

## Competing Perspectives in Resource Protection: The Case of Marine Protected Areas in West Hawai'i

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*This article examines a conflict involving the protection of coral reefs from aquarium fish collecting along the coast of western Hawai'i. The involved parties included aquarium fish collectors, dive tour operators, Hawai'i Division of Aquatic Resources, reef protection advocates, and administrative/legislature state actors. An attempt was made to resolve the controversy through a combination of legislative action and environmental dispute resolution. The responsible state agency approached the issue based on the implicit assumption that it was a conflict that could be resolved through negotiated agreements based on the best available scientific information. Our analysis suggests that scientific perspectives framed and dominated the resolution process to the perceived detriment or (at least underrepresentation) of*

Received 1 July 2003; accepted 20 March 2004.

The authors thank the following for help at various stages of the work: WHFC, LFC, R. Jussaume, K. Hopfensperger, D. Ortiz, P. Cohn, and Dr. L. Capitini.

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*some identity-based community perspectives. The resulting agreement established reef protection in the form of marine protected areas, but last-minute scuttling of previously negotiated enforcement procedures occurred, revealing that not all stakeholders were truly supportive of all elements of the agreement. This last-minute action resulted in fewer effective enforcement provisions and, at least from some perspectives, marginalization of the broader community's role as resource managers.*

**Keywords** aquarium fish collecting, coral reefs, environmental dispute resolution, fisheries resources, marine protected areas

Aquarium fish collecting in Hawai'i has been a subject of controversy, particularly on the western side of the Island of Hawai'i where the abundant coral reefs have supplied the aquarium industry for 50 years. Competition exists for reef access between an increasing number of aquarium fish collectors and recreational dive tour operators. Much of the West Hawai'i community depends on revenue generated from tourism, and although relatively fewer people rely on aquarium fish collecting profits, the gains are substantial with a total annual export value of up to US\$1.06 million (Walsh, Cotton, and Dierking 2003). Conservation and effective management strategies are important to a growing population in the community. Disputes over reef access and conservation for the increasing population of resource user groups developed into environmental conflict where community members have employed alternative environmental dispute resolution (EDR) tactics to manage the situation.

For a period of 25 years the Hawai'i Division of Aquatic Resources (DAR) had largely ignored growing public concerns regarding the expansion of the aquarium fish collecting industry, noting that there was a paucity of definitive studies on fishing impacts (Tissot and Hallacher 2003). This pattern continued until concerns reached a point when they could no longer be ignored. At this point, state-prescribed participatory management resulted in the development of an environmental dispute resolution process orchestrated by DAR managers. The process was conceived, developed, and implemented locally. It evolved into an effort that attempted to minimize community conflict and establish resource management through the formation of nine marine protected areas (MPAs). These areas were designed to ultimately protect aquarium fish species and reduce conflict among user groups, but the outcome was neither entirely satisfactory to those wishing to protect reef resources nor reflective of the agreement reached in the EDR process.

Environmental conflicts are known for complexity stemming from the combination of biological intricacy and uncertainty, multiple parties and issues, unique values and worldviews, scientific and traditional knowledge, and legal requirements (Daniels and Walker 2001). Difficulties arise when attempting to manage resources like reef fisheries that contain a high degree of uncertainty and are utilized to varying extents by numerous community groups. The successful management of small-scale coastal fisheries requires a thorough understanding of the fishers, their values, culture, resource attributes, and governing institutions together with the overall environment in which the fishers operate (Pomeroy 1994).

Legislative systems generally are ill-equipped to deal with the inherent complexity and unpredictability of biological systems while accommodating different human cultures (Sneddon et al. 2002). Traditional administrative rule-making under broad legislative mandates is often problematic as the scope and nature of disputes change over time. Thus, it produces "solutions" that fail to concurrently evolve with

the development of new knowledge and emerging understandings between or among stakeholders.

This article explores the conflict dynamics and the resolution attempt associated with the establishment of nine marine protected areas in West Hawai'i. In theoretical terms, we examine the role of "scientific" and "community" perspectives in the decision process. We argue that the DAR developed a seemingly sound process, but one that tended to frame issues in terms of *scientific* perspectives (that is, perspectives held by actors with scientific training and an interest in protecting reef resources). Despite the apparent consensus at the end of the EDR process, certain community interests reasserted themselves through actions in the state legislative/administrative arena that significantly weakened previously agreed-on regulations. We suggest that this outcome was at least partially the result of inadequate attention to the values/identity-based components of the issue during the EDR process. This case study presents a cautionary tale to resource managers and marine conservationists concerning the dangers of giving insufficient attention to such "nonscientific" elements and considerations in an environmental dispute. We suggest that our case study is an instructive example of a concern recently expressed by Agardy et al. (2003) concerning marine conservation and MPAs:

We are concerned that significant polarization of views concerning different MPA management approaches is occurring, leading to discord and potentially impeding the use of MPAs to conserve marine biodiversity. As with many popular trends...the tendency to decree as many MPAs as possible, an eagerness to do so without a clear understanding of many of the complexities or balanced framework required, and a zealous "one size fits all" approach may inadvertently impede success. A policy backlash against the popular use of marine protection tools may loom at the time when MPAs are needed most. (p. 354)

This article examines a number of these complexities in the West Hawai'i case and is organized as follows: First we explore the rationale for the use of EDR to address issues within a community-based management protocol. Then we describe three general types of conflict: interest-based, identity-based, and a mixed mode. Next, the complexity and conflict associated with Hawaiian reef fisheries are discussed, followed by a description of the methods used in this study. The major events in the West Hawai'i aquarium fishery management process are then described as a case study. The case is analyzed with respect to the significant scientific and competing value elements characterizing the process, then the removal of effective enforcement provisions late in the process, and finally the lessons learned from this case study are presented.

### **Community-Based Management and EDR Use**

Effective conservation and management requires the dynamic incorporation of ecology, political economy, and sociology into a management approach (Holling 1978; Michaelidou, Decker, and Lassoie 2002; Wilshusen et al. 2002). Community-based management has emerged as an apparently productive approach to link these factors. However, the absence of an established template makes the design, monitoring, and evaluation of such integrated projects challenging, often due to internal and seemingly irreconcilable conflicts. Environmental dispute resolution (EDR) has

evolved as an approach for managing disputes that might otherwise inhibit the success of a community-based management plan. The use of EDR can result in the successful management and even possible development of outcomes more creative and dynamic than those originally intended (Cormick et al. 1996). Most EDR processes emphasize compromise, participation, and communication, and have achieved some degree of success (Bingham 1985; Painter 1988). In one study, Bingham (1985) found that in 79% of all site-specific conflicts, a decision was reached and 80% of those decisions were implemented as planned. Environmental dispute resolution is a tool that can be used to enhance participatory decision making within a community-based initiative.

Legislative and administrative bodies have traditionally handled disputes over resource allocation using consultation-type approaches as opposed to community-based approaches. The result has often been to exacerbate or ignore underlying conflicts, leaving the combatants frustrated and reactive (Susskind and Ozawa 1985). Although it generates a "solution," the consultation approach is in many cases constraining, lengthy, expensive, inconclusive, and can reinforce perceived power imbalances. This process can result in the marginalization of one or more stakeholders, and a failure to address the real underlying issues in dispute (Bingham 1985; Cormick et al. 1996; White et al. 1994). Since many legal systems do not accommodate or necessarily reflect the values of *all* the disputants, cultural and values-based conflicts may be inadequately addressed by purely legislative resolution approaches (Susskind and Ozawa 1985).

### Three Types of Conflict

Environmental dispute resolution not only ameliorates conflicts outside traditional legislative approaches, it allows for different types of disputes to be addressed. Conflicts can be differentiated by their nature. We briefly describe three major types of conflict and how productive resolution/management approaches differ between them.

First, we define interest-based or resource-based conflicts as differences over the allotment, use, or distribution of concrete, usually observable, interests and resources (Daniels and Walker 2001; Rothman 1997). Conflict management in such circumstances generally focuses on communicating, acknowledging, and characterizing all the involved *interests* of participants rather than their positions; the interests of the participants are generally identifiable.

Second, identity-based or values-based conflicts are disputes stemming from deeper differences in personal values, long-standing concerns, psychology, culture, and threatened beliefs<sup>1</sup> (Rothman 1997). Characteristically, such conflicts are unclear in their parameters and boundaries (Rothman 1997). Often, identity-based conflicts are "disagreements over what should be the determinants, criteria, basis, or priorities of a policy decision, relationship, or conflicting issue" (Daniels and Walker 2001, 30–31). Fundamental values in these types of conflicts are not necessarily voiced or understood if a decision process focuses only on superficial issues. Participants generally will not agree to outcomes that contradict their underlying worldviews (Daniels and Walker 2001). Rothman (1997) states that negotiation and bargaining over the specifics of issues too early in a conflict resolution process can worsen identity-based conflicts because the underlying basis of the conflict remains undisclosed. It is notable that conflicts starting primarily as interest-based may evolve into identity-based conflicts if the resolution process is unnecessarily

prolonged, with the result that participants identify their dignity and prestige with the dispute (Rothman 1997).

Third, mixed-mode disputes are conflicts that include interest-based issues for some participants and identity-based issues for others, or a mix of both types within a larger controversy. Dispute resolution or conflict management in these more complex circumstances hinges on identification, awareness, and communication of both the interest- and identity-based issues within the controversy. For successful progress, a group culture should be developed that includes the respectful treatment of information from a variety of sources, free and informed choice, and internal commitment to support the group's structure and process and to increase its efficacy (Schwarz 1994). Creating a culture that allows for the legitimacy of a variety of interests and values becomes one of the larger challenges to group process, but the explicit inclusion of both values and interests introduces an element of greater depth into managing such dynamics. When the motivations of all the participants are not shrouded by emotional or defensive overlays and acknowledgment of differing values and interests occurs, the probability of reaching a creative, group-generated solution increases.

### **Complexities and Conflicts in Reef Fisheries**

Understanding human conflicts over complex ecological systems also requires an appreciation of the biology, environment, and resources of a particular area, especially in situations where scientific data and harvest practices are involved. In order to describe West Hawai'i's aquarium fish collecting conflict, we first outline several unique aspects of coral reef resources, aquarium fish collecting, and reef fisheries management.

Ecological dynamics are sometimes characterized as separate from or external to human society, but the goods and services provided by natural systems not only support human systems, they help define the overall capacity of a culture, an economy, and a society (Berkes and Folke 1998; White et al. 1994). Simultaneously, the ecological dynamics of such natural systems are often profoundly affected by human activities and more indirectly by the ideas and values that shape human activities in such ecosystems. Coral reefs typically exhibit such interactions. They hold immense intrinsic value in addition to providing food, revenue, medicines, coastal protection, research and education opportunities, recreational areas, and support for the social fabric of coastal communities (Pomeroy 1994; White et al. 1994).

The complex characteristics of coral reef ecosystems, particularly when associated with reef fisheries, contribute to access and management controversies because site- and species-specific baseline data are often incomplete and harvest effects are difficult to quantify. Reef productivity, fish life cycles, patterns of recruitment and spawning, larval dispersal, community dynamics, historic conditions, species abundance, and of course and the impacts of harvest pressure are all aspects of uncertainty in a fishery (Pomeroy 1994; Roberts and Ormond 1987; Watson and Ormond 1994). Unregulated or irresponsible harvest practices can result in reef damage, exotic species introduction, algae increase, and ultimately coral reduction (Lubbock and Polunin 1975; Wood 2001). Additionally, broad-scale threats to reefs like non-point-source pollution, global climate change, and the general impacts of increased human population pressure confound management. Thus, managers must not only account for specific harvest impacts, but also for other factors that may be indirectly subject to their influence.

Awareness of the potential biological impacts associated with aquarium fish collecting has substantially increased in recent years. Unlike consumptive commercial fishing, the collection of aquarium species requires highly selective harvesting procedures whereby young, small-bodied individuals are taken for aesthetic qualities. For example, recent studies show that 7 fish species comprise over 90% of the West Hawai'i aquarium fish catch (Tissot and Hallacher 2003). In selective reef fisheries, the major scientific issues revolve around the conservation of target species, assemblages, and habitats, but despite the potential for overexploitation, corrective actions are usually taken only after a problem becomes acute (Bohnsack 1997; Tissot and Hallacher 2003; Wood 2001). Generally, the richest, most accessible reefs are exploited and interaction with other high-revenue activities such as recreational diving can produce socioeconomic conflicts (Lubbock and Polunin 1975; Wood 2001). As a result, arguments have erupted over the extent of unsustainable exploitation, resource management, and enforcement.

One strategy for managing selective fisheries is the use of marine protected areas, a precautionary option for species protection, but one that is highly dependent on community compliance (Kelleher 2000). Studies in the Philippines show that marine reserve success is greater when the community is involved and convinced of the benefits (Russ and Alcala 1999). Wood (2001) notes the importance of both incentives for aquarium fish collectors, and individual involvement from the local aquarium industry, local leaders, government managers, consumers, other resource users, and the public. Such a multisectoral approach to resource management demands a method that incorporates the interests and values of different participants with the ecological components of the area. Inevitably, differences among stakeholders will arise and should they interfere with participatory management, EDR provides an avenue for developing a greater understanding of the scientific and social issues within the context of the affected community.

## Methods

Beginning with a basic understanding of the aforementioned complexities of reef fisheries management, we investigated the use of legislative action and EDR in the attempt to regulate aquarium fish collecting along the coast of western Hawai'i. The primary data for this analysis were the DAR records of the conflict resolution process consisting of historical overviews, chronologies, meeting minutes and procedures, reports, visuals from presentations and meetings, and pertinent legislation from 1995 to 2002. A detailed review of these records served as the primary basis for our analysis.

To supplement this data and to lend additional perspectives to our analysis, we conducted semistructured interviews with key individuals who had been involved in this process. Interviews consisted of 15 questions designed to encourage participants to explain their relationship to the decision process, other participants, the community at large, the aquarium industry, the reef resources, and the creation of marine protected areas. These topics were introduced in a manner that encouraged interviewees to express themselves in their own words. Interviews were recorded both on tape and by hand note taking. Narrative answers were tape recorded, transcribed, and later compared with DAR records to develop a more complete understanding of the West Hawai'i situation from different participants' perspectives. A research focus based on the evolving situation was maintained as questions arose and discoveries were made during interviews and observations.

Interviewees were selected primarily to lend insight into our analysis based on their differing roles and perspectives within the community, and their experience with the legislative and EDR processes. Individuals were identified by means of content analysis of the documentation, field-worker observations of the process, and participant referrals. Interviewees included users such as a DAR manager, Sea Grant extension agent, aquarium collector assistant, aquarium retailer, governor's liaison, local nongovernmental organization (NGO) members, community members, marine scientists, and dive tour operators, totaling 16 detailed interviews with stakeholders.

In addition to these data sources, the primary field-worker conducted approximately 200 hours of participant observation—attending meetings and a trial for a suspected illegal harvest, reef monitoring studies, meeting preparations, dive tour excursions, and community events. All the information in the case study, legislative events, and EDR processes is taken from the aforementioned DAR records, unless otherwise indicated, to describe the specific events in the conflict.

### **The Case Study**

Informant interviews and preexisting literature indicated that as far back as 1970, increases in aquarium fish collecting combined with the growing public perception of a dwindling number of “colorful shallow water marine fish species” began to develop into an intense conflict between aquarium fish collectors and the dive tour industry in West Hawai'i (Tissot and Hallacher 2003). As the number of aquarium fish collectors increased over time, discontent and harassment escalated between the two groups. Dive tour operators reported a decline or elimination of colorful reef species in areas they deemed essential for business, in addition to discontent at seeing aquarium fish collecting occurring during their recreational dive tours. They concluded that collecting was eroding their industry. According to a dive tour operator:

It [was] not good for business because we [had] to go farther and farther out, there [was] not the variation between sites that clients want... We took clients to see certain rare[individuals] and they would be gone from where we saw them two days ago. (interview notes)

In contrast, aquarium fish collectors considered the divers' claims unjustified and felt that harvesting from abundant areas was essential: “We... only go where there are the right types of fish and that's not just anywhere, we obviously go to good sites where we can get fish,” said one aquarium fish collector (interview notes).

As we noted earlier, the state largely ignored the issue until enough pressure from the community mounted to demand its attention. In May 1996, Hawai'i House resolution HCR 184 passed, stipulating the designation of a working group to develop a comprehensive management plan for regulating aquarium fish collecting in West Hawai'i. A considerable list of marine resource management recommendations was developed by a large community working group, but opposition from aquarium fish collectors combined with a lack of political interest from the state legislature resulted in the failure to pass substantial recommendations.

In response to this perceived lack of success in dealing with what were considered the more pertinent resource management issues of aquarium fish collecting, a group of citizens formed a nongovernmental organization called the Lost Fish Coalition to promote a total ban on aquarium fish collecting in West Hawai'i. They presented a 4000-signature petition requesting a total ban on aquarium fish

collecting to state legislators. Also, at the direction of the Division of Aquatic Resources (DAR) and the state legislature, monitoring projects were initiated to obtain much-needed objective data for reef species prevalence and to appraise reef damage from dive tour operators and aquarium fish collectors.

With the increasing interest in reef protection, HB 3457 was introduced to the state legislature in January 1997 and aimed to create a regional fishery management area along the 235-km West Hawai'i coast. Of this area, 50% was demarcated as a type of marine protected area called fish replenishment areas (FRAs), where aquarium fish collecting would be prohibited. During legislative committee hearings, local reef resource user groups reached a compromise that called for the designation of 30% of the coastline as FRAs as early as 1 October 1998. This bill passed on 13 July 1998 and became known as Act 306.

Provisions of Act 306 called for the effective management of fishery activities to ensure sustainability, enhancement of near-shore resources, and minimization of conflicts in the regional fishery management area (House of Representatives 1998). Act 306 allowed DAR to select and designate a minimum of 30% of the coast as FRAs after close consultation and facilitated dialogue with community members and reef resource users, although no funds were provided by the state to accomplish these aims (interview notes). Act 306 required a review of the FRAs every 5 years, which afforded an opportunity for amendments.

## Results

To later evaluate the results of the EDR process in West Hawai'i, we now describe details of the case. This consists of a narrative analysis of the key events of the process gleaned from documentary evidence, stakeholder interviews, and limited participant observation. Specific information concerning events presented here is drawn from internal DAR documents unless otherwise noted.

### *Consensus Processes*

In an attempt to insure broad community involvement (beyond just dive tour operators and aquarium fish collectors), DAR biologists and University of Hawai'i Sea Grant Extension Agents, acting as coordinators, elected to create a community council in June 1998 comprised of 24 representatives from the diverse stakeholder groups in the West Hawai'i community. This entity was labeled the West Hawai'i Fisheries Council (WHFC). As stated in Act 306, the goals of the West Hawai'i Fisheries Council were to ensure sustainability, enhance near-shore marine resources, and minimize conflicts over resource use. To accomplish this, DAR scientists, University of Hawai'i researchers, and other resource managers presented information to the council as educators. Topics included fish biology, community ecology, marine reserve design, reserve function, aquarium fishing, enforcement, traditional Hawaiian knowledge, and conflict resolution.

The Council was unique, we tried to include cultural aspects...but in Hawai'i a "filibuster-type" approach is common [in discussions and debates, and] we were facing a deadline with the FRAs. (interview notes).

An emphasis was placed on education, presenting data, and discussing biological issues surrounding the aquarium reef fisheries (interview notes). The discussions were sometimes contentious. According to one manager, the aquarium fish collectors were



“in denial” of a problem with fish abundance and the impacts of collecting (interview notes). To the contrary, aquarium fish collectors maintained at meetings that there “was no evidence for detrimental effects on the reefs . . . no studies on our reefs at all to prove anything” (interview notes). Several community members disagreed and offered to assist in reef surveys to prove their point: “Despite all [DAR] charts and graphs . . . there’s a problem, it’s obvious” (interview notes).

The council’s coordinators repeatedly stressed the importance of members representing their respective user groups and discussed the conflict between aquarium fish collectors and dive tour operators extensively with the goal of attaining consensus on the FRAs. One community member stated, “In the small communities with lots of local interest, this issue isn’t really about dive operators and collectors; it’s more complicated” (interview notes). After establishing selection criteria for FRAs, council members were asked to canvass their respective communities and submit maps of proposed areas for FRAs. It was hoped that by determining consensus areas visually, a mutually acceptable solution would emerge (interview notes).

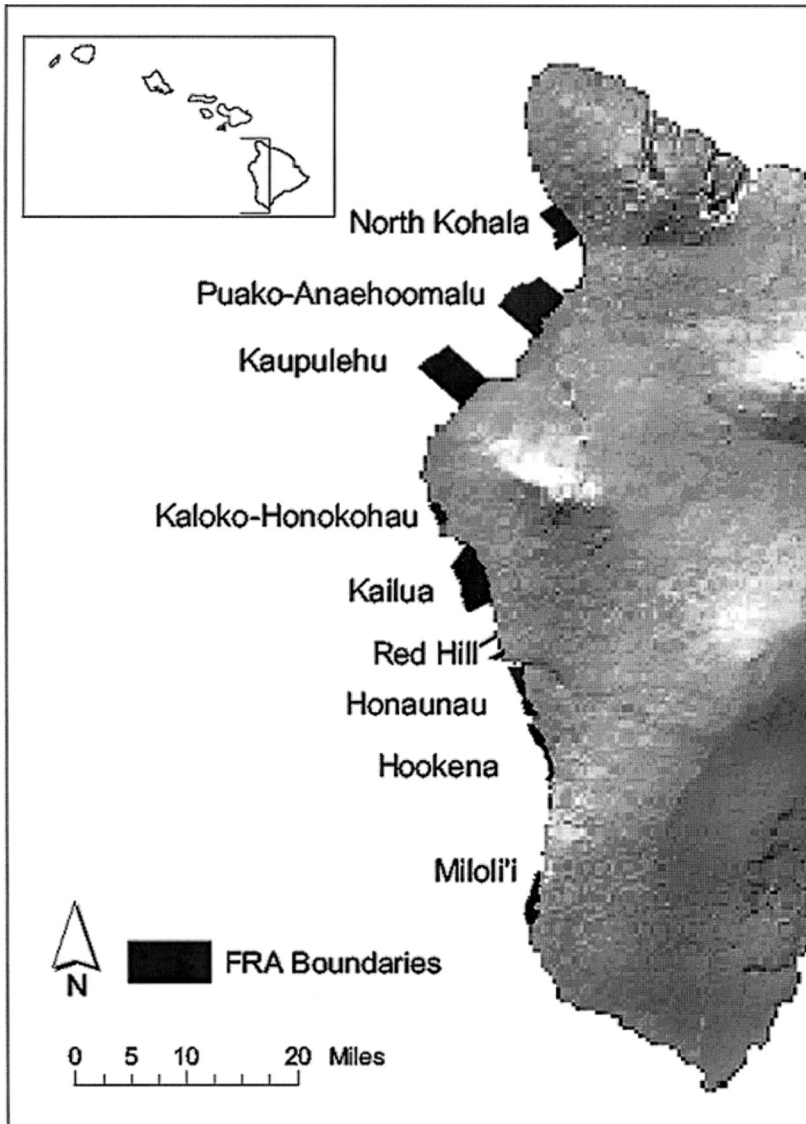
From the onset of the site selection process, the council struggled to limit the total FRA area to 30% of the coastline. Although Act 306 designated this as the *minimum* area closed to aquarium fish collecting, a map-submission strategy was adopted to counter the considerable pressure from dive tour operators, community representatives, and Lost Fish Coalition members to close a significantly larger portion of the coast. However, aquarium fish collectors maintained that this figure was too large, had been misinterpreted earlier during the legislative process, and would result in an unfair proportion of coastline awarded to other groups like recreational divers and dive tour operators who would side together against them (interview notes).

The DAR coordinators encountered a lack of participation and motivation from the aquarium fish collectors who did not submit maps in a timely manner or at all in some cases. Although aquarium fish collectors were reluctant to participate fully and mistrusting of the council’s process, the few areas they selected were similar to those chosen by the rest of the West Hawai’i Fisheries Council. At one point, an aquarium fish collector formed a boycott and did not attend the council meetings, assuming (incorrectly, according to council coordinators) that a vote would not occur without his presence (interview notes).

Nevertheless, the process continued and final maps were compiled from those submitted to provide clear indication of the groups’ selections. Agreement on certain areas was clearly evident. In September 1998, the master consensus areas were adopted into nine proposed FRAs (Figure 1), which when added to preexisting reserves would close 35.2% of the West Hawai’i coastline.

### ***Enforcement***

State enforcement agency representatives recommended that this proposed FRA rule include prohibitions on the possession of aquarium collecting gear and collected animals within the FRAs. In March 1999, these and other enforcement modifications were presented to the West Hawai’i Fisheries Council and were recommended for incorporation at an upcoming public hearing. During this public hearing held in April 1999, the proposed FRA rule received an estimated 93.5% support in testimony from the community at large for both the rule and its new enforcement provisions. The public hearing, with an estimated attendance in excess of 860, was the largest such meeting ever conducted by the DAR. In September the proposed



**FIGURE 1** FRAs along the western coast of Hawai'i.

FRA rule was drafted by DAR and included the enforcement provisions. As it went on to the Hawai'i Bureau of Land and Natural Resources for approval, the rule was unanimously approved, but the most important enforcement provision (prohibition of collecting gear in FRAs) was inexplicably absent. Then, in October 1999 the final draft of the FRA rule proceeded to the Office of the Attorney General for language review. At this stage, concerns were voiced that influenced the Deputy Attorney General to question the legality of any enforcement provisions added at the April 1999 public hearing. As a result, he stated an opinion that all remaining enforcement provisions should be removed because they had not gone through any earlier public hearing processes, unlike the original FRA rule.

Other community members criticized the Deputy Attorney General's opinion, saying that the large public hearing in April 1999 and the council's recommendations were sufficient justification for inclusion of the provision. The FRA rule was approved in December 1999 *without* the enforcement provisions. The enforcement provisions were to be redrafted and resubmitted as amendments at a later time.

A 4-year-long effort to replace those provisions has ensued. Frustration exists among many members of the West Hawai'i community over the details of losing the enforcement strategies (interview notes). According to Act 306, the FRA rule will be reexamined in 2005 by DAR and the West Hawai'i Fisheries Council to evaluate its effectiveness. At this point, reef monitoring data will become tantamount to evaluating the success of the FRAs and adapting their design to continue successful conservation.

The DAR notes that harassment and conflict between dive tour operators and aquarium fish collectors over the FRAs are less prominent than before the act was passed (interview notes). However, some community members feel that the dispute between these two groups was not fully resolved during the FRA process and that some groups failed to attend the West Hawai'i Fisheries Council under the auspices of a unified stakeholder group (interview notes). According to a coordinator:

We tried to set the groups up in such a way that one group wouldn't dominate. We tried to include all types of fishermen . . . and balance interests with representatives . . . but one problem was that the representative fish collectors did not represent or unite all the other fish collectors. Rifts emerged among the collectors and it was mostly full-time collectors [who participated]. (interview notes).

Two dive tour operators reported continued harassment from aquarium fish collectors, and one community member stated that without enforcement, the current FRAs are essentially "paper parks" where collecting will continue, just more covertly (interview notes). Research to evaluate the effectiveness of the FRAs has been underway since 1999 (Tissot 1999; Tissot, Walsh, and Hallacher 2004). This information is intended to alleviate some of the uncertainty associated with this particular fishery and also to provide baseline data for continued monitoring of the FRAs.

The events surrounding the removal of enforcement provisions in West Hawai'i's FRA rule are perhaps the most contentious in the process. The enforcement provisions in the FRA rule were recommended to the DAR by the enforcing state agency, presented to the council for debate, and supported by the community at the April 1999 public hearing. From the point of view of those committed to reef protection, there is a need for postnegotiation. Although the council did not exclusively generate these provisions, they were agreed on by the council and generated significant emotion from the DAR, Lost Fish Coalition, and a dive tour operator because they were removed so late in the process. The state in effect acted independently from the council's advice. "The Attorney General's opinion defeats the whole purpose of public hearings; it could . . . lead to endless rounds of public hearings [and] I don't know if [his] opinion was well thought out" (interview notes).

Although efforts are underway to replace the lost provisions, these enforcement provisions have not been added as of this writing. The relatively slow replacement efforts have frustrated dive tour operators, among others, who claim that aquarium fish collecting infractions continue in the FRAs, as community resources stretch to catch illegal collectors (interview notes). Although some local enforcement occurs by

independent and active citizens, the assurance of legally mandated enforcement regulations would bolster the power of the West Hawai'i Fisheries Council and the community to manage its resources. Also, such provisions would place greater responsibility on the state for funding and compliance with its community-based mandates.

### ***Role of Science and Scientists in the Process***

Given the coordinators' orientation, the West Hawai'i Fisheries Council process was approached from a scientific/regulatory perspective rather than from a broad-based conflict management perspective. Although different groups' needs were discussed, the process was seen as logical and fair for developing FRAs by the coordinators, but not by all the aquarium collectors. The perceived equity and flexibility within the West Hawai'i Fisheries Council and the creativity of the resolution process appeared to coordinators to settle the core disputes by outlining a rationale for FRA establishment that would incorporate different groups' needs and worldviews. Ultimately, from the coordinators' perspective, conflict management was secondary to creating FRAs.

Scientists hoped that by developing this process they could appease all the stakeholders and consensus would emerge once the scientific "facts" were made clear. However, the core issues as seen by the stakeholders were not as simple as the organizers assumed. The problem definition held by the organizers did not entirely encompass underlying values and worldviews from all stakeholders, namely, the aquarium fish collectors, some of whom were unconvinced of the participatory incentives and suspicious of the process. The aquarium fish collector/retailer and assistant collector interviewed mentioned "unfairness" with respect to FRA locations, inequity during the council processes, and aquarium fish collector apathy toward the process and enforcement of FRAs as partial reasons for some collectors' behavior (interview notes). Another aquarium fish collector refused an interview for this study, stating that he and his family did not "want to help the [scientists'] side" (interview notes). The overlap between the DAR's role as experts, resource users, and facilitators was construed as threatening to the values of the aquarium fish collectors, whose uncooperativeness in many cases prevented clear expression of their views during the process. As one stated, "there needed to be more than biology [in the decision process]" (interview notes).

A dispute arose early on over the scientific data in West Hawai'i. Many aquarium fish collectors claimed that their harvest impacts were minimal and that little evidence existed to the contrary. Much of the information that the council gleaned about harvest impacts came directly from the DAR's presentations at meetings. Although recent reef monitoring *has* indicated that aquarium fish collecting leads to significant declines in the abundance of target species, no long-term, site-specific studies were available at the time (Tissot and Hallacher 2003). Aquarium fish collectors seemed unconvinced of their "speculated" collecting impacts, while the Lost Fish Coalition and community members felt strongly that FRAs were a sound conservation measure (interview notes). The lack of specific data in this conflict became the focus for some aquarium fish collectors to justify the FRAs as unfair restrictions on their activities, revenue, and in some cases, heritage (interview notes). Others, such as recreational divers and NGO members, sought justification for closing the reefs to aquarium fish collecting in scientific studies that encouraged precautionary management.

## Discussion

One can argue that science (particularly when it is applied to policy issues) is a form of socially constructed knowledge and is therefore never truly devoid of values (Ozawa and Susskind 1985). This case study seems to substantiate this contention. Scientific or technical specialists often seek expertise and analytical techniques to develop technical solutions for complex controversies, often on the basis that their data should be sufficient to mitigate or eliminate social conflict over the issues (Daniels and Walker 2001). However, the EDR literature suggests that successful negotiation of “scientific” disputes demands a greater recognition of the salient facts and values behind policies and research, as values can affect the selection of evidence, the methods of evaluation, and overall interpretation by a variety of participants (Ozawa and Susskind 1985). It is also important to recall that conflicts involving complex scientific issues usually entail disagreements not only over those scientific issues, but also over the distribution of costs and benefits associated with the relevant resources (Ozawa and Susskind 1985).

In the West Hawai'i FRA controversy, the evidence suggests that the coordinators used scientific data in an attempt to minimize conflict *within their technical/scientific framework*. The coordinators saw their approach as taking into account the different groups' interests as voiced by participants and focusing on the legally mandated FRA goals. Obviously, not all groups agreed with this assessment. In addition, at the time of the West Hawai'i Fisheries Council meetings, only preliminary data existed to demonstrate the benefits of closed areas to aquarium fish collectors, and coupled with the brief timeline imposed by the state, these did not engender a comfortable environment for the communication of participant values. The role of science in the process was essentially to steer the group to generate an accord compliant with Act 306, and then to minimize the conflict. In this case, the resulting “scientific” solution lacked legitimacy across all groups and was thus partially derailed by the political process.

Environmental dispute resolution literature also suggests that dispute resolution and implementation is best when solutions are generated by stakeholders themselves (Cormick et al. 1996). Act 306 dictated that conflict must be managed, but supplied no specific measures or funds to achieve this end. Although the group was questioned regarding the representative's values, the group's culture was not conducive to open communication about personal worldviews and values at times. As the literature on identity-based conflicts indicates, lack of “buy-in” results when those with other values or worldviews feel threatened by their perceived exclusion or marginalization in a decision process. Such was evidenced by the subsequent attitudes and behaviors of the aquarium fish collectors in the West Hawai'i community. Despite the apparent success of the EDR process, the resulting lack of legitimacy in the eyes of some interests created the potential for unilateral action by external political actors concerning the enforcement provisions. Such independent action by a legislative body subsequent to the meeting process makes complex, negotiated agreements moot in the eyes of many participants who attach their personal prestige and values to the controversy (Cormick 1980).

The West Hawai'i conflict over FRA establishment would appear to be a model system for the application of EDR processes in controversies over reef fisheries resources. Instead of a purely legislative solution, the state of Hawai'i dictated in Act 306 that the community would manage its resource activities while minimizing conflicts (House of Representatives 1998). When the council's coordinators created

an empirical design for the conflict resolution process under the auspices of community-based management, they also created a comprehensive and educational system aimed at reaching agreeable solutions and equalizing the knowledge base in the community.

The DAR scientists often functioned simultaneously as organizers, facilitators, educators, and advocates while managing and facilitating the Council. Accordingly, they often disseminated information to the group in order to raise awareness of the biological impacts associated with aquarium fishing and marine reserve design. This action was intended to equalize perceived power differences among those stakeholder groups having less familiarity with scientific principles. The scientific group was clearly motivated to preserve reef resources and thus provided instruction and information from that perspective. Ozawa and Susskind (1985, 26), state, "It is often assumed that scientific experts stand apart from the 'political' arena in which decision makers and affected interests operate," and thus the facts they deliver are rationally sound and "apolitical." In West Hawai'i, the scientists were also state employees and resource managers reliant on government support and community recognition. Their role as detached scientific experts became problematic when their positions as council coordinators were defined. The result from the point of view of some stakeholders was a narrow focus in the deliberations.

The consensus process placed a large emphasis on scientific principles and applications that shaped much of the council's work on the issue. The conflict included both interest-based and identity-based elements, and the council's coordinators struggled with the creation of a committed group culture and the communication of participant values as suggested by a mixed mode dispute resolution. The aquarium fish collectors felt their values were essentially inappreciable in the face of such scientific perspectives. Simultaneously, the scientific group had significant power in the council as both educators and coordinators and was influenced by Act 306 and its deadlines. The positive outcome of this conflict process is reflected in the creation of the FRAs, but the removal of previously agreed-on enforcement provisions raises questions concerning whether the EDR process within the framework provided by Act 306 can yet be labeled a "success."

There are a number of lessons to be learned from this case. This conflict is both sociologically and ecologically complex. It is not purely interest based or identity based and includes deep and often unspoken values from the aquarium fish collectors, dive tour operators, and the scientific interests. It contains elements of scientific uncertainty in terms of the harvest impacts associated with aquarium fish collecting, which are important to different user groups for different reasons. In the case of Act 306, scientific information and perspectives were important to the conflict itself, but also played a dominant and complex role in generating a proposed solution. When the process participants sought implementation and validation of their agreement, an important part of the agreement was unilaterally invalidated. Speculatively, it seems likely that had all stakeholders been truly "on board" relative to the negotiated agreement, the Deputy Attorney General would have had neither the motive nor the political support to remove the enforcement provisions.

Environmental dispute resolution can be applicable within both the existing legislative/administrative framework and the stakeholders' values, but outside alterations to agreements stymie the process. This EDR process was partially undermined by an actor in the state government, who, by this action, represented perspectives of those who did not view the process as entirely legitimate. Essentially, this intervention was driven by a particular value set that did not reflect the full range

of values of the community. By addressing the shortcomings of both the EDR process and the subsequent political actions of the state government and acknowledging the range of underlying values of community members, the West Hawai'i Fisheries Council may be able to strengthen the legitimacy of governmental efforts to protect the resources in question. The creation of the FRAs clearly represents significant progress on an issue of long-standing dispute. It should be emphasized that the process continues to evolve with the 2005 reevaluation.

Generally speaking EDR seems to hold great potential as an alternative to purely legislative approaches to reaching acceptable decisions in the marine conservation arena. The caution in this example is to avoid a trap into which resource managers have frequently fallen in the conduct of such processes—namely, the tendency to focus on narrow scientific and technical issues to the exclusion of other stakeholder values and worldviews (Agardy et al. 2003; Hays 1959). To once again quote Agardy et al. (2003, 363): “Yet the ideological divide that has emerged between and amongst some scientists, resource managers and policymakers threatens to cast a shadow on how MPAs are viewed by society, and whether they achieve their full potential.” We believe the case described here lends support for this view. It is perhaps ironic that a narrow focus on biophysical issues can ultimately lead to a reduced capacity to protect the very environment that managers and policymakers set out to protect.

## Note

1. For purposes of brevity we henceforth refer to “identity-based or values-based” conflict as identity-based conflict.

## References

- Agardy, T., P. Bridgewater, M. Crosby, J. Day, P. Dayton, R. Kenchington, D. Laffoley, P. McConey, P. Murray, J. Parks, and L. Peau. 2003. Dangerous target? Unresolved issues and ideological clashes around marine protected areas. *Aquat. Conserv. Mar. and Freshwater Ecosystems* 13:353–367.
- Berkes, F. and C. Folke, eds. 1998. *Linking social and ecological systems: Management practices and social mechanisms for building resilience*. Cambridge, England: Cambridge University Press.
- Bingham, G. 1985. *Resolving environmental disputes: A decade of experience*. Washington, DC: The Conservation Foundation.
- Bohnsack, J. 1997. Ecosystem management, marine reserves and the art of airplane maintenance. In *Proceedings of the 50th Gulf and Caribbean Fisheries Institute*, Merida, Mexico, 1–5.
- Cormick, G. 1980. The “theory” and practice of environmental mediation. *Environ. Prof.* 2:24–33.
- Cormick, G., N. Dale, P. Emond, S. Sigurdson, and B. Stuart. 1996. *Building consensus for a sustainable future*. Ottawa, Ontario, Canada: National Round Table on the Environment and the Economy.
- Daniels, S. and G. Walker. 2001. *Working through environmental conflict: The collaborative learning approach*. Westport, CT: Praeger.
- Hays, S. P. 1959. *Conservation and the gospel of efficiency*. New York: Antheneum.
- Holling, C. 1978. *Adaptive environmental assessment and management*. London, England: Wiley.
- House of Representatives, Nineteenth Legislature. 1998. State of Hawaii HB3457. A bill for an act relating to the West Hawaii Regional Fishery Management Area.

- Kelleher, G. 2000. The development and establishment of coral reef marine protected areas. In *Proceedings of the 9th International Coral Reef Symposium*, Bali, Indonesia, 609–613.
- Lubbock, H., and N. Polunin. 1975. Conservation and the tropical marine aquarium trade. *Environ. Conserv.* 2(3):229–232.
- Michaelidou, M., D. Decker, and J. Lassoie. 2002. The interdependence of ecosystem and community viability: A theoretical framework to guide research and application. *Society Nat. Resources* 15(7):599–616.
- Ozawa, C. and L. Susskind. 1985. Mediating science-intensive policy disputes. *J. Policy Anal. Manage.* 5(1):23–39.
- Painter, A. 1988. The future of environmental dispute resolution. *Nat. Resources J.* 28:145–170.
- Pomeroy, R. 1994. *Community management and common property of coastal fisheries in Asia and the Pacific: Concepts, methods, and experiences*. Manila, Philippines: ICLARM.
- Roberts, C. and R. Ormond. 1987. Habitat complexity and coral reef fish diversity and abundance on Red Sea fringing reefs. *Mar. Eco. Prog. Ser.* 41:1–8.
- Rothman, J. 1997. *Resolving identity-based conflict in nations, organization, and communities*. San Francisco, CA: Jossey-Bass.
- Russ, G. and A. Alcala. 1999. Management histories of Sumilon and Apo Marine Reserves, Philippines, and their influence on national marine resource policy. *Coral Reefs* 18:307–319.
- Schwarz, R. 1994. *The skilled facilitator: Practical wisdom for developing effective groups*. San Francisco, CA: Jossey-Bass.
- Sneddon, C., L. Harris, R. Dimitrov, and U. Ozesmi. 2002. Contested waters: Conflict, scale, and sustainability in aquatic socioecological systems. *Society Nat. Resources* 15(8):663–675.
- Susskind, L. and C. Ozawa. 1985. Mediating public disputes: Obstacles and possibilities. *J. Social Issues* 41(2):145–159.
- Tissot, B. 1999. Adaptive management of aquarium fish collecting in Hawai'i. *SPC Live Reef Fish Inform. Bull.* 6:16–19.
- Tissot, B. and L. Hallacher. 2003. Effects of aquarium collectors on reef fishes in Kona, Hawaii. *Conserv. Biol.* 17(6):1759–178.
- Tissot, B., W. Walsh, and L. Hallacher. 2004. Evaluating the effectiveness of a marine reserve network in Hawaii to increase the productivity of an aquarium fishery. *Pacific Sci.* 58(2):175–188.
- Walsh, W. J., S. P. Cotton, and J. Dierking. 2003. The commercial marine aquarium fishery in Hawai'i 1976–2003. In *Status of Hawaii's coastal fisheries in the new millennium: Proceedings of a symposium*, ed. A.M. Friedlander, 132–159. Honolulu, HI: American Fisheries Society, Hawai'i Chapter.
- Watson, M. and R. Ormond. 1994. Effect of an artisanal fishery on the fish and urchin populations of a Kenyan coral reef. *Mar. Ecol. Prog. Ser.* 109:115–129.
- White, A., L. Hale, Y. Renard, and L. Cortesi. 1994. *Collaborative and community-based management of coral reefs*. West Hartford, CT: Kumarian Press.
- Wilshusen, P., S. Brechin, C. Fortwangler, and P. West. 2002. Reinventing the square wheel: Critique of a resurgent “protection paradigm” in international biodiversity conservation. *Society Nat. Resources* 15(1):17–40.
- Wood, E. M. 2001. *Collection of coral reef fish for aquaria: Global trade, conservation issues and management strategies*. Herefordshire, England: Marine Conservation Society.