6.0 Summary of Findings

The overall goal of this evaluation is to identify best practices that can assist agency managers and planners in improving stakeholder processes used to design and implement MPAs. The case studies clearly provide a wealth of specific lessons that form the basis for broadly applicable generalizations and recommendations. However, the case studies just as clearly show that one uniform or consistent set of approaches will not fit all situations. Thus, while the evaluation's basic intent is to move from the specific to the ideal (i.e., here is what actually happened and here are some ways it might have been made more effective), there is an equal emphasis on identifying the contexts that suggest when one approach would be preferred over another. In addition, the case studies demonstrate that the effectiveness of individual design elements or tactics is strongly dependent on the choice and application of other design elements. The findings and recommendations below therefore depend heavily on cross comparisons of lessons from multiple case studies and are often framed in "if – then" terms (as in, "if" this set of circumstances exists, "then" proceed this way and not that way).

The findings below are organized in terms of the four main process themes used to structure the core evaluation questions:

- Setting the stage
- Working with stakeholders
- Decision making
- Evaluation.

Each theme includes broadly applicable lessons, differences and similarities in lessons learned across multiple case studies, and context-based recommendations for future efforts.

6.1 Setting the stage

Initial process design is, or should be, dominated by the legal mandate and policy direction, local marine management and conservation history, goal setting, the selection of stakeholder participants, and the establishment of the structure of stakeholder groups and the rules governing their interactions. The case studies vary widely in terms of these features, as summarized in Table 1. It is important to note that these features are not all controllable to the extent process planners might desire.

Table 1. Factors involved in setting the stage for the processes in each of the case studies.

Case	History	Goals	Participants	Group structure	Rules
San Juan County/Northwest Straits bottomfish recovery zones	Earlier failed federal effort Local resentment against ambitious efforts motivated by external forces	Original federal effort not specific Focused tightly on groundfish in subsequent local effort	Local governments, agencies, residents	Federal/State led public meetings to vet sanctuary led to county-formed Marine Resources Committees and umbrella NW Straits Commission	None formalized
Marine Life Protection Act	Report criticizing the existing MPA system in state Advocacy promoring MPAs Concern re stock declines	Established in law but specific outcomes ambiguous	State agency staff Scientists Ad hoc stakeholder groups, then regional planning teams	Science team working in isolation with inadequate resources Stakeholder feedback in us vs. them setting, then regionally independent multistakeholder teams	None formalized
Channel Islands	1970s Supreme Court case re state jurisdiction Proposal from sport fishers Assertion of state authority by F&G Commission Agreement between state and federal agencies Advocacy re MPAs Concern re stock declines	Initially vague, then focused on achieving specific percentage set-aside	All major stakeholders	Stakeholder group advised by separate science and socioeconomic panels meeting in parallel	Formal and explicit groundrules
Gulf Grouper	Emerging concerns re changes in population abundance and structure	Catch reduction measures PLUS focus on protecting spawning aggregations	Customary Council participants	Customary Council bodies	Customary Council process
Tortugas	Earlier sanctuary designation Earlier reserve designation effort unsuccessful	Initially vague, then focused on protecting specific habitats	All major stakeholders	Single multistakeholder group	Formal and explicit groundrules
Horseshoe Crab	Emerging concerns re decline in crab stocks and effects on shorebirds	Reducing stock decline by reducing catches and allocating reductions equitably, then protect specific, known crab spawning habitat	State and federal managers, biomedical industry, shorebird advocates and fishermen	Customary ASMFC bodies	Formal and explicit groundrules re: • ASMFC process • Federal rule making process Informal negotiations among stakeholders

6.1.1 History
The history of events leading up to the designation effort in each case study varied widely and, in some instances, exerted a dominant influence on the process as well as on the eventual outcome. For example, the successful implementation of voluntary groundfish closures in the San Juan County case was preceded by – and, by many accounts, would not have happened without – a lengthy and ultimately unsuccessful effort to designate a national marine sanctuary in the area. The fact that the sanctuary process was initiated and promoted from outside the region, combined with its poorly articulated goals and inconsistent federal and state leadership, led to a deep-seated local suspicion of any MPA effort not locally originated and led. Past history also affected stakeholders' attitudes toward MPAs in the Tortugas case, where the often-contentious establishment of the Florida Keys National Marine Sanctuary and management plan helped to clarify issues, highlight pitfalls to avoid, and identify local leaders capable of managing a designation process.

The MLPA case provides an example of how a designation effort can itself create history that strongly influences stakeholder attitudes and subsequent changes to the overall process design. Resentment at the initial phase of this process (in which a planning team of scientists developed an initial set of maps in isolation) was so extreme that the lead agency halted the effort and then restarted it with a new process design.

History can thus be critically important and the nature of its influence will differ from process to process. Early planning efforts must therefore include a thorough assessment of past history and its potential effects on stakeholder perceptions and the goals they will agree to, as well as on their willingness to participate in any planning process, and the sorts of process structures and groundrules they will accept. This assessment should include an evaluation of the sorts of leverage, both positive and negative, that history can provide. For example, in the San Juan County case, strong resistance to any outside, federally led effort meant that stakeholders were more receptive to a local, grassroots process. As another example, in the Gulf Grouper case, the Council's experience with negotiating fishery management provisions provided a ready model, though not necessarily an elegant one, for crafting an agreement on a closure to protect grouper spawning aggregations. As a rule of thumb, past history will always provide insight into the current situation, as well as guidance on achieving leverage (either from going with or against the grain of past events). The key is knowing how to interpret that history to achieve one's ends.

6.1.2 Motivations, goals, and overlapping jurisdictions
It is a truism that collaborative stakeholder processes depend on clear and broadly accepted goals and objectives for their success. However, the case studies demonstrate that, for a variety of reasons, achieving such clarity and acceptance is often considerably harder than it seems. Further, goals that seem explicit in the abstract can turn out to be vague, ambiguous, or mutable in practice. The articulation and ongoing management of goals and objectives was one of the most challenging elements in several of the case studies examined.

One potential source of confusion about goals and objectives is the fact that, depending on the impetus for a particular MPA designation effort, there may be quite different goals associated with the enabling legislation, with the individual MPA itself, and with the process used to establish the MPA. The linkage between fundamental enabling legislation and the goals of a specific MPA is often not explicitly considered, with the result that the process design does not target primary goals and objectives. This failure can be even more problematic where the enabling legislation is vague, such as in the MLPA, where stakeholders' interpretations of the act's intent were at odds and the Department of Fish and Game failed to establish control of the message. This difficulty can be compounded by the interplay of local, state, regional, and federal authorities.

The Channel Islands case study provides a useful illustration of these issues, including the impact of overlapping state and federal authorities, which stemmed from the presence of both a national park and a national marine sanctuary around the Islands, as well as a U.S. Supreme Court decision in 1978 that affirmed California's authority to manage submerged lands under the Submerged Lands Act. Thus, while the Channel Islands National Marine Sanctuary had a fundamental interest in marine resources within the sanctuary boundary, it did not have sole authority to manage activities in the marine environment in state waters. These overlapping authorities were resolved in the Channel Islands case by identifying the national marine sanctuary as the lead agency for developing a recommended MPA design in state waters, which would then, in cooperation with the state Department of Fish and Game, be submitted to the California Fish and Game Commission for final approval.

The broad (and somewhat vague) set of goals defined by the Channel Islands Marine Reserves Working Group (MRWG) thus did not fit comfortably within the responsibilities of any single agency, a situation complicated by the fact that working relationships among the three federal agencies (National Marine Sanctuary Program, National Park Service, National Marine Fisheries Service) with responsibilities relevant to the MRWG process were not always smooth. Thus, for example, the MRWG's goal of enhancing sustainable fisheries was not a goal of the Sanctuaries Act, though it was a major goal of the Fish and Game Commission. In addition, some stakeholders commented that the fundamental tension between sustainable use and complete protection in various agency perspectives was never resolved. Key participants in the MRWG process said that, in hindsight, more attention should have been paid to identifying and resolving this network of overlapping responsibilities and establishing more explicit processes for communication, especially between the state and federal agencies involved.

A similar situation occurred in the federal sanctuary designation effort in the Northwest Straits, where uncertain and potentially conflicting goals between various federal and state agencies confused stakeholders and undermined their confidence in government's ability to successfully lead the effort. Indeed, the inability of government agencies to agree on what the goals of the sanctuary effort should be, or even whether a sanctuary was necessary or appropriate, was cited as a major factor in its demise. "A strong federal-state partnership never materialized," one participant lamented, and agencies charged with vetting the process were left "largely on their own" in the face of increasing public hostility.

In the Tortugas, the other case study with a web of interacting agency responsibilities, a long history of ongoing processes to consider and develop marine zoning plans and protected areas had resulted in a more coordinated set of interagency working relationships. This, in turn, helped the working group develop a more coherent set of goals founded explicitly on the guiding and broadly accepted notion that ecological reserves would be established in the region. Here, too, the process was made complex by a combination of state and federal waters, national park, and required approvals by the fishery management council, governor and cabinet. These relationships were tested during the designation of the Florida Keys National Marine Sanctuary and development of the management plan, so participants had more experience with each other and each others' institutional requirements.

In contrast, lines of authority were simpler in other case studies. For example, the San Juan County bottomfish recovery zones (BRZ) were developed and implemented entirely by county commissioners working in collaboration with grassroots participants energized by the deep desire to demonstrate that a federal sanctuary was not necessary to achieve resource protection. United by a common goal to avoid federal or state regulation, the BRZ process focused tightly on goals important to local participants and the unwavering commitment to succeed. This was in stark contrast to the earlier federal effort to designate a sanctuary in the region, whose goals were so vague that even proponents could not articulate what a sanctuary would mean for the region.

In a manner analogous to the local San Juan County process, the grouper closures in the Gulf of Mexico were considered and resolved within the context of the existing fishery management council decision process. In the Horseshoe Crab case, authority was passed in sequence from the states to an interstate body to federal managers. There, too, they were resolved within an existing fishery management process. While this process is not necessarily suitable for broader ecosystem management concerns, in cases such as these, where the concern is single species management, the existing fisheries management system can be a useful vehicle.

Despite its importance, the relative complexity of a designation process's management structure is not the only determinant of whether clear and explicit goals and objectives can readily be developed. Two other factors play a key role. The first is the nature of the immediate motivation or impetus for the effort. The second is the design of and the preparation for the planning process itself. As discussed below and in Section 6.1.3, these two factors interact strongly.

The original impetus for the designation efforts considered differed widely. In two cases, grouper and horseshoe crab, the impetus was a change in resource status that triggered a statutory requirement for action to reduce fishing mortality. Even though resource protection was also a motivation in the San Juan County case, more compelling was the desire to do something specifically local, and this was reflected in the goal to protect a specific resource of local importance. Not insignificantly, both San Juan County and Tortugas 2000 were also motivated by the real or perceived notion that, in the words of one participant that reflect the sentiment of many, "if we didn't do it the feds would do it to us." In contrast, the Channel Islands effort was initiated by a request from sportfishing interests to set aside 20 percentof the area around the Islands. This request was made in a policy environment characterized by active advocacy efforts in California to use reserves to compensate for perceived failures of the conventional fishery management system, efforts that also gave rise to the MLPA. The goals in both the Channel Islands and MLPA cases were thus broad and somewhat vague (e.g., in the Channel Islands to achieve "sustainable fisheries by integrating marine reserves into fisheries management" and in the MLPA to improve the management of California's MPA system).

Defining precise goals will not always be possible, however, nor will such a narrow focus be suitable in all circumstances. A comparison among the San Juan County, Channel Islands, MLPA, and Tortugas cases provides useful rules of thumb for situations that involve broader and less well defined motivations and/or goals. In all four cases, the designation effort stemmed from desires to protect broad aspects of habitat and fisheries, as opposed, for example, to a perceived need to safeguard a specific spawning area. While the Tortugas and San Juan County working groups achieved consensus on a system of closures, the Channel Islands and MLPA processes did not, and left residues of conflict and mistrust that are still being worked out, particularly for the Channel Islands case, in a variety of legal and management arenas.

The histories of both the San Juan County and Tortugas designation efforts show, however, that their ultimate success was preceded by failures analogous in many ways to those of the other two cases. A primary difference, apparent in hindsight (Figure 9), is that the San Juan County and Tortugas efforts had the time (although for somewhat different reasons) to move from earlier efforts characterized by diffuse goals and lack of agreement to more specific and tangible goals that formed the basis for an effective consensus. As one key result, participants in both processes were motivated to support the reserve design because they perceived clear potential benefits to their specific interests. In contrast, participants in the Channel Islands and MLPA processes were presented only with more global benefits that they were skeptical of and/or had difficulty translating into personal terms. Consequently, many resources users were motivated largely by fears of economic loss and focused their efforts on spreading the expected economic pain as equitably as possible. In such situations, it is not uncommon to hear participants comment that "reserves are a solution in search of a problem." Future designation efforts motivated by less specific, or more general, goals should therefore either state explicit goals and benefits as a starting

point or, if this is not possible, allow the necessary time and process for these to mature to a stage that supports design efforts based on more concrete goals that embody and reflect participants' specific interests.

Figure 9. Qualitative representation of the relationship between the specificity of a designation effort's goals and the length of time involved in the process.
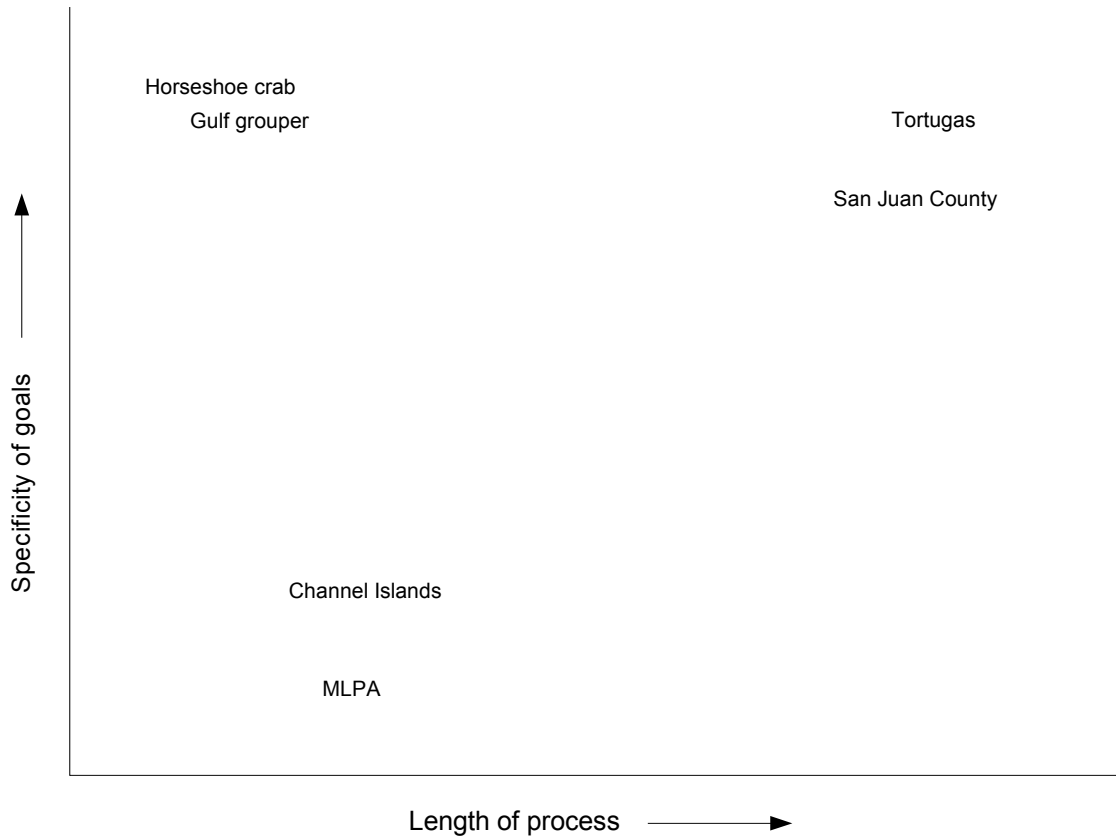
Even if it possible to distinguish and plan for use of an MPA as tool (means) versus MPA as goal (end), convenors and process managers should look at the full array of decision tools that are available and not feel locked into a complex consensus (Tortugas/Channel Islands) model or a rigid fishery management model. It may be possible to use some aspects of the more complex collaborative processes within the constraints of fishery management. For example, fishery management council structure allows for the creation of ad hoc committees, task forces, or workshops that fall outside the rigid timing that constrains plan amendment or regulatory change. If facilitation or other tools from collaborative process would be useful in this context, the planner can make such choices. By the same token, application of deadlines from aspects of agency decision or rulemaking (NEPA timelines, or other procedural frameworks) could assist the planner in constraining what might otherwise be an open-ended process without any predictable deadline. The interplay of process complexity and time is shown in Figure 9. The lesson of the diverse case studies is that each instance has attributes that require the planner to make distinctions and design the process to the circumstances. One process will not fit all situations.

6.1.3 Planning, structure, and participation
The effect of history on a particular MPA designation process, as well as issues related to motivation and goals, are typically dealt with in an initial planning effort that details the structure and groundrules of the planning process, as well as the participants to be involved. There is an extensive literature on planning

for collaborative processes in a wide range of resource management, land use, and regulatory contexts, all of which are relevant in some way to MPA designation processes. Rather than attempting to summarize and/or repeat it here, this section focuses instead on lessons to be learned from the specific circumstances of each case study.

The case studies differed widely in terms both of the amount and kind of up-front assessment and process design employed and the structures of the processes used in the planning efforts themselves. None of the six case studies conducted what could be considered a best-practices assessment and design effort, conducted by practitioners with specific expertise in process design. Instead, the stakeholder processes were typically designed by agency staff, with a greater or lesser degree of input from professional facilitators. For example, staff of the California Department of Fish and Game developed the MLPA process and stated in hindsight that they would have benefited greatly from expert process design input. Similarly, the Channel Islands MRWG effort was designed primarily by sanctuary staff, with little if any input from the professional facilitators hired to run the process. And the effort to designate a sanctuary in the Northwest Straits was run entirely by state and federal employees with no formal training in process design. In contrast, in the Tortugas 2000 process, even though the professional facilitator was brought in after the meetings had begun, his expertise contributed substantially to the creation of a process that moved forward to a conclusion most of the participants agreed was fair and successful

Table 2 presents a brief summary of key issues that should be assessed in planning an MPA designation stakeholder process. In Table 2:

- **Motivations** refers to the incentives that influence behavior,
- **History** refers to past events that have shaped the situation, including the roles, relationships, and perceptions of stakeholders,
- **Leadership** refers to leadership both within stakeholder groups, of the process as a whole, and at different levels within involved agencies,
- **Goals** refers to the specific goals of the process and how they are communicated
- **Structure** refers to the process design, including number and kinds of stakeholder and advisory groups,
- **Science** refers to the nature of available scientific information and to the role of science and scientists, and
- **Timeframe** includes schedule, deadlines, pacing

Table 2. Key issues to be assessed in planning for an MPA designation stakeholder process.

	Stakeholders	Structure	Science	Timeframe
Motivations	Perspectives, motivations, goals	How the structure is influenced or affects by different motivations	Whether new information leads scientists to make recommendation	How emerging or new perspectives can change timeframe
Relationships	Relationships among stakeholders	How the structure recognizes and capitalizes on relationships (opinion leaders, constituents) and between process manager and stakeholder	How science is used in the process How scientists relate to other each other and to other stakeholders	When in the process new information or research results become available
History	Who has been involved Past history of interaction	How well the structure leverages history of past events, interactions	Experience of participants with science in past decisions	How schedule and pacing take account of history
Knowledge	Relative distribution of different kinds of knowledge among stakeholders	How well the structure incorporates tools to teach/learn	Degree of knowledge about systems and processes directly related to problem/goals	Potential for new knowledge to be created within set timeframe
Skill	Relative distribution of process, content, organizational, campaign skills among stakeholders	How skill sets of process managers match up to requirements of the structure	Whether science skills match requirements of goals	Whether timeframe accommodates lack of skill or time for getting up to speed, for both managers and other stakeholders
Leadership	Leadership characteristics and potential within stakeholder groups Whether stakeholder representatives represent the entire sector or a subset	How authority is defined and distributed How structure is affected by leaders' influence How structure affects existing leadership	Senior or venerable scientists or other authorities as leaders	When in the process is leadership most critical? From what sectors?
Goals	Whether goals reflect stakeholder concerns Whether goals identify tangible benefits to stakeholders Whether stakeholders are involved in developing goals Whether stakeholders know source of goals they did not develop	Whether the structure is appropriate to the goals How the structure influences or is influenced by mandated goals	Whether goals reflect current science How goals depend on science to be measured or achieved Whether science is being used to develop and address goals or counter opposition	Whether schedule allows for needed evolution of goals

Partly as the result of the lack of input from process design specialists, some of the case studies encountered difficulties that stemmed directly from the process structure and/or groundrules. For example, the sanctuary designation effort that preceded the more local San Juan County process was characterized, in addition to extremely vague goals, by an inconsistent level of involvement by NOAA staff, poor follow through, erratic and confusing communication with stakeholders, and a poorly defined process. It therefore appeared to local stakeholders to be a fitful effort, managed from a distance by staff without a solid commitment to the process. As another example, the MLPA managers designed a process (Table 1) that involved an independent and isolated science team with the responsibility of developing the first draft of a proposed statewide network of MPAs. Because of its relatively small size and isolation, the science team had inadequate information about the distribution of habitats, resources, and fishing effort. Thus, the initial proposals produced by the science team, far from being received as a starting point for productive discussion, provoked fierce criticism and opposition from stakeholders who felt excluded and who could point to significant gaps and errors in the maps.

The Channel Islands MRWG process also included a separate science panel, structured to provide science advice to the stakeholder group that was meeting in parallel. This structure avoided the problems encountered by the MLPA process because it left the responsibility of map making to the stakeholder panel and had the two groups meeting in parallel. However, the Channel Islands structure engendered other problems. While one of the explicit goals of the MRWG was "to achieve sustainable fisheries by integrating marine reserves into fisheries management," the science panel included no scientists with expertise in stock assessment and other conventional fisheries management tools. In developing their recommendations, the science panel thus made the key simplifying assumption that there was no effective fisheries management in the area of interest, that is, as one panel member expressed it later, that "there was scorched earth outside the reserve." The absence of scientists with direct fisheries management expertise thus hindered the panel from developing more realistic assumptions, with the result that the science panel's recommendations were viewed with skepticism by many commercial and recreational fishermen, stock assessment scientists, and fisheries managers.

In addition, communication between the Channel Islands stakeholder panel (the MRWG) and the science panel flowed primarily through a single point of contact, who was widely perceived to be a strong advocate for the establishment of marine reserves. This separation between the two groups resulted in several MRWG members feeling that the science panel was not responsive to their concerns and, as one key MRWG member remarked, "The science panel kept answering questions we hadn't asked." While this sentiment was certainly not universally shared, the fact that much of the key scientific discussion occurred out of sight of MRWG members created a situation in which the most important scientific recommendation (i.e., to set aside a specific percentage of area) became a black box.

In contrast to the MLPA and Channel Islands cases, the multidisciplinary nature of the working group process in the Tortugas case, in which all stakeholders' knowledge was integrated and shared openly, worked to create a common body of knowledge and a collective starting point for discussion. This structure also served to build trust and understanding among participants who might have otherwise perceived their interests to be at odds. Because natural scientists and socioeconomic scientists worked as an integral part of the working group, stakeholders were able to more readily integrate their knowledge with formal scientific concepts and data. (The role of science and scientists is further addressed in the next section.)

In addition to demonstrating the need for careful up-front planning, the case studies also illustrate the importance of flexibility in adapting to unexpected events and opportunities. Thus, while the

MLPA case exemplifies the dangers of poor planning, it also illustrates how the Department of Fish and Game's willingness to reconfigure the entire MPA design process enabled it to potentially recover from its initial problems. In a different way, the horseshoe crab and Tortugas cases show how including new categories of stakeholder can expand the knowledge base, the range of options, and the support for reserve design. The addition of seabird advocates and the biomedical industry in the horseshoe crab case and Cuban American fishing interests in the latter, broadened the interest and audience for the process. The horseshoe crab case also illustrates how stakeholders took advantage of an unplanned suggestion for a spawning area reserve, moved the reserve designation from a state-level to a federal rule making context, and used an informal negotiation process to resolve the final design details. In this instance, adaptive process design worked largely because of the broad agreement that a problem existed, a narrow focus on a specific, scientifically supportable goal, and stakeholders' experience with and skill at ad hoc negotiation.

The case studies make clear that one process design will not fit all situations.. The amount of planning and structural process complexity varied widely across cases (Figure 10) and apparently had little direct relationship to overall success. Rather, a key correlate of success appears to be the extent to which the structure matched the fundamental purpose of the effort. For example, broad goals such as those articulated by the Channel Islands MRWG are extremely difficult to meet in a short period of time. Similarly, goals that depend heavily on science are difficult to meet in a structure that divides scientists from other stakeholders. As another example, it is possible to achieve tightly focused goals that are supported by a clear consensus about a problem or the strong desire to act (e.g., Gulf grouper and San Juan County), even when the process is as cumbersome as that in the regional fishery management councils. And finally, it can be useful to move the process from one venue to another, as occurred in the horseshoe crab case, as the nature of the problem shifts or evolves.

Figure 10. Qualitative depiction of the amount of planning and structural process complexity involved in each case study.
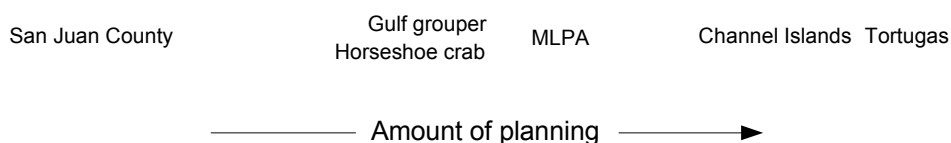
6.1.4 The role of science (and scientists)
The role of science is a recurring theme in all the case studies and deserves particular attention. It is important to consider not only the role of science (as abstract knowledge) but also that of scientists themselves. Not only are there often competing interpretations of available scientific evidence, but even widely accepted abstract knowledge is communicated, synthesized, and used by scientists. Their relationships (both structural and informal) to other stakeholders thus have a large influence on events. Because scientists are people, too, their role must be considered as carefully as that of other stakeholders and the process must be structured so that scientists play a constructive role.

The cases illustrate different approaches to building science and scientists into an MPA designation process (Table 3) and provide the basis for developing useful rules of thumb for process managers.

Table 3. Summary of the roles played by science and scientists in each case study.

Case	Structure	Science role	Scientists / stakeholder relationship	Maps
San Juan County (post sanctuary effort)	Scientists integrated into advisory group	Provide evidence in support; research inside zones	Worked collaboratively	Produced by stakeholders
Channel Islands	Separate science panel	Provide overall design target and boundary conditions	Worked separately but with some communication	Produced by stakeholders
MLPA	Separate plan team	Provide starting point for planning	Worked in isolation	First maps made by scientists
Gulf Grouper	Scientific and Statistical Committee initiated proposal	Provide justification in form of data; boundary information Described research to be done	Worked collaboratively with pro-reserve advocates	Produced by managers, stakeholders and scientists
Tortugas	Scientists integrated into stakeholder group	Provide design information	Worked collaboratively	Produced by stakeholders and scientists
Horseshoe Crab	Scientist initiated MPA proposal	Provide justification for MPA	Worked collaboratively	Produced by managers, stakeholders, and scientists

The previous section summarized some significant structural differences among the MLPA, Channel Islands, and Tortugas case studies in terms of the roles played by science and scientists. In addition, other features of the cases are worth noting.

In the Channel Islands case, the science panel was chaired by a political scientist, who was appointed chair by default because of his position on the sanctuary's Advisory Committee (SAC). While some science panel and MRWG members felt this enabled him to remain focused on more important and higher-level issues, others felt strongly that his lack of natural science knowledge enabled some stronger-willed members of the science panel to become de facto chairs and direct the panel's deliberations. Whatever the truth of the situation, it seems clear that process managers should have the ability to choose appropriate chairs or leaders of key advisory and stakeholder groups.

In many instances, "science" is understood to mean the "hard" biological and physical sciences, with the result that socioeconomic or cultural science are given less attention and resources. Thus, for example, the MLPA process made no provision for socioeconomic studies to assess the impacts of alternative reserve network designs, an omission that angered stakeholders and made it extremely difficult to assess the relative equity of competing proposals. And the lack of broad tribal scientific or cultural input into the San Juan County BRZ measures remains a major source of contention. Similarly, it was lack of consideration of socioeconomic impacts that contributed to the vulnerability of the grouper closure to legal challenge. In contrast, the Channel Islands process included a separate socioeconomic panel that conducted detailed data gathering and

analysis of alternative reserve designs. Because it worked closely with stakeholders, the socioeconomic panel generated none of the misgivings that some stakeholders held regarding the science panel's work. In the Horseshoe Crab process, the strength of a socioeconomic study and the inclusion of high economic profile interest groups helped get a new regulation past a federal administration with a declared antagonism to new environmental rules.

Decisions about how to use science and scientists must be carefully considered. It is essential to avoid stopping with superficial descriptions such as "science-driven process" but instead to push for explicit decisions about the role science and scientsts will play. There is no right answer, although there are some rules of thumb that jump out from the case studies, including:

- Remember that scientists are people, with motivations and biases like other stakeholders
- Do not assume that all scientists have equivalent expertise or similar views on key issues related to MPA design and management
- Do not separate scientists from other stakeholders
- If there must be a distinct science advisory group, then ensure stakeholders are evenly represented and provide for broad channels of communication to other stakeholder groups
- Do not have scientists alone make maps, even of seemingly noncontroversial features such as topography, oceanography, and habitat types
- Ensure that scientists are selected to match the overall goals (e.g., if rebuilding stocks is a major goal, then include stock assessment scientists)
- Be explicit about the role science will play in the process.

6.2 Process management
To the degree that planners can incorporate or anticipate most or many of the above considerations in the way they plan a stakeholder process, they can ease the job of process management. Process management is dominated by political and policy considerations, leadership issues, conflict management, and reserve design (i.e., map making) (Table 4). It can be helped or constrained by availability of resources, including the capacity of the staff managing the process, and the timing and pace of the process. If these considerations are not integrated during the work of setting the stage, they can become obstacles later. Similarly, if the role of science has been clearly delineated in the planning stage, dealings with science and scientists may not rise to a level that must to be "managed," but simply guided in accordance with the plan.

Table 4. Variation across the case studies in the major features of process management.

Case	Political considerations	Leadership	Conflict management	Map making
San Juan County	Sanctuary legislated by Congress and affected by lack of political leadership County activities motivated by desire to show grass roots success for Congressional delegation	Sanctuary suffered from lack of leadership to support process Effective leadership in opposition	No formal or effective conflict management in sanctuary process	Sanctuary maps were proposed but ineffective County maps made by stakeholders, who identified BRZs
MLPA	Goals and timeline set by law Context of active reserve advocacy	State agency with limited resources and capacity Fragmented leadership statewide in some stakeholder groups	Initial conflict a surprise, no provision for conflict management	Initially conducted by science team in isolation
Channel Islands	Context of active reserve advocacy Shared decision making between state and federal agencies	No single strong leader among stakeholders Science panel affected process through their strong design recommendation	Groundrules for consensus that were not consistenty enforced	Conducted by stakeholder group within % of area constraints established by science panel
Gulf Grouper	Context of active reserve advocacy Existing fishery management framework available History of allocation conflict	Fishery management council and well organized interest groups	Council votes on majority rule, no provision for conflict management	Conducted in public council process (in committees)
Tortugas	Reserves as unfinished business of sanctuary effort History of interstate allocation conflict	Strong and charismatic leadership, skilled facilitator	Groundrules for consensus consistently enforced	Stakeholders produced while working together around table
Horseshoe Crab	Growing concerns over the population and its links to shorebirds Context of environmental protection in political campaign	Scientists, state and federal managers, interest groups	Informal but within rules of administrative procedure and federal rulemaking	Conducted by federal agency staff in consultation with state resource managers and enforcement staff

6.2.1 Political ecology considerations
There are important economic, cultural, and institutional elements that influence how MPAs can be structured, how they will function, and, ultimately how successful they will be in achieving their objectives. Many of these human elements were to a large degree absent from the planning of the MPAs in the case studies, or became a consideration only after MPA boundaries, drawn by scientists and managers, gave rise to objections about their economic effects. The reported ecological and economic benefits of MPAs notwithstanding, the planning, design and designation of areas restricting some or all prior human uses becomes a progressively more political and economic activity (rather than a strictly scientific one) as planning proceeds, and as such requires an understanding of human behavior and institutions. "Political ecology" refers to institutional settings, such as other ongoing resource decision processes, as well as community or stakeholder group decision processes. An MPA process layered over the existing resource management and/or socioeconomic context without any particular accommodation to it is likely to create new costs and conflicts and to be vulnerable to human behavioral dynamics that can distort a design process and divert it from its stated objectives (Hanna 2003).

For example, the initial federal effort in the Northwest Straits failed to understand the political dynamic motivating much of the local resistance to the sanctuary designation effort. It thus missed an opportunity to build bridges to local constituencies by opening satellite offices in key strategic locations. At another level, an undercurrent of political tension between federal agencies participating on the Channel Islands MRWG hampered its ability to achieve its goal of integrating the reserve with existing fisheries management policies. Political considerations can also play an important role within interest groups, either enhancing or diminishing their relative power and/or effectiveness. Thus, sportfishing groups in California and Florida were united in their opposition to important aspects of the proposed closures around the Channel Islands and off the Florida coast, a reflection of their existing organization and leadership. Political considerations at the state and federal level can also affect an MPA planning process, as may have occurred in the horseshoe crab case where the Delaware governor's U.S. Senate campaign was perceived to have benefited from his strong support for the reserve.

The specifics of the political considerations in any one instance can be as varied as the participants involved and are almost guaranteed to vary markedly from process to process. This makes it difficult to develop simple process design guidance that fits all situations. However, an important design principle to remember is that politics exists and it matters greatly. MPA proponents and process managers ignore at their peril the human and institutional context within which MPAs will be designed and implemented. There is no such thing as a strictly "science-driven" process. Any process whose managers believe it is driven only by science run a large risk of being blindsided by the inevitable human and institutional reactions to perceived patterns of costs and benefits, on a variety of levels. However, given the sometimes dominant importance of political considerations, this should not be interpreted as recommending a duplicitous or manipulative process design and management approach. Rather, planners and managers should treat political ecology as the natural expression of inevitable human and interest group dynamics that reflect stakeholders' genuine interests and perceptions.

6.2.2 Constructive partnerships
One way to try to anticipate and perhaps even avoid having interest groups use stakeholder process for political ends is the formation of constructive partnerships with affected parties. For example, establishing partnerships to collect information and monitor the condition of the MPA once designated can contribute to buy-in. In the cases of the gag grouper closures, the Tortugas, and the San Juan County BRZs, the knowledge of fishermen was used to develop site proposals at the outset. After the designation of the gag closure areas, the challenge from commercial

fishermen was turned into a cooperative data collection effort to look at the effect of pelagic trolling in the closed area. The work of a university scientist with eel and whelk fishermen on the Atlantic coast led to successful development of bait bags that eased the loss of the reserve area for horseshoe crab catches. Successful methods for designing cooperative data collection projects between fishermen and government agencies have been reviewed by Bernstein and Iudicello (NFCC 2003) and the National Research Council (NAS 2003).

Constructive partnerships can provide opportunities for interagency communication and work as well. This not only can avoid the stakeholder conflicts inherent in closing areas of the ocean to prior uses, it could avoid additional conflicts that arise when other managers—in fisheries, coastal development, community planning, transportation—begin to work on their respective pieces of the puzzle. Goals developed by cooperating partners could provide a framework for planning at many levels as well as opportunities for coordinating inter/intra-agency information and research. For example, NMFS was able to use a socioeconomic study conducted for the U.S. Fish and Wildlife Service in making its argument to close the horseshoe crab area in Delaware Bay.

6.2.3 Leadership
Effective leadership of MPA stakeholder processes is widely recognized to be critically important and its essential elements difficult to define. Nevertheless, participants in the case studies were clear in their judgments about when effective leadership had (or had not) been exercised.

In the early federal effort to establish a sanctuary in the Northwest Straits, U.S. Representative Lowry provided the initial high-level political leadership that helped to jump-start the process. However, after that, there was an apparent absence of consistent leadership and commitment from both state and federal elected and/or appointed officials. This was paralleled by an equally debilitating perception of a lack of consistent leadership at the process level, related to facilitation and conflict management of a large-scale and potentially volatile initiative. In contrast, the later county-led effort to establish bottomfish recovery zones was led collectively but effectively by county commissioners, building on a broad base of popular antipathy for any process led from outside the region.

In the MLPA case, the state agency's lack of institutional capacity ("we're biologists, not facilitators") hamstrung agency managers' ability to provide effective leadership for the process of designing a statewide network of MPAs. In this case, managers' efforts to provide leadership were counterproductive until they had accumulated enough practical experience to begin making more informed decisions about the process design. They were provided the breathing space to do so by the collaborative action of several stakeholder groups that persuaded the California Legislature to extend the deadline for establishing the MPA network. However, at a more fundamental level, the initial decision to place (or leave) biologists without process design knowledge in charge of MLPA implementation indicated that at the policy-making levels of the agency there was insufficient understanding of the potential for conflict and controversy in this process.

Somewhat different leadership issues arose in the Channel Islands case. The sanctuary convened the MPA process but also had a voting seat on the stakeholder group (MRWG), a potential conflict of interest that engendered an undercurrent of suspicion among some participants about the sanctuary's motives. In the Tortugas, in contrast, a charismatic and popular leader helped inspire collaboration while a strong and skilled facilitator shaped and implemented an effective process.

De facto leadership can also come from unexpected quarters, as the role of scientists in two case studies illustrates. In the horseshoe crab case, Dr. Carl Schuster, a widely respected scientist, pointed out that the "heart of the spawning population" at the center of Delaware Bay had not been protected and suggested a closed area. His stature and credibility were such that this suggestion was sufficient to initiate the successful effort to designate the reserve, even though the idea of a closed area had not entered any of the previous years' discussions about reducing fishing mortality. In the Channel Islands case, the science panel's recommendation that a minimum area be set aside in the reserve framed the MRWG's map making and negotiations throughout the remainder of the process.

In addition to leadership at the larger political and process management levels, leadership at the interest group level also played an important role in several cases. Unless stakeholder representatives can speak for their constituents, and communicate to them what is occurring in the process, they will be ineffective. While representatives' ability to usefully communicate with their constituents can be constrained by resources (e.g., time and money for outreach), their perceived stature in their community is typically even more important. In the early stages of the effort to designate a sanctuary in the Northwest Straits, leadership from national environmental groups was not well received in the region. Although these groups did much of the communication and advocacy at the sanctuary program level, they were not seen as "speaking for" local residents who would be affected by a designation, largely regardless of their view of the proposal.

Two other factors were apparent from the case studies. First, the scope of action of stakeholder representatives is limited by their constituencies' willingness to modify their own positions. For example, one group of commercial fishermen in the Channel Islands process disavowed their representative when he moved too far out in front of them. Similarly, commercial fishing representatives on the Gulf council who initially went along with the notion of closures for gag grouper were overtaken by grassroots efforts by their constituents who were opposed to the notion. Second, the most visible person, such as a stakeholder representative, may not be the actual leader. Other people who work more in the background may exert more influence. It is an essential part of the political scoping process to identify these leaders.

The case studies make clear that there is no one locus of leadership sufficient for complex MPA designation processes. Rather, leadership is needed at the following levels, at a minimum:

- The political level that initiates the process, ensures that adequate resources and institutional support are available, and, if appropriate, uses the bully pulpit to inspire public support
- The upper levels of involved agencies that ensure a practical approach to planning and a consistent commitment and follow through on decisions
- The process level where facilitation, negotiation, and conflict management skills are crucial, and their consistent management essential
- The interest group level, where perceived stature, relationships with constituents, and communication skills are important.

In addition to a multilayered model of leadership, some of the cases showed that the locus of leadership can shift as the process evolves through different phases. Thus, the characteristics needed for the start-up and organizational phase are different from those needed for the negotiation and closure phase. For example, while Dr. Carl Schuster provided needed leadership to initiate planning for the horseshoe crab reserve, it was the Department of Commerce that managed the mechanics of the federal rule making process that implemented the reserve.

The management literature is replete with treatises on leadership in a wide variety of management contexts, many of them directly relevant to the process of MPA design, which is typically characterized by uncertainty, shifting circumstances, and stakeholders with their own power base. A set of leadership traits considered valuable in such situations includes:

- Intelligent and highly skilled leaders with a penchant for boldness and initiative
- A tolerance for errors as an essential part of a leader's learning process
- An ability to generate trust through confidence building and familiarity
- Relationship building based on honesty and frankness
- The primacy of the human element (as opposed to technology or rigid procedures) in decision making and leadership
- An understanding that effective communication is based on mutual understanding, built through shared experience
- A willingness to foster communication through long-term working relationships and direct, face-to-face contact
- An ability and willingness to demonstrate personal leadership through physical presence and involvement
- An understanding that MPA decision-making environments are typically chaotic, uncertain, and changing
- An ability to demonstrate flexibility, adaptability, and opportunism in taking advantage of changing situations.

Effective leadership is essential not only for initiating MPA design processes but for managing the conflict that inevitably arises.

6.2.4 Managing conflict

Conflict is unavoidable in any process that involves investigating and selecting new ways to manage and use natural resources. By their very nature these processes threaten the status quo, the practices, ways of life, and belief systems that have, sometimes for generations, defined and shaped individuals and communities. Whether one is a commercial fisherman, a Native American with treaty rights, a federal resource manager, or an environmental activist, the stakes involved are inextricably connected to deeply held values. And whether conscious or not, these values frequently inspire more reactive, positional bargaining, and seemingly intractable conflict.

While conflict may be unavoidable and even welcomed – a pearl is created by grains of sand rubbing against each other, the old adage goes – it does not have to dominate a process or necessarily cause it to degenerate into a series of counterproductive, polarizing, and divisive encounters. If managed carefully and strategically, conflict can be transformed into an opportunity to explore new ways of bringing people and communities together for common purposes (See e.g., Wondolleck and Yaffee 2000). Each circumstance is different, but, generally speaking, there are three levels at which value-laden conflicts can be addressed (Susskind and Field 1996).

First, skilled facilitation can assist stakeholders to discover and agree on shared principles and values. In the MPA context, these will typically focus on the desired status of resources. This may be as simple as agreeing that fish stocks are not as robust as they once were, or agreement that participants want to ensure their grandchildren enjoy the same opportunities they have had. Or perhaps the shared value is autonomy – the desire to create bottoms up, grassroots solutions to commonly understood problems. However, shared principles alone will not avoid conflict if the

available implementation alternatives result in fundamentally different costs and benefits for various stakeholder groups.

The second level involves reaching agreement on processes for relating to each other, making decisions, gathering and releasing information, and managing disagreements. The experience of developing these processes can build relationships and trust, often transforming the way participants view each other, their values, and their positions. Without agreement on how participants will behave, the process manager faces the risk of end runs, release of information prior to agreement by parties seeking competitive advantage, or repudiation of the ultimate outcome.

The third level entails ongoing and fundamental shifts in participants' view of themselves and their values as specific decisions are framed and negotiated. This can occur over time as individuals work closely with their opponents, identifying and solving problems based on shared principles, breaking down stereotypes and discarding false constructs. In practice, this is a very difficult step to accomplish because it involves an altered sense of the way people view themselves in relation to an issue or problem. Because of this difficulty, there are often limits on the degree to which participants' core views will shift throughout a process. However, the environment for making such shifts can be improved by carefully selecting peripheral issues to focus on early in the process where values overlap.

The San Juan County case study illustrates a process that became mired in value-based conflict over the designation of a national marine sanctuary in the region. With one camp adamantly opposed to the federalization of resource management and the other skeptical of local communities' ability and willingness to adequately protect resources, the process degenerated into reactive, positional standoffs. Despite its failure, however, the sanctuary process planted important seeds of future success. Motivated by the possibility of outside control of local resources, communities organized around the shared principle of autonomy and began to discover that they in fact had more in common than they thought. The groundfish resource was in trouble, they agreed, and they began working to identify problems and devise solutions.

Similarly, earlier efforts that fell short in the Florida Keys National Marine Sanctuary designation process laid the groundwork for the eventual success of the Tortugas reserve. These helped to clarify objectives, build relationships among key stakeholders, develop local leadership, and resolve sources of resistance. An analogous situation may be evolving in the MLPA process, in which agency managers and stakeholders learned from the initial failure and revised the planning process around a set of multidisciplinary regional stakeholder groups. The common, and important, theme in these three cases is that "the story is never over." Because MPAs are place-based, the resource issues and the community of stakeholders remain in place, with some necessity for interaction, even after a particular effort fails. This provides ongoing opportunities for learning from mistakes and for making multiple approaches to the problem of MPA designation.

The Tortugas and Channel Islands cases provide another informative insight into conflict management, and the way in which the structure of the process can foster self management of potentially disruptive conflicts. The planning process in both cases strove for consensus and both faced last-minute resistance from sportfishing stakeholders. In the Channel Islands case, this prevented consensus in the MRWG, with the result that the sanctuary manager developed recommendations based on the MRWG's work and forwarded them to the state Fish and Game Commission for approval. In contrast, other stakeholders in the Tortugas effort were reported to have quashed the last-minute resistance in that instance to arrive at a consensus. While the exact

reasons for group behavior in complex situations are often impossible to determine, it may be that:

- The Tortugas process, which included all stakeholders (including scientists) in one workgroup, bonded the stakeholder group more tightly and developed a confidence that stemmed from having worked through the science first hand. In contrast, the Channel Islands MRWG did not have as much first-hand experience with the science because the science panel was a separate entity,
- The number of affected parties in the Tortugas process was smaller and more localized than in the Channel Islands, or
- There may have been social mechanisms available to the Tortugas participants (perhaps because of the small size and physical insularity of the Keys) that were not available to stakeholders in the Channel Islands. Thus, given that the sportfishing resistance in the Tortugas process apparently originated with organizations headquartered outside the Keys, there may have been more of a natural us vs. them reaction to outsiders that wasn't as strong in the Channel Islands.

A useful lesson from this comparison is that the opportunities and tools for managing conflict in a particular situation depend in part on the intersection between the design of the process itself and the local sociology of the stakeholder communities.

6.2.5 The role of maps and map making
There are three important aspects to maps – the process by which they are made, the information they contain, and how, when, and by whom they are used, which can include the following:

- Organizing available information and identifying data gaps
- Starting discussion
- Defining proposals and alternatives
- Negotiating
- Framing "what-if" scenarios
- Analyzing logistical implications for implementation.

The three aspects of map making are not completely independent. For example, maps made without input from all stakeholders (as in the MLPA case) will contain only limited information. Maps made without input from enforcement agencies can end up being changed so substantially for enforcement purposes that they undo carefully negotiated boundaries. Conversely, if maps are intended to contain as much useful information as possible, then only a collaborative process will create the trust necessary for participants to open up their databanks (as in the Tortugas case). Similarly, maps intended to be used as conversation starters should be produced with a different process than maps intended as negotiating tools. For the former, sufficient preparation is required so the maps are not misinterpreted when they are produced (as occurred in the MLPA case). It can also be more productive to have stakeholders build such initial maps themselves. For maps intended as negotiating tools, participants must have been involved enough in the map production to trust the information they contain.

When in the overall process maps are produced and/or revealed depends on the three aspects listed above. There is no one correct time to produce maps. In the Tortugas process, maps were used early and successfully as conversation starters and to elicit information from resource users. Maps intended as a serious negotiating tool might be produced later in the process, after stakeholders have explored their values, desired outcomes, and motivations, and after the

negotiating process has been decided on. On the other hand, maps intended to help in eliciting data can be developed early in the process.

The map-making and manipulation technology available also influences the way maps are produced and used. The GIS system available in the Channel Islands facilitated the use of maps as a negotiating tool. Similarly, GIS was used to provide several alternative choices for the Gulf Fishery Management Council in its selection of the size and location of closed areas to protect gag grouper. In contrast, the static nature of the maps produced in the MLPA process contributed to the perception that these were a done deal, despite the agency's statements to the contrary. Stakeholders had the experience of seeing fixed lines on maps and this dominated their perception, especially given the fact that the maps were produced in relative isolation by the science planning team.

The Tortugas process included a relatively structured procedure to organize the development of boundary alternatives. This involved splitting stakeholders into smaller groups, each containing a variety of stakeholders. Each group was then asked to develop alternative proposals and ranking criteria in accordance with that group's consensus of priorities. The process was used over and over until just two proposals were generated, and resulted in consensus among diverse stakeholders. A similarly structured process was used in the Channel Islands case, where the GIS system was used to estimate the economic impact on each user group of a large number of alternative reserve boundaries. These methods contrasted sharply with that used in the Gulf grouper case, where maps resulted from a comparatively unstructured negotiation process.

The cases do not suggest one particular approach to map making that fits all situations. Rather, they emphasize the importance of recognizing the variety of purposes maps may serve, making clear and widely communicated decisions about the purpose(s) maps are meant to accomplish in any particular instance, and ensuring that the process structure supports that purpose.

6.2.6 Planning resources

Stakeholder processes can absorb as many resources as agencies make available. Although all the money in the budget won't necessarily guarantee a perfect process, a total absence of fiscal support and the technical and administrative resources it buys is a guarantee of dissatisfaction. Without going into extensive detail on all aspects of the resources needed to support a stakeholder process (agency staffing, participant travel and per diem, communication, facilities, technical support, information management and so forth), it is useful to highlight a few resource issues that relate specifically to the capacity and skill sets of process managers.

Taking a stakeholder process from initial MPA proposal through discussion, conflict management, conclusion, recommendation, and follow up is not a set of tasks to be tossed lightly into the "other duties as assigned" category. Managing a stakeholder process is time consuming and requires intensive, hands-on work that will be difficult to wedge into the normal tasks of managing a sanctuary or a fishery. More importantly, the set of skills required to plan and conduct meetings, help participants build trust, move a group toward consensus or away from conflict are not necessarily within the experience of ecologists, stock assessment scientists, ship captains, regulatory specialists, or similar resource management backgrounds.

Criticisms that arise when resource agencies try to manage stakeholder processes internally include:

- Insufficient front-end planning

- Dual roles of agency staff as convenors/facilitators, process participants, and ultimate decision makers
- Mistrust that agency staff will be able to set aside policy preferences or points of view and be neutral listeners
- Inadequate use of external resources including sources of funds, facilitation expertise, communications skills
- Conflicting pressures on staffers to protect resources and satisfy user groups
- Susceptibility to influence of campaigns by external groups.

The cases suggest a need for sufficient resources to engage an outside, professional facilitator, as well as agency commitment to permit involved staff the time needed to give full attention to process management. Resource management agencies typically have within their staffs more than just science skill sets. Constituent relations, education, policy, training, and technical assistance skills are often to be found among the agency's own personnel or within sister agencies. Even if these staff members are not directly conducting processes, they can provide a pool of expertise and advice for resource managers coming from a more traditional science background. In addition, many management agencies have access to technical assistance from the MPA Center's Training and Technical Assistance Institute or the U.S. Institute for Environmental Conflict Resolution.

6.3 Decision making
Virtually all MPAs in the United States stem from a statutory authority and sit within an overarching agency structure. More often than not, the end of a stakeholder process—even one resulting in a "decision"—is not where the decision to designate an MPA occurs. Just as important as being clear at the outset about goals and procedures is the need to be clear with stakeholders about downstream decision making. First, what kinds of decisions are they making, how they will make them, and are they decisions or recommendations? Second, if the latter, where do stakeholder decisions go and how they are treated? The answers to these two questions are important not only because they should shape the structure of the process and the kinds of skills needed to manage it, but also because there is nothing that destroys buy-in more than taking a group of stakeholders through a complex process and then having the ultimate decision appear to ignore what they produce or recommend by opting for a different solution. For example, one knowledgeable member of the Channel Islands MRWG commented, "There was some confusion about how much authority the MRWG actually had. It was advisory to an advisory group [the Sanctuary Advisory Committee] that was going to advise the sanctuary manager who was going to advise the Fish and Game Commission. People got really exercised about the MRWG and tended to think there was a lot more power and authority there than there actually was." That is not to say there may not be MPA designations where the process takes a less inclusive form, such as notice and comment rulemaking. However, if that is the procedural requirement, then stakeholders must be clearly informed. Table 5 illustrates degrees of control in the resource management agency or with stakeholders, and how the six cases fall along the spectrum.

Table 5. Types of decision-making processes possible in MPA designation efforts. Of the six case studies examined, the Gulf grouper and horseshoe crab cases fall into Category 2, the Channel Islands and Tortugas cases fall into Category 3, the San Juan County case falls into Category 4, and the MLPA case begain in Category 1 and then moved to Category 2.

Type of decision process	Communication style	Management style	Accountability	Authority	Stakeholder role
1. Management agency has authority, makes the decision, then informs stakeholders	Telling	Directing	Agency accountable and responsible	Management agency in control	Stakeholders are told about, but not involved in, decision making
2. Management agency gathers input from stakeholders before deciding	Selling	Coaching	Stakeholder input gathered as part of process	Management agency in control	Stakeholders are consulted and may have input into decision
3. Stakeholders decide and recommend actions for the agency to implement	Participating	Facilitating	Accountability is shared	Stakeholders set direction and agency takes action	Stakeholders provide decision to agency, which then implements
4. Stakeholders decide and act to implement	Delegating	Liaisoning	Stakeholders accountable and responsible	Stakeholders set direction and take action	Stakeholders decide and implement decision

Decision making occurs at numerous stages during MPA consideration, from initiation of a proposal to final designation and management. In the cases at hand, stakeholder groups were the source of proposals to create MPAs in San Juan County and the Florida Keys; scientists were the source of the closed area proposals in Delaware Bay and the Gulf of Mexico, recreational fishermen prompted consideration of MPAs in the Channel Islands, and conservation groups and resource management programs initiated the MLPA process on the California coast. In each of these cases, the proposal to consider an MPA was taken forward by decision makers (program managers) in the respective agencies.

In the Gulf grouper and horseshoe crab cases, the requirement for public participation and the nature of that process are laid out in fishery management statutes, regulations, and operating procedures of the councils and commissions. But even given the long history these bodies have, participants are not always clear on decision rules and process. During the debate over the gag grouper closures, for example, jurisdictional questions arose about highly migratory species and it was made clear the council did not have authority to manage them by closing an area. In addition, a controversy arose over the receipt and inclusion of public comments from outside the region, comments by email, or comments generated by activist campaigns. In the horseshoe crab process, new participants didn't understand the succession of steps, the way science was incorporated, or the risks of skipping procedural requirements in their preference for emergency action over rulemaking. While the gag grouper process was criticized by many for not being better organized, not having any mechanism to reach consensus, and not having a separate stakeholder process, it nevertheless used existing decision-making structures to achieve its goals. Thus, planners should not always assume, as the default option, that an MPA designation effort must necessarily have its own separate design process.

In contrast to the Gulf grouper and horseshoe crab cases, processes for the Channel Islands and Tortugas were created solely for the purpose of considering MPAs. The programmatic authority for sanctuary management in the Channel Islands allowed managers latitude in how they would approach revisions to the management plan. Similarly, the Tortugas 2000 group provides a textbook example of structured decision-making process. This, too was enabled by the authority in the sanctuary program, the statute creating the Florida Keys National Marine Sanctuary, and the sanctuary management plan.

Section 6.1, on stage-setting, emphasized the importance of clear goals. Goals may originate with either stakeholders or the agency, and may also stem from the legal authority for MPA designation or resource management. It is important that process managers make clear at the outset if the MPA designation relates to some statutory purpose, and to what degree that legal authority will guide (or constrain) decisions stakeholders want to make. For example, if the legal basis for a closed area is fishery management under the Magnuson-Stevens Fisheries Conservation and Management Act, stakeholders should recognize they are considering an MPA as a means to a fishery management end rather than a broad biodiversity protection goal, which would not be supported by the underlying authority. Conversely, programs that are authorized primarily to conserve ecosystem integrity and biodiversity, such as the National Marine Sanctuaries, are not intended nor necessarily equipped to devise and successfully pursue an MPA planning process focused on fisheries objectives.

Finally, it is crucial that stakeholders understand not only what decisions they may make, but also what happens after they make them. While it may not be necessary to educate stakeholders in all the arcane details of federal administrative procedure, it is useful to process managers and the participants in their stakeholder groups to have a grasp of "the black box" so they know what to

expect, know when and how to communicate to the next stage in the decision process, and do not have unreasonable or inaccurate expectations of decision outcomes.

For example, in the first attempt to create reserves within the Florida Keys National Marine Sanctuary, advocates had support from federal program managers, national interest groups and parts of Florida's congressional delegation. They pressed forward understanding the need for state approval, but without a complete grasp of the potential for local resistance. The campaign to set aside ecological reserves became wrapped up in state and local elections and the key decision makers turned out to be the governor and the state cabinet. In the second attempt, the Tortugas 2000 process carefully pulled all agency decision makers into the discussion at the beginning, not the end. In the Channel Islands process, even though sanctuary staff informed the MRWG participants that the sanctuary manager was required to make a recommendation to the Fish and Game Commission, even in the absence of a MRWG consensus, many participants were still outraged when that occurred. It is crucial to keep reminding participants what the decision process and timeline is, especially when a portion of it includes a consensus-based effort.

The authority for decision making about MPA designation may be dictated by national policy or set out in statute or other underlying legal framework. Requirements and procedures for stakeholder process may also stem from specific statutes, in addition to overarching procedural requirements on federal action such as those found in the Administrative Procedure Act, National Environmental Policy Act, executive orders, and other guidance. Decisions about designations are influenced by everything from presidential politics, to Congressional priorities, to local recreation preferences. The take-home message for process managers is not to try to control all these aspects, but to be aware of them and to shape and inform stakeholder processes to meet underlying structure and evolving circumstances. Figure 11 illustrates the susceptibility of decision making at every stage to both internal constraints and external influences.

Figure 11. Influences on Decision Making. A proposal to designate an MPA can originate with a change in resource status; arise through the underlying resource management authority, such as a mandated review process; be initiated by a constituent group or new scientific information. Stakeholder processes may be required public involvement steps in resource management statutes or administrative procedures, or could be convened by interested constituents, resource managers or third parties. Depending on their context, stakeholder processes may have mandates and constraints based in statute or regulation, and are subject to both internal (goals and motivations) and external influences. What is critical for design planners and managers to recognize and communicate to participants in such processes is that decision making authority to designate an MPA may lie elsewhere than the stakeholder process, and that once the outcome or recommendation of that process is passed on, there are mandates, constraints and influences on the final decision, just as there were in the stakeholder process.
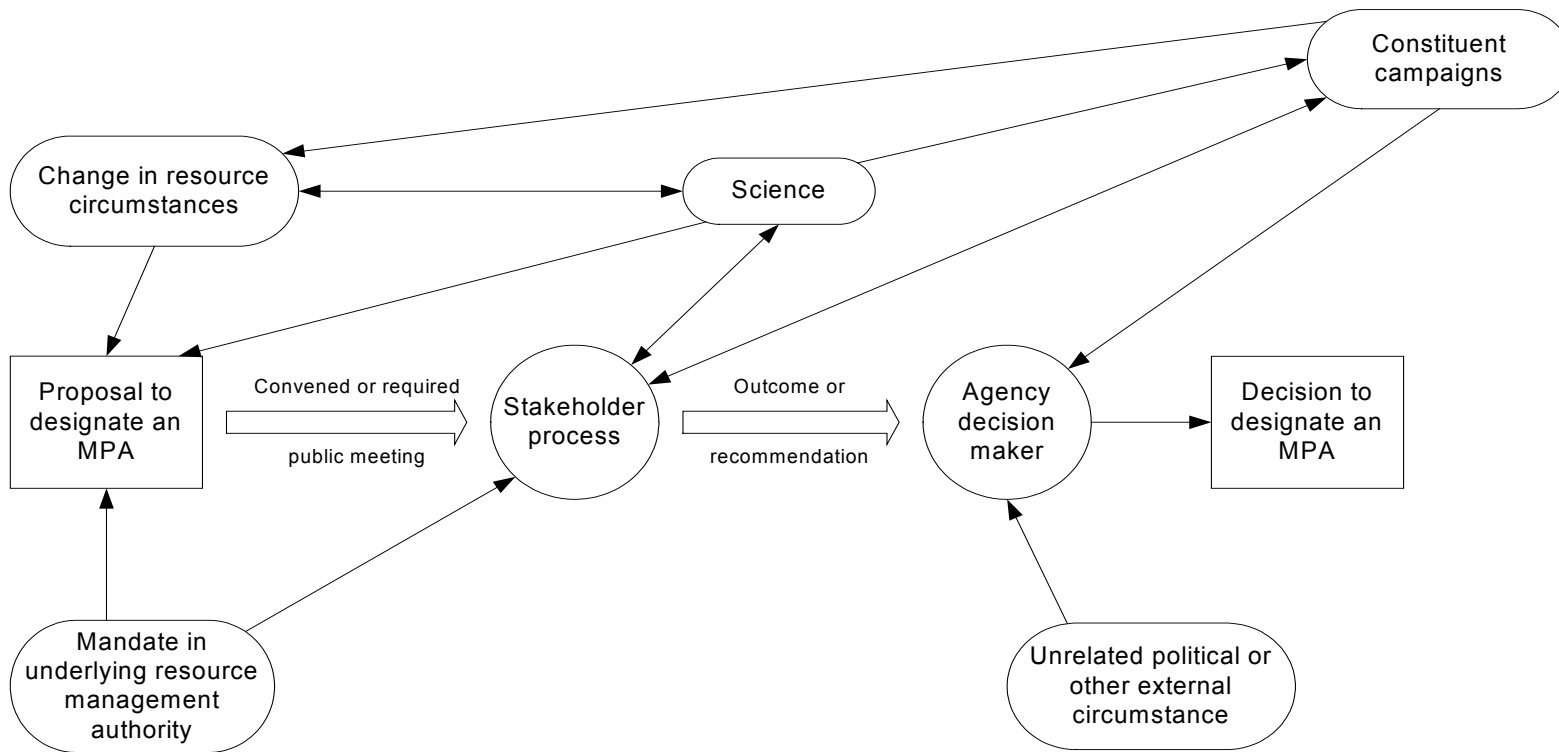
6.4 Evaluation

Some sort of evaluation and/or monitoring process is widely accepted as an essential part of virtually all management efforts, in both the business and resource management arenas. Without objective feedback, it is impossible to determine whether goals have been or are being met or whether the management process itself is efficient and effective. These two aspects of performance evaluation are somewhat different, and will be treated separately in the following subsections. Because none of the case studies has yet had the opportunity to demonstrate a functional monitoring and evaluation system, the following discussion summarizes fundamental principles essential to the design of such systems.

6.4.1 Evaluating process efficiency and effectiveness

An equivalently wide array of qualitative evaluation methods is available for determining the effectiveness of MPA design processes. However, these will be more difficult to apply than the quantitative monitoring methods just discussed. This is because it is extremely difficult to develop widely accepted criteria for process success, as the case studies amply illustrate. For example, the earlier federal effort to establish a sanctuary in the Northwest Straits was widely accounted a failure. Yet, without this prior failure, it is just as widely accepted that the subsequent locally-managed effort to designate bottomfish recovery zones would not have been successful. Similar patterns of relationship between later success and earlier failure can be found in the MLPA and Tortugas cases. The Gulf grouper case is seen by some participants and observers as a messy, conflict-ridden process that violated many best practices of collaborative management and problem solving, Yet, this is also an excellent example of the successful implementation of an MPA through the conventional fishery management process and, as such, is counted as an important success by other observers with a somewhat different perspective.

Despite these complications, there are some criteria that can help to assess whether an MPA designation process was effective, including:

- Did the process include an initial best-practices assessment by a neutral third party to identify relevant issues?
- Were the results of an initial assessment actually used in developing a process design?
- Did the process designate an MPA?
- Does the MPA adhere to the goals established by the designation process?
- Does the MPA design take account of the best available ecological, fisheries, and socioeconomic knowledge?
- What was the degree of support for the designation among stakeholders?
- Were relationships among stakeholders damaged to such an extent by the process that it undermined the possibility of future collaborative efforts to manage the MPA?
- Is there an evaluation strategy that will operate into the future?

An important lesson from the case studies is that evaluation should not be seen as a one-time effort. The case studies show that starting and ending dates for designation efforts are largely arbitrary. These efforts sit in a larger context defined by the ongoing relationships among stakeholders and the system(s) operating to manage resources. In this sense, these stories are never over.

6.4.2 Monitoring progress toward goals

The more clearly MPA goals are stated, the more straightforward it will be to measure progress toward them. For example, it will be conceptually simple to measure progress toward one of the primary goals of the Gulf grouper closure, i.e., restoration of normal sex ratios in the population.

On the other hand, progress toward the "sustainable fisheries" goal in the Channel Islands case will be difficult to measure because sustainable fisheries can be defined in so many different, and equally legitimate, ways.

A monitoring or evaluation system cannot create quantitative measures of progress where goals are vague, general, or open to widely differing interpretations. This is why best practices in monitoring program design (e.g., NRC 1990) emphasize the central importance of concrete objectives and testable questions and/or measurable targets. Where concrete objectives result from the MPA designation process, the methods described in NRC (1990) provide a useful guide to monitoring design. However, it is often the case that even concrete MPA goals may require long periods to achieve. In such cases, monitoring with an extremely long time horizon may not provide useful feedback in a reasonable length of time. If an MPA is not functioning as expected, then the sooner this information becomes available, the sooner productive adjustments to the MPA design can be made.

Where time horizons are long, monitoring can and should focus on interim benchmarks of progress that reflect an underlying mechanistic understanding about how the MPA is expected to produce its desired effect(s). For example, imagine an MPA that is intended to produce enhanced spillover of larvae to surrounding populations because of the presence of greater numbers of larger females. In this instance, managers should press for explicit predictions about both the timeframe and the magnitude of the following key benchmarks:

- Increased numbers of females in the MPA
- Increased size of females in the MPA
- Increased reproductive output of females in the MPA.

Even granted that exact predictions are not possible, expected ranges should be used as the basis for the statistical design of a monitoring program to determine whether these changes are occurring. If these interim changes do not occur, then there would be no chance that the MPA would operate as expected. MPAs designed to achieve concrete goals will (or should) always be based on some set of assumptions about the processes that will lead to these changes. Once these assumptions are made explicit, they can form the basis for establishing benchmarks than can be monitored for (see the discussion on conceptual models in Chapter 4 of NRC (1990)).

Where concrete goals cannot be established because of the nature of the MPA, then a secondary process may be required to develop criteria for a monitoring program. This is because an efficient monitoring program must focus on specific indicators and must be designed to detect some amount of change at some place and time. For example, the legislation (MLPA) mandating the statewide network of marine reserves in California merely called for improving the management of MPAs to achieve broadly stated resource conservation and protection goals. The science plan team that produced the initial design proposal, as well as the regional workgroups that extended the science team's efforts, have not gone beyond relatively simple statements about protecting specific habitat areas or avoiding excessive economic impact. Such goals are useful for MPA design but inadequate as the basis for monitoring. As another example, the Channel Islands National Park has conducted a long-term ecosystem monitoring program in many of the areas recently set aside in reserves in state waters. While suitable for tracking success in some respects, this program is not suitable for assessing progress toward the sustainable fisheries goal because it has not monitored commercially caught species.

6.4.3 A conceptual model for designing evaluation systems

Despite the complexity of ecological and institutional systems, a simple conceptual model can help determine if a monitoring/evaluation system is adequately designed. This model has three levels of design and three levels of measurement and is based on the core assumption that any evaluation must be based on an understanding of the system being measured. This understanding can range from completely qualitative to specifically quantitative (see discussion of conceptual models in Chapter 4 of NRC (1990)).

The three levels of design are:

- The ultimate intention or goal (e.g., Success is ….)
- The system we interact with
  - o The whole and its parts
  - o How things work
  - o Processes and feedbacks
- The mechanisms used to effect change
  - o Tracking milestones
  - o Measuring results of actions.

In other words, an MPA design, and the evaluation system used to assess its performance, should clearly define the goals, describe how the system (ecological or institutional) is thought to work, and define the mechanisms or actions that will be taken to achieve the goals.

Three levels of measurement correspond to each of these design levels:

- Measures of ultimate success (e.g., whether grouper sex ratios have returned to normal)
- Periodic assessments, as new knowledge is gained, of the adequacy of the underlying conceptual model(s)
- Monitoring of interim milestones or benchmarks to determine whether the system is moving as expected in response to the MPA.

This evaluation model, though simple in structure, will fit virtually all situations.