STANFORD LAW SCHOOL
ENVIRONMENTAL AND NATURAL RESOURCES
LAW AND POLICY PROGRAM

SLS Case No. 06-042

Channel Islands
(Part II)

The Letter

It was the end of November 1998, when Peter Chandler discovered in his inbox a letter to the California Fish and Game Commission ("Commission") that would change the course of marine protection in California. Chandler, a senior biologist, on staff at the California Department of Fish and Game ("Department"), had already received several inquiries about marine protected areas. This letter, however, was different. While all the other inquiries originated from conservation groups and state and federal agencies, this letter was the first proposal for no take reserves authored by a recreational fisherman, representing a group of concerned recreational fishermen, the Channel Islands Marine Resource Restoration Committee.

In addition to its unlikely author, the timing of the letter proved crucial. Concern was growing regarding the decline in west coast fish stocks, especially the rapid decline of rockfish. At that same time, the interest in MPAs as another tool outside of traditional fisheries management had been garnering new attention since the early 1990s.

After much discussion with other staff members, Chandler, on behalf of the Department, drafted a recommendation to the Commission for its January 1999 meeting, concluding that the Commission should take no action on the proposal for no-take marine reserves in the Channel Islands until a statewide policy on MPAs was adopted. The Commission heard public comments, discussed the proposal, and followed the Department's recommendation to take no action until further study had been done. See

Revised 3/06

Exhibit A for minutes from the January 1999 meeting. Donlon was still hopeful that his letter would possibly spur further action.

Decision-Making Process

Despite the Commission's decision not to act, Chandler knew that momentum was gathering quickly to examine the possibility of marine reserves at Channel Islands, and he and others began orchestrating that effort at the direction of the Commission. While Chandler was aware of the momentum towards the designation of marine reserves, he also understood that the science of marine reserves was still relatively unproven, and that the uncertainty of the science would present a major stumbling block in the designation of any reserves in the Channel Islands.

Chandler also knew that several people were drafting new legislation, to be called the "Marine Life Protection Act" (MLPA), to provide the governance framework for MPAs throughout California. Chandler was sure that the stakeholders' knowledge of the parallel MLPA process would impact the Channel Islands marine reserves debate, and vice versa.

Marine Life Protection Act (MLPA): California legislation to designate MPA network throughout state

With all of that in mind, Chandler wanted to set up a multi-stakeholder process that would provide a public forum to debate the merits of the proposed marine reserves network and lend the needed legitimacy to any reserve designation.

After discussions with some folks at the Channel Islands National Marine Sanctuary ("Sanctuary"), the following decision-making process began to take shape: a working group would consider the marine reserves proposal and, with the support of technical panels, make a recommendation to the Channel Islands National Marine Sanctuary Advisory Council ("Council"). This Council was not a part of the Sanctuary staff, but functioned as an advisory body to the Sanctuary Manager.

Sanctuary Advisory Council Members

Name	Representation
Michael Hanrahan	Business
Rebecca Roth	California Coastal Commission
Brian Baird	California Resources Agency
Harry Liquornik	Commercial Fishing
Linda Krop	Conservation
Diane Meester	County of Santa Barbara
Lyn Krieger	County of Venture
Patricia Wolf	Department of Fish and Game
Larry Manson	Education
Jon Clark	General Public
Matthew Cahn	General Public
Robert Duncan	General Public
Drew Mayerson	Minerals Management Service
Mark Helvey	National Marine Fisheries Service
Tim Setnika	National Park Service
Jim Brye	Recreation
Robert Warner	Research
Jeannette Webber	Tourism
Lt. J. Wade Russell	U.S. Coast Guard
Alex Stone	U.S. Department of Defense

The Council would forward a recommendation to the Sanctuary and the Department. The Sanctuary would then take the recommendation to the Pacific Fisheries Management Council and NOAA's Ocean Service to determine the federal waters, if any, to be designated to marine reserves. Similarly, the Department would take the recommendation to the Commission to determine the state waters, if any, to be designated to marine reserves.

The Working Group

With that general process in place, Chandler, as part of the joint federal-state partnership of the Department and the Sanctuary, decided to assign the task of setting up a working group to the Council. In July 1999, the Council created the Marine Reserves Working Group ("Working Group"), appointing 17 members. Five members were from the Council and the remaining 12 members were nominated and approved by the Council.

Working Group Members

Name	Affiliation	Representation
Patricia Wolf, Chair	Department of Fish and Game	Department of Fish and Game
Matt Pickett, Sanctuary Manager, Co-Chair Ed Cassano	NOAA's Channel Islands National Marine Sanctuary	NOAA's National Marine Sanctuary
Warner Chabot Greg Helms	Center for Marine Conservation	Non-consumptive
Jim Donlon Steve Roberson	Channel Island Marine Resource Restoration Committee	Non-consumptive
Alicia Stratton Sean Kelly	Surfrider Foundation	Non-consumptive
Chris Miller	Lobsters Trappers Association	Consumptive
Neil Gugliemo	Squid Seiner and Processor	Consumptive
Dale Glanz	ISP Alginates Inc.	Consumptive
Tom Raftican	United Anglers	Consumptive
Robert Fletcher	Sport Fishing Association of California	Marine/Business
Locky Brown	Channel Islands Council of Divers	Sport Diving
Marla Daily	Sanctuary Advisory Council	Public At Large
Dr. Craig Fusaro	Sanctuary Advisory Council	Public At Large
Gary Davis	Channel Islands National Park	National Park Service
Mark Helvey	NOAA's National Marine Fisheries Service	NOAA's National Marine Fisheries Service
Deborah McArdle	California Sea Grant	California Sea Grant
Dr. Michael McGinnis (resigned in protest)	Acting Director of Ocean and Coastal Policy Center, MSI, UCSB	Non-consumptive

Where two names are listed, the former initiated the process and the latter completed it.

The members represented the various stakeholder interests, both consumptive and non-consumptive, such as recreational fishing, kelp harvesting, commercial fishing, consumptive diving, recreational diving, conservation, scientists, surfers, and the public, California Sea Grant, state and federal agencies. Only three members represented exclusively nonconsumptive uses—a political science professor (Michael McGinnis who later resigned in protest), a Surfrider representative, and an Ocean Conservancy representative. The Working Group included six fishermen, including Jim Donlon representing concerned recreational fishermen. Upon his death, Donlon was replaced by another recreational fisherman, Steve Roberson. The Working Group was co-chaired by the Sanctuary Manager, originally Ed Cassano, later replaced by Matt Pickett, and the Department's Marine Region Manager, Patricia Wolf. The Working Group represented a diversity of stakeholders generally heralded by all interested parties.

Chandler, along with others at both the Department and the Sanctuary, devoted time and resources to the Working Group's efforts, hosting monthly meetings, providing funds for facilitation services, and contributing data. The Channel Islands National Park and NOAA's National Ocean Service also made similar contributions. The Working Group members simply donated their time and efforts.

The Science Panel

Chandler at the Department and the Sanctuary team had also concluded that the Working Group should be supported by a Science Panel and a Socioeconomic Panel. These panels would be particularly important in order to educate the Working Group about the uncertainty of the science of marine reserves, their potential benefits and the potential costs. The Working Group set the criteria for selection of the Science Panel members: (1) local knowledge, (2) no published "agenda" on reserves, (3) breadth of disciplines, (4) geographic and institutional balance, (5) consideration of involvement with NCEAS Reserve Theory Working Group, and (6) time available.

The second criterion, prohibiting any scientist who had previously published any paper on marine reserves, was included to ensure that the scientists were objective and not co-opted by the conservation community. Even with this prohibition, the Science Panel was generally considered of high quality. The Science Panel was approved unanimously by the Working Group. The Science Panel was chaired by Matthew Cahn, a public policy professor at CSU Channel Islands, who served as the primary liaison to the Working Group.

Science Panel Members

Name	**Affiliation**	**Disciplines**
Dr. Matthew Cahn, Chair	CSU Channel Islands	Public Policy
Peter Haaker	California Department of Fish and Game	Invertebrate Zoology, Marine Ecology, Fisheries Management
Dan Richards	Channel Islands National Park	Invertebrate Zoology, Marine Ecology
Dr. Steven Murray	CSU Fullerton	Invertebrate Zoology, Phycology, Marine Ecology
Dr. Russ Vetter	National Marine Fisheries Service	Ichthyology, Reserve Design/Management, Rock Fish, Larval Transmission
Dr. Ed Dever	Scripps Institute	Physical Oceanography
Dr. Joan Roughgarden	Stanford University	Invertebrate Zoology, Statistical Modeling, Population Dynamics, Larval Transmission
Dr. Allan Stewart-Oaten	UC Santa Barbara	Statistical Modeling, Population Dynamics
Dr. Bruce Kendall	UC Santa Barbara	Population Dynamics
Dr. Daniel Reed	UC Santa Barbara	Phycology, Marine Ecology, Statistical Modeling, Reserve Design/Management
Dr. Dave Siegel	UC Santa Barbara	Physical Oceanography
Dr. Libe Washburn	UC Santa Barbara	Physical Oceanography
Dr. Robert Warner	UC Santa Barbara	Ichthyology, Marine Ecology, Population Dynamics, Reproduction
Dr. Steve Gaines	UC Santa Barbara	Invertebrate Zoology, Marine Ecology, Statistical Modeling, Population Dynamics, Larval Transmission
Dr. Steve Schroeter	UC Santa Barbara	Invertebrate Zoology, Marine Ecology, Statistical Modeling, Reproduction, Larval Transmission
Dr. Mark Carr	UC Santa Cruz	Ichthyology, Marine Ecology, Rock Fish

The Working Group directed the Science Panel to review the literature on marine reserves. Chandler helped the Working Group draft its questions for the Science Panel. The Working Group asked the Science Panel to specifically do the following: research the potential natural resource consequences of reserves, define scientific criteria to achieve goals for biodiversity and fisheries defined by the Working Group, identify and evaluate existing data sets for geographic information system-based ecological characterization (GIS), and evaluate scientific merit of different reserve scenarios provided by the Working Group. The Science Panel generally met separately from the Working Group with its Chair acting as the intermediary, updating the Working Group on the Science Panel's progress and also relaying the Working Group's directives to the Science Panel.

The Socioeconomic Panel

The other panel, the Socioeconomic Panel, was composed of two NOAA economists and three locally-based contractors who collected economic data for various industries. The Socioeconomic Panel was created to provide the potential costs and benefits of the establishment of marine reserves through an evaluation of existing studies and records of catch from commercial and recreational industries in the region. The fishermen, who were reluctant to share data with the Socioeconomic Panel regarding their fishing spots, contracted with industry consultants to provide data in a confidential manner. Under the direction and guidelines of the local fishing industry, the consultants assembled the fishermen's information and conveyed it to the Panel, including the recreational and commercial priority fishing areas, catch data, oral histories and anecdotal information from long time fishing leaders and other local mariners. Chandler helped compile much of this information. The Socioeconomic Panel was then directed to conduct an economic impact analysis of various marine reserve scenarios provided by the Working Group. The members of the Socioeconomic Panel collected data from the respective industries listed below.

Socioeconomic Panel Members

Name	Affiliation	Industries Researched
Dr. Bob Leeworthy	NOAA Special Projects Office	Commercial Fisheries
Peter Wiley	NOAA Special Projects Office	Recreational Fisheries
Dr. Craig Barilotti	Sea Foam Enterprises	Commercial Fisheries
Dr. Charles Kolstad	UC Santa Barbara	Charter/Party Boats
Dr. Carolyn Pomeroy	UC Santa Cruz	Squid Fishery

The Working Group Process

Chandler attended all 22 Working Group meetings that were held from July 1999 to May 2001. He observed the Working Group as it deliberated through three phases: (1) description of criteria, goals, objectives, and data gathering, (2) development of alternative reserve designs, and (3) deliberation over alternatives and consideration of a final recommendation.

The Working Group first agreed on a consensus model of decision-making, which required that the participants reach the highest level of agreement without dividing participants into factions. According to their agreement, each decision had to be supported by each member's ability to make the following statement: "whether or not I prefer this decision above all other, I will support it because it was reached fairly and openly." No single member held veto power. Instead, a member who objected to a proposal need to suggest an alternative or resign.

Along with the agreement on consensus building, the Working Group also spent considerable time developing a mission statement, a problem statement, and detailed goals and objectives before actually considering the marine reserves. The box below presents the resulting agreed on statements and goals.

Mission Statement	Using the best ecological and socioeconomic and other available information, the Marine Reserves Working Group will collaborate to seek agreement on a recommendation to the Sanctuary Advisory Council regarding the potential establishment of marine reserves within Channel Islands National Marine Sanctuary area
Problem Statement	The urbanization of southern California has significantly increased the number of people visiting the coastal zone and using its resources. This has increased the human demands on the ocean, including commercial and recreational fishing, as well as wildlife viewing and other activities. … and the use of our coastal waters as receiving areas for human, industrial, and agricultural wastes. In addition, new technologies have increased the efficiency, effectiveness, and yield of sport and commercial fisheries. Concurrently, there have been wide scale natural phenomena such as El Nino weather patterns, oceanographic regime shifts, and dramatic fluctuations in pinniped populations. … One strategy is to develop reserves where all harvest is prohibited. Reserves provide a precautionary measure against the possible impacts of an expanding human population and management uncertainties, offer education and research opportunities, and provide reference areas to measure non-harvesting impacts.
Three Dominant Goals and Objectives	(1) Protect ecosystem biodiversity, protect representative and unique marine habitats, ecological processes, and populations of interest; (2) Maintain long-term socioeconomic viability while minimizing short-term socioeconomic losses to all users and dependent parties; (3) Achieve sustainable fisheries by integrating marine reserves into fisheries management

Early Communication with the Science Panel

Once the Working Group had settled on the above statements and goals, they asked the Science Panel several preliminary questions:

> Is there a problem with current fisheries management in the Channel Islands National Marine Sanctuary?
> What are the benefits of marine reserves for conservation and fisheries management?
> Do reserves increase reproductive output and recruitment of fished species?
> Can marine reserves enhance fisheries through spillover of adult fish into fished areas?

In its first written response to the Working Group (Exhibit B), the Science Panel answered the first question with the Working Group's own problem statement. As to the second question regarding marine reserves benefits, the Science Panel provided the following answer:

> Marine reserves are important tools for marine conservation and fisheries management, with the potential to provide ecosystem protection, improved fisheries yields, expanded understanding of marine environments, and improved non-consumptive opportunities. The degree to which a reserve will provide certain benefits or achieve specific goals will vary with the species, depending on life-history characteristics and various aspects of reserve design.
>
> The number of documented successful examples of no-take marine reserves is increasing rapidly. There is now abundant evidence to show that protecting areas from fishing leads to rapid increases in abundance, size, biomass, and diversity of animals, regardless of where in the world reserves are sited. Halpern (in press) reviewed 76 studies of reserves that were protected from at least one form of fishing. He derived aggregate measures of reserve performance, by combining responses of all the organisms studied for each of four variables: abundance, total biomass, average body size, and species diversity. Across all reserves, abundance (measured as density) approximately doubled, biomass increased 2.5 times that in fished areas, average body size increased by approximately 1/3 (equivalent in many fish to an increase in egg output of 240% or more), and the number of species present per sample increased by 1/3.

See Table 1 in Exhibit B for a summary of examples of reserve effects from a range of different parts of the world and different habitats. The next time the Working Group would hear from the Science Panel would be at the pivotal September 2000 meeting. The Working Group had asked the Science Panel for its recommendations, including a recommendation for the size of potential reserves.

The Science Panel and Socioeconomic Panel Recommendations

After over a year of deliberations, consensus-building, and dialogue with the Science Panel and Socioeconomic Panel, Chandler arrived at the September 2000 Working Group meeting anticipating a more animated meeting than those in the past. He had been assisting with the drafting of the recommendations from the Science Panel and the Socioeconomic Panel. He knew the recommendations would heighten some of the tensions among the stakeholders. This September 2000 meeting proved to be central to the future of the process.

At the September meeting, the Science Panel provided a decision-making tool, using a GIS computer model with maps of locations of substrate type (rock, sand, mud) kelp, eelgrass, and surfgrass, as well as bird and mammal breeding colonies. This was a habitat-based approach, whereby essentially each pixel on the map of the Channel Islands was loaded with particular habitat information, habitat types, and ecological criteria, such as the abundance of pinnipeds or fisheries species, along with the amount of displaced fishing, and short-term economic costs. With this tool, both the Working Group members and members of the public could draw reserve lines on the map and receive immediate feedback as to the potential benefits of that reserve design. In this way, the tool provided information about how well a marine reserve network might capture representative habitat types and the amount of fishing it displaced, thereby demonstrating which areas gave more protective bang for the buck.

The Science Panel also made several recommendations, regarding biogeographical representation, connectivity of reserves, reserve network size, individual reserve size, habitat representation, human threats and natural catastrophes, vulnerable habitats, species of special concern and critical life history stages, exploitable species, and monitoring sites. Specifically, the Science Panel recommended the designation of a network of 1-4 reserves in each of the three biogeographic regions in the sanctuary.

The most controversial recommendation was the recommended range in the size of marine reserves of 30-50% of the Sanctuary waters out to 6 nautical miles offshore. In making this recommendation, the Science Panel stated the following:

> If reserves are designed for fisheries enhancement and sustainability, most theoretical studies and limited empirical data indicate that protecting 20 to 50% of fishing grounds will minimize the risk of fisheries collapse and optimize long term sustainable catches. If reserves are designed for conservation, most theoretical studies and limited empirical data indicate that protecting a minimum of 10 to 40% of all marine habitats is needed to help conserve ecosystem biodiversity. Scientists recommended protecting at least 30%, and possibly 50%, of each of the representative habitats in each of the three biogeographical zone of CINMS to achieve conservation and fisheries goals. Because of the complexity and uncertainty upon which this recommendation is based, continued evaluation of the effectiveness of marine reserves is necessary to determine whether subsequent alteration of reserve design (reduction or increase) is appropriate.

See Exhibit C at p.1.

The remainder of the Science Panel's recommendation addressed the Working Group question, "How large should marine reserves be?" See the key points in Exhibit C at pp.12-13. See also the summary of studies estimating marine reserve area relative to the conservation of management objectives in Table 1 in Exhibit C at pp. 17-19.

Many in the fishing community, including those on the Working Group, were shocked by the 30-50% range. The original proposal of 20% waters out to one mile seemed too high. Now the idea of giving away one-third to one-half of their fishing grounds surely portended economic disaster to the regional fishing industry.

The Socioeconomic Panel provided a socioeconomic impact analysis of the proposed network of marine reserves, analyzing the impacts of various network designs. The Panel described the economic background of the affected regions, i.e. Santa Barbara County, Ventura County, etc. Then, the Panel presented the maximum potential losses, followed by an analysis of the likelihood of those losses in light of potential benefits and mitigation that could offset those losses. The costs included the displacement costs to commercial fishing, kelp harvesting, recreational fishing and consumptive diving. The potential beneficiaries included sport divers, wildlife viewers, passive users, along with potential spillover benefits to commercial fishing, kelp harvesting, recreational fishers, and consumptive divers. Lastly, the Panel outlined the benefits to science and education.

Bob Leeworthy, the lead economist on the socioeconomic panel stated, "If you're a user group, you're scared that the size of closure will put you out of business." All of

the data collection and analysis was compiled into a single report, "Socioeconomic Impact Analysis of Marine Reserve Alternatives for the Channel Islands National Marine Sanctuary," dated April 2, 2002 included as Exhibit D. See Exhibit E for a rebuttal to the Socioeconomic Panel's Report from the American Sportfishing Association, finding that the Panel's analysis vastly underestimated the economic impact of banning sportfishing in parts of the sanctuary.

While the map-making tool was extremely useful to all the parties, the number of 30-50% really put the debate into sharp focus. Chandler watched from the sidelines as the dialogue, which had begun with a great deal of good faith consensus-building, evolved into a much more polarized debate, with various interest groups staking out positions attached to specific numbers. And, subsequently, the map-making process was deeply influenced by that focus on the 30-50% range.

Map-making

At the same September 2000 meeting, the Working Group set to work with the map-making tool. In small groups, representing heterogeneous interests, the Working Group developed ten initial reserve designs. In the following meetings, from October until April 2001, the Working Group continued to labor over the map-making, in homogenous groups, then as the Working Group as a whole, working towards a single map to recommend to the Council for forwarding onto the Department and Sanctuary, and then to the Commission, PFMC and NOAA. The Working Group discussed the use of multiple levels of protected areas, phasing reserves in over time, and recreational-only and limited-take zones.

Size of Reserves

Chandler observed the predictable perspectives emerge: the conservation community largely adopted the Science Panel's recommendations, while the recreational fishing community largely rejected them. The following table illustrates the various positions on reserves size.

Size of Reserves

Perspective	Interest	Proposals
Reserves should initially be limited in size until their benefits, especially spillover benefits, can be adequately demonstrated.	Minimize economic hardships on consumptive users. Maintain access to key important traditional areas of use.	7% Set-aside 14% Set-aside
Set aside 20-30% of high quality habitat within the Sanctuary as an initial Phase of marine reserves. Provide consumptive users additional time to adapt to the closures and through adaptive management over	Make significant scientifically defensible progress towards achievement of the goals and objectives for marine reserves and build community support for additional expansions	20-30% Set-aside

time, increase the area to 30+% per the Science Panel's recommendation.	through adaptive management.	
Reserves must cover at least 30% of the Sanctuary to be successful, as defined by the Science Panel.	Minimize environmental risk at the expense of short-term adverse economic impacts to consumptive users	30+% Set-aside 28% Set-aside
Reserves should be at least 30% plus an additional 1.2 – 1.8X "insurance" multiplier. Anything less could fail to protect species if natural or manmade disasters cause significant harm to ecosystem health and functions.	Eliminate environmental risk at the expense of adverse economic impacts to consumptive users.	36-48% Set-aside

From Facilitators' Report May 23, 2001

While the original proposal came from Jim Donlon, a recreational fisherman and representative of a group of recreational fishermen concerned about the declines in fish stocks in Channel Islands, a large group of recreational fishermen organized a very strong lobby against the designation of marine reserves in Channel Islands. Having worked at the Department for years, Chandler was well aware of the political power of the recreational fishing community. However, Chandler had not seen the recreational fishing groups mobilize as they did during the Working Group process. These recreational fishermen did not want marine reserves, especially not on Santa Barbara Island or Anacapa Islands. This group was represented by Tom Raftican and Bob Fletcher on the Working Group. While the conservation community was well-represented at each of the Working Group meetings, the meetings were overwhelmed with the consistent presence of hundreds of opposed recreational fishermen who wore red shirts, followed Raftican and Fletcher from meeting to meeting, and greeted their representatives' statements with thunderous applause.

Recreational fishing is a $500 million-a-year industry in California; one in 20 Southern Californians have fishing licenses. Fletcher, himself, was a 15-year member of the Pacific Fishery Management Council, a federal agency, and twice chaired that agency. Fletcher was also the Chief Deputy Director of the Department of Fish and Game at one point.

At the December 2001 meeting, Fletcher complained that the Science Panel had exceeded the Working Group directives and instead pursued a hidden agenda to promote marine reserves and ignore traditional fishery management practices. Steve Roberson, who replaced Jim Donlon after Donlon died of cancer in 1999, responded at the meeting that Fletcher was one of those who approved the composition of the Science Panel, and that the Working Group had requested the recommendations about reserve size.

Final Answers from Science Panel

After answering the preliminary questions and providing a recommendation, the Science Panel addressed several follow-up questions, mostly aimed at better explaining their size recommendation. A group of recreational fishermen felt that the Science Panel

did not adequately weigh the traditional fishery management practices already in place in the Channel Islands, in particular the Cowcod Conservation Area. Many fishermen felt that the Cowcod Conservation Area should operate to reduce the need for reserves. The Science Panel specifically addressed this issue with the following:

> Other current management measures cannot reduce the recommended reserve size of 30-50% of the Channel Islands National Marine Sanctuary for ecosystem conservation. The proposed cowcod closure provides some protection for groundfish species within a limited depth range (below 120 ft) and areas (south of the Channel Islands, including San Nicolas and Santa Barbara Islands). With the exception of the Anacapa Reserve, closures in the Channel Islands region have been limited to a single or several species, or a single or several gear types. Single (or several) species (or gear type) closures do not meet the Marine Reserves Working Group goal of protecting ecosystem biodiversity. One of the primary objectives for marine reserves is to "protect representative and unique marine habitats, ecological processes, and populations of interest". The Marine Reserves Working Group and the Science Panel have identified 20 representative and unique marine habitats (Table 7) and 119 populations of interest (Table 8). Ecological processes link the species with their habitats and with other species through direct and indirect interactions.
>
> In response to stock status classified as over-fished, the Pacific Fisheries Management Council adopted tentative guidelines for the development of draft rebuilding plans for canary rockfish and cowcod. For canary rockfish, the tentative guidelines include substantially reduced take limits that would be in place for several decades or until the populations are rebuilt. Reduced limits on canary rockfish do not prevent accidental or by-catch of canary rockfish during other fishing efforts. To protect cowcod, found almost exclusively in waters off southern and central California, large area closures in the best cowcod areas will be closed to all groundfish fishing below 120 ft, and retention of cowcod will be restricted in all fisheries in open areas. Fishing will be permitted at depths shallower than the officially recognized cowcod habitat (>120 ft). Consequently, there is little benefit to most rockfish species (including the occasional cowcod) that inhabit kelp beds up to depths of 120 ft. The proposed cowcod closure does not substitute for protection of marine ecosystems in the northern Channel Islands where we have little suitable cowcod habitat, and do not expect to protect significant populations of cowcod.

See Exhibit F at 32.

Location of Reserves

Within the fishing community, another divide surfaced: the important commercial fishing areas tended to be toward the western (more seaward) part of islands, whereas important recreational fishing areas tended to be closer to mainland. The optimal location of the reserves would be sites that contained little of extractive value, yet held great ecological value. The following tables demonstrate the positions taken by the various stakeholders as to the location of reserves.

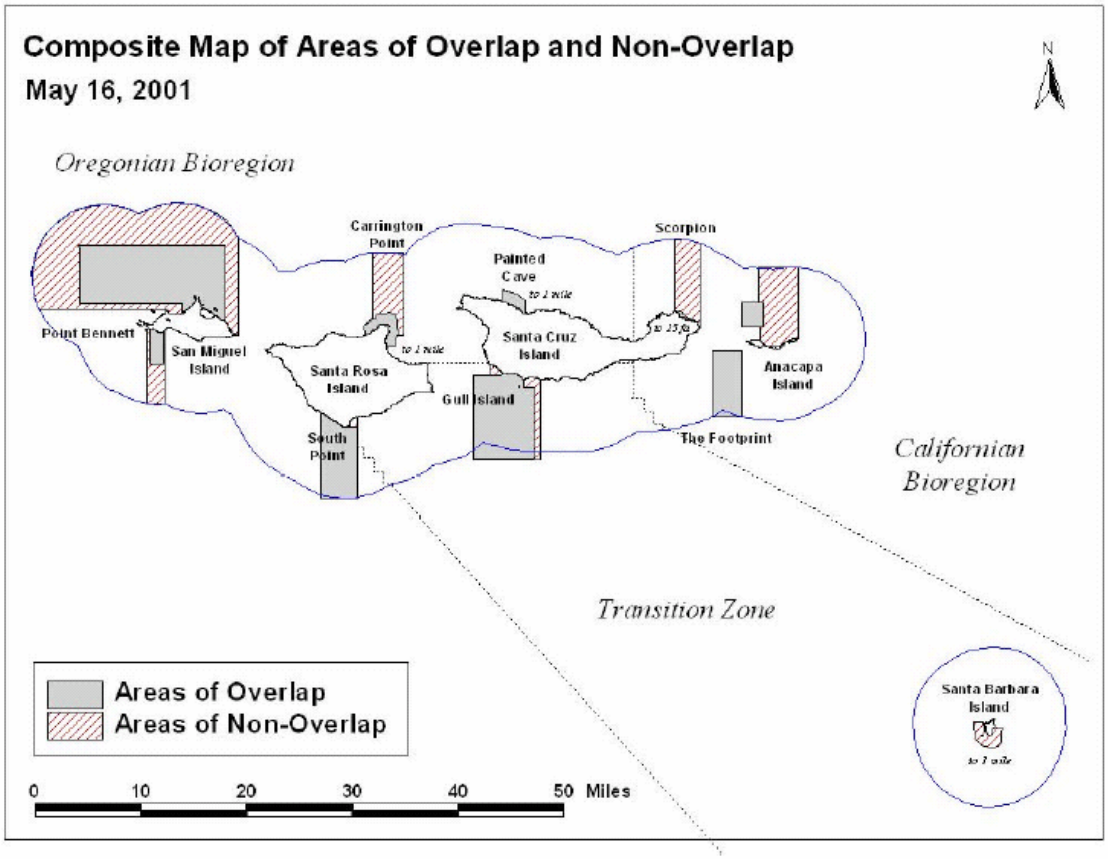
Location of Reserves

Perspective	Interest	Proposals
Santa Barbara and Anacapa Islands are used extensively by sport fishermen (and for Anacapa by recreational divers) from throughout Ventura and Los Angeles Counties and should not be off limits. Access to Santa Barbara has already been severely limited by the Cow Cod Conservation closure.	Maintain some areas easily accessible to ½ and ¾ day charter boats.	No reserves whatsoever on Santa Barbara or Anacapa Islands.
Sport fishermen and squid fishermen use the north side of Santa Cruz Island; very limited reserve areas should be set aside along this portion of the Island.	Maintain some areas easily accessible to ½ and ¾ day charter boats. Balance the placement of reserves so that squid harvesting is not disproportionately impacted	If reserves are absolutely necessary in this area, they should only extend out to the 20 fathom depth, leaving the remainder either open entirely or open to some limited take by recreational fishermen and possibly some types of low impact commercial fishing.
Commercial fishermen utilize the northwest portion of San Miguel, weather permitting.	Maintain some areas accessible to shrimp trawlers and other commercial uses.	The placement of reserves should not extend beyond three miles from the elbow to Wilson Rock
The placement of reserves should not be such that it significantly impacts existing kelp harvesting lease areas. Kelp harvesting is a renewable resource and only impacts the top six feet of the water column.	Balance the placement of reserves so that kelp harvesting is not disproportionately impacted.	Allow limited kelp harvesting in selected reserve areas which are situated in locations that are critical to the economic viability of the kelp harvest industry.

Adequate habitat should be fully protected in a replicate manner in all three bio-geographic provinces.	The placement of reserves needs to provide for sufficient representation of the full range of habitats in amounts sufficient to meet identified sustainability and biodiversity goals	Set aside quality habitat areas on both the north and south sides of islands in the Oregonian, Californian and Transitional provinces.

From Facilitators' Report May 23, 2001

Even with these various positions staked out, Chandler was heartened to see many of the Working Group members continue to work together, refining maps, with the intention of presenting a final recommendation. By April 2001, the Working Group had created a single map called a non-consensus map. Essentially, the map was a composite of two different reserve network options that represented the "resistance point" of each caucus of interests. One reserve network represented the minimum level of set-aside for conservation interests, while the other reserve network represented the maximum level of habitat set-aside for consumptive interests. By placing the two networks on the same map, the Working Group was able to better see the points of overlap and non-overlap between the two factions. Over the course of the next month, different Working Group members continued negotiations in order to bring a single consensus map to the May meeting that represented a single agreed-on network of marine reserves.



Impasse in May 2001

Chandler arrived early at the packed May 2001 Working Group meeting in anticipation of the unveiling of the final map. Instead, the Working Group, after producing 40 maps and failing to craft a single preferred option, formally announced that they reached an impasse after 22 months of deliberations. The Working Group agreed to end their process and forward their work, including the problem statement, goals, objectives, and their April non-consensus map, indicating the two different proposed networks, to the Council. Two weeks later, the facilitators forwarded the Working Group's materials, along with a summary of their work, to the Council. Chandler wondered how the Working Group's inability to join in consensus, and the resulting acrimony, would shape not only the future of the Channel Islands, but also the future of MPAs in California.

Addendum

Both the Science Panel and Socioeconomic Panel highlighted the uncertainty of their findings. In its first response to Working Group questions, the Science Panel described the uncertainty with the following:

> Many questions about the effects of marine reserves on reproductive output and recruitment still remain unanswered. Part of the problem is that there are too few protected areas available for study and little research has been directed at the question of reproductive output and recruitment. Contributing to the problem, recruitment is an extremely variable process. Recruitment may vary by orders of magnitude from year to year making it extremely difficult to prove that any increases measured in fishing grounds are a result of nearby reserves.

See Exhibit B at pp.8-9. The Science Panel also often cites "numerous theoretical studies and limited empirical data."

Similarly, in the Socioeconomic Panel's Report (Exhibit D), the Introduction emphasized uncertainty with the following:

> The analyses of the impacts of marine reserves are generally about what will happen in the future. So by its nature, our analyses will be characterized by great uncertainty. Although we have assembled considerable information and our Step 1 analyses yield good starting points to assess the potential impacts, the uncertainties of human and biophysical responses, and the interaction between them, make the results of the Step 2 analyses less certain.

Discussion Questions

1. Considering the issues that arise in the context of uncertainty:
   How can technical panelists address uncertainty honestly and credibly?
   How can scientists build trust with decision-makers when conclusions vary among the scientists?
   Does the debate itself place pressure on scientists to polarize issues?
   How much science, research, data is necessary to make an informed decision?
   How objective is science? Do scientists have an agenda?
   What is the role of scientists in setting public policy?

2. Addressing the impact of uncertainty on the public process:
   How can participants in a Working Group come to a consensus in an atmosphere of so much uncertainty? Is consensus desirable?
   Was there any value to the public process that ultimately failed to agree on a preferred alternative?
   How do you think the arrival at a stalemate will affect future MPA designation public processes?
   What public process works best for the designation of marine reserves?
   How and when should maps be introduced?

3. Addressing the socio-economic data and policy-making:
   What and how is socio-economic data collected?
   How should socio-economic data be used? How should it be weighed against science?
   How should marine reserve scientists take into account fisheries regulations?
   Is there a disconnect between science and policy, and how can science and policy be better integrated?
   How should the protagonists create a science-driven policy that also addresses socio-economic impacts?

Case Study Exhibits (Part II)

Exhibit A: California Fish and Game Commission Minutes, January 6-7, 1999. Donlon's letter.

Exhibit B: Questions for the Science Advisory Panel (Part I). Science Advisory Panel to the Marine Reserves Working Group. January 17, 2001.

Exhibit C: The Science Advisory Panel Recommendation. Science Advisory Panel to the Marine Reserves Working Group. October 17, 2001.

Exhibit D: Socioeconomic Impact Analysis of Marine Reserve Alternatives for the Channel Islands National Marine Sanctuary. Leeworthy, Dr. Vernon R., Wiley, Peter C. April 2003.

Exhibit E: The Economic Effects of Sportfishing Closures in Marine Protected Areas: The Channel Islands Example. Southwick, Robert. March 2002. American Sportfishing Association, United Anglers of Southern California.

Exhibit F: Questions for the Science Advisory Panel (Part II). Science Advisory Panel to the Marine Reserves Working Group. January 17, 2001.