Tortugas 2000: Making a Difference with Data

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KEY TO ACRONYMS

CMC – Center for Marine Conservation
DEP – Florida Department of Environmental Protection
DTNO – Dry Tortugas National Park
ER – Ecological Reserve
FKNMS – Florida Keys National Marine Sanctuary
FKNMSPA – Florida Keys National Marine Sanctuary Protection Act
FMCC – Florida Fish and Wildlife Management Council
FMFC – Florida Marine Fisheries Commission
GMFMC – Gulf of Mexico Fisheries Management Council
MCCF – Monroe County Commercial Fisherman
NGOs – Non-Governmental Organizations (specifically environmental)
NMFS – National Marine Fisheries Service
NMSA – National Marine Sanctuaries Act
NMSP – National Marine Sanctuary Program
NOAA – National Oceanic Atmospheric Administration
NPS – National Park Service
OFF – Organized Fishermen of Florida
RR – Replenishment Reserve
SAFMC – South Atlantic Fisheries Management Council
SPAs – Sanctuary Preservation Areas
SUAs – Special Use Areas
T2000 – Tortugas 2000
USCG – United States Coast Guard
USDOC – United States Department of Commerce
USDOI – United States Department of Interior
USGS – United State Geological Service
WMAs – Wildlife Management Areas
WWF – World Wildlife Fund

If you drive down to the southernmost tip of Florida, and begin the long journey along U.S. Route 1/State Route 5, also known as the Overseas Highway, through the islands of Key Largo and Conch Key, eventually you will find yourself in a tropical paradise named Key West. Perhaps you might even fool yourself into thinking that you've left the United States for a Caribbean island. Once the Overseas Highway ends in Key West if you travel an additional 70 miles (112.9km) west of Key West via boat or sea plane you will find yourself at the Dry Tortugas National Park, home of Fort Jefferson. In 1513 the seven small Dry Tortugas islands were discovered by explorer Ponce De Leon. Later these coral reef rimmed islands were known as a stop over for pirates. The island of Garden Key is the home to Fort Jefferson, one of the largest US coastal forts built in the 19th century. In addition to its history as a fortress, there are close to 200 shipwrecks in the nearby waters, bringing in a new breed of pirates in the 20th century, salvagers. With this history in mind it is easy to see why the southernmost Florida Keys developed a reputation as a place with an anything goes attitude, where the living is easy, and where the ocean is every man and woman's commons. The descendants of some of the original settlers and smugglers are still living in the Keys, making a living off the ocean, through fishing, shrimping, and otherwise living a modern day pirate's existence.

The waters are crystal clear. Turquoise mirrors where the sun's brilliance allows you to look off the end of a dock and see straight to the bottom where fine white sand and seagrass beds of Turtle-grass, *Thalassia testudium*, and Manatee-grass, *Syringodium filiforme* form a mosaic of dark and light sea floor until they are interrupted by a shock of color and structure; the coral reef. A myriad of life forms rush about their daily activities over the coral reef, while the backbone of the coral reef, the bottom dwelling invertebrate corals and sponges, filter the water and gain sustenance from the plankton in the water column. This backdrop of serenity and natural beauty provided the stage for a bitter dispute over the right to use notorious waters.

This case study focuses on the issue of data negotiation by using the Tortugas 2000 process as an example of how a highly contentious issue was successfully negotiated by a diverse group of stakeholders aided by the utilization of maps to visually portray a wide range of scientific data. Through a conflict analysis, we explain why the Tortugas 2000 proposal was so much more publicly palatable as compared with the original management plan proposal will be addressed.

BACKGROUND – THE CONTEXT

The National Marine Sanctuary Program was established in 1972 by the National Marine Sanctuaries Act (NMSA), 16 U.S.C. 1431 et seq., as amended. Sanctuaries can be designated in two ways, by approval of candidate sites from a list of National Marine Sanctuary Program Site Evaluation List through an Act of Congress. The National Marine Sanctuary Program (Figure 1) is an office of the National Oceanic and Atmospheric Administration (NOAA) in the United States' Department of Commerce. In 1989 three large ships grounded in the Florida Keys in a three-week time frame, resulting in a flurry of media and public attention and influencing Florida Senator Bob Graham and U.S. Representative Dante Fascell to sponsor legislation to protect the region from ship traffic, water quality threats and potential oil and gas development. The Florida Keys National Marine Sanctuary (FKNMS) was subsequently designated by congress and authorized by the signature of President George Bush in 1990 under the Florida Keys National Marine Sanctuary and Protection Act (FKNMSPA) (Public Law 101-605, H.R. 5909) (USDOC 1995). The FKNMS employees work in coordination with state agencies in Florida to manage the resources of the sanctuary. The FKNMS is one of thirteen sanctuaries composing the National Marine Sanctuary Program (Figure 1).

The sanctuary encompasses 9,800 square kilometers stretching the entire length of the Florida Keys island chain and includes both state and federal waters. The FKNMS contains important ecosystems of mangroves, seagrass beds, coral reefs, and wildlife habitat. There are

approximately 6,000 species of organisms known to inhabit the sanctuary. The Florida Keys are at the bottom of the South Florida watershed and are thus a key component of the Florida Bay system, which is threatened by water pollution and reduced freshwater inflows. The sanctuary encompasses Monroe County, Florida, home to 80,000 permanent residents and receives over three million visitors annually, generating over $1.3 billion in tourist revenue annually. The Florida Keys' waters are home to the largest commercial fishery in Florida, with the most lucrative fisheries being lobster, shrimp and reef fish. Other uses of the sanctuary include recreational fishing, diving, snorkeling, tropical fish collecting, treasure salvaging, shell collecting and all forms of boating.

Boaters using a mooring buoy in the FKNMS.

In 1995, the FKNMS released the three volume "Strategy for Stewardship: Florida Keys National Marine Sanctuary Draft Management Plan/Environmental Impact Statement," which outlined how the previously existing regions of the Florida Keys (Key Largo National Marine Sanctuary-established 1975 and Looe Key National Marine Sanctuary-established 1981) would be subsumed within the new FKNMS. The new plan included an elaborate zoning plan, that would utilize five different types of restricted use areas: Wildlife Management Areas, Sanctuary Preservation Areas (SPAs), Replenishment Reserves, Existing Management Areas, and Special-use Areas. In addition to recognizing all Existing Management Areas, the sanctuary proposed 26 Wildlife Management Areas, 19 Sanctuary Preservation Areas (SPAs), 3 Replenishment Reserves, and 4 Special-use Areas which would encompass approximately five percent (150 square nautical miles) of the entire sanctuary boundaries (USDOC 1995). This elaborate zoning plan was one of the first examples of marine zoning in the NMSP. The recommendations of the Tortugas 2000 Working Group covered a geographic area of 185 square nautical miles under the jurisdictions of the Florida Keys National Marine Sanctuary, Dry Tortugas National Park, the State of Florida, the South Atlantic Fisheries Management Council, and the Gulf of Mexico Fisheries Management Council.

The new FKNMS, as authorized by the FKNMSPA encompassed 2,800 square nautical miles and 220 miles of reef tract, so when the proposed zoning plan was released in 1995 there were many competing financial and recreational interests that were affected. John Ogden, director of the Florida Institute of Oceanography commented in anticipation of the plan in 1993:

> *"It's huge, complicated, interconnected and unprecedented, and if they (NOAA) can make zoning work in the Keys they can make it work anywhere. You have every conceivable human interaction with the marine environment in the Keys, and it's right there in your face"* (Booth, 1993).

When the 775 page, three volume draft plan was released for public comment in 1995 there was a significant public outcry against the proposed zoning regulations, especially in terms of the no-take zones (replenishment reserves). There was opposition to the proposed zoning from several highly vocal individuals and organizations including the Conch Coalition, a group of anti-zoning citizens comprised mostly of fishers and salvagers and Victims of NOAA, which were associated with a national anti-environmental regulation organization (Klingener, 1995). On the other hand, most stakeholder groups took the 'not in my backyard' (NIMBY) stance and were in favor of the

sanctuary as long as they were not directly affected. The controversial issues in the proposed zoning plan included fishing access, allowing divers into areas otherwise off limits to fishers, treasure hunting (salvaging) restrictions, septic system restrictions, and boat access and speed (including personal watercraft/jet skis), a general conspiracy theory/libertarian belief that any federal regulations are out of place in state waters, and finally the hottest issue of all, restricted access no-take Replenishment Zones.

In 1993, two years before the Draft Management Plan was released there were already vigorous signs of opposition to the new zoning. In an October 17, 1993 Washington Post article a tropical fish collector accused the FKNMS of wanting to *"make it a playground for the rich, …Disneyland on the water, and then there's not going to be any room for weird, smelly fishermen who have made their living here for years"* (Booth 1993). Although the sanctuary had consulted with other agencies and some scientists in the development of the Draft Management Plan, for all intents and purposes for the general public, they used the "decide-announce-defend" approach and suffered great public outcry and lost the trust of almost all stakeholder groups. In reaction to public responses to the Draft Management Plan only one of the three proposed Replenishment Reserves were kept in Final Management Plan, the Western Sambo Ecological Reserve located south of Boca Chica Key. The proposed Key Largo Replenishment Reserve was dropped altogether due to intense objections from residents of the upper Keys and south Florida (Figure 2). The third proposed area, Tortugas Replenishment Reserve, was put on hold, and the Final Management Plan mandated that a new Tortugas Ecological Reserve be developed within two years utilizing a public participatory design process and in coordination with the National Park Service (NPS) Dry Tortugas National Park (DRTO) which was concurrently revising its management plan (USDOC, 1995 and 1996). The resulting process to establish the Tortugas Ecological Reserve in the FKNMS was dubbed Tortugas 2000 (T2000) because of the projected completion date in the year 2000.

The Tortugas 2000 process began in 1998, after efforts in 1995-1996 to include an area within sanctuary boundaries and to the east of the Dry Tortugas as a Replenishment Reserve of the FKNMS drew objections from stakeholders. This formal process included a facilitator, stakeholder representative panel, workshops, public hearings, solicitation of public comments and web postings encompassed Tortugas 2000 (see Figure 3). The first phase of the T2000 process focused on the design of the new reserve by presenting data from a variety of disciplines.

Phase I began in April 1998 with the Working Group (WG) establishing ground rules, followed by the Ecological and Socio-Economic Forums which provided baseline data to the WG. A series of 5 public scoping meetings were held and then the WG developed criteria, drafted alternative boundaries for the Tortugas reserve, and finally the group selected their preferred alternative in June 1999. The second phase solicited comments from the general public and created recommendations to NOAA. Phase II began with a presentation of the WG's recommendations of draft boundaries and preferred alternatives to the Sanctuary Advisory Committee (SAC). The SAC then presented the recommendations to NOAA and the FKNMS which resulted in the FKNMS publishing Strategy for Stewardship: Tortugas Ecological Reserve Draft Supplemental Environmental Impact Statement/ Draft Supplemental Management Plan in 1999. At this point there was a call for public comment on the Draft EIS and the third phase focused on implementing the new Ecological Reserve in the Tortugas.

Figure 2. Map of the zone network in the Florida Keys National Marine Sanctuary going into the Tortugas 2000 process in 1998 (USDOC,1999).

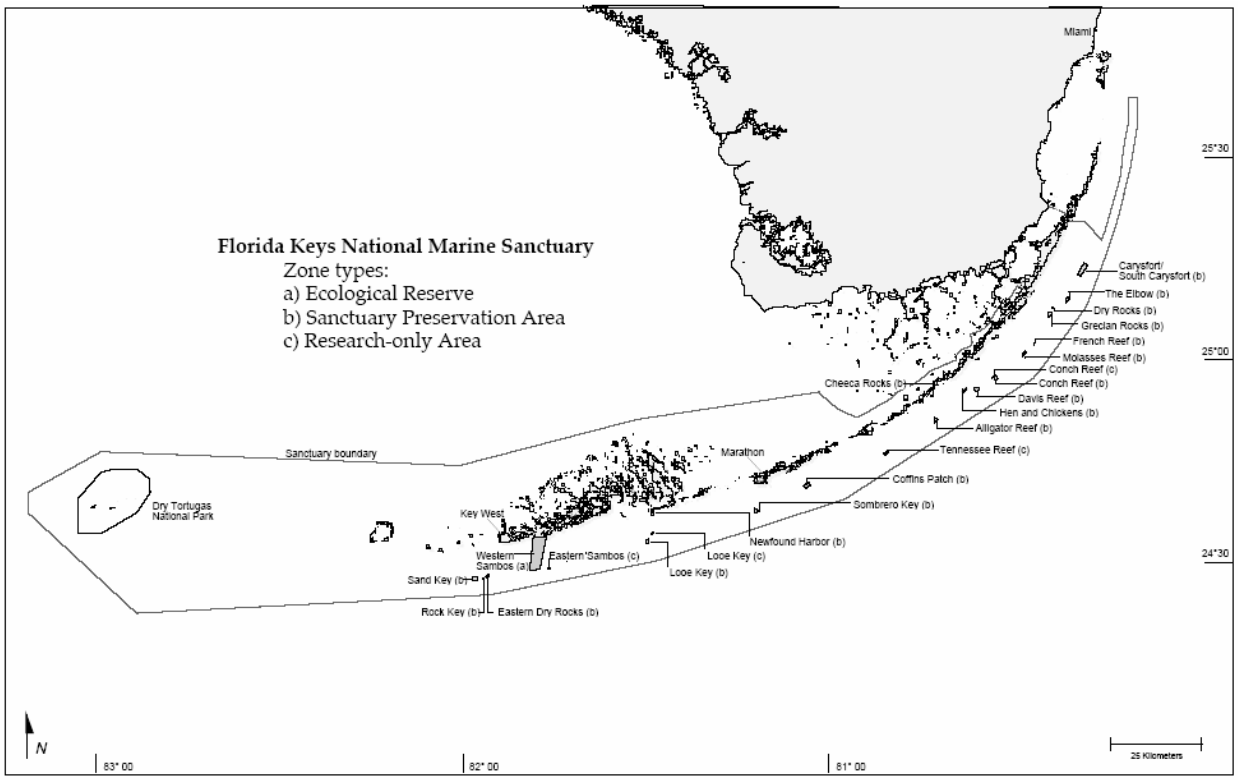


Figure 3. The Tortugas 2000 planning process and significant event timeline (Modeled after USDOC, 2000).

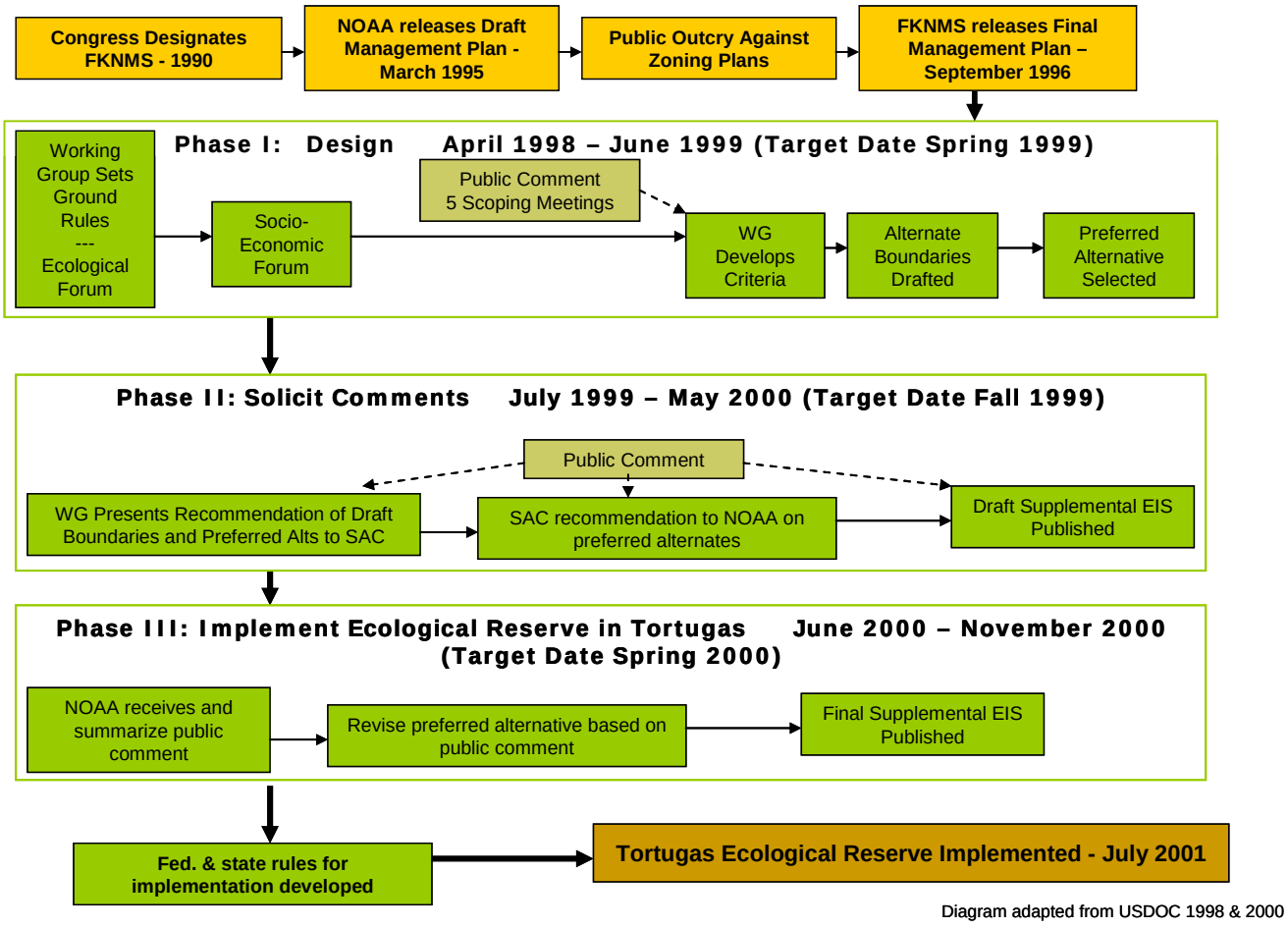


Diagram adapted from USDOC 1998 & 2000

IDENTIFICATION OF THE PROBLEM – TORTUGAS 2000

In the Florida Keys, and specifically the Dry Tortugas, there are many competing stakeholders utilizing a limited and unique resource that is relatively small in area or size. The dispute over the Florida Keys National Marine Sanctuary's proposed zoning of the Dry Tortugas marine resources was complex in that it included issues of economic (fishing, diving, and salvaging), environmental, and socio-cultural importance. In addition to these three important issues, there were high levels of distrust and miscommunication between the various stakeholder groups going into the negotiations due to recent and historical conflicts.

Economic Problem Identification: Amongst the residents of South Florida, there was a perception/reality that recreational fishing and diving and commercial fishing would have short-term economic losses as a result of proposed restricted use zoning of the Dry Tortugas marine resources. There were a variety of differing opinions regarding the economic status of the region and a lack of consistent information or data sharing among groups. In general, when people feel that their livelihoods or pocketbooks are going to be impacted, they will perceive a large problem.

Environmental Problem Identification: The Dry Tortugas and Tortugas region are located at the convergence of the Gulf of Mexico and Atlantic Ocean resulting in the mixing of the water by currents. The Tortugas region had been identified as relatively pristine and possibly serving as an important research area and base line to compare against the already degraded and highly visited regions of the Keys. The Tortugas are located at the end of the Florida Keys chain, and are in essence the end point in which to monitor the effects of water quality degradation from declining freshwater inflow and increasing pollution input into the Florida Bay ecosystem. Increased pressure from fishing, boating and diving were potential threats which translated into concern over the sustainability of the ecosystems and the biodiversity of the region (USDOC, 2000).

Socio-Cultural Problem Identification: The Dry Tortugas islands and their surrounding waters had long been a frontier for fishers in the Keys, a hidden gem where old-timers knew to go fishing. Over time it had begun to be more heavily visited, with a DRTO study sighting a 400 percent increase in visitation to the park between 1996 and 2000, with 95,000 annual visitors in 2000 (USDOI, 2001). The increasing number of users created a clash of different user groups, objectives and put a strain on the small area's resources. When the FKNMS originally proposed

a Tortugas Replenishment Reserve it did not meet the needs of most user groups, and subsequently caused them to feel disenfranchised from the design process.

STAKEHOLDER ANALYSIS

Understanding stakeholders' positions and interests provides insight into how and why they make decisions in a negotiation (Fisher and Ury, 1991). Interests are defined as the desires and concerns of participants while their positions are what a participant has decided upon (Fisher and Ury, 1991). Fisher and Ury state that "interests are what cause people to make a decision towards one position" but that "for every interest there usually exist several possible positions that could satisfy it" (1991).

The conflict over zoning and no-take areas in particular brought a number of different interest groups to the forefront (Tables 1, 2, 3). There were seven government regulatory agencies that potentially would be impacted by the outcome of the Tortugas 2000 process: Florida Keys National Marine Sanctuary, Dry Tortugas National Park, Florida Marine Fisheries Council, National Marine Fisheries Service, Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission, and the Fisheries Management Councils of the Gulf of Mexico and South Atlantic United States (Figure 4). In addition to the primary and secondary stakeholders, regulatory agencies and community leaders, the tertiary stakeholders included environmental non-governmental organizations (NGOs), commercial fishing, recreational diving, and recreational fishing groups (Figure 5). In reaction to the 1995 -1997 development of the FKNMS management plan and subsequent public disapproval of the no-take zones of the plan, Suman et al. (1999) conducted an analysis of the perceptions and attitudes of commercial fishers, environmental groups and dive operators in the FKNMS. Their analysis found that the commercial fishers had felt completely disenfranchised from the planning process and perceived that the sanctuary had excluded them purposefully; dive operators had been the most involved in the original planning process, yet were still concerned about the potential limitations that the regulatory zones would place on their activities; and environmental groups (local and national) were the most supportive of the proposed management plan. The overarching message was that there were a number of ways that these groups, specifically commercial fishers, could have been engaged in a public education and participation program from the

beginning which could have resulted in a higher level of support for the proposed zoning plan in 1995 (Suman et al., 1999).

Figure 4. Seven resource management agencies had jurisdiction within the study area during Tortugas 2000 (USDOC, 2000).

The Florida Keys region has a culture of making a living and conducting recreation in the 'backwoods' of the Keys, perhaps deriving from the pirate days and more recently treasure salvagers. When the FKNMS announced the new sanctuary there was a fear of restrictions, followed later by a strong NIMBY response to use restrictions. The proposed reserves (no-fishing zones in the eyes of the public, ecological refugia in the eyes of the scientists) were the first areas in the Keys to fully restrict all recreational fishing, and were as proposed the largest no-take reserve in the United States. The groups in opposition to restricted access in their 'backyard' included commercial fishers, recreational fishers, and charter dive boat operators (Table 2, Table 3). One opposition argument to the proposed Tortugas Replenishment Reserve was that the Reserve unfairly impacted commercial fishermen, especially shrimpers and lobstermen by being placed directly over the best fishing grounds in the state of Florida. As was learned later in the Tortugas 2000 process, when data from the shrimp fishing community regarding the best places to shrimp were compared with data regarding the most biologically

diverse areas, the proposed reserves were in the least advantageous location in terms of economic, ecological and socio-cultural factors. Without the use of data in the negotiations the final outcome would have missed the best solution for all stakeholders.

Table 1. The following stakeholders were involved in the dispute over zoning in the FKNMS, specifically in the Tortugas Ecological Reserve process. * Stakeholder groups with representation on Working Group (WG), ** Initiator of process

- NOAA
  - FKNMS **, *
    - SAC *
  - National Marine Fisheries Service *
- National Park Service
  - Dry Tortugas National Park (DTNO)*
- Gulf of Mexico Fisheries Management Council
- South Atlantic Fisheries Management Council *
- Florida Dept. of Environmental Protection *
- Florida Marine Fisheries Commission *
- Florida Governor
- Governor's Council
- NGOs (Environmental)
  - WWF*, Ocean Conservancy*
- Citizens *
- Commercial Fishing
  - Shrimping
  - Lobstering *
  - Handlining *
  - Commercial charter fishing *
- Recreational Fishing *
- Spearfishing *
- Diving *
- Salvagers
- Scientists / Academia *
- US Coast Guard *
- US Geological Survey *
- Local Elected Officials
- ReefKeeper International *
- REEF Relief

In an October 22, 1998 press release by the FKNMS addressing the Sanctuary's goal, FKNMS Superintendent Billy Causey said:

> *"By creating an ecological reserve in the Sanctuary's portion of the Tortugas, we hope to preserve the extraordinary range of species found there. The reserve also will serve as a control site away from the populated Keys, helping scientists determine which changes in the coral reef ecosystem stem from human activities and which are natural."*

The FKNMS took the position of utmost transparency and desire to collaborate for the T2000 process and literally utilized every trick in the integrative, collaborative problem solving book. The FKNMS was determined to make up for past mistakes and have the T2000 results publicly accepted.

The positions of the stakeholder groups going into the Tortugas 2000 were a lot more flexible than in 1995. The concerns most frequently sited by stakeholders were concern with the sustainability of the fishery, the potential size of the reserve, access rights, and the biodiversity of the marine environment (Table 3). In the transcripts from the first working group meeting it was interesting to note that the representative from the environmental NGOs stated his interest was to

"ensure that the livelihoods of fishermen are sustained" (WG minutes, 4/16/98) while it was well known that the interests of the environmental NGOs was to protect the marine habitat (Table 2). Perhaps the opening statement by the NGO representative is an indication that their organization realized that there was a significant amount of concern from other stakeholders that their interests were to put fishers out of business and close off large areas of the marine environment off from all uses. The stakeholders came to the table the second time around with much more open minds and were interested in coming away with the best possible final outcome for all parties.

Whenever there is a large group of people involved in a negotiation, there is a need to understand the different players' power and personal styles and how they contribute to the overall dynamic of negotiations, but more importantly, how they influence the final negotiation outcomes (Lewicki et al., 2004; Fisher and Ury, 1991). Lewicki et al. identify three types or sources of power: information and expertise (e.g. data access), control over resources and position (ie. status and legitimacy). The Governor of Florida, Jeb Bush, was in charge of two regulatory agencies, the Governor's Council and the Florida Marine Fisheries Commission, of which each group had representation on the working group.

It is important to note that the Governor indicated that a balance between protection and appropriate uses was desired for the Tortugas, but more importantly, the Governor provided his word that he would support whatever recommendations were brought forward by the T2000 working group. This decreased all parties' BATNAs (Best Alternative to Negotiated Agreement) and increased the likelihood of a negotiated outcome (Fisher & Ury, 1991). Support from the Governor was important because his office provided the power of his political position and of his office's legitimate regulatory capacity to the final outcome of the Tortugas 2000 working group's negotiations. In a similar environmental dispute over coastal environmental regulations in Delaware where industrial groups had very little motivation to participate in a negotiated resolution (due to their satisfaction with the status quo) until the Governor and Secretary of the Delaware Department of Natural Resources and Environmental Control reduced industry's BATNA by stating that new regulations would be formed regardless of industry's involvement (Sobel, 2000). A negotiator with less perceived power can increase their bargaining strength with a strong BATNA, but in this case there was strong incentive for all parties to stay (Fisher & Ury, 1991). In both the Florida and Delaware situations the endorsement of the negotiation process by

individuals in leadership positions created the incentives for all parties to come to the negotiating table in good faith. The leaders had legitimate power to influence all parties to be at the negotiating table making their best faith efforts to work towards a negotiated outcome (Lewicki et al., 2001).

Table 2. Stakeholder analysis for the Tortugas 2000 controversy. (USDOC, 1999; WG meeting minutes 4/16/998)

Stakeholder	Interest	Power/ Resources	Positions
NOAA / FKNMS	To bring agencies' interests and trusteeship for the waters integrate interests/ concerns of user groups and the public through the Working Group (WG);	Data, legitimate, regulatory, and staff	Mandate is to zone the Florida Keys and create an ecological reserve in the Tortugas. The ER will be implemented in some form. Not doing fisheries management.
National Park Service / Dry Tortugas National Park	Use sound science to meet the mandates set forth by the National Park Service	Data, regulatory, staff and process. Co-leader of process	Interested in collaborating with NOAA on gathering data to make the best decisions for their management plan review
NOAA/ NMFS	Enhance fish population protection measures	Data, regulatory & enforcement	Encourage and support the creation and concepts behind marine reserves and fisheries enhancement
United States Coast Guard	Concerned with enforcement capabilities	Enforcement	The cleaner the boundary lines, the easier to enforce. A no-entry area is easier to enforce than one that allows one activity while prohibiting another.
State of Florida/DEP	The Tortugas region is located in state waters and the DEP is interested in appropriate protection and uses of the area	Regulatory, data, enforcement	The DEP Division of Marine Resources is directly involved in this process and will most likely adopt the recommendations of the working group
US Geological Survey, Biological Resources Div.	Protection of biodiversity, use of the Tortugas as a scientific research site	Data	Would like to see the Tortugas protected from potentially harmful practices
Gulf of Mexico Fishery Management Council	Interested in marine reserves as a management tool for enhancing fisheries	Regulatory, has overlapping jurisdiction in reserve	Did not show up to first WG meeting, but wants to make sure current regulations are incorporated into the marine reserve
South Atlantic Fishery Management Council	Interested in the use of marine reserves as an alternative tool for fisheries management	Regulatory	Interested in learning about 'no-take' zones as a new technique for the council
Commercial handliners	Protecting the way of life and the fish populations. Prevent the public from loving it to death	Local support, money from national commercial fishing groups	Represented by Peter Gladding, this group had seen declines in fish pops in Tortugas and wanted to use appropriate science and zoning.
Commercial shrimping & lobstering	Maintenance of the soft bottom areas to the north and east of Dry Tortugas for shrimping	Local support, historically the economic base for the region, support from national fishing groups	The original Tortugas RZ was placed in the wrong area. The Tortugas ER must not cover our most productive shrimp and lobster harvest areas.
Spearfishing & Tropical Fish collectors	Concerned with the reduction in areas that constituents can use for fishing activities	Vocal local citizens, one spear fisherman actually	We want to ensure that our fishing areas aren't restricted

Stakeholder	Interest	Power/ Resources	Positions
		changed the final boundary due to his protests	
Charter Fishing/ Recreational Fishing	Protect their ability to take people out to the banks, The selected reserves may only represent 6% of the sanctuary, but they are the best 6% to fish (Klinger, 1995)	National groups backing their interests, Large membership, money, large circulation magazine, have the attention of the Governor.	Concerned with fishing restrictions on the lee side of the islands during high winds
Divers	We want to protect the biodiversity and beauty of the pristine reefs of Sherwood Forest	Large memberships	Wanted to be able to dive , but also thought it would be better if fishing was banned in areas where they dove
Scientists / Academia	Want to provide scientific information to aid the process	Data	Interested in the potential of the reserve for scientific monitoring
Non-governmental organizations	Protection of biodiversity	Memberships, money, lobby groups	There is not enough being done to protect these areas, the sanctuary is too much of a paper site, and protecting a small percentage of the Keys is not enough
Citizens	balance between resource protection and impacts to user groups	Numbers, media influence	Concerned with making sure that local citizens can maintain their livelihoods while simultaneously protecting the natural resources.
Governor of Florida	Want to ensure that activities in state waters are a balance between protection and appropriate uses	Legitimate/ regulatory, political influence	Will support the working group's recommendations
Governor's Council	This is a political group, and was divided.	Decision making	They were an unknown quantity, with the ability to make a decision 50/50 either way based on the members' known political views.
Florida Marine Fisheries Commission	Interested in the potential use of Ecological Reserves as a fisheries management tool to replenish over-fished stocks; Interested in the size of the reserve	Decision making, regulatory body	Want to ensure the sustainable management of Florida's regional fisheries
Local elected officials	Not directly involved in the Tortugas process, interested in economic vitality of area	Ability to hold votes, attract media attention	Will do what it takes to please their constituents. Personal views are subsumed by political will

Figure 5. Stakeholder Participation in Decision-Making Process. The concentric circles start in the center with the decision makers and primary stakeholders. Moving outwards, the next circle represents the secondary stakeholders, this level contains active leaders of community organizations. Next, you have the tertiary level containing interested leaders, and finally in the outer most circle, containing the general public. Modeled after Godschalk et al. (1994).

PROCESS

The Tortugas 2000 dispute resolution process is an excellent example of how data (socio-economic and environmental) can be used to inform stakeholders in a contentious debate with the final result being better than any single group could have obtained on their own. The T2000 process was successful due to data sharing among fishermen, policy makers and scientists. Some of the elements of the T2000 process that contributed to its success include the use of a mediator, establishment of ground rules, and various communication and participation techniques

The Role of the Mediator

Mediators face an immediate challenge in that they must build credibility with participants in terms of the process and their legitimacy as a negotiator (Moore, 1996). Next, the mediator must establish a relationship with the participants, educate them about the process and finally get all participants to commit to the mediated process (Moore, 1996). Michael Eng was brought in by NOAA and the FKNMS to facilitate the Tortugas 2000 process. Eng was a NOAA Coastal Services Center employee and the former manager of the Dry Tortugas National Park (DTNO) and had participated in the development of the 1995 Draft EIS for the FKNMS during his tenure as manager at DTNO. He had since left Florida and gone on to get a degree in marine resources management and then was hired by NOAA's Center for Coastal Services in South Carolina. The NOAA Coastal Services Center provides neutral facilitation services to the coastal management community, thus with his current employment and his history in the area, he was selected for the role of mediator.

Eng's background had the potential to either hinder or enhance his ability to facilitate the Tortugas 2000 process. First, he was familiar with the Tortugas and most likely familiar with the stakeholders, their interests and finally he had an understanding of some of the technical data that would be utilized in the process. On the other hand, it appears that Eng worked very hard to convince the working group members of his impartiality and neutral position as a facilitator who had previously been a stakeholder (Personal communication, G. P. Schmahl; USDOC, 4/16/98 WG Minutes, Tortugas 2000).

Ground rules to be utilized in the negotiating process

The clear designation of ground rules are an essential element necessary to successful negotiations. Without clear decision-making procedures a negotiation can stall out or result in an outcome that all parties will not honor or endorse. In Delaware's coastal zone management

regulation process there had been an ad hoc round of initial negotiations which had resulted in unsatisfactory outcomes for several groups due to the chairperson of the negotiation declaring agreement with only two-thirds agreement (Sobel, 2000). The second time around Delaware hired a team of mediators to assess and facilitate the drafting of new coastal regulations and resulted in a successful final outcome (Sobel, 2000).

The process. Tortugas 2000 was designed to be an integrative negotiation and collaborative problem solving process utilizing technical data encompassing ecological, oceanographic, physical and socio-economic concerns. At the first meeting of the working group (WG) there were introductions, the objectives for the process were illuminated, working group members interests were presented, and the ground rules were provided. Sanctuary Advisory Council Subcommittee members of the working group were mandated to represent the same constituents they represent on the Advisory Council (USDOC, 4/16/98 WG Minutes, Tortugas 2000). Terms of the negotiation were very specific, identifying the goal of the process for the FKNMS to establish an Ecological Reserve in the western part of the sanctuary, possibly to include a portion of Dry Tortugas National Park (DTNP) (USDOC, 4/16/98 WG Minutes, Tortugas 2000). Other important process rules included a firm commitment to involve the public in every step, and to keep all discussions soft in terms of boundary lines and percent areas to be protected until the final decision making portion of the process (USDOC, 4/16/98 WG Minutes, Tortugas 2000). Keeping the decision making separate from joint fact-finding allows all parties to become educated about the issues (Ehrmann & Stinson, 1999; Ozawa, 1991).

The final product of the Working Group would be a single negotiating text in the form of the Draft Environmental Impact Statement (EIS) which was provided to Florida Marine Fisheries Commission (FMFC) and Sanctuary Advisory Council (SAC), ensuring that any recommendations from the WG would acknowledge jurisdictions and shared authorities of agencies (USDOC, 4/16/98 WG Minutes, Tortugas 2000). Other process related issues introduced at the first meeting included a description of the tools that the WG would use during the process, including meetings, small group exercises, forums, a website and public notices, and a promise that all data would be provided to working group members for their examination (USDOC, 4/16/98 WG Minutes, Tortugas 2000). The facilitator introduced a five level voting process for the WG to ‘vote’ on the final boundary alternative decision, which was followed by discussions about the reservations of individuals voting at levels that indicated a lack of

acceptance of the proposed alternative (USDOC, 4/16/98 WG Minutes, Tortugas 2000). This particular rule is similar to the five finger voting method utilized in the San Francisco Estuary project where the number of fingers raised by a voter indicated the level at which that person supported a proposed measure (Innes & Connick, 1999).

The Agenda and Behavior. The WG agreed to have the meeting agendas be set by the co-chairs, Superintendents Billy Causey, FKNMS and Dr. Robert Brock, Dry Tortugas National Park (Table 4). Behavioral rules were addressed during the first WG meeting (see Table 4). They were comprehensive, and focused on interpersonal interactions, the role each individual would play in the negotiation, recommendations on respect, listening, participation, and focusing on the content of discussions, not the larger legal process (USDOC, 4/16/98 WG Minutes, Tortugas 2000). Fisher and Ury suggest that it is important to "separate the people from the problem" by asking negotiating parties to see an issue or problem from both sides and to focus on the content (1991). Setting rules relating to communication, emotion, and perception can increase both sides participation in the process in a constructive manner (Fisher and Ury, 1991)

Table 4. Working Group Meeting Participants' Ground Rules for Behavior, (USDOC, 4/16/98 WG Minutes, Tortugas 2000).

Participants	Ground Rules for Behavior
Facilitator – works for NOAA	Neutral & impartial, accountable for entire group, help group with process, communication, protection from attack, clarify, common understanding, not advocate for any group, may be replaced at any time
Recorder – FKNMS staff	Neutral, group memory, written summaries, use speakers words
Co-Chairs - superintendents	Media point of contact, develop agendas
25 Working Group Members	Actively participate, focus on content (not process), inform constituency, respect and attention

Participation Techniques used to ensure effective communication and negotiation

The working group (WG) had 25 members, representing the regulatory agencies and user groups for the Tortugas (Table 5). The FKNMS vowed to engage the public and provide regular reporting on the Tortugas 2000 status. Public participation was ensured through four mechanisms: 1) active interaction of SAC members and WG members with their constituents; 2) public hearings in a workshop format (Table 6); 3) a mailing list; and 4) a website and email listserve that was updated regularly throughout the process (USDOC, 2000; Delaney, 2003). The public hearings/ workshops were held in order to receive comments from the public at the outset

of the Tortugas 2000 planning process in October and November, 1998 (Table 6). The superintendents of the FKNMS and DTNO gave overview presentations twice during each workshop, with the rest of the meetings used for recording of public comment via small groups, public testimony and tape recorded statements (USDOC, 2000). While these public meetings utilized the presentation and reaction meeting typology, they more effectively used reaction gathering and "feedback" meetings (ie. workshops) as described by Godschalk et al. (1994).

Table 5. Original Working Group. The final WG consisted of 25 members. Five stakeholder groups were represented by their FKNMS sanctuary advisory council (SAC) members. * denotes members added after the process began. *** denotes WG members who left/were replaced. (USDOC, 2000; Cowie-Haskell and Delaney, 2003).

Stakeholder Group Member Represents	**Working Group Member's Name**
NOAA / Florida Keys National Marine Sanctuary	Ben Cowie-Haskell Billy Causey
National Park Service	Dr. Robert Brock
NOAA / National Marine Fisheries Service	Michael Barnette***/Dr. Joseph Kimmel* Dr. James Bohnsack Gene Proulx, NOAA Office of Law Enforcement
United States Coast Guard	BMC Bob Thomas
Florida Dept. of Environmental Protection	Ed Conklin
- Florida Marine Patrol	Maj. Bruce Buckson
- Div. of Marine Resources	Anna Marie Hartman ***
US Geological Survey, Biological Resources Div.	Dr. Nicholas Funicelli
Gulf of Mexico Fishery Management Council	Kay Williams ***/ Felicia Coleman* (Florida State University)
South Atlantic Fishery Management Council	Peter Moffit
Florida Fish and Wildlife Conservation Commission	Dr. Russell Nelson
Citizen	Fran Decker
Commercial fishing	Tony Iarocci, Monroe County Commercial Fishermen, Inc. Don DeMaria, Commercial spearfisherman Richard Diaz, Commercial lobster trapper * Peter Gladding, Commercial handliner
Recreational Fishing	John Brownlee, Saltwater Sportsman magazine
Charter Fishing	Andy Griffiths, Commercial charter fishing
Recreational diving	Don Kincaid, Citizen Alex Stone, ReefKeeper International
Scientists / Academia	Dr. Erich Mueller, Mote Marine Laboratory
Non-governmental organizations	Debra Harrison, World Wildlife Fund David Holz, The Ocean Conservancy

Table 6. Five public hearings took place at the beginning of Tortugas 2000 (USDOC, 2000).

Date	1998 Public Meetings – Open House Format
October 27, 1998	Washington, D.C.; Commerce Department Main Auditorium;14th St. and Constitution Ave., NW; 2PM to 5:00 PM (Superintendents' presentations at 2:30 PM)
October 29	Ft. Myers at the Exhibition Hall, 1320 Hendry St.
November 9	Key West, Holiday Inn Beachside, 3841 North Roosevelt Blvd.
November 10	Key West, Holiday Inn Beachside, 3841 North Roosevelt Blvd.
November 17	Miami at Florida International University, Graham Center, SW 8th St. at SW 107th Ave.

THE ROLE OF DATA

The use of experts and joint fact-finding efforts enhance the outcomes of agreements to provide outcomes that are often more reliable, creative, and long-lasting than traditional bargaining efforts (Ehrmann & Stinson, 1999). The Tortugas 2000 process is a perfect example of where joint fact-finding and the use of experts and data produced a better end result in terms of social, economic and environmental issues. Not only was the new ER better able to meet the criteria and objectives of an ecological reserve, it was almost unanimously accepted by all WG members and regulatory entities. The Tortugas 2000 (T2000) process utilizes many of the same data analysis techniques employed in the ground-breaking case of the New York Bight Initiative, which was one of the first times a policy dispute had utilized panels of scientists and extensive data gathering (McCreary, 1999). In another example, the Northern Oxford County Coalition's joint fact-finding efforts enabled participants to learn more about the facts surrounding air pollution in their region and allowed all parties to become well versed in the scientific reasoning behind the different arguments (Ehrmann & Stinson, 1999).

In response to the announcement of the management plan incorporating a variety of reserves Bhat (2003) conducted a survey of visitors to the FKNMS and subsequently developed a model to measure the non-market value increases in the FKNMS as a result of the marine reserve zoning. His results indicate that average visitors would visit the park more frequently and perceived the quality of their experience to be greater with the presence of the marine reserve.

In the Tortugas 2000, process panels of experts were brought in to give presentations to the working group during the first two meeting times of the group. These panels of experts presented and answered questions under the auspices of an ecological forum and a socio-economic forum (see Table 7). Question and answer sessions with experts' are helpful to distill the true meaning of their scientific language, in a realm where methods and findings are subject

to varying interpretations (Ozawa, 1991). NOAA also commissioned three site characterization studies focusing on fish and fisheries, benthic communities, and physical oceanography/ recruitment (see Table 8). The proceedings and results of these forums were made available to the public via the Tortugas 2000 website (http://floridakeys.noaa.gov). WG members Cowie-Haskell and Delaney (2003) discuss the various levels of scientific information that were integrated into the Tortugas 2000 process.

Table 7. Forums used to present data to working group members in the Tortugas 2000 process (USDOC, 2000).

Forum Topic	**Presentations Given By Experts**
Socio-Economic Forum	Overview of Uses Recreational fishing and diving Commercial fishing Socioeconomic considerations
Ecological Forum	Physical characterization Local knowledge Fish Seagrass Lobster Turtles and other megafauna

Table 8. Data provided in three site characterization studies (white papers) and some of the most important knowledge that came from the studies.

Site characterization studies	**Important Results**
Fish & fisheries (Schmidt et al., 1999)	Spawning areas. Riley's Hump has only known spawning aggregation of mutton snapper. Numerous adult fish species aggregations would be protected by the ER.
Benthic communities (Jaap et al., 1998)	Discovered new coral reef (Sherwood Forest) which is one of the healthiest and abundant coral communities in the Gulf of Mexico and Caribbean.
Physical oceanography & recruitment (Lee et al., 1999)	Circulation patterns around Tortugas region. The Keys are interconnected with the rest of the Caribbean. Tortugas area protection enhances potential reproductive success and larval transport (via Gulf of Mexico loop current) of a number of commercially important species

In their paper Cowie-Haskell and Delaney (2003) emphasize that the use of a simple grid cell system in GIS was essential in the success of the process. In addition, they suggest that the presence of abundant scientific data allowed many debates over economic impacts to be measured in terms of short term and long term economical and ecological benefits. Some fishing groups conducted their own economic impact study and showed levels of financial loss which were much higher than the National Marine Fisheries Service (NMFS) calculations for the same areas. It turned out that the fishers had either used their own actual catch amounts for the study,

meaning that they had lied to the NMFS about their actual yields, or they were using inflated numbers to support their interests (Personal communication, G. P. Schmahl).

In addition to the site characterization studies, and public information forums, there was a study to determine the perceptions and attitudes of stakeholder groups in the Florida Keys with respect to marine reserves (Suman et al., 1999). The use of forums to present data to the working group was an excellent way to ensure that informational power was evenly distributed amongst all parties involved in the decision-making process (WG members). The forum presentations were given from the perspective of the experts without any recommendation for the reserve, just presenting the information. After the presentations, question and answer sessions with the WG helped distill the true meanings and implications of the experts' presentations (Ozawa, 1991; USDOC, WG minutes, 4/98 & 6/98). These meetings fall into Godschalk et al.'s information exchange typology (1994). Information exchange meetings provide participants with new knowledge then encourage them to engage in "discussion and mutual education" saving decision-making for a separate meeting (Godchalk et al., 1994).

The originally proposed protected area in the Tortugas was selected based on ease of boundary creation and proximity and focused on an area rich for shrimping, but low in biological and geological diversity, subsequently upsetting fishermen and not meeting the goals of the FKNMS. Two ecologically and topographically important areas of the Tortugas that had been left out of the proposed reserve were Sherwood Forest and Riley's Hump (Figure 2, Figure 6, Figure 7). Sherwood Forest, a coral reef estimated to be at least 400 years, has coral coverage averaging 30% live coral as compared with 10% in the rest of the Florida Keys. Sherwood Forest is home to rare black coral which is a protected species (USDOC, 2000). Riley's Hump is southwest of DRTO and had previously been overlooked by sanctuary researchers due its lack of dramatic topography and benthic cover (Personal communication, G. P. Schmahl). Riley's Hump is actually quite exceptional in its diversity and numbers of fish and other marine life. The key reasons for protecting Riley's Hump is that it is now a well known site for a variety of fish species' spawning aggregations and that it was a common site for large ocean freighters to drop anchor and subsequently damage the seafloor with their large anchor chains (USDOC, 2000).

Figure 6. Top: Map of the Tortugas Ecological Reserve Study Area. Bottom: Map of the study site for the Tortugas Ecological Reserve with GIS grid & jurisdictions (USDOC, 2000).

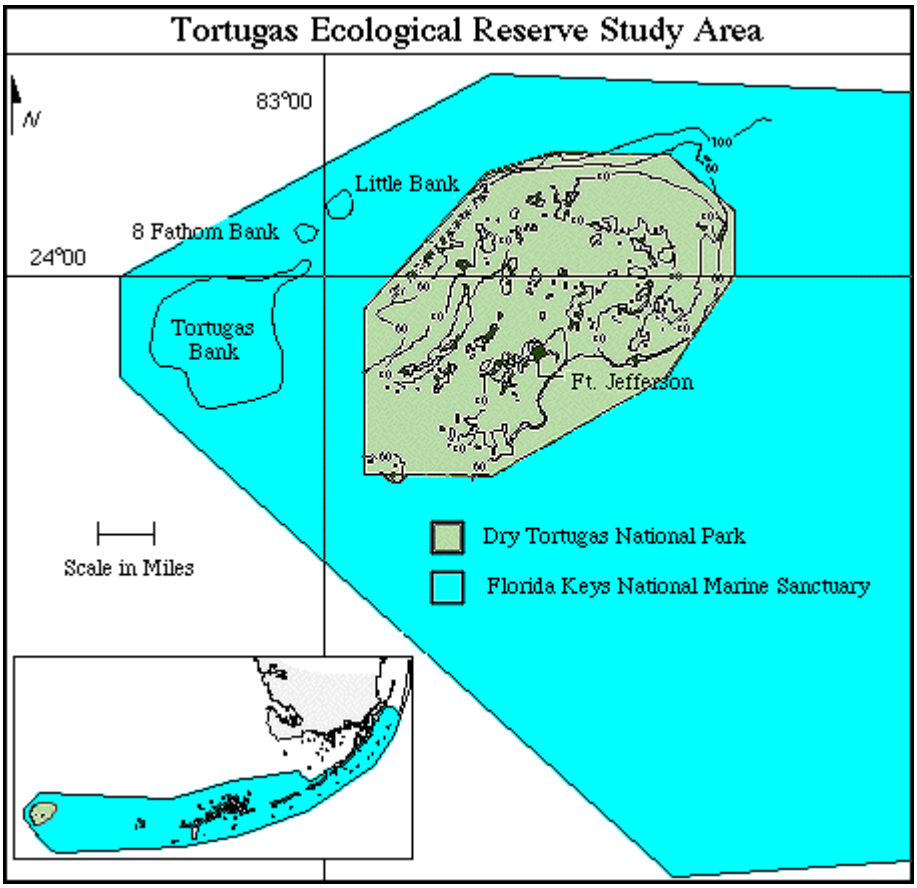
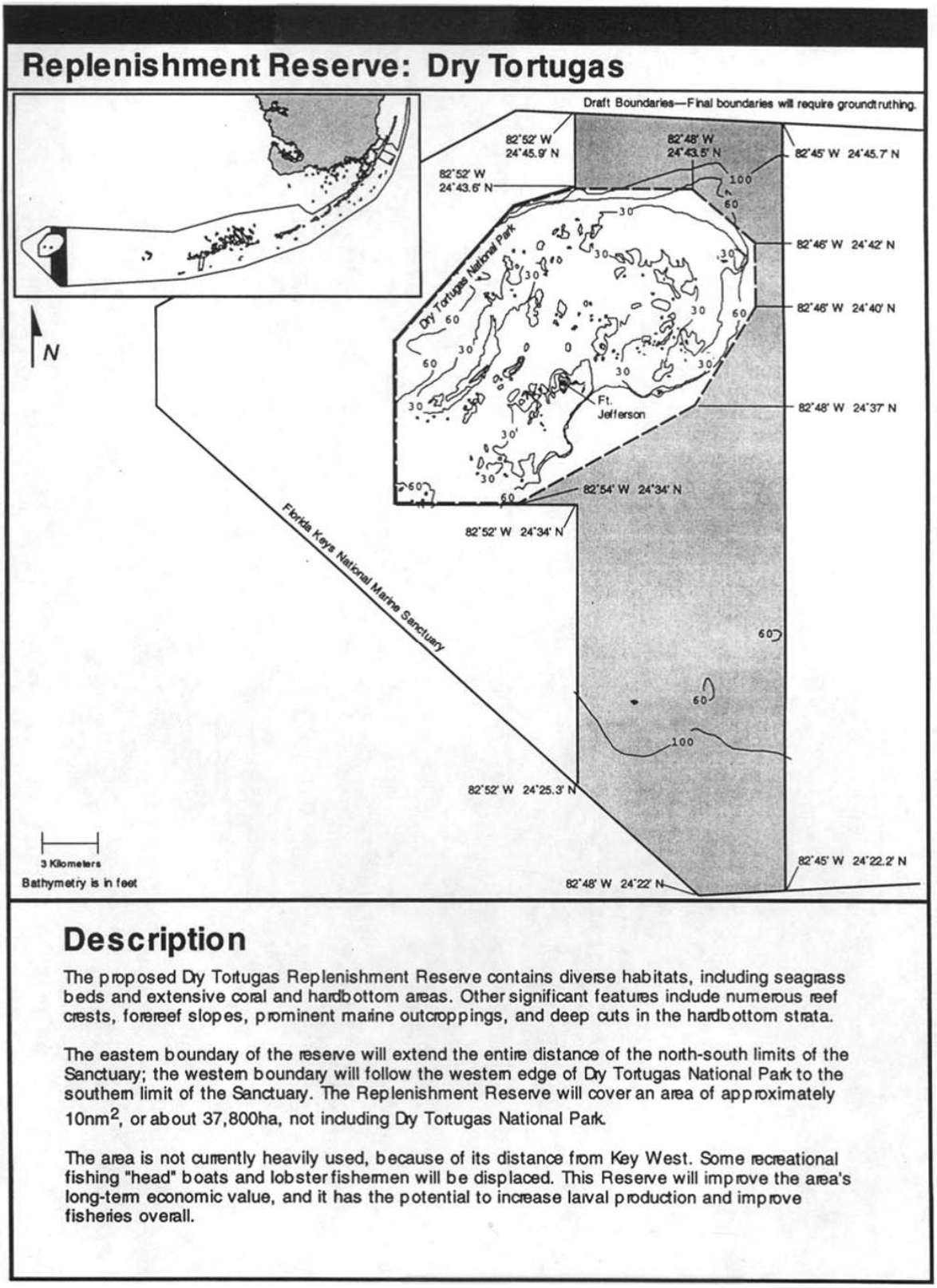


Figure 7. Map of the proposed Tortugas Replenishment Reserve (USDOC, 1995).



Description

The proposed Dry Tortugas Replenishment Reserve contains diverse habitats, including seagrass beds and extensive coral and hardbottom areas. Other significant features include numerous reef crests, forereef slopes, prominent marine outcroppings, and deep cuts in the hardbottom strata.

The eastern boundary of the reserve will extend the entire distance of the north-south limits of the Sanctuary; the western boundary will follow the western edge of Dry Tortugas National Park to the southern limit of the Sanctuary. The Replenishment Reserve will cover an area of approximately 10nm^2, or about 37,800ha, not including Dry Tortugas National Park.

The area is not currently heavily used, because of its distance from Key West. Some recreational fishing "head" boats and lobster fishermen will be displaced. This Reserve will improve the area's long-term economic value, and it has the potential to increase larval production and improve fisheries overall.

Consensus Building

After the WG attended the Ecological Forum there was a feeling that the reasons for a reserve were not very clear, despite the presentations that the WG had seen. The WG agreed that if the new reserve was going to be successful, they needed to distill the scientific information into units that could be easily understood by the average lay person, and there needed to be a clear expression of the benefits of a reserve. The WG was then directed through a simple, yet clearly defined process to answer the question "What are the potential benefits of an Ecological Reserve (no-take zone)?" (USDOC, Tortugas 2000 WG minutes, 4/17/98). This exercise was a great example of how data can help build consensus among stakeholders by focusing on the issues, plus it had the added bonus of shaping a more effective public outreach effort (Lewicki et al., 2004).

In February 1999 the WG developed criteria for the future ecological reserve in terms of ecological and socioeconomic values. The criteria developed were a direct result of incorporating clear objectives and using the best available information in terms of ecological and socio-economic factors. The criteria were: biodiversity and habitat, fisheries sustainability, sufficient size, allowable activities, socioeconomic impacts, reference area/monitoring, and enforcement/compliance (Table 9). Fisher and Ury stress the importance of establishing objective criteria because it allows decisions to be reached "amicably and efficiently" by setting a decision-making structure by which both parties can follow (1991). This allows all parties, in this case the working group members, to feel that the process utilizes fair standards and procedures (Fisher and Ury, 1991).

Table 9. Criteria for the Tortugas Ecological Reserve developed by the WG at their February 1999 meeting (USDOC, 2000).

Criteria	**Objective**
Biodiversity & habitat	Choose an area that contains the greatest level of biological diversity and widest range of contiguous habitats.
Fisheries sustainability	Choose an area that would provide the greatest benefit in protecting and enhancing commercially and recreationally important fish species, especially those that are rare, threatened or depleted.
o Spawning areas	Choose an area that would include significant fish spawning.
o Full life cycles	Choose an area that would encompass all the habitats required to support the full life cycle of commercially and recreationally important fish.
Sufficient size	Choose a boundary that would encompass an area that is large enough to meet the criteria listed above and to achieve the potential benefits and goals of an ecological reserve.
Allowable activities	Choose an area and craft recommendations that would serve to minimize adverse socio-economic impacts on established users of resources in the area.
Reference area/ monitoring	Choose an area that would serve as a reference or control area to facilitate the

	monitoring of anthropogenic impacts and to evaluate the consequences of establishing the Ecological Reserve.
Enforcement/ compliance	Choose a boundary and craft regulations that would facilitate enforcement and encourage compliance.

GIS Used as a Decision-Making Tool and Consensus Building Device

NOAA Special Projects office was brought in to provide support in the design phase (Figure 3) of the planning process. Utilizing data acquired from each of the site characterization studies, in addition to local knowledge (e.g. from fishermen and divers), GIS layers were created for each information source. A regular grid was created in GIS to facilitate analysis and discussion of distinct areas of the Tortugas region. The grid was divided along north/south one degree latitude by one degree longitude minutes resulting in one square nautical mile grid cells. The use of this regular grid following actual latitude and longitudes helped provide easily locatable boundaries for users and was more user-friendly than the polygons traditionally used in GIS applications (Cowie-Haskell & Delaney, 2003; USDOC, 2001). The grid was used to synthesize all of the collected scientific data on benthic coverage, fish spawning aggregations, ocean currents, and topography (USDOC, 2000). Additionally, blank grid overlays and study area maps were given to both commercial and recreational fishermen to shade in the cells on the grid where they concentrated their fishing efforts. The commercial fishermen were reluctant at first to participate because they feared that by sharing information about where they fished, they would automatically be shut out of those areas (Delaney, 2003; Cowie-Haskell & Delaney, 2003; USDOC, 2000). The fishermen were eventually brought on board when they saw that by participating in the process they could have a say in protecting their fishing grounds. If the fishers had not already been through the FKNMS regulation process and seen what would happen if they did not participate in the planning process they probably wouldn't have been willing to get involved in the T2000 process.

Working group members were sent home with sets of maps and grid templates. They were charged with developing their own proposed management scenarios for boundaries of an ecological reserve. Twelve alternate boundaries were proposed by the working group with two alternatives (1a & 4a) presented as the preferred alternatives (Figure 8). The SAC responded to the WG's recommendations and came up with a third alternative that eventually was accepted as the final boundaries for the Tortugas Ecological Reserve (Figure 9).

The scientific publications that were a result of the Tortugas 2000 process are important contributions to the field of planning marine protected areas. Meester et al. (2004) detail the methods used to evaluate designs and boundary alternatives utilized in reaching the final Tortugas ER and Dahlgren and Sobel (2000) evaluated the issues of determining the appropriate reserve size for the Tortugas.

Products of the Negotiation & Implementation

The final products of the negations, recorded in the single negotiating text, the Draft EIS, were new boundaries and regulations for the Tortugas Ecological Reserve. On June 15, 1999, the WG presented the preferred alternative to the SAC and final support for the Tortugas Ecological Reserve was given unanimously by the SAC, despite strong debate at the SAC level until the final vote. The SAC unanimously accepted the final recommendations with the following statement:

> *"The Sanctuary Advisory Council recognizes the hard work and extensive deliberations of the Working Group, a diverse group of stakeholders, in arriving at an unprecedented consensus recommendation for an ecological reserve that both protects biodiversity and minimizes impacts to users. The FKNMS SAC adopts the attached recommendation of the Tortugas 2000 Working Group Alternative as the preferred alternative for the T2000 Ecological Reserve*." (USDOC 2000).

The final boundaries for the Tortugas Ecological Reserve encompassed Sherwood Forest and Riley's Hump, closing Riley's Hump to all fishing and diving in a concession to fishing interests who felt that allowing diving would negate the purpose of the ER. The final regulations limit the number of dive boats that can enter Sherwood Forest by permit and limits the number of mooring buoys installed in the area (USDOC, 2000).

Figure 8. The 12 boundary alternatives for the Tortugas ER as proposed by the WG (Source: http://floridakeys.noaa.gov/tortugas/studyarea/welcome.html#base)

Figure 9. Final boundaries of the Tortugas Ecological Reserve (USDOC, 2001).

ANALYSIS

Traditional negotiation uses a zero sum end game while collaborative models of negotiation such as integrative bargaining and principled negotiations "expand the pie" allowing for all parties to have some level of success in the process (Kelleher, 2000). Principled negotiations establish the goal for all parties to work together to create a mutually advantageous outcome (Kelleher, 2000). In environmental disputes involving the Environmental Protection Agency and other parties, there is a "negotiated rulemaking" process in which new consensually based regulations are formed (Moore, 1996).

One of the most interesting outcomes of Tortugas 2000 is the ability to compare the two different planning processes with respect to proposed and final zone boundaries and regulation development for the Dry Tortugas region. In the drafting of the FKNMS management plan there was a conscientious effort on the part of NOAA to utilize "knowledge-based consensus building" in the form of workshops, followed by public scoping meetings (USDOC 1995a). NOAA utilized four working teams to develop the vision and knowledge base to create the original draft management plan for the FKNMS (USDOC, 1995a). The four teams were: (1) the Interagency Core Group (federal, state and local agencies with direct jurisdictional responsibility charged with oversight of the policy development and overall process), (2) the Strategy Identification Work Group (49 local scientists and management experts charged with generating the initial strategies and implementation requirements), (3) the Sanctuary Advisory Council (representatives of the Key's stakeholders/user groups who met over 15 times to help with the formulation of policy), and (4) the NOAA team (NOAA employees mandated to implement the process to produce the final plan (USDOC, 1995a). Despite these efforts, the original process was highly contentious, whereas the Tortugas 2000 process was less controversial. Increased stakeholder involvement during the T2000 process may also result in increased compliance with adopted regulations (Brody, 1998; Brody, Godschalk and Burby, 2003).

The original management plan review was heavily represented by government employees and scientists and had very little representation of local community stakeholders, especially fishermen. It is possible that Florida Keys residents, especially commercial fishermen, were already highly sensitive to government regulations after a state ballot passed banning the use of all gill nets in Florida waters through a constitutional amendment in November 1994 (Barnes, 1995). On the other hand, when the T2000 process started in 1998, most people were exhausted from the previous seven years of public outrage and intimidation from activist groups like the Conch Coalition, so it is possible that the T2000 process benefited from people's exhaustion with fighting (Personal communication, G. P. Schmahl).

The Tortugas controversy and subsequent Tortugas 2000 process has shaped the way that the NMPS approaches all potential management plan revisions. Touted as a success story, this collaborative science based process is the new model for marine zoning and public participation in the United States. Without the large protests and public uproar following the 1995 proposed FKNMS zoning plan, there would not have been the interest from the stakeholders to participate

in the T2000 planning process. The FKNMS was going to go ahead and create zoning with or without the participation of stakeholders, and stakeholders began to realize this after the 1995-1997 events, thus they had motivation to participate. In particular the commercial fishers got on board for the T2000 process after having an "it wouldn't matter if they participated" attitude (Personal communication, G. P. Schmahl).

One of the strengths of the T2000 process was that the FKNMS listened to what the public had to say after the 1995-1997 management plan review. In addition, the insightful and eloquent recommendations of Suman et al. (1999) who conducted a survey analysis of the three main stakeholder groups (environmental groups, commercial fishers, and dive operators) from the 1995 FKNMS management plan attempt seemed to have had an influence on the involvement of stakeholders in T2000. The FKNMS learned a lot of lessons about how to garner public support and build trust in the community as a result of the management plan review process. Joanne Delaney, recorder for the T2000 process (Delaney, 2003) identified the strengths of the process as: (1) extensive public involvement and efforts to engage and inform the community; (2) the identification of a clear purpose and ground rules; (3) the distribution of the best available science to WG members; (4) building upon a "bottoms-up" process to ensure regulatory agency support; (5) consideration of "social, political and cultural climates of the region" in the design process.

The FKNMS Tortugas 2000 process was enhanced by the simultaneous occurrence of the Dry Tortugas National Park (DTNO) management plan review. This enabled both organizations to share data, and because the FKNMS had representation and consultation with DTNO it was easier to ensure agreement with the final recommended plan for the Tortugas ER. Additionally, many of the scientific studies were co-funded by both agencies, thus cutting the cost of the endeavor. The DTNO approved a similar zoning plan in their management plan review which was authorized in July 2001 (USDOI, 2001).

The Tortugas 2000 process was probably extremely costly in terms of funding the research studies and in terms of people hours to coordinate and implement all of the levels of the process. Although this process has been touted as the model for other sanctuaries and marine protected areas (MPAs), it is not feasible for most small (budget and staff) MPAs to employ such a science intensive collaborative decision making process. A surprising weakness of the T2000 process is that not all relevant stakeholder groups were at the table from the beginning (USDOC,

Tortugas 2000 WG minutes, 4/16/98). Bringing in the Cuban-American fishing representative after the process started had the potential to slow the process, and was identified as one of the process challenges by Delaney (2003). It was surprising that the FKNMS could have left out any potential stakeholders considering the opportunities they had to evaluate the membership of the original working teams and SAC from the draft management plan process. On the other hand, it is a credit to the way the working group was facilitated, since a discussion of whether or not all of the important stakeholders were represented was facilitated during the first meeting of the working group.

Personal Styles

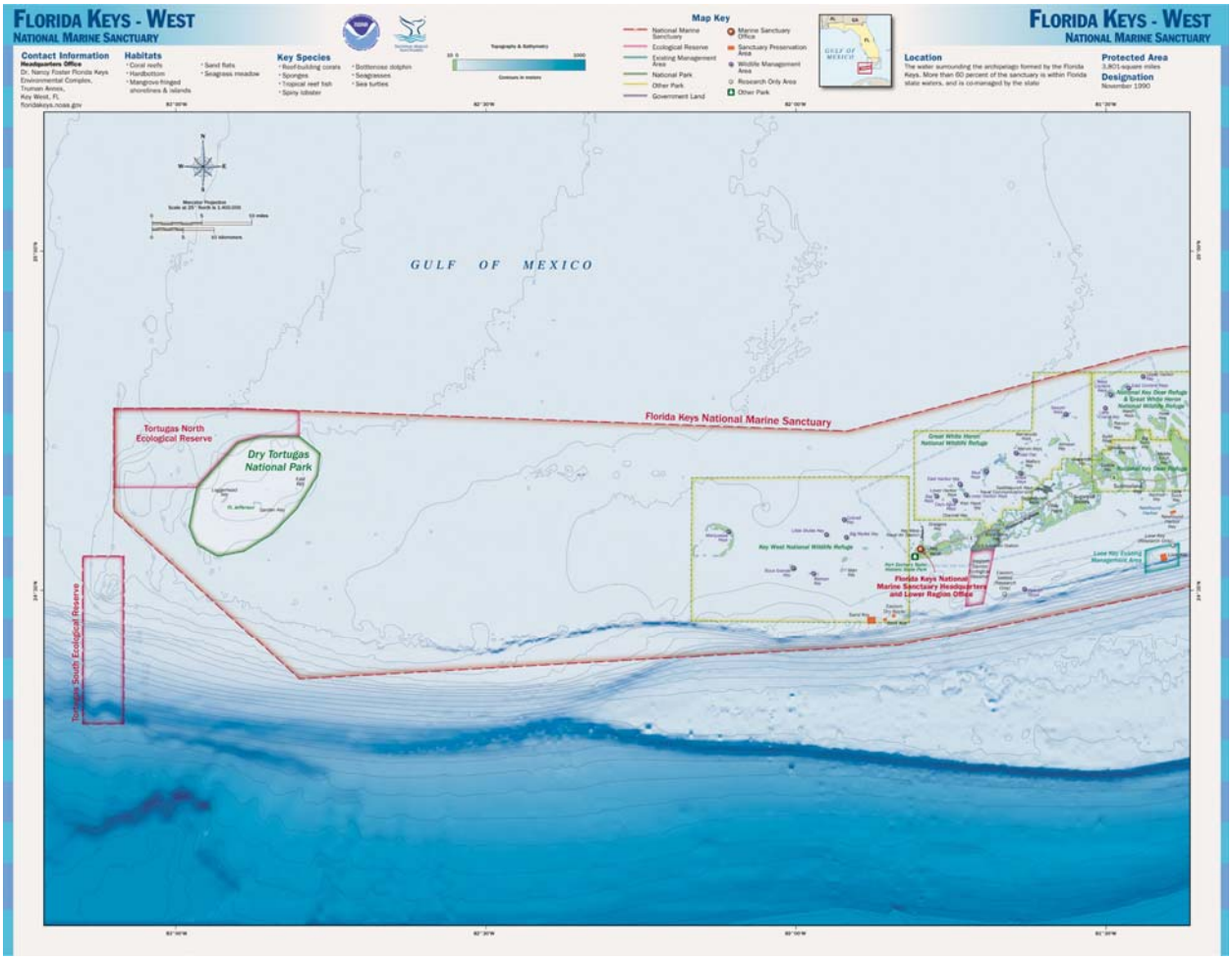
The personal styles of key players were another factor in ensuring the final success of T2000. Peter Gladding, an old "Conch" and fisherman, was an essential member of the working group. He had spent almost 50 years fishing the Tortugas Banks and had personally seen the numbers of fish decline in key areas such as Riley's Hump. Gladding offered two important sources of power to the negotiation process in terms of expertise and position (Lewicki et al., 2004). Gladding's expertise came from his 50 years fishing in the Tortugas which also created power in terms of his position as a respected member of the fishing community (Lewicki et al., 2004). Gladding was a respected member of the Keys and fishing communities, thus he was able to get the support of many fishers for the T2000 negotiations (Personal communication, G. P. Schmahl).

Another important player was Dan Basta, the leader of the NOAA Special Projects Office group that facilitated the GIS mapping process. He was of the opinion that brainstorming was too touchy-feely and pushed his concept of "idea engineering." While this might have upset some members of the group, it was Basta's insistence on focusing on the substantive decisions relating to mapping and drawing boundaries that eventually helped the process move forward more quickly (Personal communication, G. P. Schmahl). Basta exhibited characteristics of a directive dealmaker, focusing on the substantive matter of creating maps of potential zone plans (Moore, 1996). Another important player was Michael Eng, the facilitator, who truly kept the lines of communication open between working group members who had been at odds with one another coming into the process (Personal Communication, G. P. Schmahl). The styles of each of these individuals contributed to a successful negotiation, which is an important factor to consider when evaluating the successfulness of a negotiation.

CONCLUSIONS

Although DTNR and FKNMS maintained final decision-making authority in their management plan revisions, both engaged in a joint fact-finding consensus building process with their stakeholders which resulted in a final outcome approved by all participating stakeholder groups. Formal agreement is easier to maintain in this case because the FKNMS and DTNO have the staff and regulatory authority to ensure implementation of the final agreement and recommendations of the WG and SAC (Moore, 1996). The Tortugas 2000 process avoided the pitfalls of nonself-executing agreements because there was a clear and indisputable final outcome that would be executed: the FKNMS would create an ecological reserve in the Tortugas region at the end of the process (Moore, 1996). Brody describes the T2000 process as a "bottom-up" approach which resulted in less protection than originally proposed by the FKNMS, with the trade-off that more stakeholders were satisfied with the final outcome (Brody, 1998).

The Tortugas 2000 process has been heralded as a success (NRC, 2001; Delaney, 2003; Cowie-Haskell and Delaney, 2003). The integration of science and public input undertaken for the FKNMS management plan review and the subsequent Tortugas 2000 decision making process has been described as one of the most intensive efforts undertaken in the history of United States public lands. The originally proposed Tortugas Replenishment Reserve (Figure 7) was located in an entirely different region of the Tortugas as compared to the final Tortugas Ecological Reserve (Figure 9). The drastic differences between the two reserves are a testament to the importance of comprehensive public involvement and a thorough consideration of the best available data. There have been numerous references to the Tortugas 2000 process in guidebooks to planning marine protected areas (e.g. NRC, 2001). The Tortugas 2000 planning model is an excellent one for marine protected areas (MPAs), although the economic and time intensive aspects of the process, coupled with an extraordinary amount of scientific data collection, make a Tortugas 2000-like process a lofty goal that may not be reachable by many under-funded and understaffed marine protected areas. Personnel at smaller MPAs, however, can learn many important lessons from the Tortugas 2000 process and hopefully it will be possible to develop less costly methods to resolve future planning disputes.



Final boundaries for the western portion of the FKNMS (including the two separate areas created as a result of the 2000 process. (Source: http://sanctuaries.noaa.gov/).

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