Learning from California's Experience in Marine Life Protection

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INTRODUCTION

The history of marine policy in the United States (US) reflects a series of institutional responses to oil catastrophes. Many of the federal and state environmental laws and programs in the US were created in response to the 1969 Union Oil's blowout and oil spill offshore Santa Barbara, California.[1] Today, the crisis in the world's oceans is much deeper; the decline in the health and integrity of the oceans should be recognized as an ongoing catastrophe. There is no simple acquiescence or institutional resolution to the dramatic changes that human beings are having on the world's oceans. This article argues that marine resource use should be made more compatible with the value of biological integrity and the maintenance of the health of marine ecosystems. The response to this crisis will require more than planning for the future use of marine areas, maximizing resource allocation or yield, or balancing competing interests for resource use. The management challenge is to integrate uses across a common marine area while prioritizing biodiversity protection so that ecosystems can be sustained for future generations.

This article's focus is on the lessons learned since 1999 in the California effort to protect marine biodiversity. A century ago, the coastal and marine areas of Santa Barbara County, California included thousands of onshore and nearshore oil rigs and associated structures.[2] As oil moved farther offshore in deeper marine areas, the risks of oil development intensified. The citizens of the state remember the 1969 oil spill off Santa Barbara's shore. The memory is a driving force behind the diverse ecological movement, and contributes to the development of marine policy in the state.

Over forty years after Unocal's catastrophic oil spill in the Santa Barbara Channel, California is recognized as a leader in the development and implementation of policies and programs that embrace the goal of marine biodiversity protection. Since 1999, California has developed and implemented a range of planning and management tools that support an ecosystem-based approach to protect marine biodiversity. The article focuses on the politics of the California *Marine Life Protection Act* (MLPA), which supports the designation of MPAs in state waters (0–3 nautical miles (NM)).[3] To support the implementation of the MLPA, the state established multi-stakeholder forums that encourage negotiation between diverse members of the scientific community, government agencies, user groups, and other interests including conservationists. The article describes a number of lessons learned in the implementation of the MLPA that are useful for those interested in the further development of ecosystem-based plans and management measures for marine areas.

Today, California's resource agencies support large-scale marine ecosystem-based plans and management activities. For example, the state is collaborating with the governments of Oregon and Washington in a process that may lead to the creation of a marine spatial plan or MSP for the California Current, a large marine ecosystem offshore the west coast of the US. Based on the California MLPA planning process, the article provides a general summary of the major challenges facing managers and planners who are interested in integrative, multi-sector, and ecosystem-based approaches to MSP. In the face of dramatic evidence that shows the decline in primary and secondary levels of ecological productivity of the world's oceans, the designation of MPAs and implementation of MSP is warranted today, and may represent a new era of marine life protection that can be supported by scientists and

[1] Leonard Nevarez, Harvey Molotch, Randolph Bergstrom, and Perry Shapiro. *Petroleum Extraction in Santa Barbara County, California: An Industrial History*. Offshore Continent Shelf Study Mineral Management Service 98-0048 (1998).
[2] *Id*.
[3] Marine Life Protection Act, Fish and Game Code ss. 2850–2863 (2004).

diverse stakeholders. With this in mind, the next section reviews the scientific literature that shows that California's marine areas are threatened by a range of anthropogenic impacts, including large-scale climate change.

THE PRIMARY THREATS TO THE OCEANIC COMMONS

A study by researchers at Stanford University's Center for Oceans Solutions (COS) in 2008 reviewed over 3,400 peer-reviewed articles that include analysis of the primary threats to the Pacific Ocean.[4] The study by the COS identifies four primary threats that are described in the scientific literature – pollution, overfishing, habitat destruction and climate change.[5] One major threat to marine ecosystems is the unsustainable use of commercially valuable fishes to the point of biological and economic collapse.[6] Jackson and colleagues write, "Overfishing and ecological extinction predate and precondition modern ecological investigations and the collapse of marine ecosystems in recent times, raising the possibility that many more marine ecosystems may be vulnerable to collapse in the near future."[7] Overfishing is considered a primary factor contributing to the disruption and degradation of marine ecosystems.[8] A majority of the commercially valuable fishes of the world's oceans are severely depleted.[9] About one third of all commercial fish landed are traded in international markets.[10] Unique and sensitive marine ecosystems, such as the Ross Sea of the Antarctic,[11] are being fished, and show signs of decline. A majority of the world's fisheries surpassed sustainability in 1988,[12] while the top of the marine food chain is fished-out by the substantive removal of large marine predators, such as sharks, from the world's oceans.[13] Commercial fishers have shifted down the food chain from large marine predators to prey species, such as sardine, squid, and mackerel.[14] Pauly and Zeller write, "Fishers, whose daring and

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[4] Center for Ocean Solutions, *Pacific Ocean Synthesis: Scientific Literature Review of Coastal and Ocean Threats, Impacts and Solutions* (2009), available online: <http://centerforoceansolutions.org/PacificSynthesis.pdf>.

[5] The Center for Ocean Solutions, *Ecosystems and People of the Pacific Ocean - Threats and Opportunities for Action: A Scientific Consensus Statement* (2009), available online: <http://www.centerforoceansolutions.org/projects/pacific-ocean-initiative>.

[6] Jeremy B. C. Jackson, Michael X. Kirby, Wolfgang H. Berger, Karen A. Bjorndal, Louis W. Botsford, Bruce J. Bourque, Roger H. Bradbury, Richard Cooke, Jon Erlandson, James A. Estes, Terence P. Hughes, Susan Kidwell, Carina B. Lange, Hunter S. Lenihan, John M. Pandolfi, Charles H. Peterson, Robert S. Steneck, Mia J. Tegner, Robert R. Warner, "Historical overfishing and the recent collapse of coastal ecosystems," *Science 293,* 5530 (1998):629-637 ; Boris Worm, Edward B. Barbier, Nicola Beaumont, J. Emmett Duffy, Carl Folke, Benjamin S. Halpern, Jeremy B. C. Jackson, Heike K. Lotze, Fiorenza Micheli, Stephen R. Palumbi, Enric Sala, Kimberley A. Selkoe, John J. Stachowicz and Reg Watson, "Impacts of biodiversity loss on ocean ecosystem services," *Science* 314, 5800 (2006):787-790.; A.F. McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850–1980* (Cambridge: Cambridge University Press, 1986).

[7] Jackson et al., n. 6 above, p. 629.

[8] Jackson et al., n. 6 above.

[9] Boris Worm, Ray Hilborn, Julia K. Baum, Trevor A. Branch, Jeremy S. Collie, Christopher Costello, Michael J. Fogarty, Elizabeth A. Fulton, Jeffrey A. Hutchings, Simon Jennings, Olaf P. Jensen, Heike K. Lotze, Pamela M. Mace, Tim R. McClanahan, Cóilín Minto, Stephen R. Palumbi, Ana M. Parma, Daniel Ricard, Andrew A. Rosenberg, Reg Watson and Dirk Zeller, "Rebuilding Global Fisheries," *Science* 325, 5940 (2009):578-585.

[10] The UN Food and Agriculture Organization (FAO) Fact Sheet: *The international fish trade and world fisherie*s (2009), available online: <http://www.fao.org/fileadmin/user_upload/newsroom/docs/fact_sheet_fish_trade_en.pdf>.

[11] David G. Ainley, "A history of the exploitation of the Ross Sea, Antarctica," *Polar Record* 46 (2010):233-248.

[12] Reg Watson and Daniel Pauly, "Systematic distortions in world fisheries catch trends," *Nature* 414 (2001):534-536.

[13] Jackson et al., n. 6 above.

[14] Daniel Pauly, Villy Christensen, Johanne Dalsgaard, Rainer Froese and Francisco Torres Jr., "Fishing down marine food webs," *Science* 279, 5352 (1998):860-863.

ingenuity had, for centuries, justified our romantic view of their profession, [have] become cogs in the high-tech machine that almost instantly reduces any stock it touches to a shadow of its former self."[15] Indeed, as Ludwig, Hilborn and Walters explain, "[T]here is a remarkable consistency in the history of resource exploitation: resources are inevitably overexploited to the point of collapse or extinction."[16]

The Case of California

The globalization of commercial fishing activity is one key historical feature of California's diverse coastal and maritime economy. McEvoy describes the history of the development and impacts of industrial-scale commercial fishing offshore California as one that has "followed a repetitive pattern of boom and bust, one typical of fisheries the world over."[17] New markets for commercial fishes have emerged (primarily in Asia) for California within the last two decades. There are currently over 285 species fished and landed commercially and recreationally. For example, California market squid (*Loligo opalescens*) ranks as the state's largest commercial fish landed by volume.[18] Among US exports of commercial fisheries in 1999, squid ranked 6th by volume and 16th in value, higher than any other California commercial fish. A vast majority of the squid is exported to China and European markets. Most of the landed squid is from the Channel Islands National Marine Sanctuary (CINMS). In 2005, the Fishery Management Plan (FMP) for market squid was set by the California Department of Fish and Game (CDFG) at a seasonal catch limit of 118,000 tons, which is the highest historical landing for the fished species (that occurred in 1999).[19] One failure of conventional fisheries management is that the plans rarely take into account important ecological characteristics of fished species. For instance, the role of the fished species as a predator or prey species in the marine ecosystems is rarely considered in the development of fishery plans. Market squid is a principal forage species for a minimum of 19 species of fish, 13 species of birds, and 6 species of mammals that depend on the CINMS.

The global-scale use and trade of marine resources influences the ecology and productive capacity of marine areas. Resource use should be carefully considered by managers and planners as taking place within a socio-ecological context that includes the impacts from global climate change and the large-scale pressures of human use on marine ecosystems. Marine managers should take into account the large-scale impacts from climate disturbance that is indicated by an increase in sea surface temperature, change in salinity, increase in acidification (or changes in oceanic pH), and general decline in primary and secondary levels of productivity in many areas of the world's oceans.[20] Scientists show that the impacts of climate change on biodiversity will persist for long periods of time even if carbon dioxide emissions were cut.[21]

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[15] D. Pauly and D. Zeller, "The Global Fisheries Crisis as a Rationale for Improving the FAO's Database of Fisheries Statistics," *Fisheries* Centre *Research Report* 11, 6 (2003), p. 1.

[16] Donald Ludwig, Ray Hilborn, and Carl Walters, "Uncertainty, resource exploitation, and conservation: Lessons from history," *Science* 260, 5104 (1993), p. 17.

[17] McEvoy, n. 6 above, p. 6.

[18] V.R. Leeworthy and P. Wiley, *Socioeconomic Impact Analysis of Marine Reserve Alternatives for the Channel Islands National Marine Sanctuar*y (National Oceanic and Atmospheric Administration, National Ocean Service, Special Projects, Silver Spring, Maryland. April 8, 2003), p. 13.

[19] California Department of Fish and Game, *Final Market Squid Fishery Management Plan* (2005), available online: <http://www.dfg.ca.gov/marine/msfmp/pdfs/section1_summary.pdf>.

[20] R. Schubert, H.-J. Schellnhuber, N. Buchmann, A. Epiney, R. Grießhammer, M. Kulessa, D. Messner, S. Rahmstorf, and J. Schmid, *The Future Oceans – Warming Up, Rising High, Turning Sour* (Berlin, German Advisory Council on Global Change 2006).

[21] *Id.*

In addition to the historic loss of coastal habitats such as wetlands in the state,[22] scientists describe the synergistic impacts of multiple pressures on marine ecosystems. Studies by Halpern and colleagues include analysis of the cumulative impacts of human use and climate-related factors on the California Current.[23] The California Current is an oceanographic process of primarily cooler water which extends from Washington down the coast to southern California. These studies are based on an analysis of spatial data sets for 25 pressures, such as marine pollution, fished areas, and other indicators such as sea surface temperature, and 19 ecosystems relevant to the California Current.

The development and implementation of marine ecosystem-based approaches to biodiversity protection is one planning and management response to the pressures and threats to marine life. Marine ecosystem-based planning and management takes place within an ecological context that includes significant loss and degradation of marine habitats.

INTEGRATING SCIENCE AND VALUES FOR MARINE ECOSYSTEMS

There are a number of governmental and non-governmental initiatives that support marine ecosystem-based planning and management.[24] The idea of marine ecosystem-based planning and management is generating a considerable amount of interest across the disciplines, and includes the use of new planning tools such as CMSP, marine zoning, and the designation of MPAs.[25] Calls for the development of regional, marine ecosystem-based planning and management began with the work of Cicin-Sain and others in the 1990s.[26] Since 1999, California has implemented a range of planning and management tools that support an ecosystem-based approach to protect marine life,[27] and particular case studies of several of the California marine ecosystem-based efforts are described elsewhere.[28] Scientists and academics (including representatives from conservation organizations) are playing important roles in the further development of ecosystem-based planning tools.[29] Californian lawmakers passed the California *Ocean*

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[22] Reed F. Noss, Edward T. LaRoe III, J. Michael Scott, *Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degradation* (US Department of the Interior 1993) at Appendix A, available online: <http://biology.usgs.gov/pubs/ecosys.htm>.

[23] Benjamin S. Halpern, Shaun Walbridge, Kimberly A. Selkoe, Carrie V. Kappe, Fiorenza Micheli, Caterina D'Agrosa, John F. Bruno, Kenneth S. Casey, Colin Ebert, Helen E. Fox, Rod Fujita, Dennis Heinemann, Hunter S. Lenihan, Elizabeth M. P. Madin, Matthew T. Perry, Elizabeth R. Selig, Mark Spalding, Robert Steneck and Reg Watson, "A global map of human impact on marine ecosystems," *Science* 319, 5865 (2008): 948-952*;* Benjamin S. Halpern, Karen L. McLeod, Andrew A. Rosenberg, and Larry B. Crowder, "Understanding cumulative and interactive impacts as a basis for ecosystem-based management and ocean zoning," *Ocean & Coastal Management* 51, 3 (2008):203-211.

[24] Commission on Ocean Policy, *An Ocean Blueprint for the 21st Century* (2004), available online: <http://oceancommission.gov/documents/prepub_report/welcome.html#final> and Pew Oceans Commission, *America's Living Oceans: Charting a Course for Sea Change*. Summary Report (2003), available online: <http://www.pewoceans.org>.

[25] K. McLeod and H. Leslie, *Ecosystem-Based Management for the Oceans* (Washington D.C., Island Press 2009). See also Melissa M. Foley, Benjamin S. Halpern, Fiorenza Micheli, Matthew H. Armsby, Margaret R. Caldwell, Caitlin M. Crain, Erin Prahler, Nicole Rohr, Deborah Sivas, Michael W. Beck, Mark H. Carr, Larry B. Crowder, J. Emmett Duffy, Sally D. Hacker, Karen L. McLeod, Stephen R. Palumbi, Charles H. Peterson, Helen M. Regan, Mary H. Ruckelshaus, Paul A. Sandifer and Robert S. Steneck, "Guiding ecological principles for marine spatial planning," *Marine Policy* 34, 5 (2010):955-966.

[26] Biliana Cicin-Sain, "A National Ocean Governance Strategy for the United States is Needed Now," *Coastal Management* 22, 2 (1994):171–176.

[27] Deborah A. Sivas and Margaret R. Caldwell, "A New Vision for California Ocean Governance: Comprehensive Ecosystem-Based Marine Zoning," *Stanford Environmental Law Journal* 27 (2008):209-270.

[28] McLeod and Leslie, n. 25 above.

[29] Michael V. McGinnis and Christina E. McGinnis, "Adapting to Climate Impacts in California: The importance of civic science in local coastal planning," *Coastal Management* 39, 3 (2011):225-241. There term "civic science" is

Protection Act in 2004, and thereby established the California Ocean Protection Council.[30] The Council is tasked with coordinating state activities related to the protection of ocean ecosystems.[31] In accordance to the California *Ocean Resources Stewardship Act* of 2000 the California Ocean Sciences Trust was created to foster evidence-based or science-based policymaking in the state.[32] These programs emphasize the need to strengthen the integration of scientific information, scientists, stakeholders and resource agencies in marine ecosystem-based planning.[33]

The role of science and scientists in marine ecosystem-based planning in California has been strengthened by the creation of a number of interdisciplinary scientific partnerships, such as the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) and Stanford University's Center for Ocean Solutions.[34] In addition to these new partnerships, research centers have been formed with support from the federal government, such as the National Center for Ecological Analysis and Synthesis (NCEAS) and the National Science Foundation's Long Term Ecological Research (LTER) Program.[35] Recent developments in science-based communication have also occurred, and are exemplified by the Communication Partnership for Science and the Sea (COMPASS).[36] The communication of scientific information is supported by advances in new technologies, such as various mapping techniques that depict available social, economic, and ecological information and data using geographic information systems and other mapping tools.[37]

Coastal and Marine Spatial Planning

Scientists and other experts are contributing to the planning activities in support of MSP.[38] MSP is a "process of analyzing and allocating parts of three-dimensional marine spaces (ecosystems) to specific uses, to achieve ecological, economic, and social objectives that are usually specified through a political process."[39] MSP is characterized as a holistic approach that can integrate diverse government sectors and uses of marine areas,[40] and as a planning tool that can support the value of biodiversity protection and

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developed by K.N. Lee, *Compass and Gyroscope*: *Integrating Science and Politics for the Environment* (Washington, D.C.: Island Press 1993).

[30] 23 Cal. Pub. Res. Code § 35500 et seq. (2004).

[31] *Id*., § 35615(a)(1).

[32] 113 Cal. Pub. Res. Code § 35615(3) (2004).

[33] Sarah E. Lester, Karen L. McLeod, Heather Tallis, Mary Ruckelshaus, Benjamin S. Halpern, Phillip S. Levin, Francisco P. Chavez, Caroline Pomeroy, Bonnie J. McCay, Christopher Costello, Steven D. Gaines, Amber J. Mace, John A. Barth, David L. Fluharty, and Julia K. Parrish, "Science in support of ecosystem-based management for the US West Coast and beyond," *Biological Conservation* 143, 3 (2010):576-587; Michael Osmond, Satie Airame, Margaret Caldwell, and Jon Day, "Lessons for marine conservation planning: A comparison of three marine protected area planning processes," *Ocean and Coastal Management* 53, 2 (2010):41-51.

[34] Partnership for Interdisciplinary Studies of Coastal Oceans, available online: <http://www.piscoweb.org>; Center for Ocean Solutions, available online: <http://www.centerforoceansolutions.org>.

[35] National Center for Ecological Analysis and Synthesis, available online: <http://www.nceas.ucsb.edu>; National Science Foundation's Long Term Ecological Research, available online: <http://sbc.lternet.edu>.

[36] Communication Partnership for Science and the Sea, available online: <http://www.compassonline.org>.

[37] Mary Gleason, Scott McCreary, Melissa Miller-Henson, John Ugoretz, Evan Fox, Matt Merrifield, Will McClintock, Paulo Serpa and Kathryn Hoffman, "Science-based and stakeholder-driven marine protected area network planning: A successful case study from north central California," *Ocean & Coastal Management* 53, 2 (2010):52-68.

[38] Foley et al., n. 25 above.

[39] Charles N. Ehler and Fanny Douvere, *Visions for a Sea Change*, Report of the First Intergovernmental Oceanographic Commission and Man and the Biosphere Programme, IOC Manual and Guides, The Biosphere no. 48, IOCAM Dossier no. 4, 12 (UNESCO 2007).

[40] Morgan Gopnik, "Integrated Marine Spatial Planning in U.S. Waters: The Path Forward," A paper prepared for the Marine Conservation Initiative of the Gordon and Betty Moore Foundation (2008), available online: <http://www.msp.noaa.gov/_pdf/Gopnik_MSP_in_US_Waters.pdf>.

other conservation measures.[41] The literature in support of MSP emphasizes the need for the use of stakeholder-based processes to address potential conflicts between users and resource managers, and remedy increasing conflicts between resource users and ecosystems.[42] MSP is also described as a tool that can be used with processes in support of marine zoning and the designation of marine reserves or MPAs.[43]

In the wake BP's oil spill in the Gulf of Mexico, President Obama signed on July 19, 2010 an Executive Order (EO) for the Stewardship of Our Oceans, Coasts and Great Lakes that supports the Final Recommendations of the Ocean Policy Task Force and states, "This order also provides for the development of MSP that build upon and improve existing Federal, State, tribal, local, and regional decision-making and planning processes."[44] The Obama Administration established a National Ocean Council (NOC) that will assist in the development of regional, science-based integrative frameworks for coastal and marine spatial planning. President Obama's EO for the Stewardship of Our Oceans, Coasts and Great Lakes builds on the prior reports from the US Ocean Commission and Pew Ocean Commission insofar as the final report emphasizes the need for an ecosystem-based approach to marine planning, and describes national guiding principles for CMSP.[45] The regional approach will build on existing interstate partnerships such as the West Coast Governors' Agreement on Ocean Health.[46]

The future success of MSP will depend on the institutional capacity to address conflict that is likely to emerge over existing and future use of marine resources and areas. MSPs will also need to provide adequate levels of biodiversity protection measures so that marine ecosystems can be maintained and preserved. Conflicts over resource use and allocation often reflect deep-seated differences between diverse institutional cultures, interests, values and biases. In the face of scientific uncertainty, MSP will likely be a value-based activity that will require categorical judgments about ecology, politics and economic use. With this in mind, I now turn to the case of the politics of implementing the California MLPA.

THE CALIFORNIA MARINE LIFE PROTECTION ACT

In 1999, a complicated system of MPAs off California included an area 0.06 percent (i.e., 14 out of 220,000 square miles) of the EEZ associated with the state.[47] Based on the state's complicated range of

[41] Sivas and Caldwell, n. 27 above, emphasize the importance of CMSP as a conservation tool in California ocean governance.

[42] M.M. Foley et al., n. 25 above.

[43] Benjamin S. Halpern, Sarah E. Lester, and Karen L. McLeod, "Placing marine protected areas onto the ecosystem-based management seascape," *Proceedings of the National Academy of Sciences 107, 43 (2010): 18251-18255*.

[44] The White House Council on Environmental Quality. Final Recommendations of the Interagency Ocean Policy Task Force (July 19 2010) and Executive Order (EO) 13547 of July 19, 2010—Stewardship of the Ocean, Our Coasts, and the Great Lakes. EO 13547 will result in the creation of a National Oceans Council, consisting of representatives of 24 federal agencies, designed to help better coordinate oceans management efforts. Two key elements of the Task Force's recommendations were the adoption of ecosystem-based management and the application of CMSP (and similar integrated approaches to CMSP have been developed in Canada, Australia, and the United Kingdom). The National Oceans Council will oversee the implementation of MSP. Nine regional planning bodies will be established to develop coastal and marine spatial plans based on large marine ecosystems. The planning areas will extend from high water mark to the outer edge of the EEZ and continental shelf. Available online: <http://www.whitehouse.gov/the-press-office/executive-order-stewardship-ocean-our-coasts-and-great-lakes>.

[45] Foley et al., n. 25 above.

[46] West Coast Governors' Agreement on Ocean Health (WCGA): Executive Overview of the Action Coordination Teams' Final Work Plans (2010).

[47] Legislative declaration at Section 2851 of the California Fish and Game Code, Chapter 10.5, Section 2851 [g].

MPA designations and the inadequate level of marine protection,[48] the California Legislature approved and the governor signed the *Marine Life Protection Act* (MLPA).[49] Related state legislation includes the *Marine Life Management Act* of 1998 (MLMA),[50] Marine Managed Areas Improvement Act of 2000[51] and California *Ocean Protection Act* of 2004.[52] The MLPA emphasizes the role of MPAs as an important tool in marine ecosystem-based planning and resource management,[53] and encourages a planning process that includes the advice and assistance of scientists, resource managers, experts, stakeholders and members of the public.[54] Based on the California MLPA Master Plan for MPAs (Master Plan), the MPA designation process is a regional, collaborative and ecosystem-based approach to planning.[55] The six goals of the MLPA are:[56]

> Goal 1: to protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems;
> Goal 2: to help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted;
> Goal 3: to improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity;
> Goal 4: to protect marine natural heritage, including protection of representative and unique marine life habitats in California waters for their intrinsic value;
> Goal 5: to ensure that California's MPAs have clearly defined objectives, effective management measures, and adequate enforcement, and are based on sound scientific guidelines; and
> Goal 6: to ensure that the MPAs are designed and managed, to the extent possible, as a component of a statewide framework.

During the implementation of the California MLPA, the planning process has been based on a collaborative approach to decision making, and has used paid professional facilitators and mediators, scientists with expertise in diverse disciplines,[57] stakeholders, consultants and other advisors, and resources agency personnel in a number of regional forums across the state.[58] After ten years of policy implementation, the results or outcomes of the state's MLPA planning processes vary with respect to the scale of MPA designation or the level of protection set aside in no-take marine reserves. Over time, there has been a decline in the size and type of marine reserves designated by the state. This section includes a description of the two phases of the implementation of the Act.

Phase One (1999–2003)

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[48] Deborah A. McArdle, *California Marine Protected Areas: Past and Present*, Publication No. T-050 (San Diego, California Sea Grant 2002).
[49] California Marine Life Protection Act (MLPA) Section 2853.
[50] Stats. 1998, Chapter 1052.
[51] MMAIA Stats. 2000, Chapter 385.
[52] COPA Stats. 2004, Chapter 719.
[53] MLPA Section 2852(c). MPA terms and the types of reserve areas are defined in Sections 36700 and 36710 of the Public Resources Code.
[54] Chapter 10.5, Section 2858.
[55] California Department of Fish and Game, *Master Plan for Marine Protected Areas, Revised Draft* (2008), available online: <http://www.dfg.ca.gov/mlpa/pdfs/revisedmp0108.pdf>.
[56] Codified at MLPA Section 2853(b).
[57] Satie Airamé, Jenifer E. Dugan, Kevin D. Lafferty, Heather Leslie, Deborah A. McArdle, Robert R. Warner, "Applying ecological criteria to marine reserve design: a case study from the Channel Islands," *Ecological Applications* 13, 1 (2003):170-184.
[58] Gleason et al., n. 37 above and Osmond n. 33 above.

In 1999, three advisory groups were established by the Channel Islands National Marine Sanctuary (CINMS) and the CDFG to consider the designation of MPAs for the marine area 6 NM offshore five northern Channel Islands offshore southern California (the marine areas around Santa Barbara, Anacapa, Santa Cruz, Santa Rosa and San Miguel Islands). The CINMS is one of 13 sanctuaries managed by the National Marine Sanctuaries Program (NMSP) under the US Department of Commerce. The public process for the MPA planning effort for the CINMS and CDFG included a Marine Reserve Work Group (MRWG), a Science Advisory Panel, and Socioeconomic Panel. The MRWG included 17 members that were purported to represent a wide diversity of interests and values within the region. The MRWG included representatives from state and federal resource agencies, user groups (e.g., commercial and recreational fishers), local and national environmental organizations, and an academic.[59] The MRWG met several times a month for roughly two years; the process represented the first state effort to develop and establish no-take MPAs in state (0–3 NM) and federal (3–6 NM) marine areas of the CINMS, and included the use of two paid professional mediators. The funds for this consensus-based planning effort came from the state and federal resource agencies.

In September 1999, six planning goals (including the goal to protect marine biodiversity and to sustain fisheries) were agreed to by each member of the MRWG. Based on the MRWG goals, the 15-member Science Advisory Panel developed recommendations for MPA designs. In November 1999, the science panel recommended to the MRWG that a network of no-take marine reserves representing 30 to 50 percent of the entire CINMS would be needed in order to satisfy the MRWG goals.[60] The Panel's recommendations were based on a comprehensive review of the available scientific information on MPA design.[61] To further support the recommendations, the Panel produced hundreds of maps that represented a range of alternative MPA networks that would set aside 30 to 50 percent of the CINMS. The maps were produced using innovative new tools in visual representation, and identified the estimated economic costs associated with MPA alternatives, and the habitat representation provided within the reserve network. The economic information was based on qualitative and quantitative analysis by NOAA's National Ocean Services and social scientists (including ethnographers) who were members of the Socioeconomic Advisory Panel.[62]

In their deliberation, the members of the Science Advisory Panel reached consensus on their recommendations. The members of the Panel agreed that there recommendations could both sustain fisheries and protect marine biodiversity.[63] It was estimated that the 30 percent reserve network could protect up to 70 percent of the marine life within the CINMS, while a 50 percent reserve design captures roughly 85 percent of the species. Less than 50 percent would not protect birds or mammals.[64] A reserve network of greater than 50 percent would have detrimental impacts on the goal of sustaining fisheries. The Panel did not consider the issue of whether or not particular marine species were over-exploited or base their recommendations on the policy priorities, goals or requirements, such as whether reserves could protect special status species or keystone species in the marine environment, including marine mammals or birds.

Conflict between the members of the MRWG over the scientific recommendations was intense, and received media attention throughout the state. One institutional challenge was that the formal designation document of the CINMS did not have a clear mandate to develop MPAs or any other tool to protect marine life.[65] There were a number of public hearings on the scientific recommendations that were

[59] Mark Helvey, "Seeking Consensus on Designing Marine Protected Areas: Keeping the Fishing Community Engaged," *Coastal Management* 32, 2 (2004):173-190.
[60] Available online: <http://www.cinms.nos.noaa.gov/marineres/PDF/mpa_history%20of%20process.pdf>.
[61] Airame et al., n. 57 above.
[62] Leeworthy and Wiley, n. 18 above.
[63] *Id*.
[64] The CINMS is an important area for birds and mammals. Available online: <http://channelislands.noaa.gov/focus/alert.html>.
[65] Pursuant to Section 304(a)(4) of the National Marine Sanctuaries Act, a Sanctuary's terms of designation set forth the geographic area included within the Sanctuary; the characteristics of the area that give it conservation,

attended by commercial and recreational fishers and conservationists. Commercial and recreational fishers remain opposed to the use of marine reserves. Commercial fishers supported the continued use of traditional fishery management strategies, such as restrictions on the type of fishing gear and catch limits. Recreational fishers supported the continued access of fishing areas. Resource managers, recreational and commercial fishers remained wary of the scientific recommendations. From September 2000 to February 2001, the MRWG members debated the science and could not reach agreement on the size or location of MPAs. After months of public debate and informal negotiation, the members of the MRWG failed to reach consensus on the scientific recommendations. Local conservation organizations supported the science panel recommendation during this period, including important local conservation organizations, such as Santa Barbara's Environmental Defense Center. In the March 2001 meeting of the MRWG, members representing the resource agencies (including the superintendent of the CINMS and regional manager of the CDFG), commercial and sports fishing industries, The Ocean Conservancy, and other formal stakeholders in the process did not support the scientific recommendations, and agreed to begin mapping exercises to consider reserve alternatives that did not protect a minimum set aside of 30 percent. Only one member of the MRWG supported the science panel's recommendations.[66]

In May 2001, the MRWG was disbanded after failing to reach an agreement on a map(s) representing a reserve network design of less than 30 percent set aside. The members of the MRWG representing fishers did not support an expanded role of the CINMS to manage fishers in the sanctuary. This was anticipated given the level of resource use in the CINMS. Recreational fishers argued for maintaining access to fishing areas located in the eastern waters of the CINMS, including Anacapa and Santa Cruz Islands, which are in close proximity to the Ventura Harbor. Commercial fishers did not trust the scientific information in support of marine reserves, and remained skeptical of the recommendations made by the Science Advisory Panel because of the potential economic costs to particular fishers.

The CDFG and CINMS were left with a MRWG mission statement, six MRWG goal statements, the Science Panel's recommendations, a complex record of public hearings and workshops, and a series of maps that was produced by the Panel in over two years of formal and informal negotiation. Based on the mandate of the MLPA, the CDFG staff worked with federal resource agencies to finalize a recommendation for a preferred alternative MPA network designation for state waters.[67] In August 2001, the CDFG recommended to the CDFG Commission the formation of a network of MPAs in the marine areas from 0–3 NM within the CINMS. The state assumed that the federal government would complete the designation process for the federal waters (3–6 NM) in a separate environmental review process. The recommendation represented the culmination of more than three years of deliberation among a variety of groups, and well over 10,000 comment letters were submitted during the state's CEQA review process. In October 2002, the CDFG Commission adopted regulations to create MPAs within the nearshore waters of

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recreational, ecological, historical, research, educational or esthetic value; and the types of activities that will be subject to regulation by the Secretary of Commerce to protect those characteristics. These details are contained in a Designation Document that is published in the Federal Register. The CINMS designation document was published in the Federal Register (Vol. 45 No. 193) on October 2, 1980. Available online: <http://www.cinms.nos.noaa.gov/marineres/PDF/1980.pdf>.

[66] The author was a member of MRWG until March 2001. The author resigned from MRWG on the grounds that the group failed to accept the best available scientific information on the importance of a minimum set aside of 30 percent of the CINMS in MPAs.

[67] The decision-making processes for evaluating and approving proposed MPAs are undertaken by federal (NOAA) and state agencies (CDFG) are defined by the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. § 4321 et seq.) and the California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.), respectively. These separate processes provide the overarching structure for the MPA designation in state (0–3 NM) and federal (3–6 NM) waters of the CINMS. On a vote of 3 to 2, the CDFG Commission approved the preferred alternative of the MPA network in California waters, as described in the CEQA document. The state and federal agencies prepared separate environmental documents that evaluated a range of alternative MPA network alternatives. State and federal agencies agreed on a shared preferred alternative for their respective CEQA and NEPA documents.

the CINMS.[68] The MPA design emphasized the importance of establishing no-take marine reserves. NOAA expanded the MPA network into the sanctuary's deeper waters (3–6 NM) in 2006 and 2007.[69] The entire MPA network consists of 11 marine reserves where all take and harvest is prohibited, and two marine conservation areas that allow limited take of lobster and pelagic fish. The MPA network encompasses 241 square NM (or 318 square miles) making it the largest network off the continental US. The combined state-federal marine zoning network provides protection to 22 percent of the CINMS. Fishing is allowed in the remaining 78 percent of the CINMS.

The general assessment of this first phase of the MLPA process is that stakeholders failed to reach consensus because of the lack of institutional resources and support, and that significant changes to future planning processes were needed that moved beyond the goal of consensus between stakeholders.[70] Scholars note that the MRWG process failed because of a lack of resources (e.g., staffing, funding, and technical tools),[71] and that the role of the scientists in the formal collaborative planning effort needed to be weakened.[72] Science or scientists, it was argued, should not drive the planning process.[73] In addition, scholars suggest that the MRWG members failed to reach consensus because of their value-based differences, and the intergovernmental conflict over the scale of protection recommended by the Panel. The recommended scale of protection led to an expanding scope of conflict between diverse interests and value orientations. While some fishers would receive the burden of the cost (e.g., to their industry or access to a fishing area) associated with a particular MPA option or alternative, the public (and other user groups) would receive the benefit. The public benefits of MPAs received little systematic attention by the Socioeconomic Advisory Panel during the MRWG debate.

The first phase of the MLPA process highlights the problem of informal, and, at times, formal (i.e., government initiated and supported) modes of the privatization of marine areas or ocean commons by vested interests. Commercial fishing areas are passed on from generation to generation and from owner to owner. Commercial fishers rarely compete for marine areas. The designation of MPAs threatens the privileged use of marine areas by commercial and recreational interests. These interests also play a major role in state and federal marine management and planning. As noted earlier, the scale of commercial fishing activities that take place within the CINMS is global with respect to the trade of marine life, such as market squid, in international markets. Until 1999, the CINMS represented merely a "paper tiger" insofar as very little of the marine area (around a small area offshore Anacapa Island) was protected from some type of resource use or extraction. The economic costs associated with protecting 30 to 50 percent of the entire CINMS were found insignificant to the region's economy by economists involved in the process. But there would be potential impacts on particular fishers who would receive the burden of the cost of an MPA closure.[74] Any proposed designation of a network of MPAs would likely represent a cost to some individuals involved in the recreational and commercial fishing industries. The MRWG process did not consider planning tools that could address or mitigate the impact of the loss of fishing areas to particular fishers.

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[68] The California Office of Administrative Law approved the Channel Islands MPA regulatory action and filed it with the Secretary of State on March 10, 2003. The regulations took effect on April 9, 2003. Section 630(b), Title 14, CCR.

[69] NOAA published a final rule on May 24, 2007 (72 FR 29208) that established marine reserves and a marine conservation area in the CINMS. As part of this action, NOAA modified the terms of designation for the CINMS, which were originally published on October 2, 1980 (45 FR 65198), to allow for the regulation of extractive activities, including fishing, and a slight modification to the outer boundary of the CINMS, pursuant to section 304(b) of the National Marine Sanctuaries Act (NMSA), 16 U.S.C. 1434(b). Available online: <http://channelislands.noaa.gov/marineres/pdfs/fr5-24-07.pdf>.

[70] Osmond, n. 33 above, and Gleason et al., n. 37 above.

[71] Gleason et al., n. 37 above.

[72] Helvey, n. 59 above.

[73] Gleason et al., n. 37 above, p. 3.

[74] Leeworthy and Wiley, n. 18 above.

Gary Davis, who at the time was a senior ocean scientist at the Channel Islands National Park, was a member of the MRWG. After the process, Davis maintains that this planning process exposed the conflict between values and ethics held by diverse stakeholders, which eventually led to a major compromise on the recommendations by the science panel.[75] There is empirical support for this claim. In an analysis of the data collected in 2002 from surveys of stakeholders involved in this first planning effort, a study found at least two "advocacy coalitions" – an anti-MPA advocacy coalition and a pro-MPA advocacy coalition.[76] The anti-MPA advocacy coalition (e.g., recreational fishers) remained opposed to the designation of marine reserves.

The MRWG debate also unhinged an intergovernmental conflict between federal and state resource agencies that began well before this process. Staff in the National Marine Fisheries Service (NMFS), CDFG, and the CINMS were engaged in conflict over what role, if any, the federal government should play in the designation of MPAs in federal or state waters; the utility of MPAs as a fishery management tool; the role of the National Marine Sanctuary Program in fisheries management; and what resource agency or jurisdiction should take the lead in developing MPAs under NOAA. Helvey, who was a member of the MRWG representing the NMFS, published an article that represented his position on the MRWG process.[77] Helvey's essay surprised many who were involved in the planning effort. Helvey, who is currently the Assistant Regional Administrator of the NMFS's Southwest Region, maintains that there is a need for stakeholders to recognize irreconcilable impasses early in the MPA planning effort, and to seek solutions to "maneuver" around conflicts. In this sense, one could conclude from Helvey's article that when science is not acceptable to a particular interest or user group (e.g., commercial or recreational interest) some form of political maneuver (e.g., lobbying, litigation, among other tactics) is needed. Maneuvering around the science, in effect, can be interpreted as a means to attempt to reject *unfavorable* information that threatens one economic interest despite the clear goals of the MLPA. Helvey's recommendation seems to miss the intent of the MLPA; the goals of collaborative decision making; and the ground rules that each member of the MRWG agreed to. Helvey's view also challenges the importance of the use of "sound scientific guidelines" as set forth in the MLPA.[78]

In the MRWG process, professional facilitators emphasized the place of values and diverse stakeholder interests in the interpretation of scientific information or, in this case, the recommendations that were made by the members of the Panel.[79] While scholars suggest that the MRWG process failed because of the lack of institutional resources or information, the lack of consensus on the part of the members of the group had more to do with conflicts between economic and ecological values.[80] The politics of the MRWG process reflects deep-seated conflicts between users and values of the maritime commons, in this case the CINMS, and the inevitable tension between (recreational and commercial) industrial use of marine areas and the value of marine conservation. Formal facilitation and collaborative decision-making strategies are useful tools but they do not guarantee that scientific information will be received or acted upon by all participants, stakeholders, and interests. In the case of the MRWG deliberation, it is not surprising that the commercial and recreational fishing interests and stakeholders in the process rejected the recommendations made by the science panel. But it is surprising that all federal

[75] Gary E. Davis, "Science and society: Marine reserve design for the California Channel Islands," *Conservation Biology* 19, 6 (2005):1745-1751.

[76] Christopher M. Weible and Paul A. Sabatier, "Comparing Policy Networks: Marine Protected Areas in California," *Policy Studies Journal* 33, 2 (2005):181–201.

[77] Helvey, n. 59 above, p. 185.

[78] MLPA, as amended to July 2004, Fish and Game Code Section 2851(a).

[79] Helvey, n. 59 above, p. 184 suggests that the facilitators failed to uphold the ground rules for the MRWG negotiation.

[80] Christopher M. Weible, "An Advocacy Coalition Framework Approach to Stakeholder Analysis: Understanding the Political Context of California Marine Protected Area Policy," Journal of Public Administration Research and Theory 17, 1 (2007):95-117; Christopher M. Weible, "Caught in a Maelstrom: Implementing California Marine Protected Areas," *Coastal Management* 36, 4 (2008):350-373.

and state agencies (and the member of the MRWG from The Ocean Conservancy) failed to accept the scientific recommendations.[81]

Since the adoption of the MPA network by state and federal governments there have been relatively minor impacts to commercial and recreational fishing interests.[82] Detailed studies suggest some changes in number of fishers and catch may be linked to the MPAs. The estimated number of recreational fishing trips to the waters of the CINMS has remained fairly constant since MPAs were established.

Phase Two (2004–2011)

In 2004, the California Resource Agency, which includes the CDFG, and the Legacy Fund Foundation launched a renewed effort to implement the MLPA by establishing a regional approach to collaborative planning. The MLPA Initiative established a MLPA Blue Ribbon Task Force (task force), together with a Master Plan Science Advisory Team (science team) and a Regional Stakeholder Group, to oversee the completion of several objectives. The first of these objectives was to develop a Master Plan Framework that describes strategic guidance based on the requirements of the MLPA, [83] and outlines the process to consider alternative MPA designs in state waters. The Plan also identified specific study regions noted below:

- Central Coast study region (Pigeon Point to Point Conception) (Completed);
- North Central Coast study region (Alder Creek near Point Arena to Pigeon Point) (Completed);
- South Coast study region (Point Conception to the California/Mexico border) (Completed);
- North Coast study region (California/Oregon border to Alder Creek near Point Arena) (to be completed by late 2011); and
- San Francisco Bay study region (waters within San Francisco Bay, from the Golden Gate Bridge northeast to Carquinez Bridge) (the designation process for this study area may not be initiated due to the lack of funds for the planning effort).

A comprehensive overview of each of the completed regional processes is beyond the scope of this article. Table 1 includes a depiction of the planning process with respect to the number of stakeholders, the general character of the planning procedure (e.g., consensus-based or supportive of agreement between stakeholders), and whether or not the process met the criteria and design as set forth by the scientific advisory council or team that was involved in each regional effort.

[INSERT Table 1]

In addition, the major characteristics of the designation of MPAs for each regional planning process are represented in Figure 1. Figure 1 depicts the level of MPA set aside for no-take and conservation areas for each study region of the California MLPA that has been completed to date.

[INSERT Figure 1]

[81] In accordance to the National Marine Sanctuary Act 16 U.S.C. 1431 et. seq., Sec. 301(b)(5)(9)) the priority goal of marine sanctuary management is to "maintain, restore, enhance, living resources by providing places for species that depend on marine areas to survive and propagate." The National Marine Sanctuary Program (NMSP) emphasizes the importance of marine biodiversity conservation from an "ecosystem-based approach."

[82] California Department of Fish and Game, *Partnership for Interdisciplinary Studies of Coastal Oceans, Channel Islands National Marine Sanctuary and Channel Islands National Park. Special Session: The First Five Years of Monitoring the Channel Islands Marine Protected Area Network* (2008).

[83] California Department of Fish and Game, *California Marine Life Protection Act Master Plan for Marine Protected Areas* (2008).

Figure 1 shows the dramatic decline in the designation of no-take MPAs by the state, as indicated by the 21 percent no-take MPA network established in the CINMS marine areas by the state and federal governments during Phase One, and 3.9 percent for the South Coast study region, as adopted in December 2010 by the CDFG Commission (Phase Two). What explains the major change in the design of MPAs designated during Phase One and Phase Two? One explanation is that powerful fishery interests carried the day, and influenced the process of the state's designation of MPAs. During the second phase of the implementation of the MLPA, the South Coast planning process concluded after two years of negotiation between 64 stakeholders. As noted in Table 1, the CINMS and CDFG marine designation process included 17 stakeholders in the MRWG. The preferred alternative that was developed during this process and adopted by the CDFG Commission was evaluated by the Science Team, and was found not meet the ecological criteria for reserve design by members of the team. The CDFG Commission adopted regulations to set aside an additional 187 square miles or 8 percent of the state waters of the South Coast (the existing MPAs around the northern Channel Islands which encompass 168 square miles and 7 percent of state waters in the study region). Even if the total percentage of MPAs in the CINMS is combined with the state reserves off the coastal mainland of southern California, one recognizes a major shift in the type of reserve designated and the scale or level of protection provided to marine life.

The primary features of the Phase Two designation process include:

- an emphasis on "fishery-based science" (e.g., resources) rather than multiple-species ecosystem-based planning;
- a shift from the designation of no-take MPAs to conservation areas that allow some type of fishing or use;
- a reduction in the physical scale and level or protection provided by MPAs;
- an emphasis in garnering "broad-based agreement" among a high number of stakeholders; and
- a change in the scientific criteria that supports the role of small reserves based on MPA network connectivity rather than the size, quantity or scale of representative habitats protected in the MPA network.

The Phase Two processes focused on MPA network design to enhance fisheries rather than on larger-scale design features that could support and protect more marine species. With respect to the first goal of the MLPA noted above, the level of protection provided by the state for the South Coast study area falls short of the promise of the Act. A large part of the percentage of area protected by MPAs in southern California is based on the prior designation of marine reserves for the CINMS. Figure 2 depicts the MPA networks for both phases of the MLPA that have been adopted by the state for southern California.

[INSERT Figure 2]

A careful comparison of the MPA design adopted for the CINMS and the marine areas in state waters off the mainland indicates a dramatic difference in the level of protection, and the type of reserve design that has been adopted. Figure 2 shows the following:

- few of the marine reserves off the coastal mainland extend to coastal processes, such as important coastal wetlands and estuaries;
- there are few no-take MPAs designated within the marine areas off the coastal mainland; coastal mainland reserves often allow some type of fishing activity; and,
- there is currently no deep water marine area protected in MPAs offshore California (beyond 6 NM).

Overall, birds, mammals, and pelagic species are not protected by the designated MPA networks in state waters off the coastal mainland. In addition, the reserve networks will not provide the type of multiple species, biodiversity protection that scientists show is needed to address environmental fluctuation, such as major change in sea temperature associated with long- and short-term climate disturbance events.

LEARNING FROM CALIFORNIA

Based on the California MLPA experience, a range of factors influence the process of marine ecosystem-based planning and management, including:

- the general character of the institutional decision-making structure (e.g., consensus or agreement-based);
- the unit (or study area) adopted for planning and decision making;
- the formal and informal roles of stakeholders and scientists in governance;
- issues of institutional capacity and capability;
- the nature of enabling legislation and public policy;
- the interplay between diverse institutional culture(s);
- the values and conflicts between users of ecosystems;
- the political and economic ramifications of multiple- use and global trade; and,
- the ecological context (including the impacts from climate change and human activities).

Additional planning and management tools are needed to address conflict that is developing over resource allocation and the management of use, and to support larger-scale efforts to protect marine biodiversity. The future of marine biodiversity protection should include an emphasis in integrative approaches that are cross-cultural, interdisciplinary, and multi-sectoral. MPAs are one tool in the tool box.

The case of the politics of the California MPA designation reflects a complex interplay between scientists, government agencies, and diverse stakeholders who often hold contending interests and values about the resource use and marine life protection. Conflict is an inevitable part of large-scale marine ecosystem-based planning and management. The implementation phases of the MLPA show that as the scope of conflict between diverse interests expands (with respect to the number of stakeholders involved in the process), governments may attempt to reduce the conflict by limiting the scope of issues addressed in decision making and planning. Government's response to an expanding scope of conflict can take many forms. For instance, the California MLPA process reflects the state's shift from a planning focus on multi-scalar, biodiversity concerns to sector-specific resource issues, such as fisheries conservation. Due to an expanding scope of conflict that is often associated with large-scale marine ecosystem planning, scientific recommendations and advice may fall on deaf ears.

The problem of downscaling economic use of resources remains a fundamental barrier to the further development of marine ecosystem-based planning. One assumption of MSP as a tool for marine ecosystem-based planning and management is that resource managers can resolve the inevitable conflicts between social, economic and political interests that are often associated with marine spaces.[84] A second assumption is that collaborative processes and stakeholder-based planning strategies can support evidence-based, holistic and integrative approaches to MSP.[85] Yet, as the California MLPA efforts show,

[84] Charles N. Ehler and Fanny Douvere, *Marine Spatial Planning: A Step-By-Step Approach toward Ecosystem-Based Management*. Intergovernmental Oceanographic Commission and Man and the Biosphere Programme. UNESCO (2009). See also UNESCO Initiative on Marine Spatial Planning, available online: <http://www.unesco-ioc-marinesp.be/msp_guide>.

[85] Fanny Douvere and Charles N. Ehler, "New perspectives on sea use management: Initial findings from European experience with marine spatial planning**,"** *Journal of Environmental Management* 90, 1 (2009)*: 77*-88.

there is no guarantee that planning outcomes will be grounded in science or that collaborative processes that include stakeholders and users will lead to stronger biodiversity protection measures. While a set of generic principles to guide MSP is described in many recent scientific articles and government documents,[86] many of these planning principles are difficult to practice or apply in light of the unsustainable use of marine resources in global markets and the role of special interests in marine resource management. MSP is more than a technical or scientific mapping exercise; it will require more than the formulation of zonal plans for particular uses of marine space. MSP is more than a bureaucratic or technocratic exercise. MSP requires that human beings address the types of over-use and behavior that is a primary cause of the declining state of the world's oceans.

Confronting the economic behavior and the associated impacts on marine resources requires changing the prevailing institutional structures that support the interests of powerful commercial alliances and industrial relationships.[87] As a tool for decision making and planning, MSP requires a strategic and forward-looking ecological approach to manage human behavior and the multiple-uses of marine ecosystems. As with all tools or technologies, the use and application of MSP may not represent an ecological panacea. There are pitfalls in the reliance on a view of MSP that deploys techniques to rationalize nature and to render the oceans predictable, to replace its self-sustaining, ecological function and structure with well-managed industrial, commercial, and recreational spaces or boundaries.

There are two forces at work in the politics of marine life protection: the scientific realization that highly valued marine ecological processes and species should be preserved in networks of MPAs; and the government recognition that many ecosystems high in biodiversity value are of high economic value. These apparently conflicting factors contribute to an emerging politics of marine biodiversity protection, and it remains unclear whether MSP can resolve the fundamental tension between ecological and economic values associated with marine ecosystems. Policymakers, scientists and resource managers recognize that successful integrative ocean governance means overcoming particular institutional and structural challenges. One major challenge is the power relationships that often support the unsustainable use and the trade of common and publicly held marine resources. As described in this essay, marine ecosystem-based planners and managers must overcome a conservation conundrum – the scale required to protect marine biodiversity can be undermined by powerful economic interests that support commercial and recreational use of marine life. The tension between the physical scale of protective measures needed to protect marine life and the global scale of the economic use of marine resources will need to be addressed if marine ecosystems are to be sustained. As the socio-ecological processes that are driving marine ecosystem change become more apparent, the scope of political conflict becomes wider and deeper over how to better protect and sustain marine life.

While a new era of marine biodiversity protection may be developing that emphasizes the use of new planning tools such as MPAs and MSPs, the era of global trade and the powerful interests that support large-scale economic use of marine resources continues to have a major role in marine planning and management. The role of powerful interests in future marine planning and management will likely remain a major barrier to the development of more sustainable, integrative approaches to protect marine life. Despite calls for the development of collaborative and stakeholder-based planning processes that include the use of scientists and other experts in decision making, there is no guarantee that adequate levels of marine biodiversity protection will be supported by stakeholders and other users of marine systems.

The quest for a recovery of the oceanic commons requires a fundamental shift in orientation away from purely instrumental values and toward a more integrative and ecological approach to marine ecosystem-based planning and governance. The scale of marine ecosystem change is shaping a new era of politics and conflict over marine resource use and biodiversity conservation. Future development and implementation of MSPs and MPA designation will likely face similar challenges – the question remains

[86] Foley, n. 25 above.

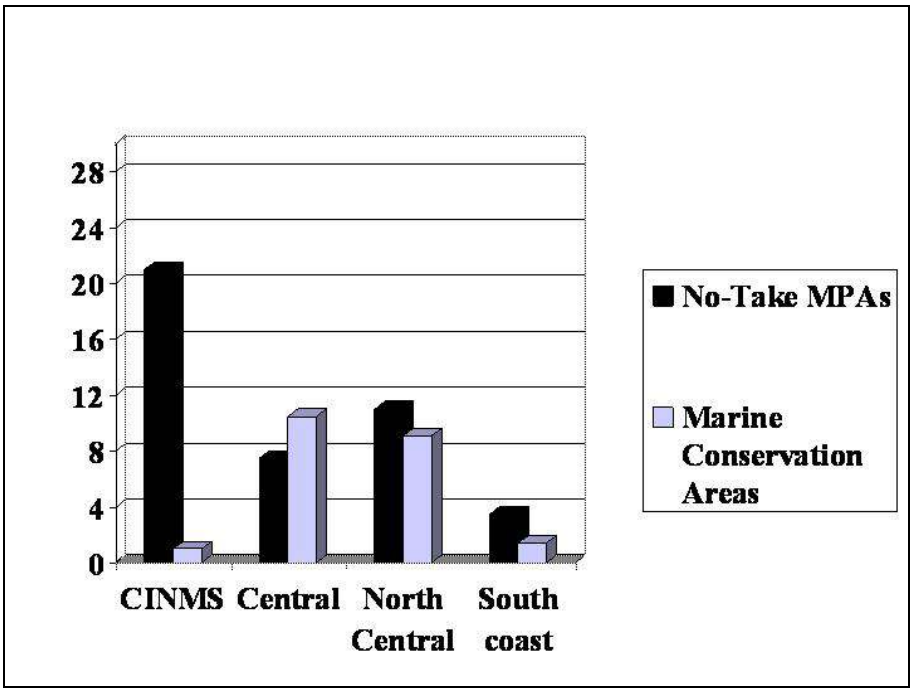
[87] Tom. A. Okey, "Membership of the eight Regional Fishery Management Councils in the United States: Are special interests over-represented?," *Marine Policy* 27, 3 *(*2003):193–206.

whether we can plan for and adapt to the scale of the dynamic ecological changes that lie ahead within an era of economic globalization. The cultivation of more sustainable, adaptive capacities and institutional capabilities to limit the scale of marine resource use requires a systematic recognition of the biophysical limits of marine ecosystems. The development and implementation of planning tools such as MPAs and MSPs that support marine ecosystem-based planning and integrative management should include measures that can limit existing and future levels of resource use and associated impacts so that we can maintain and preserve the ecological values that are inherent to the life-giving blue planet.

Table 1.—General Characteristics of Each Planning Effort

Region	Number of Stakeholders	Did the MPA design satisfy the Scientific Criteria for Reserve Designation?	Planning Process
Northern Channel Islands	17	No	Failure to reach Consensus
North-central Coast	45	Yes	Broad-based agreement
Central Coast	56	Yes	Broad-based agreement
South Coast*	64	No	Broad-based agreement

* The South Coast region marine reserve designation is based on the "integrated preferred alternative" (IPA) for the environmental assessment which is currently under preparation in accordance to the *California Environmental Quality Act*. The development of the IPA was based on agreement by the region's stakeholder group, which did not meet the criteria as set forth by the scientific advisory group for adequate levels of protection. The South Coast total percentage and no-take marine reserve percentage include the state area MPA designations associated with the northern Channel Islands. A total of 55 percent of the total proposed area protected is associated with the state areas off the coastal mainland of the South Coast.


28
24
20
16
12
8
4
0
CINMS
Central
North Central
South coast
No-Take MPAs
Marine Conservation Areas
Figure 1.

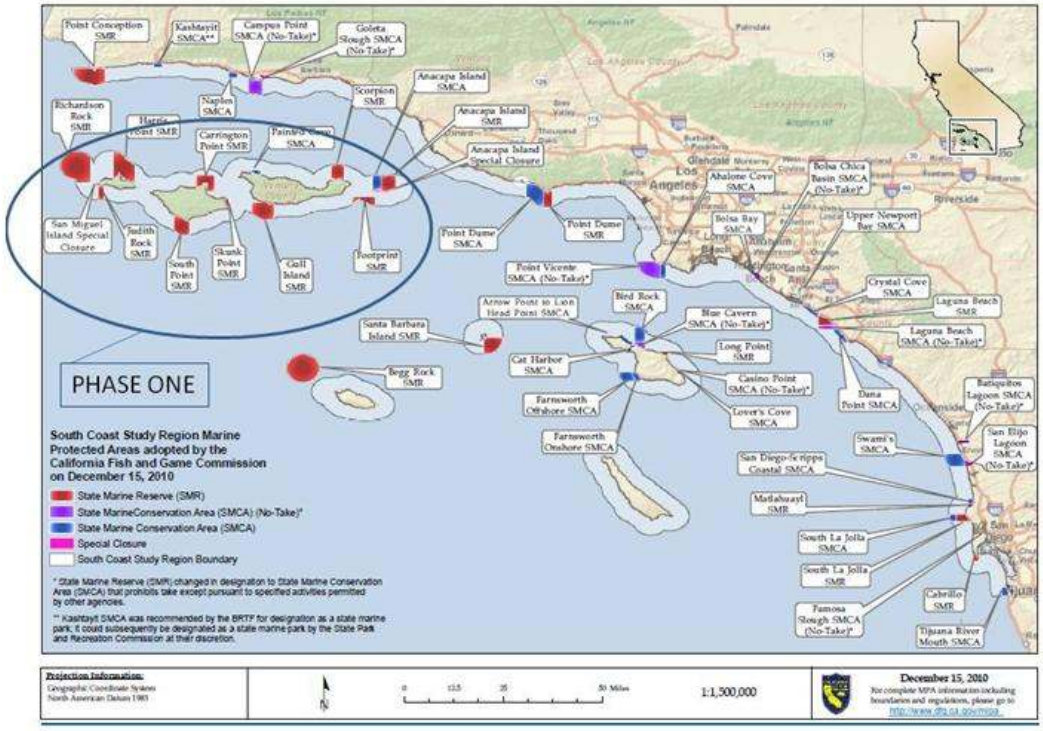

PHASE ONE
South Coast Study Region Marine Protected Areas adopted by the California Fish and Game Commission on December 15, 2010
State Marine Reserve (SMR)
State MarineConservation Area (SMCA) (No-Take)*
State Marine Conservation Area (SMCA)
Special Closure
South Coast Study Region Boundary
* State Marine Reserve (SMR) changed in designation to State Marine Conservation Area (SMCA) that prohibits take except pursuant to specified activities permitted by other agencies.
** Kashtayit SMCA was recommended by the BRTF for designation as a state marine park. It could subsequently be designated as a state marine park by the State Park and Recreation Commission at their discretion.
Point Conception SMR
Kashtayit SMCA**
Campus Point SMCA (No-Take)*
Goleta Slough SMCA (No-Take)*
Richardson Rock SMR
Naples SMCA
Scorpion SMR
Anacapa Island SMCA
Anacapa Island SMR
Anacapa Island Special Closure
Harris Point SMR
Carrington Point SMR
Painted Cave SMCA
San Miguel Island Special Closure
Judith Rock SMR
South Point SMR
Skunk Point SMR
Gull Island SMR
Footprint SMR
Point Dume SMCA
Point Dume SMR
Point Vicente SMCA (No-Take)*
Arrow Point to Lion Head Point SMCA
Santa Barbara Island SMR
Begg Rock SMR
Cat Harbor SMCA
Farnsworth Offshore SMCA
Farnsworth Onshore SMCA
Bird Rock SMCA
Mor Cavern SMCA (No-Take)*
Long Point SMR
Casino Point SMCA (No-Take)*
Lover's Cove SMCA
Los Angeles
Glendale
Anaheim
Santa Ana
Riverside
Abalone Cove SMCA
Bolsa Bay SMCA
Bolsa Chica Basin SMCA (No-Take)*
Upper Newport Bay SMCA
Crystal Cove SMCA
Laguna Beach SMR
Laguna Beach SMCA (No-Take)*
Dana Point SMCA
Batiquitos Lagoon SMCA (No-Take)*
San Elijo Lagoon SMCA (No-Take)*
Swami's SMCA
San Diego-Scripps Coastal SMCA
Matlahuayl SMR
South La Jolla SMCA
South La Jolla SMR
Famosa Slough SMCA (No-Take)*
Cabrillo SMR
Tijuana River Mouth SMCA
Projection Information:
Geographic Coordinate System
North American Datum 1983
0 12.5 25 50 Miles
1:1,500,000
December 15, 2010
for complete MPA information including boundaries and regulations, please go to
http://www.dfg.ca.gov/mpa

Figure 2.