising because those individuals closest to the marine
489 resource/area have experience-based knowledge to contribute to wise planning and management.
490 These individuals will also have great dependence on the marine environment and this will bring
491 forth interest and commitment. The bottom-up approach creates opportunities for full
492 participation in and a sense of ownership and stewardship on the part of local people or dedicated
493 resource users and this can be important in some management decisions.

494
495 Potential problems with bottom-up initiatives arise when local users may not have the larger
496 national interest in mind. There is a tendency in such situations for local users to believe that the
497 natural resources “belong to the local people.” The top-down articulation of national goals and
498 legal mandates can be useful and necessary in galvanizing many MPA processes, but care must
499 be taken to avoid the unwelcome imposition of seemingly arbitrary and capricious strictures on
500 long-established patterns of resource use. As with most things, a mixture of top-down and
501 bottom-up approaches will likely prove to be more effective than a preponderance of a single
502 approach pursued in isolation.

503
504 Effective stewardship requires enhanced communication among stakeholders, as well as the
505 general public. Communication must take many dimensions, and must be multi-dimensional if it
506 is to accomplish its purposes. Those directly involved in an MPA process must make an effort to
507 learn from others.

508
509 It is important to stress that the effectiveness of individual MPAs in protecting important marine
510 habitats will depend, in many respects, on what we choose to term a *culture of compliance*.
511 Compliance can often be confused with enforcement and we wish to stress that this conflation of
512 ideas is not helpful. Compliance (or non-compliance) with the protocols and regulations put in
513 place to maintain the integrity of an individual MPA (or a national system) depends on several
514 factors, including individual ethics, a shared sense of “ownership” of the MPA, economic
515 incentives, and social incentives—including negative sanctions for offenders. Enforcement—the
516 imposition of penalties and sanctions for non-compliance, and deterrence based on fear of being
517 caught—is but one factor in the creation of a culture of compliance or non-compliance. We see
518 that the specific context is important. Lax enforcement, lack of clear rules, and lack of
519 transparency can often encourage non-compliance. A high degree of transparency, clear rules, and
520 consistent but fair enforcement can usually lead to a high degree of compliance. Over time, one
521 can expect to see emerge a culture of compliance.

522
523 This evolutionary process can be enhanced and strengthened by continual efforts to demonstrate
524 the values of MPAs to affected parties. Local education on MPA rules and benefits can be
525 facilitated in order to promote the recognition of conservation ethics and practices. The
526 consistent enforcement of even minor offenses will create a context for enhanced compliance.
527 We stress the importance of insuring that the particular compliance goals and tools used are
528 appropriate for the objectives of the individual MPA. There should be attention paid to
529 appropriate incentive programs for compliance. The MPA system (and its constituent parts) can
530 be designed to encourage compliance, thereby reducing enforcement costs and enhancing
531 effectiveness. This includes not only questions of siting and boundaries, in relation to law
532 enforcement, but also effective participation of stakeholders, especially those to whom the rules
533 directly apply (i.e. fishermen, divers, vessel operators). A culture of compliance is enhanced by
534 insuring that planning, implementation, and decision-making processes are transparent and
535 quickly communicated to stakeholders.

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538 B. Effectiveness:

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540 The effectiveness of individual MPAs—as well as the national system—will depend on the
541 existence of a body of research that addresses matters directly pertinent to the MPA process.
542 Research can be helpful in the process of identifying MPA goals, objectives, management plans,
543 and pertinent stakeholders. The natural and social sciences should be understood as part of the
544 same enterprise seeking to understand the anthropogenic causes of the problems being addressed,
545 as well as the human consequences of alternative proposed solutions. Such integrated research
546 will also be helpful in obtaining and assessing **customary knowledge** as well as local, regional,
547 and national values. Local users can often be important participants in the research process.

548 Such “participatory research” facilitates communication, education, and trust, and thereby
549 enhances the prospects for good stewardship and effective MPAs.

550
551 Extensive and good-faith participation of stakeholders is essential for long-run stewardship and
552 effectiveness of MPAs. Such participation enhances the knowledge available for MPA planning
553 and implementation, increases trust in the process between stakeholders and agencies, and
554 provides a sense of ownership of the MPA that can translate into a culture of stewardship.
555 Because MPAs typically involve multiple goals and interests, sometimes conflicting ones, and
556 often entail consideration of diverse human communities, it is important to have an open,
557 transparent and highly participatory process at all points of planning and implementation. Some
558 of the key principles of participation are:

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- 561 1. Skilled and knowledgeable facilitators can interview stakeholders, help develop the
562 planning and implementation process, and run meetings;
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 - 564 2. Full participation is enhanced by using a variety of communication means—web
565 pages, printed materials, email, Public Service Announcements;
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 - 567 3. Stakeholders must be identified and engaged at the beginning of the process;
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 - 569 4. Clear rules and procedures for comment, dialogue, and participation must be spelled
570 out;
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 - 572 5. There must be transparent means to resolve conflicts;
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 - 574 6. Local values must be understood, acknowledged, and considered in decision-making
575 processes;
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 - 577 7. The schedule of the process must be clear and readily available; and
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 - 579 8. There must be accommodations made for varying the degree of power sharing. This
580 will depend on the cultural context of the MPA, and it will require an
581 assessment of the social, cultural, and economic attributes of the local
582 community.
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585 C. Adaptive Management:

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587 One overarching principle for successful MPAs—and thus for a successful national system of
588 MPAs—is the need to embrace **adaptive management**. The science of developing and
589 managing MPAs is relatively new and underdeveloped. Moreover, the ocean environment is
590 highly variable on multiple time scales, as is the human dimension (changing markets, cultural
591 trends, fishing practices, etc.). Given this variability, procedures are needed to allow for
592 flexibility and learning in the face of new knowledge regarding changes in ecological conditions
593 and/or in the human dimension. Adaptive management entails a continual process of assessing,

594 evaluating and improving on-going decisions in light of new knowledge and new evidence.
595 Adaptive management relies on the collection and timely use of monitoring data, careful research
596 to determine cause-and-effect relationships (including statistically rigorous experimental
597 designs), evaluation of management measures and ecological indicators, communication of new
598 information, and transparent decision-making.
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600 Adaptive management should be a normal part of the planning and management process, and it
601 should be based on new information and data from the pertinent scientific disciplines, from
602 management actions, and from the general public. Care must be taken to avoid speculative
603 experiments and management protocols where there is a potential for adverse impacts on
604 livelihoods or other important interests. Research sites can be chosen and monitored in ways that
605 will enhance the gathering of data and information necessary for improved management.
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607 We stress that continual monitoring of important indicators (ultimately reflected in ecological
608 indicators) is essential for adaptive management. Research is essential for understanding cause-
609 and-effect relationships, which is the key for intelligent adaptive management. Ideally, the
610 monitoring and research programs should be integrated so as to maximize their usefulness and
611 cost-effectiveness. Involvement of stakeholders in the research and monitoring activities can
612 help to enhance the effectiveness of an individual MPA, or of a national system.
613

614 We suggest that participatory research, tribal knowledge, experience-based information, and
615 traditional ecological knowledge are as important as research from the natural and social
616 sciences. The key difference turns on which questions are under discussion. For some matters,
617 only the very best peer-reviewed science will satisfy some participants. For other matters, other
618 ways of knowing will be decisive. The key is to fit the research task to the informational need at
619 the time. The use of local knowledge further encourages local users to undertake useful research
620 and monitoring activities.
621

622 Formal research programs must include the social and natural sciences and should be related to
623 MPA goals, objectives, and monitoring needs. This means that there is scope for both basic as
624 well as applied research. It is important that there be coordination of research and monitoring
625 activities. That is, research hypotheses inform particular monitoring programs, and data from
626 monitoring activities will then facilitate management-related research. All monitoring and
627 research activities must be sensitive to potential conflicts with other uses of the marine habitat
628 being studied.
629

630 The information gained from an integrated monitoring and research program becomes an
631 essential input into planning for effective stewardship. The frequent and coherent dissemination
632 of data and information creates transparency about the process of MPA management and
633 therefore enhances trust among various interest groups. This provision of data and information
634 also makes possible independent analyses of MPA effectiveness, further enhancing adaptive
635 management.
636

637 The on-going evaluation of MPA effectiveness is a critical element of adaptive management.
638 This continual evaluation relies on a clear understanding of what is being measured, an accurate
639 interpretation of the compiled indicator data, and competent research to assess trends and to

640 clarify plausible cause-and-effect relationships. Evaluation must be transparent, it must entail
641 clear criteria, and it requires effective communication.

642
643 The evaluation of effectiveness should be done on a planned schedule appropriate to the
644 objectives of the MPA. Such evaluation should include stakeholders and others pertinent to the
645 MPA under scrutiny. The process must be transparent and entail clear criteria and good
646 communication. The process of evaluation should measure demonstrated progress toward
647 identified objectives using agreed-upon performance indicators. The evaluation process should
648 include a periodic review of goals, objectives, and indicators. Are the original objectives still
649 related to the achievement of goals? Are the original goals still appropriate? Are the original
650 performance indicators still appropriate?

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654 D. Summary

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656 Strong stakeholder participation is the key to enhancing stewardship and ensuring the
657 effectiveness of individual MPAs, and of a national system of MPAs. Neither “top down” nor
658 “bottom up” approaches in isolation can bring about coherent stewardship and effective
659 management. Full participation is necessary to elicit the broad range of stakeholder interests and
660 concerns. Strong commitments by agencies or other appropriate authorities are necessary in
661 order to implement relevant laws and to honor their public trust responsibilities. In this way it is
662 possible to insure that the Nation’s marine resources are used sustainably and the marine
663 ecosystems that provide these resources are effectively restored, enhanced, and protected into the
664 future.

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668 V. Implications

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670 At the present time there are a number of legal designations that suggest protection and
671 management of the marine environment. Particular marine habitats carry a variety of names: (1)
672 marine managed areas; (2) marine protected areas; (3) marine sanctuaries; and (4) marine parks.
673 Indeed, some regional fisheries management councils, as part of their fishery management plans,
674 have established seasonal and area closures to protect particular species and these actions have
675 come to be associated with (and to be called) “marine protected areas.” Some of these closures
676 came about not through the volition of the councils but only in response to the threat of lawsuits
677 under various other legislative decrees (the Endangered Species Act, the Marine Mammal
678 Protection Act, to name but two).

679

680 As we noted at the outset, the Executive Order creating our Federal Advisory Committee called
681 for:

682

683 ...strengthening and expanding the Nation’s system of marine protected areas (MPAs).
684 An expanded and strengthened comprehensive system of marine protected areas
685 throughout the marine environment would enhance the conservation of our Nation’s

686 natural and cultural marine heritage and the ecologically and economically sustainable
687 use of the marine environment for future generations (p. 34909).
688

689 We have offered a number of suggestions by which this mandate might be realized. At stake is
690 not just the protection of the marine environment. *Also at stake is the larger public perception of*
691 *the coherence and effectiveness of that protection.* In particular, the current arrangement—in
692 which a number of government agencies (and other groups) claim to be engaged in “marine
693 protection” through a variety of laws, administrative rules, and management strictures—is a
694 serious threat to the integrity of the idea of marine protected areas. The current arrangement is
695 threatening precisely because the very act of proscribing certain traditional activities in or
696 adjacent to the marine environment may hold adverse and unwanted implications for some
697 individuals and interest groups. If their actions are suddenly circumscribed under the banner of
698 “marine protection,” and if anticipated and plausible results are not forthcoming, the concept of
699 “marine protected areas” is thereby undermined and jeopardized. A few well-publicized and
700 controversial instances of this sort and the entire enterprise of protecting the marine environment
701 will thereby be discredited. This ominous development must be prevented.
702

703 It is for this reason that we insist that the term “marine protected area” (MPA) be carefully and
704 judiciously used in the future as a national system is realized. Just as a private company jealously
705 guards the integrity of its trademark (IBM, Coca Cola, Rolex) from abuse by pretenders, so too
706 must the federal government protect the integrity of those areas it has decided to identify as
707 “marine protected areas.”
708

709 This report is concerned with a judicious process of: (1) identifying areas in need of protection;
710 (2) specifying the precise steps that must be taken to justify inclusion in a national system; (3)
711 identifying the exact measures that must be followed to monitor and evaluate the effectiveness of
712 that protection; and (4) stipulating procedures to be followed to assure that administrative costs
713 and burdens are held to a minimum. Only when all of these protocols have been adhered to
714 should it be possible to bestow the “trademark” MPA on a particular section of marine habitat.
715 Anything less than this will seriously, and perhaps irreparably, undermine the integrity and
716 credibility of the entire process. The marine environment is too valuable, too fragile—and too
717 threatened—to allow that to occur.
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Glossary

This glossary is included to clarify the meaning of key words and concepts, using as available, legal or broadly accepted definitions.

Adaptive management: A systematic process for continually improving management policies and practices by learning from the outcomes of operational programs. Its most effective form—'active' adaptive management—employs management programs that are designed to experimentally compare selected policies or practices, by evaluating alternative hypotheses about the system being managed." (British Columbia Forest Service, <http://www.for.gov.bc.ca/hfp/amhome/Amdefs.htm>)

Affected party: An individual, group, or organization that may or may not express an interest in an MPA but is likely to be affected by MPA-related decisions. An affected party is typically one that uses an MPA or uses the MPA location, e.g., for ocean transportation and or national defense; one on whom a specific MPA or National MPA system will have a noticeable impact.

Area: Marine site or region that has legally defined geographic boundaries. The site or region shall not include the entire US EEZ or an entire state's waters.

Biodiversity: The variety of living organisms in all their forms. Technically, biodiversity includes variation at three levels of biological organization: genetic variation within species, the variety of species, and the variety of ecological communities.

Cultural resources: Any ethnographic resource, or submerged historical or submerged cultural feature, including archaeological sites, historic structures, shipwrecks, and artifacts in the marine environment. Ethnographic resources include natural resources and sites with tribal or traditional cultural meaning, value, and use.

Cultural heritage MPAs: MPAs established and managed principally to protect, understand, and interpret marine cultural resources that reflect the nation's maritime history and traditional cultural connections to the sea, as well as the uses and values they provide to this and future generations. (MPA Center, 2004).

Customary knowledge: Tribal, traditional, and/or local ways of knowing, including traditional ecological knowledge.

Ecological linkages: Connections between marine systems manifested by swimming (in the case of fish and other nekton) or by horizontal/vertical drift or diffusion (in the case of nutrients, pollutants, and larvae and other plankton), or among terrestrial, freshwater, atmospheric, and marine systems.

Ecological network: A set of discrete MPAs within a region that are connected through dispersal of reproductive stages (eggs, larvae, spores, etc.) or movement of juveniles and adults. The effective management of certain marine species may require networks of discrete MPAs encompassing regional collections of local populations linked by dispersal and movement, which may be essential for some local populations to persist. The creation of MPA networks must take into consideration other non-MPA areas that provide similar linkages and does not necessarily

770 imply additional management measures outside MPAs or the creation of a "super MPA" with
771 boundaries encompassing all MPAs in the network.
772

773 **Ecologically significant processes:** Interactions among species (e.g., predation, competition,
774 mutualism, habitat formation), within species (e.g., communication, mating, schooling), and
775 between species and the physical environment that play important roles in the structure and
776 function of an ecosystem and its component communities.
777

778 **Ecologically significant species:** Species that have substantial roles and impacts in their
779 ecological communities.
780

781 **Ecosystem-based management:** A management approach that "looks at all the links among
782 living and nonliving resources, rather than considering single species in isolation." This
783 approach "reflects the relationships among all ecosystem components, including humans and
784 nonhuman species, and the environments in which they live. This system of management
785 considers human activities, their benefits, and their potential impacts within the context of the
786 broader biological and physical environment." (USCOP, 2004)
787

788 **Ecosystem structure and functioning:** An ecosystem's biotic and abiotic organization and
789 associated processes, including interactions among the constituent species (interactions being
790 predation, competition, mutualism, etc.), as well as the cycling of matter and the flow of energy.
791

792 **Effecting parties:** Individuals or industries whose action or inaction may cause changes to the
793 marine or social environment that affects an MPA. One example is the owner of a foreign oil
794 tanker that spills oil in an area designated as an MPA; another would be coastal developers and
795 residents, upstream farmers, municipal water authorities, or businesses the activities of which
796 affect water quality or other ecological processes important to maintaining the ecological
797 integrity of an MPA.
798

799 **Interested party:** An individual, group, or organization with direct and expressed interest in an
800 MPA through a recognized stake in the outcome—or a more general concern with the issues
801 involved. Interested parties could be users of an MPA (for example, for ocean transportation,
802 tourism, national defense, or fishing) or of the products of an MPA (i.e. fish that are protected in
803 an MPA and travel outside of it). They could also be parties that are more broadly concerned
804 about ocean management or marine conservation.
805

806 **Lasting:** Enduring long enough to enhance the conservation, protection, or sustainability of
807 natural or cultural marine resources. As detailed in Table 1, the minimum duration of "lasting"
808 protection ranges from 10 years to indefinite depending on the type and purpose of MPA. An
809 "indefinite" duration of protection means that the intent at the time of designation is permanent
810 protection. The distinction between "indefinite" and "permanent" acknowledges that MPA
811 designation and level of protection may change for various reasons, including natural disasters
812 that may destroy or alter resources, or change in societal values.
813

814 **Protection:** Specifically established with the goal of providing an enhanced level of
815 conservation for part or all of the natural and cultural resources therein. Restrictions may range
816 from managed use to no access.
817

818 **Marine environment:** Ocean waters and seafloors, including intertidal areas (to legally
819 mandated high tide levels), estuaries (extending upstream to 0.5 ppt salinity), and the Great
820 Lakes.
821

822 **Marine resource:** Any living or non-living entity in the marine realm that contributes to
823 ecosystem processes or services and/or is used or otherwise valued by humans. (adapted from
824 Daily, 1997).
825

826 **Monitoring and evaluation:** The process—based on independently reviewed natural and social
827 science, as well as other information—of determining whether, and to what extent, an MPA has
828 met or is on course to meet its specified goals and objectives, and whether modifications are
829 warranted.
830

831 **Natural heritage MPAs:** MPAs established and managed principally to sustain natural
832 biological communities, habitats, ecosystems, and processes, and the ecological services, uses,
833 and values they provide to this and future generations. (MPA Center, 2004).
834

835 **Representative examples of the nation's major marine ecosystems and habitats:** areas that
836 are characteristic of recognized major categories of ecosystems and habitats. An **ecosystem**
837 comprises all the species that occupy a habitat, the nonliving environment included within, and
838 all biotic and abiotic interactions and processes included within. A **habitat** is a place where
839 species normally live, typically characterized by dominant physical features and/or structurally
840 dominant organisms. (adapted from Art 1993).
841

842 **Reserved:** Legally established by Federal, State, territorial, tribal, or local governmental
843 authority.
844

845 **Species at risk, threatened, or endangered and their critical habitats:** An **at-risk species** is a
846 candidate for threatened or endangered status. According to the U.S. Endangered Species Act
847 (ESA) of 1973 (Pub. L. 93-205, 87 Stat. 884, 16 U.S.C. § 1531 - 1534). An **endangered species**
848 is "in danger of extinction throughout all or a significant portion of its range." A **threatened**
849 **species** is "likely to become an endangered species within the foreseeable future throughout all
850 or a significant portion of its range." The ESA further defines **critical habitats** for a threatened
851 or endangered species as "(1) the specific areas within the geographical area occupied by the
852 species, at the time it is listed in accordance with the provisions of the Endangered Species Act,
853 on which are found those physical or biological features (a) essential to the conservation of the
854 species and (b) which may require special management considerations or protection; and (2)
855 specific areas outside the geographical area occupied by the species, at the time it is listed in
856 accordance with the provisions of the Endangered Species Act, upon a determination by the
857 Secretary of the Interior or the Secretary of Commerce that such areas are essential for the
858 conservation of the species."
859

860 **Stakeholder:** Individuals, groups of individuals, organizations, or political entities interested in
861 and/or affected by the outcome of management decisions. Stakeholders may also be individuals,
862 groups, or other entities that are likely to have an effect on the outcome of management
863 decisions.
864

865 **Stewardship:** A commitment to careful and responsible management of individual MPAs and
866 the national system of MPAs to ensure that the goals and objectives are being achieved for the
867 benefit of present and future generations.
868

869 **Sustainable use:** The extraction and/or utilization of a living or non-living resource in a way that
870 enhances social and economic benefits from that resource, with the goal of conserving the long-
871 term viability of that resource with acceptable environmental impacts. In short, the goals of
872 sustainable use include ecological, social, and economic viability.
873

874 **Sustainable production MPAs:** MPAs established and managed principally to support the
875 continued sustainable extraction of renewable living resources within or outside the MPA by
876 protecting important habitat, including but not limited to spawning, mating, or nursery grounds,
877 or providing refuges for by-catch species. (MPA Center, 2004).
878

879 **System:** The national MPA "system" consists of MPAs of all types, purposes, and jurisdictions
880 in state and territorial marine waters and Exclusive Economic Zone of the United States,
881 including the Great Lakes, the purpose of which is to enhance the conservation of natural and
882 cultural marine resources.
883

884 **Unique biophysical and geological features:** Natural structures on the seafloor (e.g., submarine
885 canyons, hydrothermal vents, volcanoes, pinnacles) and unusual oceanographic features (e.g.,
886 locally prominent upwelling areas and oceanic fronts) that are rare or uncommon, including
887 associated biological assemblages.

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DRAFT

TABLE 1: DEFINITIONS OF "LASTING" PROTECTION FOR MARINE PROTECTED AREAS

Executive Order 13158 defines a marine protected area (MPA) as involving "lasting" protection. This table provides minimum durations¹ defining "lasting" protection for all three categories of MPA², including relevant subcategories based on primary conservation goals. Note that all MPAs have a maximum possible duration of protection that is indefinite³. This table addresses only the issue of the duration of protection, and does not address the issue of level or type of protection, which may vary widely according to the specific goals of each MPA. Footnotes following the table are essential for understanding these definitions.

MPA CATEGORY & Sub-Category	MINIMUM DURATION OF PROTECTION	RATIONALE FOR MINIMUM DURATION OF PROTECTION
NATURAL HERITAGE MPA:		
Living Natural Resources (i.e., species, populations, ecological communities, and/or ecosystems, including habitats and ecological processes)	10 years	<ul style="list-style-type: none"> • <i>procedural</i>: time required for public and stakeholder involvement, regulatory processes, and at least 5 yr of scientific and other monitoring and analysis, including independent review in an adaptive-management framework. • <i>scientific</i>: response rate of species, populations, ecological communities, and/or ecosystems and their associated features are determined by the generation time⁴ of focal species.
Large-Scale Non-Living Natural Resources ⁵ (i.e., larger geological features that are well-documented and permanent from the human perspective, some examples being submarine canyons, volcanic features, seamounts, and pinnacles)	indefinite ³	Representative, unique, rare, or uncommon seafloor features are irreplaceable and sufficiently valued to be preserved for present and future generations.
Small-Scale Non-Living Natural Resources ⁵ (i.e., smaller geophysical features that may be poorly documented and/or ephemeral from the human perspective, some examples being hydrothermal vents, methane seeps, submarine freshwater springs, and sand "waterfalls")	10 years	<ul style="list-style-type: none"> • <i>procedural</i>: time required for public and stakeholder involvement, regulatory processes, and scientific monitoring of the persistence of a geophysical feature in an adaptive-management periodic review. • <i>scientific</i>: poorly documented features may be more common than previously assumed and/or features may be ephemeral, both cases justifying occasional adaptive-management review.

MPA CATEGORY & Sub-Category	MINIMUM DURATION OF PROTECTION	RATIONALE FOR MINIMUM DURATION OF PROTECTION
CULTURAL HERITAGE MPA:		
Archaeological Resources (i.e., artifacts, shipwrecks, and other archaeological sites or objects, including human remains)	indefinite ³	Some archaeological features may degrade over time, requiring periodic survey and assessment followed by adaptive management, yet the intent is that these features are irreplaceable and sufficiently valued to be preserved for present and future generations.
Tribal/Indigenous Cultural Resources	indefinite ³	Continued access to and sustainable use of resources in an area may be paramount to a culture's identity and/or survival.
SUSTAINABLE PRODUCTION MPA:		
There are multiple possible sub-categories, all of which are designed to protect focal species, and may protect supporting ecological communities and ecosystems, including habitats and ecological processes.	10 years	<ul style="list-style-type: none"> • <i>procedural</i>: time required for public and stakeholder involvement, regulatory processes, and at least 5 yr of scientific and other monitoring and analysis, including independent scientific review in an adaptive-management framework. • <i>scientific</i>: response rate of species, populations, ecological communities, and/or ecosystems and their associated features are determined by the generation time⁴ of focal species. Also, large-scale oceanographic cycles (e.g., El Niño-Southern Oscillation and Pacific Decadal Oscillation) occur on multi-year time scales.

Footnotes for Table 1: Definitions of "Lasting" Protection for Marine Protected Areas:

1. The "**duration**" of protection is defined as the time period an MPA (or candidate site) has been designated to exist, regardless of how long that MPA (or MMA) has actually existed. For example, a 3-year-old MPA designated to exist for 25 years is considered to have a 25-year duration of protection. The specified **minimum durations of protection** are also based on the following general considerations:
 - (a) any MPA may have an indefinite³ duration if specified by legal authority;
 - (b) MPAs with only seasonal protection must provide that protection at a fixed and regular period each year that corresponds to the timing of a predictable ecological process or anthropogenic threat (otherwise the absence or removal of such explicit periodic protection means that the site is no longer an MPA);
 - (c) management of all MPAs must include the plans, capacity, and resources to conduct regular and meaningful monitoring and analysis to assess and evaluate performance; and
 - (d) the specified minimum durations of protection incorporate the times estimated to be required for: (i) the MPA to become fully functional after establishment; (ii) some effect of the protection to occur, especially in the case of MPAs that protect living resources; (iii) a statistically valid trend in performance to be monitored and assessed; and (iv) the appropriate adaptive-management response to be taken based on the results of monitoring and analysis, which may include alterations or de-designation of the MPA.
2. For detailed definitions of the three **categories of MPA**, see MPA Center publication "A Classification System for Marine Protected Areas in the United States: A Tool To Understand What We Have And What We May Need" (January 2004).
3. An "**indefinite**" duration of protection means that the intent at the time of designation is permanent protection. The distinction between "indefinite" and "permanent" acknowledges that MPA designation and level of protection may change for various reasons, including natural disasters that may destroy or alter resources, or change in societal values.
4. At least one full **generation**, at a minimum, is necessary to determine the trajectory of protected biological populations inside an MPA or regional populations ecologically linked to that MPA.
5. **Non-living natural resources** that are protected principally to conserve their associated marine life are, by definition, subsumed within the sub-category of living natural resources (as the habitat for those living resources).