Commonwealth of the Northern Mariana Islands: Fishing Community Perceptions of the Marine Protected Area Siting Process and its Implications

FINAL REPORT

Western Pacific Regional Fishery Management Council
Pacific Island Fisheries Research Program

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Introduction

Within the jurisdiction of the Western Pacific Regional Fishery Management Council is the largest amount of federally-restricted ocean area in the United States. In the past, these areas of the ocean offered open-access. But for conservation and a variety of other reasons, these areas have now been classified as marine protected areas (MPAs). In the Commonwealth of the Northern Mariana Islands (CNMI), there are five MPAs designated as "no-take" areas: Managaha Marine Conservation Area (established in 2000), Bird Island Sanctuary (2001), Forbidden Island Sanctuary (2001), Lau Lau Bay Sanctuary (1996), and Lighthouse Reef (1996). Accordingly, access to and use of resources in these marine areas are now restricted. Members of the region's fishing communities have been directly impacted by these restrictions, and have anecdotally indicated that they feel they may have not been appropriately involved in the MPA decision-making process, or perhaps the management process. A likely consequence of this would be a perception of being treated unfairly, and as a result, dissatisfaction with management decisions. Under such circumstances, these fishermen would be less likely to believe or trust agency scientists or managers, and less likely to support or conform to management regulations. This is consistent with the theory of procedural justice, which speaks directly to this issue.

Marine protected area designations are not without controversy. In general, while MPAs may be beneficial to the marine ecosystem, they present an unknown future to people who are very much rooted in tradition and who are typically wary of government intervention. From a social perspective, MPAs inevitably bring with them disagreements over the situational appropriateness of particular allocation norms (equity, equality, need) (Deutsch, 1975), as well as issues concerning the fairness associated with the decision-making process (procedural justice) and with the allocation of the resource itself (distributive justice). Such discussions are further complicated by the fact that different cultural and ethnic perspectives may favor one allocation norm over another. Conflict between fishermen and managers, as well as between different sectors of the fishery (e.g., recreational, commercial, subsistence, artisanal) is also relevant, and an important area of inquiry in management and regulations.

The importance, and requirement, of fairness is highlighted in the Magneson-Stevens Fishery Conservation and Management Act (MSA, 1976), National Standard 4, requiring that "such allocation shall be fair and equitable…and that no particular individual, entity or corporation acquires an excessive share" (16 U.S.C. 1801 et seq.). As mandated by the MSA, the Western Pacific Regional Fishery Management Council (WPRFMC) has authority over fisheries in the U.S. territorial waters of American Samoa, Commonwealth of the Northern Mariana Islands (CNMI), Guam, and Hawaii. The WPRFMC operates with a place-based archipelagic Fisheries Ecosystem Plans (FEP) for all non-pelagics in each archipelago in the Council's jurisdiction. An important feature of the archipelagic FEPs is an emphasis on community-based management and an integration of traditional and local ecological knowledge in the management process (Severance, 2014). According to the MSA, guidelines in National Standard 8 requires "sustained participation" in fisheries and minimizing economic impacts to fishing communities when implementing regulations.

Concerns about fairness emphasize the importance of a public outreach strategy to identify stakeholders and their degree of consensus on management objectives, location and design, and use of MPAs (Dobrzynski & Nicholson, 2001). Unfortunately, resource managers oftentimes run the risk of being viewed as placing too much emphasis in the beginning on where to site MPAs and how much of the resource to protect, and too little emphasis on the social, economic, and cultural considerations (NRC, 2000). In effect, decisions are often made before there is any public input. Therefore, those most affected by a decision are not given an opportunity to participate until a later stage when it may appear that important decisions have already been made. As a result, perceptions of inequality or unfairness regarding the resource allocation schemes may arise from the perspective of those affected. These perceptions may lead to conflict between some or all stakeholders, and management. An understanding of the diverse fishery groups, and including them in the decision-making process, can help marine resource management avoid making allocation decisions that may result in loss of credibility, low compliance, and legal opposition (Daigle, Loomis, & Ditton, 1996; Salz & Loomis, 2005). In addition to the fairness issues

associated with decisions on where to site an MPA, there are other concerns associated with such a decision.

One known concern is the issue of transferred effects. There are consequences that result from establishing an MPA. One is the closure of the area to fishing, which leads fishermen to relocate their fishing effort to other areas. The results, which can be many, may be desirable, or undesirable for fishermen or the resource. The extent to which these transferred effects impact either fishermen or the resource should be understood as part of an effort to locate or designate an MPA.

Another known concern associated with the creation or siting of an MPA has to do with safety issues and the fishermen. If fishermen are forced to move their fishing effort to other locations, does this move lead to decreased levels of safety? Are the fishing waters less safe, or is the transit to the alternative location less safe? These questions also need to be better understood as part of an effort to locate or designate an MPA.

Based on the above, this study has three objectives:

1) Properly evaluate fishermen perceptions of the fairness associated with the process of establishing and siting an MPA.
2) Evaluate certain of the transferred effects resulting from the establishment and siting of an MPA.
3) Evaluate issues of fishermen safety resulting from the establishment and siting of an MPA.

The matter of fairness in the decision-making or management process from the perspective of the fishing community is best understood via the established theory of procedural justice. This research also builds off the methods and findings of studies on transferred effects of MPA designations. The issue of safety is a more specific matter, again with a base of literature, and this study examines fishermen perceptions of how their safety may have changed as a consequence of MPA designation or management. Based on existing literature, there is overlap between these issues and thus the opportunity to understand them in combination.

Literature Review

As noted earlier, some stakeholder groups (fishermen in this case) may feel left out when decisions are made about when or where to locate various MPAs. This will likely result in dissatisfaction and/or anger on the part of fishermen, and perhaps a reduced desire to comply with related rules or regulations. This specific situation is best understood and studied within the concept of procedural justice.

Procedural Justice

Procedural Justice can be defined as "the fairness of the decision-making process that leads to a distribution of resources" (Folger, Rosenfield, & Robinson, 1983). In this study, "resources" refers to an MPA, or to policy or regulations specific to an MPA (i.e., access to a resource or its use). Procedural justice speaks to the fairness of the mechanisms, structures, and processes that lead to a distribution of resources. This form of fairness is not to be confused with distributive justice, which is defined as the fairness associated with the actual allocation outcome of the resource of interest (who actually gets how much, of what, and who does not) (Loomis & Ditton, 1993). In general, people tend to be satisfied with outcomes if they are reached through what they perceive to be a fair procedure, regardless of whether they are the winner or loser of the outcome (Thibaut & Walker, 1975). Improving perceptions of procedural fairness will have a positive influence on evaluations of decision makers and their institutions (i.e., manager). As confidence in decision-makers grows, acceptance and compliance with regulations will increase (Cohen, 1985; Jentoft, 2000; Lawrence, Daniels, & Stankey, 1997; Nielsen, 2003; Sutinen & Kuperan, 1999; Tyler, 1997). If the process or procedures are not viewed as fair, the important goal of compliance is less likely to be achieved, and long-term relationships are also likely to suffer (Dalton, 2006; Smith & McDonough, 2001; Wilson & McCay, 1998).

To examine the concern that members of the fishing communities in CNMI feel they have not been adequately involved in the designation of an MPA or its management (and thus feel the process is unfair), this project builds on the work of Leventhal (1980). Leventhal has suggested that individuals

view procedural justice in terms of seven procedural components, and six justice rules. These are specific and measurable indicators of perceived fairness associated with a decision-making process. To the extent these components and rules are properly followed, fishermen should be more likely to consider the process to be fair, will likely be satisfied, and will be more likely to support management decisions. To the extent these components and rules are not properly followed, fishermen will most likely consider the process to be unfair, will likely be dissatisfied, and will be less likely to support management decisions.

The seven procedural components are 1) the selection of decision makers (who picks them), 2) the setting of ground rules concerning the availability of information about an allocation and how to obtain it, 3) the way information is gathered to evaluate the resource and potential recipients, 4) the decision-making structure, 5) the appeals process, 6) the safeguards that exist to monitor the integrity of decision makers, and 7) the change mechanisms available if existing procedures fail. One or more of the following six procedural justice rules can then be used to evaluate the above components. A justice rule is "an individual's belief that a distribution of outcomes, or procedure for distributing outcomes, is fair and appropriate when it satisfies certain criteria" (Leventhal, 1980). The rules are as follows: 1) *Consistency rule* – the process is perceived to be consistent across persons and through time; 2) *Bias suppression rule* – the allocator's personal self-interest or blind allegiance to narrow preconceptions is suppressed at all times; 3) *Accuracy rule* – the information used in the decision-making process is believed to be accurate.; 4) *Correctability rule* – the potential exists for modification or reversal of decisions throughout the process; 5) *Representativeness rule* – the opportunity to voice opinions or concerns is open to all individuals or groups affected by the decision; and 6) *Ethicality rule* – the procedures used are consistent with the individual's or group's moral and ethical values.

Transferred Effects

A consequence of closing an area to fishing is for the fishing effort to move to another area, which may lead to a number of unintended consequences. Some of these consequences are likely to be undesirable, while others might be desirable. These consequences are known as transferred effects. A

number of studies have looked into transferred effects and have identified both positive and negative effects. Eliminating fishing from an area often causes fishermen to move to different areas, thus potentially concentrating additional fishing effort in smaller areas and adding to the stressors at those sites. Rijnsdorp, Piet, and Poos (2001) for example, showed that closing an area for protection of cod in the North Sea led to unintended transfer of effort to areas where skates and long lived benthic species were more vulnerable. The displacement of fishermen may also produce social anxiety, such as removing people from their "favorite fishing holes." Having to go to another area to fish may come with considerable economic costs as well, such as having to travel to fishing grounds that are further away (e.g., cost of fuel and time) and perhaps having to fish in areas that are less productive (Rijnsdorp et al., 2001). Coastal communities located next to the no fishing area may be negatively impacted, socially and economically, as well (Sanchirico, Eagle, Palumbi, & Thompson, 2010).

On the one hand, a new fishing location adjacent to the MPA may give fishermen the best available access to any benefits accruing from the MPA, i.e., if reduced fishing within the MPA and a healthier ecosystem lead to rebuilding of the relevant stock, which then migrates out of the MPA to be caught by the displaced fishermen. On the other hand, relocating fishing activities can cause extra costs in travelling farther to new fishing grounds; less time available for fishing owing to greater travel times; or competition with others holding long-standing rights. Although debatable, the concentration of fishing effort outside the MPA could also cause excessive pressure on the stocks in that area with consequences that could counteract the benefits of the MPA itself (Jones, 2007).

Jones (2009) described a case in southwest England involving the frustrations of inshore fishermen in response to no-take MPAs designations, and discussed issues related to fishing as a "way of life" and who should be involved in decisions (this speaks to the issue of procedural justice, covered above). Inshore fishermen argued that they are particularly vulnerable to MPAs as they are "critically dependent on their local, customary grounds, their boats being too small for them to steam offshore or along the shore to alternative grounds in safety (p. 763)." They also argued "inshore fishing operations had a smaller impact on fish stocks and marine ecosystems because smaller, less powerful boats use less

gear, much of which is static" (p. 763). The concentration of fishing effort near boundaries of no-take areas (i.e. "fishing-the-line") is not uncommon and can be interpreted as spillover benefits to adjacent fisheries (Wilcox & Pomeroy, 2003; Kellner, Tetreault, Gaines, & Nisbet, 2007). On the other hand, very intense fishing-the-line behavior may produce a sharp decrease in density adjacent to a reserve boundary. Different fisheries respond differently to the implementation of protection measures, with preferred habitats of target species driving fishermen's preferences in the selection of fishing grounds. Moreover, within each fishery individual fishermen showed distinct strategies, with some operating in a broader area whereas others kept preferred territories, some of them being adjacent to a no-take area. The loss of fishing grounds and the attraction to the reserves' boundaries when there are substantial spillover effects are important factors explaining the reallocation of fishing effort related to the implementation of MPAs. These effects are, however, influenced by the spatial distribution of habitats and target species inside and outside the reserve (Forcada, Bayle-Sempere, Valle, & Sanchez-Jerez, 2008). Thus, the proximity to no-take zones may not be involved in the choice of the fishing ground or may be due to the fishermen's preference for being closer to their former fishing location (Le'de'e, Sutton, Tobin, & De Freitas, 2012; Leleu et al., 2012).

Chen, Lopez-Carr, and Walker (2014) conducted research on California commercial sea urchin fishermen and describe how the circumstances imposed on communities and individuals "inhibit or enable their ability to cope with the loss of fishing grounds and other direct/indirect effects of MPAs" (p. 279). These factors were largely unconsidered during the California MPA planning process. All fishermen indicated that increasing regulations, in particular the loss of fishing areas constrained the ability of fishermen to maintain a viable fishing livelihood (Chen, Lopez-Carr, & Walker, 2014). They also mentioned that areas in which urchins are harvested are often rotated to let populations recover. However, with the loss of fishing areas, fishing pressure is displaced to and increasing in remaining open areas making it more difficult to find and harvest quality urchins in safely accessible fishing areas. Furthermore, fishermen often rely upon a "portfolio of fishing areas" in order to adapt to the environmental changes inherent in the fishery and with the loss of fishing areas this adaptive capacity is

compromised.

In Wilcox and Pomeroy's (2003) study, California near-shore rockfish fishermen reported that travel costs to comparable fishing grounds were too high to be able to satisfactorily recoup fishing expenses. Similar observations were found in studies on commercial lobster fishermen around the Channel Islands State Marine Reserve, where fishermen were unable to travel to areas further than 1 km outside the nearest MPA border (Guenther, Lopez-Carr, & Lenihan, 2015; Kay, Lenihan, Kotchen, & Miller, 2012). Sanchirico, Eagle, Palumbi, and Thompson (2010): "Operating further offshore increases the time it would take to return to port, placing fishermen at greater risks from storms. These risks could be exacerbated if inshore fishermen, who are displaced by the MPA, are unable to secure the capital needed to make the necessary upgrades to their gear and vessels before heading offshore. The combination of inadequate vessels and lack of experience of the displaced fishermen 'forced' to operate in new, riskier environments poses the potential for greater occupational risks and higher costs from increases in search and rescue missions."

Safety

The case of CNMI fishermen stresses the dire necessity for genuine and meaningful integration of human sensitivity and needs when designing and planning MPAs. The designation of MPAs can affect the safety of fishermen, depending on the locations of the MPA and fishing area. An example of the transferred effect on safety is seen in the case of Guam fishermen. A major concern for fishermen who have traditionally fished inshore is the loss of accessible fishing grounds caused by the establishment of five MPAs in 1997. The five MPAs include Tumon Bay, Piti Bomb Holes, Sasa Bay, Achang Reef Flat, and Pati Point. These areas were established for the purpose of "preserving local traditions and protecting the natural resource of fish" (Guam Legislature, 1997). The MPAs are located in traditional Chamorro fishing areas along the West Coast (leeward side of the island) and on the Northern and Southern tips of the island. Fishing for most species and by most techniques is prohibited in the MPAs (i.e., dip-netting, gill-netting, drag-netting, surround-netting, and spear fishing). In Tumon Bay, cast-netting from shore and

hook and line fishing from shore is allowed but only for certain species of fish. Pati Point also allows hook and line fishing from shore but local fishermen do not have access as it is blocked by U.S. military land. All fishing is prohibited in the other three areas.

As a result of the five MPAs, the indigenous Chamarro fishermen were displaced from traditional fishing grounds. This displacement prevented them from teaching fishing techniques in a safe environment to younger generations, thus putting at risk the future of their culture (Allen & Bartram, 2008), as well as fishermen safety. Before the MPAs were established, artisanal fishermen had fished primarily in the protected areas of the Western (leeward side) and Southern Coasts. Once the preserves were established in 1997, these fishermen have had to travel farther from shore and into unfamiliar, dangerous waters.

As fishermen become displaced from their usual fishing grounds, attention must be given to the latent consequences of MPA restrictions. Fishermen may be exposed to greater risks when they venture to unfamiliar and more hazardous waters to find fish. A study done by Lucas and Lincoln (2010) found that for Chamorro inshore fishermen, the risk of drowning more than doubled after the enforcement of MPAs in 2001. The study was published by the U.S. National Institute for Occupational Safety and Health (NIOSH) in a report on *The Impact of Marine Preserve Areas on the Safety of Fishermen on Guam*. NIOSH also reported that the proportion of drowning deaths to Chamorro fishermen that occurred in more hazardous waters off the east coast increased from 20% during 1986-2000 to 63% during 2001-2009.

The above review identifies numerous possible transfer effects. They include the loss of customary access to traditional fishing grounds; impeded cultural practices; preferential access arrangements; distribution shifts in income, food security, material assets; no or poor availability of alternative or supplementary livelihood opportunities; higher user congestion within open areas; increased fishing effort outside of MPA; increased travel costs/time to open areas; increased user conflicts in open areas; distributive equity changes; and increased occupational risks. Some or all of these transferred effects can apply to MPAs in the Western Pacific region. Similarly, there may well be other transferred

effects specific to the Western Pacific region which are not identified in these studies. Collectively, however, the above provides a robust set of transferred effects that are specific and clearly measurable. Also, some of these indicators of transferred effects will likely be matters of safety. To identify the best and most relevant set of transferred effect indicators, and potentially match them with indicators of safety, we worked closely with the WPRFMC staff to ensure local knowledge is incorporated.

Methods

Sampling and Survey Administration

The population of interest in this study are fishermen who reside in CNMI. The term "fishermen" is inclusive and refers to all types of fishermen. Ideally, there would be a list of fishermen from which a sample could be pulled according to a known procedure. This would result in a representative sample of known size. Data would then be collected by sending these individuals a survey by mail or via the internet, which the fishermen could complete and return. Unfortunately, no such list of fishermen exists, which is not uncommon. Therefore, it is not possible to pull a representative sample of fishermen. As a result, and in consultation with the Western Pacific Fishery Management Council, is was decided that obtaining a representative sample of fishermen was not likely given available resources nor necessary, and a convenience sample of fishermen would be appropriate for this study.

As noted above, no list of CNMI fishermen exists. In addition, other challenges were presented in terms of identifying fishermen to include, and then have them complete the survey. In discussions with the Western Pacific Fishery Management Council staff, and others familiar with the fishing community in CNMI, it was determined that there would be language difficulties and perhaps an unwillingness to complete and return the survey via mail or internet. This would make the use of a mail or internet survey approach problematic at best. An alternative data collection approach was therefore identified and implemented.

Individuals with connections to the fishing community, and who spoke the resident languages, were identified and contacted. These individuals were contracted with to implement the survey in a face-to-face manner. These individuals identified fishermen, asked for their cooperation and if they agreed, administered the survey to them. In some cases, the fisherman was willing and able to complete the survey on their own. Once they had completed the survey it was returned to the interviewer. In other cases, the interviewer would be required to translate the survey questions, obtain the fisherman's response, and record it on the survey. In an effort to minimize interviewer bias, interviewers were given

basic training in how to communicate with those fishermen who needed assistance in completing the survey.

A final note concerning the challenges faced in collecting data in CNMI is worth mentioning. During the data collection phase of this study, Super Typhoon Yutu made landfall across Tinian and Saipan. Yutu was the equivalent of a Category 5 hurricane in the Atlantic or east Pacific basins at the time of landfall, with maximum sustained winds of 290 km/h (180 mph). This was the most intense storm to ever strike the Northern Mariana Islands, according to NASA. Data collection efforts were curtailed, and some completed surveys were lost.

Survey Design

The survey instrument for this study included twenty-one questions (Q1 – Q21), with numerous items within each question, which were designed to measure concepts relevant to the procedural justice of the MPA siting process, and the transferred effects of marine protected area locations (Appendix A). The survey also included questions about the respondents' fishing activity, information sources, and demographics. The survey questions were designed and formatted according to the Dillman Total Design Method (1978). This method is commonly thought of in terms of being a meticulous process that has proven effective in producing a satisfactory response rate (mail surveys). However, it also informs on the design of survey instruments, including question wording and presentation, and survey instrument formatting.

During the questionnaire development process, every visible aspect of the survey instrument was subjected to three design considerations: making the questionnaire appear easy and less time-consuming to complete; making it interesting to fill-out by adding relevant questions; and increasing trust by using official sponsorship (Dillman, 1978). The survey was twelve pages in length and formatted into a booklet containing an illustrated front cover and a specified instruction format. The ordering of questions assured that interesting items related to the topic came first and progressively became more in-depth. Each page of the booklet contained proportionally spaced text to make pages seem smaller and easier to complete.

The purpose of these efforts was to improve the likelihood of a fisherman completing the survey and returning it to the interviewer.

Results

Fishing Activity

A total of 81 completed surveys were obtained from the data collection efforts. Based on this data, respondents of the CNMI fishing community were predominantly male (81.5%), an average of 35 years old, and have been fishing in CNMI for an average of 15 years (Appendix B; Q1, Q20-21). The largest group of respondents primarily thought of themselves as subsistence fishermen (40.0%). This was followed by purely recreational fishermen (22.7%), or recreational expense fishermen (14.7%) (Q2, Figure 1). The remaining 22.6% were primarily full-time commercial or cultural fishermen, and no one self-identified as a part-time commercial fisherman. In the survey (Q2), a "subsistence" fisherman was defined as someone who fishes primarily to feed themselves or their family; a "purely recreational" fisherman was someone who fishes only for sport or pleasure; and a "part-time commercial" fisherman was someone who fishes to pay some of the bills, but also had to work at another job. The other respondents self-identified as "cultural" fishermen (enjoys fishing but is even more concerned about keeping traditional practices alive), "recreational expense" fishermen (primarily for sport or pleasure, but also sells fish to recover trip expenses), or "full-time commercial" fishermen (fishing brings in most or all of the money made in a year).

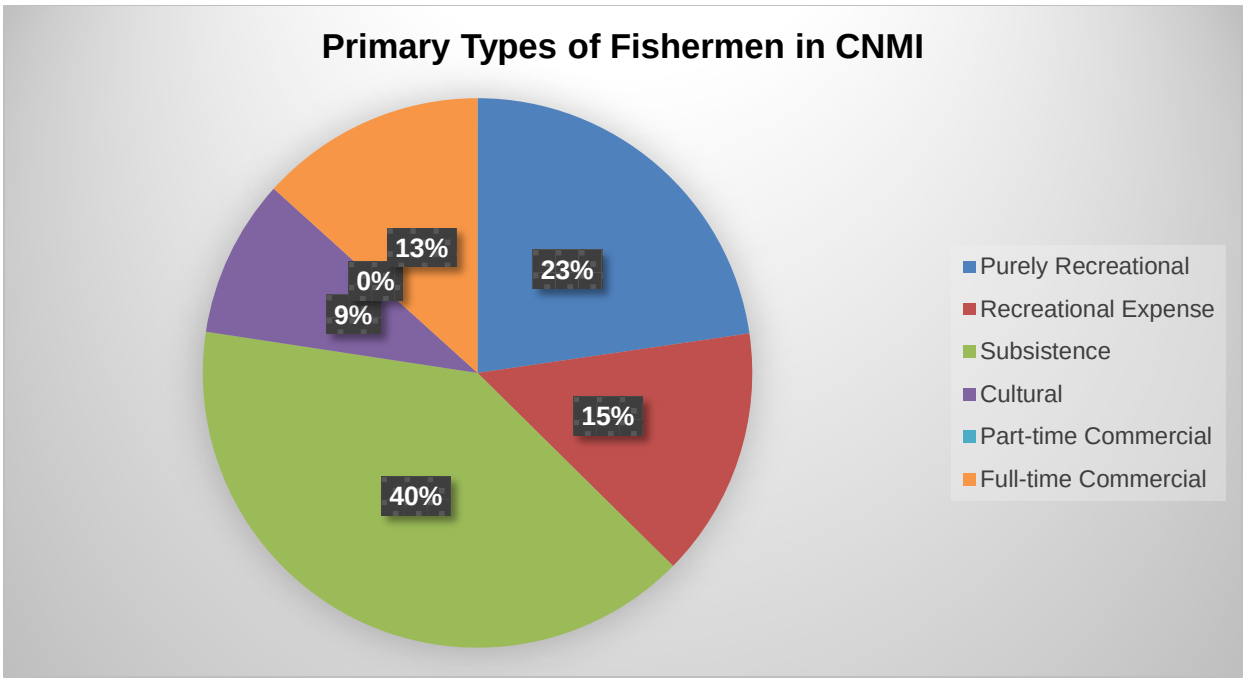

Figure 1. Primary types of fishermen in CNMI (*N*=75).

The respondents were asked to indicate the primary type of saltwater fishing they engage in (Q3). They could choose from five types of saltwater fishing which included shore-based fishing only, boat-based fishing only, and three different combinations of shore-based and boat-based fishing. "Shore-based" fishing was defined as fishing without the use of a boat, and "boat-based" fishing was defined as the use of a boat or other watercraft while fishing. Slightly less than one-third (29.6%) of the respondents indicated that they only engaged in either shore-based fishing (14.8%) or boat-based fishing (14.8%), whereas the majority (70.4%) engaged in some combination of both boat-based fishing and shore-based fishing. The highest proportion of respondents primarily engaged in equal amounts of shore- and boat-based fishing (34.6%), or mostly shore-based fishing and some boat-based fishing (25.9%). The fewest number of respondents engaged in mostly boat-based fishing and some shore-based fishing (9.9%).

Fishermen also indicated how much of their fishing was done in State and Federal waters (Q4). When fishing, more than half (52.5%) of the respondents always fish in State waters (within three miles from shore), and only 2.5% indicated that they always fish in Federal waters (more than three miles from shore). About 17.5% of the respondents fish equally in State and Federal waters, 21.3% usually fish in

State waters but sometimes in Federal waters, and 6.3% usually fish in Federal waters but sometimes in State waters.

CNMI fishermen reported the approximate number of days they engaged in nine different types of fishing methods during the past twelve months (Q5). On average, fishermen spent the largest number of days tuna hand-lining ($\bar{x}$ = 43.4 days), followed by offshore trolling ($\bar{x}$ = 32.2 days), spearfishing ($\bar{x}$ = 28.0 days), deep bottom-fishing ($\bar{x}$ = 24.0 days), shallow bottom-fishing ($\bar{x}$ = 19.3 days), or whipping/casting ($\bar{x}$ = 10.0 days) (Figure 2). They spent an average of seven days reef trolling, and the fewest amount of days were spent trapping ($\bar{x}$ = 2.2 days) or netting ($\bar{x}$ = 1.7 days).

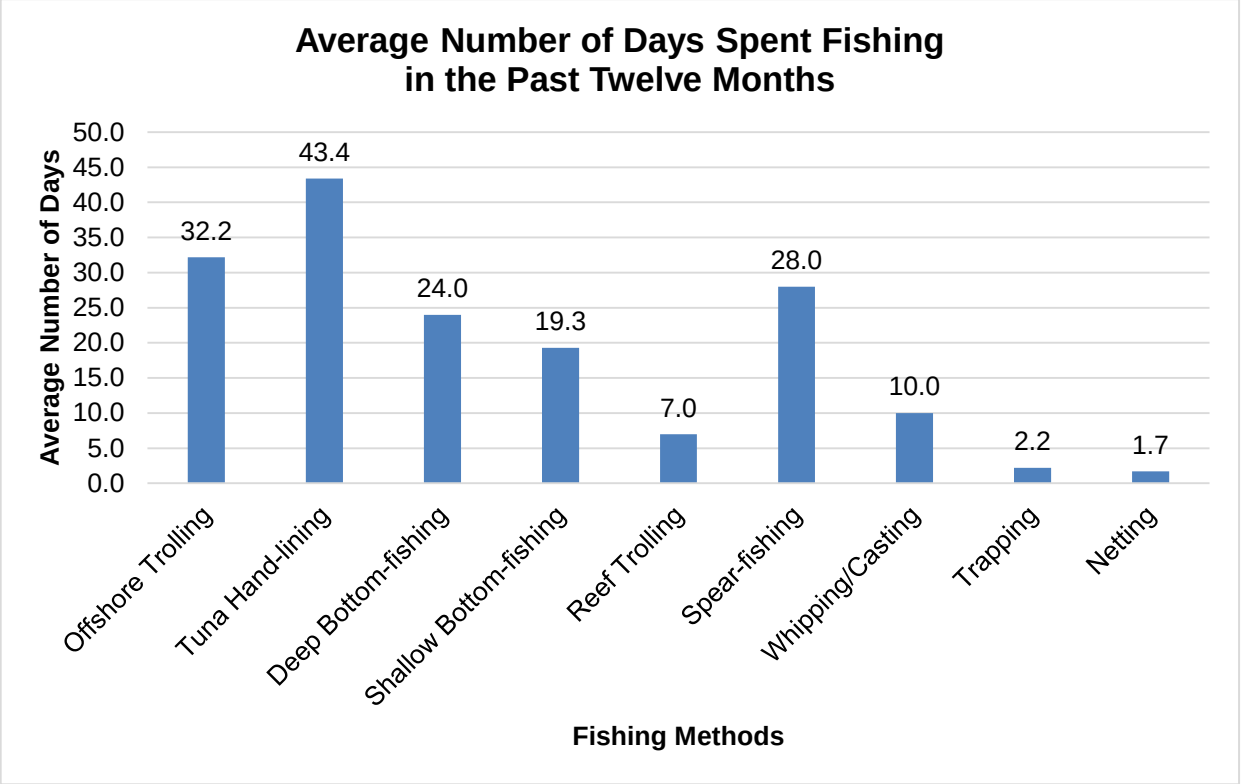

Figure 2. Average number of days spent fishing in the past twelve months (n=80).

When asked what they typically do with their catch (Q6), the fishermen indicated that, on average, more than half (53.5%) of their catch is consumed at home, 20.9% is sold for income, 19.0% is given to relatives, and 16.8% is given to friends/neighbors. The rest is typically given to the crew

(10.7%), catch and release (8.9%), exchanged for goods and services (7.3%), or provided for a cultural event (5.0%).

Information about MPA Fishing Rules and Regulations

The survey included a section of five questions pertaining to how fishermen receive information about the MPA decision-making process, MPA fishing rules and regulations, and public hearings held in CNMI (Q10; Table 1). Each question was rated on a 7-point scale of strongly disagree (score = 1) to neutral (score = 4) to strongly agree (score = 7). A note to the reader: the mean response to each item is just that, a response to that item. However, each item must be read carefully since some are worded in one direction, and others might be worded in the opposite direction. Each item must be read carefully if the results are to be properly understood. This note applies to all of the 7-point items in the report.

The respondents slightly disagree that fishermen are notified of public hearings in plenty of time to be able to make necessary adjustments to their fishing practices ($\overline{x}$ = 3.7), or that they are informed about any updates to fishing rules and regulations in plenty of time to be able to make necessary adjustments to their fishing practices ($\overline{x}$ = 3.7). They are neutral about being notified in plenty of time to be able to attend public hearings ($\overline{x}$ = 4.1). They very slightly agree that public hearings are scheduled at convenient times ($\overline{x}$ = 4.3), or that information about CNMI MPA fishing rules and regulations is easy to find ($\overline{x}$ = 4.2).

Table 1. Fishermen access to information about the MPA decision-making process, MPA fishing rules and regulations, and public hearings held in CNMI.

Information	Mean
Public hearings are scheduled at locations convenient for fishermen to attend	4.3
Information about CNMI MPA fishing rules and regulations is easy to find	4.2
Public hearings are scheduled at times convenient for fishermen to attend	4.1
I am informed about any updates to fishing rules and regulations in plenty of time to be able to make any necessary adjustments to my fishing practices	3.7
Fishermen are notified of public hearings in plenty of time to be able to attend	3.7

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Respondents were also asked to indicate the extent to which they make use of ten different sources for current information about fishing in CNMI (Q11; Figure 3). Talking with other fishermen is the most used information source, as indicated by an average response of *some* to *a lot of use* ($\overline{x}$ = 4.5). Fishermen make *some use* of current information from bait and tackle shops/companies ($\overline{x}$ = 4.1) or Internet sites ($\overline{x}$ = 3.8). They make *a little use* of information from newspapers ($\overline{x}$ = 3.5), fishing clubs/organizations ($\overline{x}$ = 3.5), government agency publications ($\overline{x}$ = 3.4), radio ($\overline{x}$ = 3.3), fishing magazines ($\overline{x}$ = 3.2), conservation organization publications ($\overline{x}$ = 3.0). The least used information source is television, with an average response of ($\overline{x}$ = 2.8). These results suggest that while fishermen are in active in seeking information, there are considerable differences in where fishermen actually get their information.

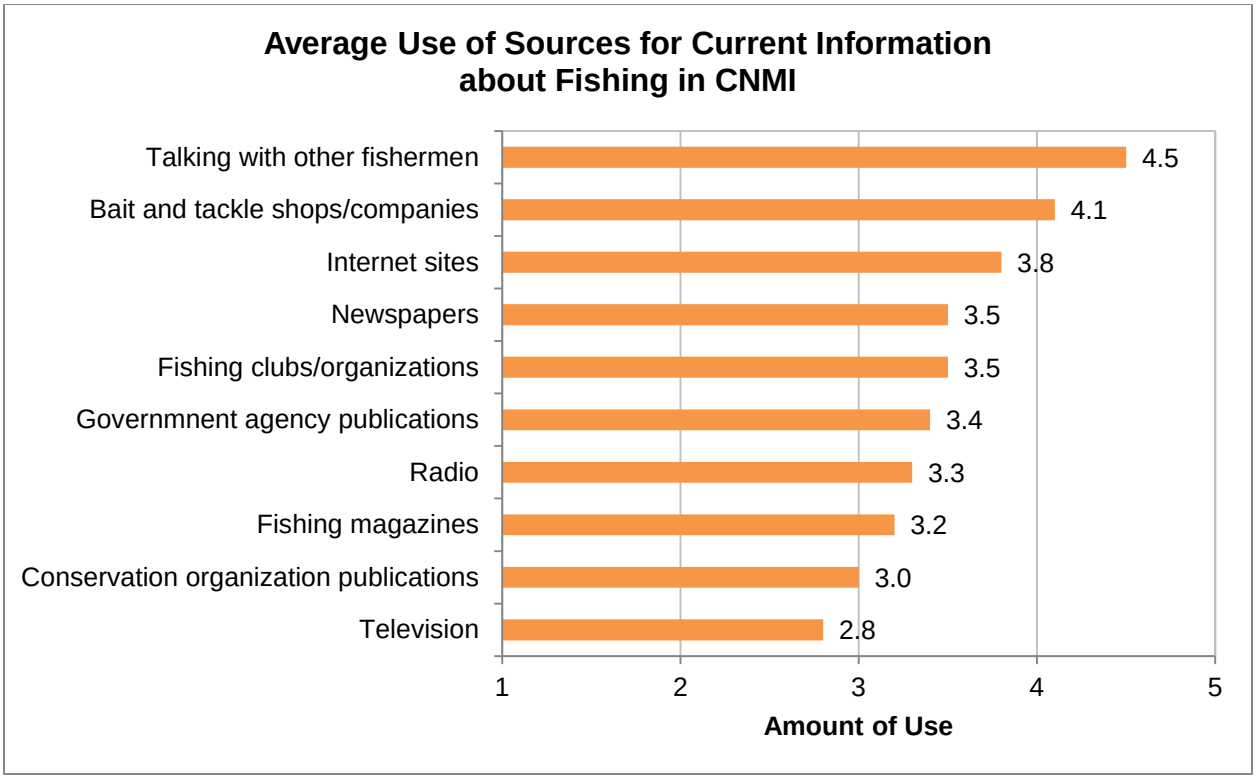

Figure 3. Average use of sources for current information about fishing in CNMI; 1=No Use, 2=Almost No Use, 3=A Little Use, 4=Some Use, 5=A Lot of Use.

Procedural Justice

Overall fairness was measured by instructing respondents to rate the extent to which they believe the following five aspects of the decision making process are fair or unfair: "When thinking about MPAs in CNMI, I feel that the overall process decision-makers use to locate an MPA is…" (Q19). Each statement was rated on a 7-point scale of extremely unfair (score = 1) to neutral (score = 4) to extremely fair (score = 7). Figure 4 shows that on average, CNMI fishermen believe that the overall decision-making process is *somewhat unfair* ($\bar{x}$ = 3.8). However, of the 77 respondents, 37.7% believe the process is *somewhat to extremely unfair*, and 23.4% believe the process is *somewhat to moderately fair*. This suggests that among the fishermen there are two different views on this issue

The fishermen also rated the overall fairness of five specific aspects of the decision-making process using the same 7-point scale (Q14): the treatment of all fishermen during the MPA siting process

($\bar{x}$ = 3.6), how fishing regulations within an MPA are decided ($\bar{x}$ = 3.7), the decision making process for deciding where to locate MPAs around CNMI ($\bar{x}$ = 3.7), the role fishermen play in the ongoing management of MPAs ($\bar{x}$ = 3.8), and the openness and transparency of the MPA siting process ($\bar{x}$ = 3.7). When thinking about MPAs in CNMI overall, CNMI fishermen considered each of these five aspects as *somewhat unfair* (Figure 4).

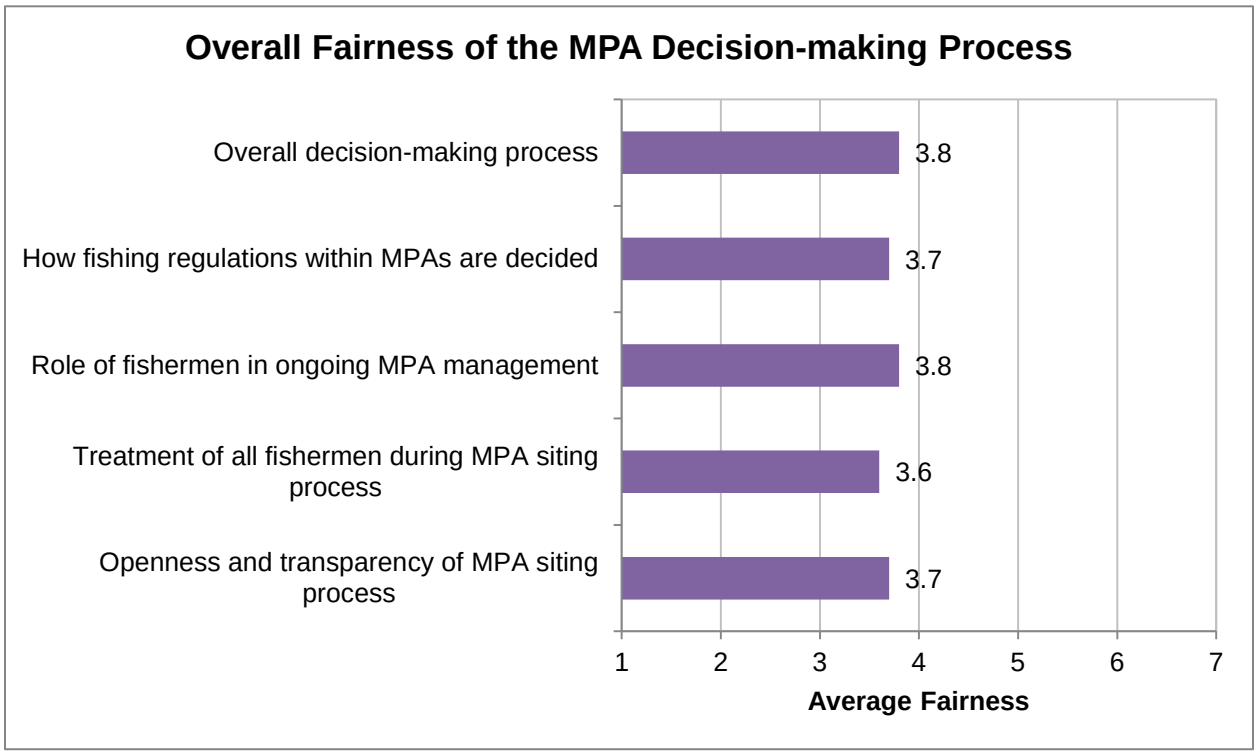

Figure 4. Overall fairness of the MPA decision-making process; 1=Extremely Unfair, 2=Moderately Unfair, 3=Somewhat Unfair, 4=Neutral, 5=Somewhat Fair, 6=Moderately Fair, 7=Extremely Fair.

In addition to questions of overall fairness, the survey included six sections of questions designed around Leventhal's seven components and six rules of procedural justice, as reviewed earlier. A total of 34 items were used to evaluate these components and justice rules. The results of these items are presented below. These items provide a detailed understanding of fishermen views on the procedural justice associated with the siting of MPAs in CNMI.

Representation

The procedural justice rule of representation states that the opportunity to voice opinions or concerns is open to all individuals or groups affected by the decision. In the survey, respondents were asked to rate the extent to which they agree or disagree with seven different statements concerning the representativeness of the decision-making process for creating and locating MPAs around CNMI (Q7a – Q7g; Table 3). Each rating was measured on a seven-point scale ranging from strongly disagree (score = 1), to neutral (score = 4), to strongly agree (score = 7).

Overall, result in this section are mixed. Mean responses to four of the items were slightly favorable, and three were viewed unfavorably in terms of procedural fairness. Respondents agreed that decision-makers are serious about involving fishermen in the process of deciding where to locate an MPA ($\overline{x} = 4.5$), that fishermen have sufficient opportunity to voice their opinion on where an MPA is located (($\overline{x} = 4.4$), they are satisfied that fishermen's views are adequately represented in the decision-making process on where to locate MPAs ($\overline{x} = 4.4$), and they are satisfied with decision-makers attempts to understand fishermen's views regarding where to locate an MPA ($\overline{x} = 4.3$) (Table 2). However, they also agree that the fishermen invited to attend meetings on where to locate MPAs do not represent all fishermen ($\overline{x} = 4.8$), that decision-makers allow fishermen to voice their opinions on where to locate MPAs, but they don't encourage them to do so ($\overline{x} = 4.7$), and that decision-makers are not interested in the views of fishermen when deciding where to locate an MPA ($\overline{x} = 4.3$).

Table 2. Representation of fishermen in MPA decision-making process.

Representation	Mean
The fishermen invited to attend meetings on where to locate MPAs do not represent all fishermen	4.8
Decision-makers allow fishermen to voice their opinions on where to locate MPAs, but they don't encourage us to do so	4.7
Decision-makers are serious about involving fishermen in the process of deciding where to locate an MPA	4.5
Fishermen have sufficient opportunity to voice their opinion on where an MPA is located	4.4
I am satisfied that fishermen's views are adequately represented in the decision-making process on where to locate MPAs	4.4
Decision-makers are not interested in the views of fishermen when deciding where to locate an MPA	4.3
I am satisfied with decision-makers' attempts to understand fishermen's views regarding where to locate an MPA	4.3

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Accuracy

The accuracy rule states that the information used in the decision-making process is believed to be accurate. Accuracy is used to evaluate the procedural components of the setting of ground rules concerning the availability of information about an allocation and how to obtain that information, and the way information is gathered to evaluate the resource and potential recipients. In the survey, respondents were asked to rate the extent to which they agree or disagree with six different statements regarding the accuracy of the information used to locate an MPA in CNMI (Q8; Table 3). Each rating was measured on a seven-point scale ranging from strongly disagree (score = 1), to neutral (score = 4), to strongly agree (score = 7).

CNMI fishermen are consistent in their response to these items. In terms of procedural justice, they view the information accuracy component as being somewhat unfair on all six items. They *slightly agree* that in the past, decision-makers have located an MPA based on inaccurate information ($\overline{x} = 4.7$), that fishermen are often unsure about the accuracy of the information used by decision-makers to locate an MPA ($\overline{x} = 4.3$), or that the information that decision-makers use to locate an MPA is accurate, but incomplete ($\overline{x} = 4.3$). They *slightly disagree* that fishermen are able to have new information added to the public discussion on where an MPA should be located ($\overline{x} = 3.7$), that decision-makers do a good job ensuring that the information they use is accurate ($\overline{x} = 3.7$) and that decision-makers have all the information they need before they determine where to locate an MPA ($\overline{x} = 3.6$).

Table 3. Accuracy of the information used to locate an MPA in CNMI.

Accuracy	Mean
In the past, decision-makers have located an MPA based on inaccurate information	4.7
Fishermen are often unsure about the accuracy of the information used by decision-makers to locate an MPA	4.3
The information that decision-makers use to locate an MPA is accurate, but incomplete	4.3
Fishermen are able to have new information added to the public discussion on where an MPA should be located	3.7
Decision-makers do a good job ensuring that the information they use in locating an MPA is accurate	3.7
Decision-makers have all the information they need before they determine where to locate an MPA	3.6

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Correctability

The correctability rule states that the potential exists for modification or reversal of decisions, or of information, throughout the process. Correctability is used to evaluate the procedural components of the appeals process, the change mechanisms available if existing procedures fail, and the safeguards that exist to monitor the integrity of decision-makers. In the survey, respondents were asked to rate the extent to which they agree or disagree with six different statements regarding the correctability of the information used to locate an MPA in CNMI (Q9; Table 4). Each rating was measured on a seven-point scale ranging from strongly disagree (score = 1), to neutral (score = 4), to strongly agree (score = 7).

On the six items, fishermen responded unfavorably on five, and were neutral on one. Fishermen slightly agreed that once a decision is made about an MPA location, it is final and there is no method for appealing it ($\bar{x}$ = 4.4). They *slightly disagree* with four of the other statements regarding correctability; that fishermen have been successful in getting decision-makers to reconsider their decisions after an MPA has been created ($\bar{x}$ = 3.6), decision-makers are willing to revisit their information if fishermen believe it is wrong ($\bar{x}$ = 3.6), there is a formal appeal process open to fishermen if they disagree with the quality of

the information being used to locate an MPA ($\bar{x}$ = 3.5), and that decision-makers are willing to remove an MPA that is not working, or is determined to be ill-advised or mislocated ($\bar{x}$ = 3.2). They were *neutral* in their view that the process decision-makers follow in locating MPAs allows fishermen to correct information they believe to be incorrect ($\bar{x}$ = 3.9)

Table 4. Correctability of the information used to locate an MPA in CNMI.

Correctability	Mean
Once a decision is made about an MPA location, it is final and there is no method for appealing it	4.4
The process decision-makers follow in locating MPAs allows fishermen to correct information they believe to be incorrect	3.9
Fishermen have been successful in getting decision-makers to reconsider their decisions after an MPA has been created	3.6
Decision-makers are willing to revisit their information if fishermen believe it is wrong	3.6
There is a formal appeal process open to fishermen if they disagree with the quality of the information being used to locate an MPA	3.5
Decision-makers are willing to remove an MPA that is not working, or is determined to be ill-advised or mislocated	3.2

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Consistency

The consistency rule states that the process is perceived to be consistent across persons and through time. In the survey, respondents were asked to rate the extent to which they agree or disagree with five different statements concerning the consistency of the decision-making process for creating and locating MPAs around CNMI (Q7h – Q7l; Table 5). Each rating was measured on a seven-point scale ranging from strongly disagree (score = 1), to neutral (score = 4), to strongly agree (score = 7).

Fishermen *agree* that some fishermen's opinions seem to matter more than others' opinions ($\bar{x}$ = 4.9), and that the people who make the decisions change too often ($\bar{x}$ = 4.6). They are *neutral* that all

stakeholders involved in decisions about where to locate an MPA have consistently been treated as equals in the process ($\bar{x}$ = 4.1), or that decision-makers have always taken the opinions of fishermen seriously when deciding where to locate an MPA ($\bar{x}$ = 3.9). They *slightly disagree* that the procedures followed by decision-makers for deciding where to locate an MPA is the same for every MPA ($\bar{x}$ = 3.7).

Table 5. Consistency of the MPA decision-making process in CNMI.

Consistency	Mean
Some fishermen's opinions about where to locate an MPA seem to matter more than others' opinions	4.9
The people who make the decisions on where to locate an MPA change too often	4.6
All stakeholders involved in decisions about where to locate an MPA have consistently been treated as equals in the process	4.1
Decision-makers have always taken the opinions of fishermen seriously when deciding where to locate an MPA	3.9
The procedures followed by decision-makers for deciding where to locate an MPA Is the same for every MPA	3.7

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Bias Suppression

The bias suppression rule states that the allocator's personal self-interest or blind allegiance to narrow preconceptions is suppressed at all times during the decision-making process. In the survey, respondents were asked to rate the extent to which they agree or disagree with five different statements regarding the bias-suppression of the decision-makers who determine where to locate MPAs around CNMI (Q12; Table 6). Each rating was measured on a seven-point scale ranging from strongly disagree (score = 1), to neutral (score = 4), to strongly agree (score = 7).

Findings in this section of the study are mixed. Respondents *slightly agree* that decision-makers rely too much on political pressures and not enough on scientific data when deciding where to locate

MPAs ($\bar{x}$ = 5.3), and that decision-makers already know where they want to locate an MPA, and the public input sessions are merely a required formality they will later ignore ($\bar{x}$ = 4.8). They also *slightly agree* that decision-makers are more interested in biological considerations than in the welfare of fishermen when locating an MPA ($\bar{x}$ = 4.7). In contrast, they also slightly agree that decision-makers suppress their own personal preferences when deciding where to locate an MPA ($\bar{x}$ = 4.8), and they are *neutral to slightly agree* that those deciding on where to locate MPAs give equal consideration to biological, economic and cultural factors ($\bar{x}$ = 4.2).

Table 6. Bias suppression of the decision-makers in the MPA location siting process.

Bias Suppression	Mean
Decision-makers rely too much on political pressures, and not enough on scientific data when deciding where to locate MPAs	5.3
Decision-makers already know where they want to locate an MPA, and the public input sessions are merely a required formality they will later ignore	4.8
Decision-makers suppress their own personal preferences when deciding where to locate an MPA	4.8
Decision-makers are more interested in biological considerations than in the welfare of fishermen when locating an MPA	4.7
Those deciding on where to locate MPAs give equal consideration to biological, economic and cultural factors	4.2

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Ethicality

The ethicality rule states that the procedures used are consistent with the individual's or group's moral and ethical values. In the survey, respondents were asked to rate the extent to which they agree or disagree with five different statements regarding the ethicality of the decision-makers involved in locating MPAs around CNMI (Q13; Table 7). Each rating was measured on a seven-point scale ranging from strongly disagree (score = 1), to neutral (score = 4), to strongly agree (score = 7).

Respondents *slightly agree* that professionally, decision-makers have an obligation to fairly consider the interests of fishermen when deciding where to locate an MPA ($\overline{x}$ = 4.7). They are *neutral* about whether or not decision-makers try their best to balance the needs of the environment with the needs of fishermen and their communities when deciding where to locate an MPA ($\overline{x}$ = 4.0), or that fishermen feel welcome at meetings where decisions on where to locate an MPA are being discussed ($\overline{x}$ = 3.9). They *slightly disagree* that decision-makers show concern for fishermen during the process of locating an MPA ($\overline{x}$ = 3.7), or that decision-makers consider the safety of fishermen when making decisions about where to locate an MPA ($\overline{x}$ = 3.6).

Table 7. Ethicality of the decision-makers involved in locating MPAs in CNMI.

Ethicality	Mean
Professionally, decision-makers have an obligation to fairly consider the interests of fishermen when deciding where to locate an MPA	4.7
Decision-makers try their best to balance the needs of the environment with the needs of fishermen and their communities when deciding where to locate an MPA	4.0
Fishermen feel welcome at meetings where decisions on where to locate an MPA are being discussed	3.9
Decision-makers show concern for fishermen during the process of locating an MPA	3.7
Decision-makers consider the safety of fishermen when making decisions about where to locate an MPA	3.6

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Transferred Effects

Almost two-thirds (64.6%) of the respondents indicated they took *about the same number* of fishing trips despite the existence of MPAs in CNMI (Q15; Table 8). However, one-third of the respondents (32.9%) took fewer or far fewer fishing trips because of MPAs, and only 2.6% took more fishing trips. Thus, of those affected, almost all took fewer trips. Fishermen were also asked about the

extent to which the siting of five different MPAs in CNMI may have limited their ability to fish where they most prefer to fish (Q16), on a scale of not being limited (score = 1) to being completely limited (score = 7). Results indicate that all five MPAs caused fishermen to feel they were, to some extent (moderately), limited in being able to fish where they prefer to fish (Figure 5).

Table 8. The effect of CNMI MPAs on the number of fishing trips fishermen take.

Effect of MPAs on Number of Fishing Trips	Count	Total	%	Total %
I take far fewer fishing trips because of MPAs	7	7	8.9	8.9
I take fewer fishing trips because of MPAs	19	26	24.1	32.9
I take about the same number of fishing trips, even with the MPAs	51	77	64.6	97.5
I take more fishing trips because of MPAs	1	78	1.3	98.7
I take many more fishing trips because of MPAs	1	79	1.3	100.0

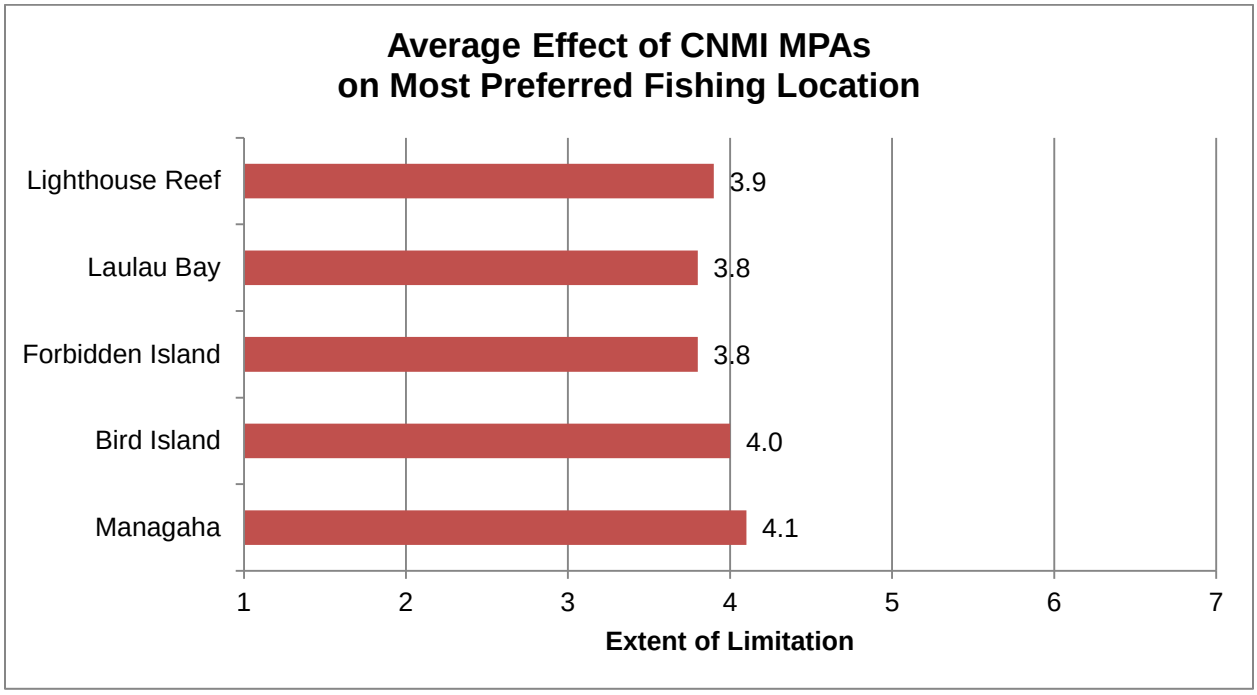

Figure 5. Average extent of limitation by CNMI MPAs on most preferred fishing location; 1=Not Limited, 2=Slightly Limited, 3=Somewhat Limited, 4=Moderately Limited, 5=Very Limited, 6=Strongly Limited, 7=Completely Limited.

To evaluate possible transferred effects due to the siting of an MPA, survey respondents were asked to indicate the extent to which ten different aspects of their fishing trips have become worse or become better due to where an MPA is located in CNMI (Q17). This was rated on a 7-point scale ranging from much worse (score = 1), to no change (score = 4), to much better (score = 7). For the 78 respondents who indicated they were impacted by an MPA, responses ranged from a low of 3.5 (Overall expenses for individual fishing trips), to a high of 4.0 (Catch per unit effort; my actual financial earnings). Respondents indicated that, for these ten items, the effects were worse on sex of the items and neutral on for. Thus, the location of an MPA resulted in transferred effects leading to *somewhat worse* fishing trips (Figure 6).

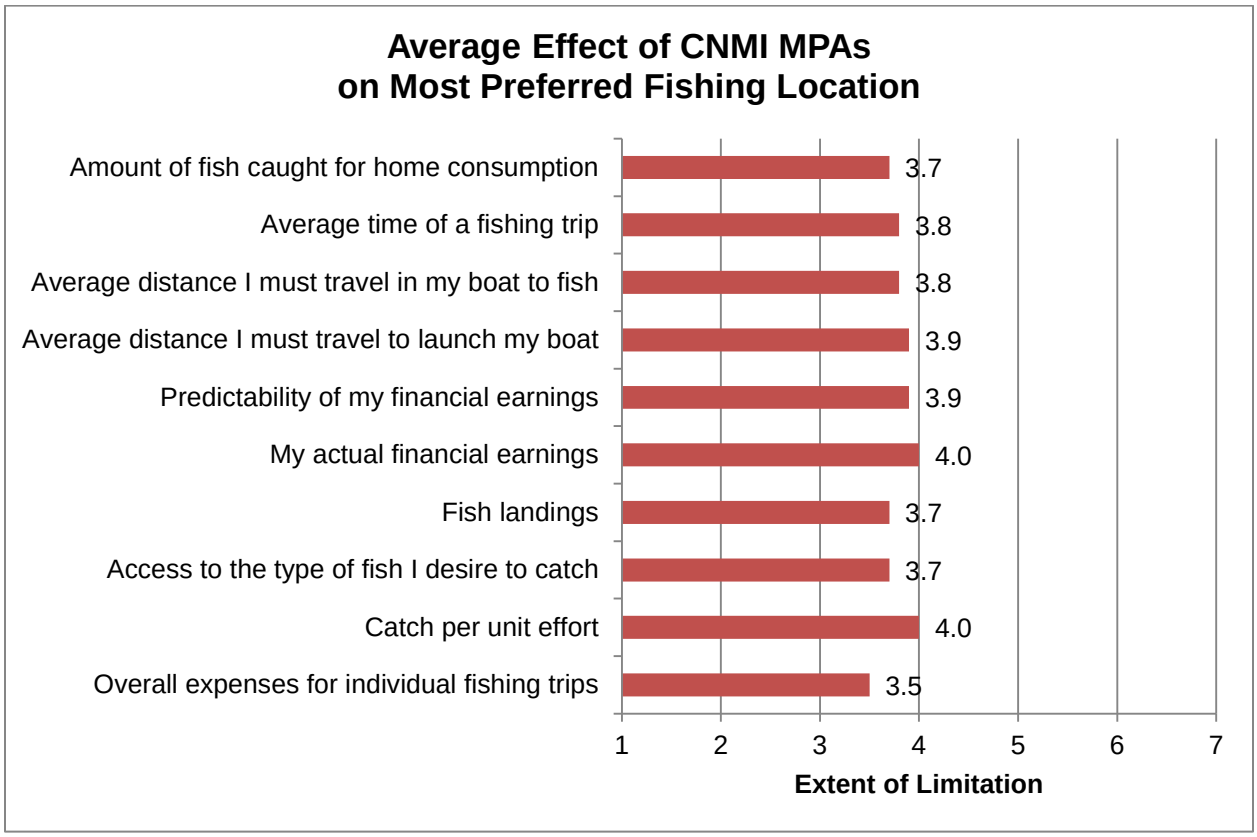

Figure 6. Average effect of MPA location on aspects of fishing trip; 1=Much worse, 2=Worse, 3=Somewhat worse, 4=No change, 5=Somewhat better, 6=Better, 7=Much Better.

Fishermen were also asked about the extent to which they agreed or disagreed with six statements about transferred effects of their fishing activity (Q18). The statements were rated on a 7-point scale of strongly disagree (score = 1) to neutral (score = 4) to strongly agree (score = 7). Overall, the respondents indicated that the location of MPAs did not have much of an effect on these six aspects of their fishing activity (Figure 7). Specifically, they indicated mostly *neutral* agreement for each of the transferred effects items. The average effect of CNMI MPAs on fishing activity ranged from 3.9 (My costs to fish have increased due to the location of MPAs) to 4.2 (I spend more time traveling to where they now fish because of where MPAs are located).

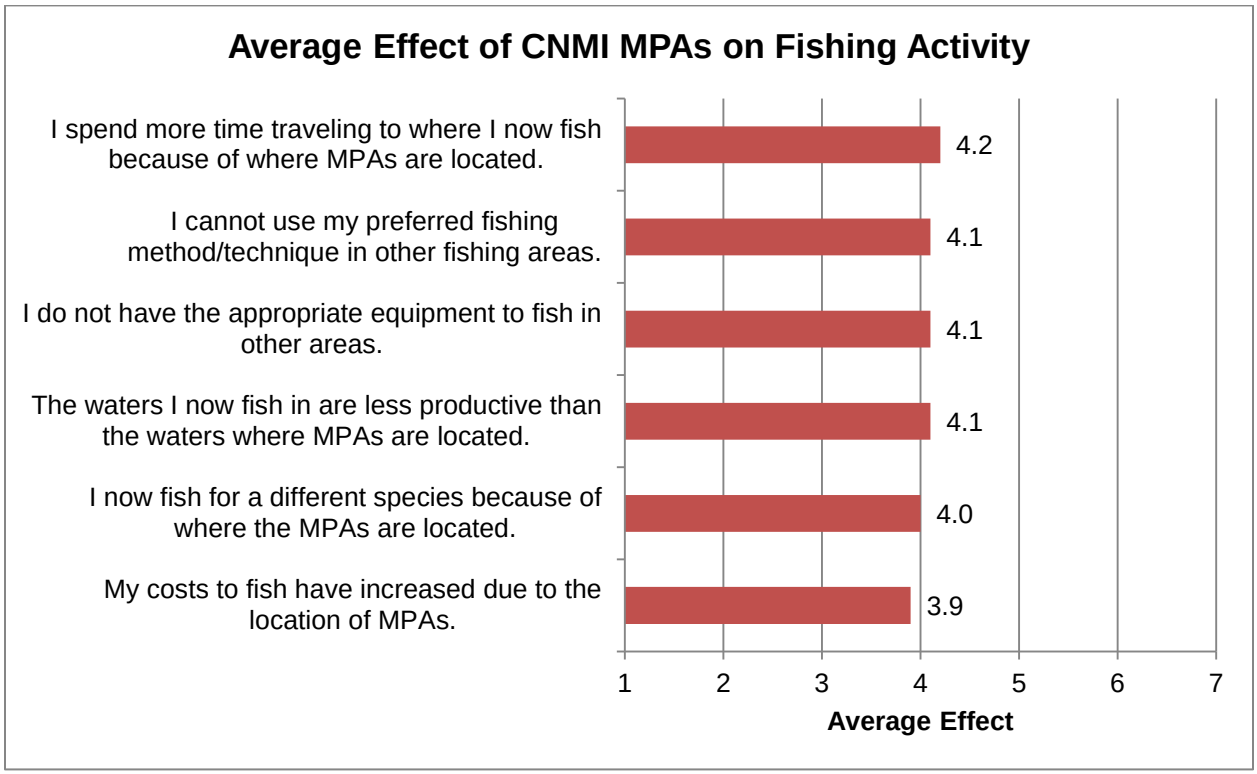

Figure 7. Average effect of CNMI MPA locations on fishing activity; 1=Strongly Disagree, 2=Moderately Disagree, 3=Slightly Disagree, 4=Neutral, 5=Slightly Agree, 6=Moderately Agree, 7=Strongly Agree.

Safety

Respondents rated the extent to which they agree or disagree with a series of six statements concerning how the location of MPAs has affected their safety in terms of ocean and fishing conditions,

and travel to fishable areas (Figure 8). The statements were rated on a 7-point scale of strongly disagree (score = 1) to neutral (score = 4) to strongly agree (score = 7). Similar to the responses for transferred effects on fishing activity, MPA locations in CNMI have not had much of an effect on the safety of fishermen. Respondents generally expressed *neutral* agreement about the effect of MPA locations on four of the six items. They *slightly disagree* with the statement "I do not know the areas where I now have to fish as well as my previous fishing areas" (average of 3.8), and slightly agreed that "It is less safe now because I have to travel farther to reach a fishable area" ($\bar{x}$ = 4.2). Responses to the other four statements ranged from an average of 3.9 to 4.1, indicating *neutral* agreement.

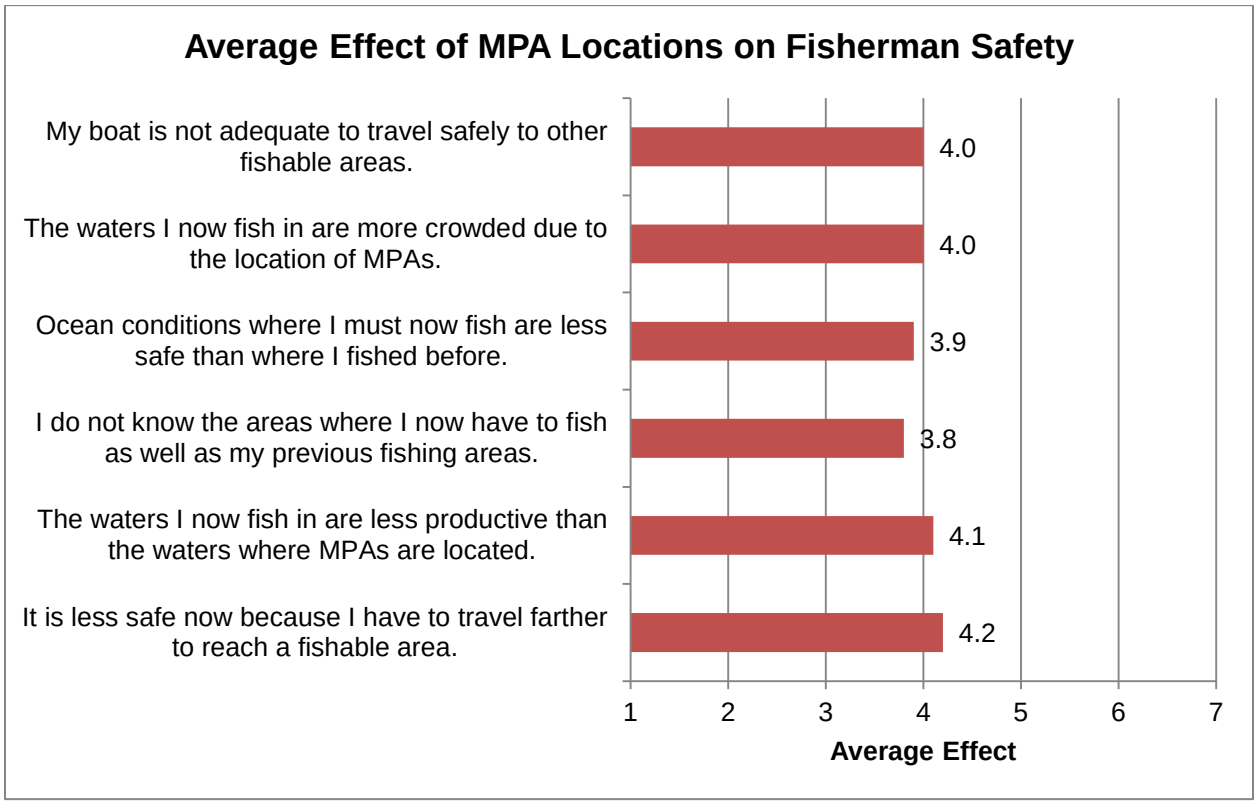

Figure 8. Average effect of MPA locations on fisherman safety in CNMI; 1=Strongly Disagree, 2=Moderately Disagree, 3=Slightly Disagree, 4=Neutral, 5=Slightly Agree, 6=Moderately Agree, 7=Strongly Agree.

Discussion

The first objective of this study was to properly evaluate fishermen perceptions of the fairness associated with the process of establishing and managing MPAs. This was accomplished through the conceptual lens of procedural justice, which seeks to understand the fairness associated with the procedures used in allocating a resource among competing interests. On an overall measure of unfairness-fairness, fishermen feel the process is somewhat unfair ($\overline{x}$ = 3.8 on a 7-point scale). However, such an overall judgment is somewhat simplistic and of limited value because procedural justice is complex and multifaceted. The varied and diverse components that lead to such an overall view are buried in such an overly simplistic perspective. A deeper understanding of fairness is required to better understand fishermen's particular judgments about the decision-making process, which will better reflect on why fishermen might feel the process is viewed as unfair, and perhaps provide insights into their preferences, intentions and how they might react to future management decisions. When this deeper understanding is examined, the results of this study reveal that fishermen have a consistent, though modest, sense of unfairness associated with the overall process used to site marine protected areas.

To provide this deeper understanding, this study built upon the justice components and justice rules as presented by Leventhal (1980). We included a total of 40 items focusing on topic-specific justice components and rules, and fishermen expressed a sense of unfairness with 29 of them. For the other 11 items, fairness was seen as neutral on six items, and fair on only five items. An additional five items focused on access to information about the MPA decision-making process, and on these items two were seen as fair, one as neutral and two as unfair. Thus, overall of the 45 items that examined the issue of fairness, 31 were viewed as unfair, seven and neutral and only seven as fair. This is strong evidence that procedurally, fishermen see the current process of siting MPAs as being somewhat unfair to them. While this perception is consistent across all aspects of the justice components and rules, it appears to be strongest for the overall fairness measures, access to information about fishing rules and regulations, accuracy, correctability, and bias suppression. However, no single component of procedural justice

stands out as being viewed as particularly unfair, or as being extremely unfair. The results do not appear to be extreme. Nor do they indicate any broad sense of outrage or anger on the part of the fishermen. The do, however, suggest a general underlying sense of unfairness with the overall process as it relates to the siting of MPAs. A review of this study's findings reveals that fishermen are not being treated, or involved, in the manner they feel they should be.

For example, CNMI fishermen believe that the overall treatment of fishermen in ongoing MPA management is somewhat unfair. Fishermen are somewhat neutral about whether or not their views are adequately represented in the decision-making process on where to locate MPAs in CNMI, but at the same time they do not believe that all fishermen are represented properly at meetings on where to locate MPAs or that they are encouraged to voice their opinions. People who have concerns about resource decisions or issues value the opportunity to present their problems to decision-makers. By providing people with opportunities to voice their opinions and concerns, decision-makers reaffirm people's social standing and their right to call on the decision-makers for help or to provide input. Of course, providing an opportunity to speak is not enough. This is only valuable if people believe that what they say has actually been considered by the decision-makers when a decision is being made, and that decision-makers have made an effort to be fair (Tyler, 1987).

CNMI fishermen are generally neutral about decision-makers' attempts to understand fishermen's views, and how serious decision-makers are about involving fishermen in the process of deciding where to locate MPAs. However, the fishermen believe that decision-makers already have their mind made up about where they want to locate an MPA before public input, and the public input sessions are merely a required formality they will later ignore. As suggested by previous studies (Leventhal, 1980; Tyler, 1988; Smith & McDonough, 2001), these aspects of ethicality and inconsideration might be key in the fishermen's evaluations of unfair treatment. When fishermen feel their comments are not taken seriously, this reflects on who they are as people. Ignoring someone's comments or concerns is a sign of disrespect and so invokes a person's sense of social standing (Lind & Tyler, 1988). If the fishermen perceive a more

positive disposition, then they may trust that in the long run, decision-makers will strive to serve their interests.

Leventhal (1980) suggested six criteria that might influence judgments about the fairness of a procedure, and four of those criteria are aspects of neutrality on the part of decision makers: bias suppression, consistency, accuracy, and correctability. From the fishermen's point of view, this study clearly indicates that these four criteria have not been fulfilled by decision-makers or during the process of determining locations of MPAs in CNMI (17 of the 22 individual items within these criteria were seen as being unfair and only one as being fair). For example fishermen believe that decision-makers are more interested in biological considerations than in the welfare of fishermen. Fishery management decisions are to be "based upon the best scientific information available" (MSA, National Standard 2), and must "take into account the importance of fishery resources to fishing communities by utilizing economic and social data" (MSA, National Standard 8). Unfortunately, fishermen believe decision-makers in CNMI rely too much on political pressures or their own personal preferences when deciding where to locate an MPA. Consequently, fishermen perceive the MPA siting process as biased by the decision-makers.

The CNMI fishermen do not believe that MPA decisions are based upon accurate information or a complete representation of all the stakeholders affected by MPA designations, and in the past, decision-makers were not consistent in the way procedures were made regarding the siting of MPAs. Fishermen's perceptions of inadequate representation may partly be tied to the way fishermen are notified or receive information about upcoming public hearings. Although legislation such as the Magnuson-Stevens Fishery Conservation and Management Act encourages local participation, responsibility and authority, this study suggests that there are issues in the way decision-makers communicate and interact with the public, as well as the openness and transparency of the decision-making process. Fishermen do not believe they are notified of public hearings early enough to be able to attend, and these public hearings are typically scheduled at times inconvenient for fishermen to attend. If fishermen do not have the ability to participate in the decision-making process to begin with, then their perspective on where to site an MPA is less likely to be considered. In previous studies, procedures imposing time constraints led people to believe decision-

makers were intentionally trying to control the outcome for regulations by disallowing ample time for the public to respond to proposals (Daigle et al., 1996). A perception of secrecy in decision-making caused by inadequate notification can also lead to a lack of acceptance of MPA decisions (Smith & McDonough, 2001). Decision-makers do have a responsibility to engage in discussions with citizens, and therefore, they must be open, transparent, and accommodating to the public's needs.

A consequence of designating an MPA and closing the area to fishing is for the fishing effort to move to another area, which may further lead to a number of unintended consequences. The second objective of this study focused on the issue of transferred effects that might result from the establishment and siting of one or more MPAs, and the third objective focused on fishermen safety. Because safety issues can be viewed as a transferred effect, we have chosen to discuss them together for simplicity purposes.

Two broad, overall, questions looked at possible transferred effects on fishermen due to the siting of MPAs. First, fishermen were asked how MPAs affected the number of trips they took. Results indicate there was an effect, though not large. While the large majority of fishermen took the same number of trips (two indicated they actually took more trips), one-third of the fishermen reported taking fewer trips because of MPAs. For these fishermen there clearly was a transferred effect. Almost certainly this would result in other effects, such as reduced landings, income, etc. However, this would have been limited to about 33% of the fishermen. The second broad question asked about whether the location of a particular MPA had limited their ability to fish where they most preferred to fish. This relates to the previous question in that if fishermen were taking fewer trips, we can consider which particular MPAs might be seeing less fishing activity, or perhaps which MPA was leading to this transferred effect. Results show only a modest effect due to MPA location. Fishermen reported that the Managaha and Bird Island MPAs moderately limited where they prefer to fish. The other three MPAs, Lighthouse Reef, Laulau Bay, and Forbidden Island, had a somewhat limiting effect on where they prefer to fish. We conclude that while the location/existence of the MPAs does have an effect on where fishermen fish, it is not a large effect.

To evaluate specific effects due to the location of MPAs, fishermen were asked to indicate on ten items the extent to which the siting of an MPA made their fishing trip better, or worse. Fishermen indicated on eight items that their fishing trips were made somewhat worse (a modest level of worse), but their catch per unit effort and actual financial earnings did not change. This can be expected given the findings above concerning number of trips taken and the ability to fish in preferred locations. Because there is pattern to these results (they all trend one way, though only slightly), there are no conflicting or asymmetric findings to evaluate. The results concerning transferred effects basically say the same thing, but are not of a large magnitude.

The last measures of potential transferred effects asked fishermen to indicate the extent to which the location of MPAs affected their fishing activity. These findings show little diversity in terms of transferred effects. Fishermen indicated neutral agreement for all six statements, with average effects ranging from 3.9 to 4.2. They disagreed slightly with the statement that their costs to fish have increased due to the location of MPAs. Results were mixed but generally neutral regarding the effects to their preferred fishing methods, the time spent traveling to where they now fish, the fishing productivity in other waters, having the appropriate equipment to fish in other areas, or that they have to fish for different species. Although somewhat mixed, the results do not indicate there are additional transferred effects.

Safety concerns of fishermen were measured on six variables. Findings on these safety issues appear to be somewhat similar to the transferred effects measures. Fishermen indicated mixed agreement about whether or not it is less safe because they must travel farther ocean conditions, or that the waters they now fish in are less productive than the waters where MPAs are located. They disagreed slightly, that they don't know the areas as well or that ocean conditions where they must now fish are less safe than where they fished before. Fishermen were neutral when asked about whether their boat being adequate to travel safely to other fishable areas, and that the areas they fish are more crowded. On the 7-point scale, the results ranged from 3.8 to 4.2. Consistent with transferred effects, these are relatively modest levels.

Conclusion

This study found that fishermen in CNMI perceive the process used to determine locations of marine protected areas as somewhat unfair. Though not extreme in intensity, this perception by fishermen is broad and consistent across all elements of procedural justice. The concept of procedural justice would suggest that these fishermen would sense some lack of respect or standing, and believe that their "voice" might not matter to those who manage the resources on their behalf. It can be expected that there would be some associated lack of trust with the management process or findings, and similarly some lessening of support for management rules or regulations. At the same time, it is important to note that the level of perceived unfairness is not too high. The literature would suggest that the level of distress that might be felt by the fishermen is in proportion to the level of unfairness perceived. These results therefore suggest that the working relationship between the resource managers and the fishermen should not be in deep distress. However, the relationship could be improved through greater attention to the justice components and rules evaluated in this study. The findings highlight the importance of opportunities for participation, the neutrality of the process, the trustworthiness of the decision-makers, and the treatment of all stakeholders with dignity and respect when evaluating the fairness of locating MPAs. All of these elements come into play in the process of designating MPAs in the Western Pacific Region.

The issues of transferred effects and safety are to an extent similar to the results found for procedural justice. They are modest, and consistent. There are transferred effects due to the siting of MPAs, and fishermen report some safety concerns. It is at this point that the relationship between transferred effects/safety and procedural justice becomes relevant. Persons who feel they have been treated fairly are more likely to accept the results or consequences of decisions that are otherwise less favorable to them. Those treated less fairly are less likely to accept the results or consequences of that same decision. In this study, there is evidence that fishermen may feel they have been treated somewhat unfairly in the process of siting MPAs and have also indicated some modest but unfavorable transferred effects and safety consequences. It would be reasonable to expect that these fishermen might not be as

supportive of the rules and regulations associated with these MPAs as one would prefer. Although it is unknown if this is currently the case, it is fair to say is would be an undesirable outcome. Moving towards a more supportive and informed population of fishermen could be accomplished through closer adherence with the principles presented in procedural justice. The study results suggest some reasonable attention to the justice components and rules would be of value in future decisions and would lead to greater support for management rules and regulations.

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Appendix A. Survey Instrument

Survey of Saltwater Fishermen in the Commonwealth of the Northern Mariana Islands

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In this section, please tell us about your fishing activity in the Commonwealth of the Northern Mariana Islands (CNMI). Your answers will help us to understand fishing in CNMI, and how to improve fisheries management. The information you provide will remain strictly confidential and you will never be identified with your answers.

1. How many years have you been fishing in CNMI?

_____ Years

2. Please tell us what kind of fisherman you primarily think of yourself as by choosing one of the following categories. You will be answering the remaining survey questions from that perspective.

1 Purely recreational (only for sport or pleasure)

2 Recreational expense (primarily for sport or pleasure, but I also sell a few fish to recover trip expenses whenever I can)

3 Subsistence (primarily to catch fish to feed myself/my family)

4 Cultural (I enjoy fishing, but I am even more concerned about keeping traditional practices alive, such as using traditional gear and sharing fish with the community in a historical way)

5 Part-time commercial (fishing pays some of my bills, but I still have to work at another job)

6 Full-time commercial (fishing brings in most or all of the money I make in a year)

3. Please indicate the primary type of saltwater fishing you engage in (circle only one number). "Shore-based" fishing means you do not use a boat. "Boat-based" fishing means you use a boat or other watercraft while fishing.

1 Only shore-based fishing

2 Mostly shore-based fishing, and some boat-based fishing

3 About equal amounts of shore- and boat-based fishing

4 Mostly boat-based fishing, and some shore-based fishing

5 Only boat-based fishing

4. When fishing, I would say that: (Please circle only one number)

1 I always fish in CNMI territorial waters (0-3 miles from shore)

2 I usually fish in CNMI territorial waters, but sometimes in Federal waters (more than 3 miles from shore)

3 I fish about equally in CNMI territorial waters and Federal waters

4 I usually fish in Federal waters, but sometimes in CNMI territorial waters

5 I always fish in Federal waters

5. In the <u>past 12 months</u>, approximately how many days did you engage in each of the following types of fishing?

a. Offshore trolling (for tuna, mahi-mahi, wahoo, billfish, etc.)..... _____Days

b. Tuna hand-lining (bonita, etc.)..... _____Days

c. Deep bottom-fishing (for opakapaka, onaga, etc.)..... _____Days

d. Shallow bottom-fishing (for for mafute, gadao, Satmoneti, etc.)..... _____Days

e. Reef trolling (for skipjack, barracudas, etc.) ..... _____Days

f. Spear-fishing (free-diving)..... _____Days

g. Whipping/Casting (rod and reel or hook and line)..... _____Days

h. Trapping ..... _____Days

i. Netting..... _____Days

6. On average, what percent of your catch is…

a. Catch and release..... _____%

b. Consumed at home ..... _____%

c. Given to relatives ..... _____%

d. Given to friends/neighbors ..... _____%

e. Given to crew..... _____%

f. Provided for fa'alavaelavae or other cultural events ..... _____%

g. Exchanged for goods/services ..... _____%

h. Sold for income ..... _____%

TOTAL..... 100%

In recent years, various types of Marine Protected Areas (MPAs) have been created around CNMI.

These MPAs are intended to conserve and replenish marine resources, so fishing is often restricted or prohibited within their boundaries.

In this section, we are interested in your perceptions of various aspects of the <u>decision-making process</u> regarding MPA designations and locations.

7. Please indicate the extent to which you <u>agree</u> or <u>disagree</u> with the following statements concerning the <u>decision-making process</u> for creating and locating MPAs around CNMI. Please read each statement carefully. While some statements may seem similar, each statement is different.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
a. Fishermen have sufficient opportunity to voice their opinions on where an MPA is located	1	2	3	4	5	6	7
b. I am satisfied that fishermen's views are adequately represented in the decision-making process on where to locate MPAs	1	2	3	4	5	6	7
c. I am satisfied with decision-makers' attempts to understand fishermen's views regarding where to locate an MPA	1	2	3	4	5	6	7
d. Decision-makers are serious about involving fishermen in the process of deciding where to locate an MPA	1	2	3	4	5	6	7
e. Decision-makers are not interested in the views of fishermen when deciding where to locate an MPA	1	2	3	4	5	6	7
f. Decision-makers allow fishermen to voice their opinions on where to locate MPAs, but they don't encourage us to do so	1	2	3	4	5	6	7
g. The fishermen invited to attend meetings on where to locate an MPA do not represent all fishermen.	1	2	3	4	5	6	7

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
h. Some fishermen's opinions about where to locate an MPA seem to matter more than others' opinions	1	2	3	4	5	6	7
i. All stakeholders (fishermen/non-fishermen) involved in decisions about where to locate an MPA have consistently been treated as equals in the process	1	2	3	4	5	6	7
j. Decision-makers have always taken the opinions of fishermen seriously when deciding where to locate an MPA	1	2	3	4	5	6	7
k. The procedures followed by decision-makers for deciding where to locate an MPA is the same for every MPA	1	2	3	4	5	6	7
l. The people who make the decisions on where to locate an MPA change too often	1	2	3	4	5	6	7

In this section, we are interested in your beliefs about the <u>information</u> used in the decision-making process for locating a CNMI MPA.

8. Please indicate the extent to which you <u>agree</u> or <u>disagree</u> with the following statements regarding the <u>*accuracy*</u> of the information used to locate an MPA in CNMI.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
a. Decision-makers have all the information they need before they determine where to locate an MPA	1	2	3	4	5	6	7
b. Decision-makers do a good job ensuring that the information they use in locating an MPA is accurate	1	2	3	4	5	6	7
c. The information that decision-makers use to locate an MPA is accurate, but incomplete	1	2	3	4	5	6	7
d. In the past, decision-makers have located an MPA based on inaccurate information	1	2	3	4	5	6	7

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
e. Fishermen are often unsure about the accuracy of the information used by decision-makers to locate an MPA	1	2	3	4	5	6	7
f. Fishermen are able to have new information added to the public discussion on where an MPA should be located.....	1	2	3	4	5	6	7

9. Please indicate the extent to which you <u>agree</u> or <u>disagree</u> with the following statements regarding the *<u>correctability</u>*** of information used to locate an MPA.**

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
a. The process decision-makers follow in locating MPAs allows fishermen to correct information they believe to be incorrect.....	1	2	3	4	5	6	7
b. Fishermen have been successful in getting decision-makers to reconsider their decisions after an MPA has been created	1	2	3	4	5	6	7
c. Decision-makers are willing to remove an MPA that is not working, or is determined to be ill-advised or mis-located.....	1	2	3	4	5	6	7
d. Decision-makers are willing to revisit their information if fishermen believe it is wrong.....	1	2	3	4	5	6	7
e. There is a formal appeal process open to fishermen if they disagree with the quality of the information being used to locate an MPA.....	1	2	3	4	5	6	7
f. Once a decision is made about an MPA location, it is final and there is no method for appealing it	1	2	3	4	5	6	7

In the following questions, we are interested in how you <u>receive information</u> about CNMI MPAs and the decision-making process.

10. Please indicate the extent to which you <u>agree</u> or <u>disagree</u> with the following statements. Please circle only one number for each item.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
a. Information about MPA fishing rules and regulations is easy to find	1	2	3	4	5	6	7
b. Fishermen are notified of public hearings in plenty of time to be able to attend	1	2	3	4	5	6	7
c. Public hearings are scheduled at times convenient for fishermen to attend	1	2	3	4	5	6	7
d. Public hearings are scheduled at locations convenient for fishermen to attend	1	2	3	4	5	6	7
e. I am informed about any updates to fishing rules and regulations in plenty of time to be able to make any necessary adjustments to my fishing practices	1	2	3	4	5	6	7

11. To what extent do you <u>make use</u> of the following sources for current information about fishing in CNMI?

	No Use	Almost No Use	A Little Use	Some Use	A Lot of Use	Not Applicable
a. Fishing magazines	1	2	3	4	5	n/a
b. Government agency publications	1	2	3	4	5	n/a
c. Newspapers	1	2	3	4	5	n/a
d. Bait and tackle shops/companies	1	2	3	4	5	n/a
e. Fishing club/organization meetings	1	2	3	4	5	n/a
f. Television	1	2	3	4	5	n/a
g. Talking with other fishermen	1	2	3	4	5	n/a
h. Internet sites/Social media	1	2	3	4	5	n/a
i. Conservation organization publications	1	2	3	4	5	n/a
j. Radio	1	2	3	4	5	n/a

We are interested in your perceptions of the <u>decision-makers</u> who determine where to locate MPAs in CNMI.

12. Please indicate the extent to which you <u>agree</u> or <u>disagree</u> with the following statements regarding the *<u>decision-makers</u>* who determine where to locate an MPA.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
a. Decision-makers rely too much on political pressures, and not enough on scientific data when deciding where to locate MPAs	1	2	3	4	5	6	7
b. Decision-makers suppress their own personal preferences when deciding where to locate an MPA	1	2	3	4	5	6	7
c. Decision-makers are more interested in biological considerations than in the welfare of fishermen when locating an MPA	1	2	3	4	5	6	7
d. Those deciding on where to locate MPAs give equal consideration to biological, economic and cultural factors	1	2	3	4	5	6	7
e. Decision-makers already know where they want to locate an MPA, and the public input sessions are merely a required formality they will later ignore	1	2	3	4	5	6	7

13. When it comes to the *<u>ethicality</u>* of decision-makers involved in locating an MPA,

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
a. Decision-makers show concern for fishermen during the process of locating an MPA	1	2	3	4	5	6	7
b. Fishermen feel welcome at meetings where decisions on where to locate an MPA are being discussed	1	2	3	4	5	6	7
c. Decision-makers consider the safety of fishermen when making decisions about where to locate an MPA	1	2	3	4	5	6	7

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
d. Professionally, decision-makers have an obligation to fairly consider the interests of fishermen when deciding where to locate an MPA	1	2	3	4	5	6	7
e. Decision-makers try their best to balance the needs of the environment with the needs of fishermen and their communities when deciding where to locate an MPA	1	2	3	4	5	6	7

14. When thinking about MPAs in CNMI overall, to what extent do you consider the following to be <u>fair</u> or <u>unfair</u>?

	Extremely Unfair	Moderately Unfair	Somewhat Unfair	Neutral	Somewhat Fair	Moderately Fair	Extremely Fair
a. The decision-making process for deciding where to locate MPAs in CNMI	1	2	3	4	5	6	7
b. Treatment of all fishermen during the process of deciding where to locate an MPA	1	2	3	4	5	6	7
c. How fishing regulations within an MPA are decided	1	2	3	4	5	6	7
d. The role fishermen play in the ongoing management of MPAs	1	2	3	4	5	6	7
e. The openness and transparency of the process that decision-makers use to locate MPAs	1	2	3	4	5	6	7

For the next set of questions, please think about the MPAs that have been put in place during the time you have been a fisherman. We are interested in your views of how these MPAs have affected your fishing activity and livelihood.

15. In general, how have MPAs affected the number of fishing trips you take?

1 I take far fewer fishing trips because of MPAs

2 I take fewer fishing trips because of MPAs

3 I take about the same number of fishing trips, even with the MPAs

4 I take more fishing trips because of MPAs

5 I take many more fishing trips because of MPAs

16. To what extent have the following MPAs limited <u>where you most prefer to fish</u>? If a protected area does not apply to you, circle "Not Applicable" (n/a).

		Not Limited	Slightly Limited	Somewhat Limited	Moderately Limited	Very Limited	Strongly Limited	Completely Limited	Not Applicable
a.	Managaha Marine Conservation Area	1	2	3	4	5	6	7	n/a
b.	Bird Island Marine Sanctuary	1	2	3	4	5	6	7	n/a
c.	Forbidden Island Marine Sanctuary	1	2	3	4	5	6	7	n/a
d.	Lau Lau Bay Sea Cucumber Sanctuary	1	2	3	4	5	6	7	n/a
e.	Lighthouse Reef Trochus Sanctuary	1	2	3	4	5	6	7	n/a

17. Thinking about whether or not an MPA has affected your fishing activity, to what extent have the following aspects of your fishing trips <u>improved</u> or <u>become worse</u> due to where an MPA is located?

		Much Worse	Worse	Somewhat Worse	No Change	Somewhat Better	Better	Much Better	Not Applicable
a.	Overall expenses for individual fishing trips	1	2	3	4	5	6	7	n/a
b.	Catch per unit effort	1	2	3	4	5	6	7	n/a
c.	Access to the type of fish I desire to catch	1	2	3	4	5	6	7	n/a
d.	Fish landings	1	2	3	4	5	6	7	n/a
e.	My actual financial earnings	1	2	3	4	5	6	7	n/a
f.	Predictability of my financial earnings	1	2	3	4	5	6	7	n/a
g.	Average distance I must travel to launch my boat (miles, one-way)	1	2	3	4	5	6	7	n/a
h.	Average distance I must travel in my boat while fishing (miles)	1	2	3	4	5	6	7	n/a
i.	Average time of a fishing trip (hours)	1	2	3	4	5	6	7	n/a
j.	Amount of fish caught for home consumption (food security)	1	2	3	4	5	6	7	n/a

18. To what extent do you <u>agree</u> or <u>disagree</u> with the following statements concerning how the location of MPAs has affected you?

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree	Not Applicable
a. Ocean conditions where I must now fish are less safe than where I fished before	1	2	3	4	5	6	7	n/a
b. I do not know the areas where I now have to fish as well as my previous fishing areas	1	2	3	4	5	6	7	n/a
c. It is less safe now because I have to travel farther to reach a fishable area	1	2	3	4	5	6	7	n/a
d. My boat is not adequate to travel safely to other fishable areas	1	2	3	4	5	6	7	n/a
e. I cannot use my preferred fishing method/technique in other fishing areas	1	2	3	4	5	6	7	n/a
f. I do not have the appropriate equipment to fish in other areas	1	2	3	4	5	6	7	n/a
g. I spend more time traveling to where I now fish because of where MPAs are located	1	2	3	4	5	6	7	n/a
h. I now fish for a different species because of where the MPAs are located	1	2	3	4	5	6	7	n/a
i. The waters I now fish in are more crowded due to the location of MPAs	1	2	3	4	5	6	7	n/a
j. My costs to fish have increased due to the location of MPAs	1	2	3	4	5	6	7	n/a
k. The waters I now fish in are less productive than the waters where MPAs are located	1	2	3	4	5	6	7	n/a

19. To what extent do you believe the following statement is fair or unfair?

When thinking about MPAs in CNMI, I feel that the overall process decision-makers use to locate an MPA is:

Extremely Unfair	Moderately Unfair	Somewhat Unfair	Neutral	Somewhat Fair	Moderately Fair	Extremely Fair
1	2	3	4	5	6	7

The following questions will help us to improve our understanding of fishermen. The information you provide will remain strictly confidential. Your name will never be associated with your answers.

20. Are you?

1 Male

2 Female

21. What is your age?

_____ Years

Is there anything else you would like to share with us?

_____

_____

_____

_____

Your contribution to this research is greatly appreciated. Thank you for your time!

Please direct all inquiries to:

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ID NO. _____ 12

Appendix B. CNMI Survey Data Tables

Q1. How many years have you been fishing in CNMI?

Number of Years	Count	Total	Percent	Total Percent
0-1	5	5	6.3	6.3
2-5	19	24	24.1	30.4
6-10	12	36	15.2	45.6
11-20	25	61	31.6	77.2
21-30	12	73	15.2	92.4
31-40	4	77	5.1	97.5
41-50	1	78	1.3	98.7
51-60	1	79	1.3	100.0

Mean = 14.8 years

Q2. Please tell us what kind of fisherman you primarily think of yourself as by choosing one of the following categories. You will be answering the remaining survey questions from that perspective.

Type of Fisherman	Count	Total	Percent	Total Percent
Purely recreational	17	17	22.7	22.7
Recreational expense	11	28	14.7	37.3
Subsistence	30	58	40.0	77.3
Cultural	7	65	9.3	86.7
Part-time commercial	0	65	0.0	86.7
Full-time commercial	10	75	13.3	100.0

Q3. Please indicate the primary type of saltwater fishing you engage in. "Shore-based" fishing means you do not use a boat. "Boat-based" fishing means you use a boat or other watercraft while fishing.

Type of Fishing	Count	Total	Percent	Total Percent
Only shore-based fishing	12	12	14.8	14.8
Mostly shore-based fishing, and some boat-based fishing	21	33	25.9	40.7
About equal amounts of shore- and boat-based fishing	28	61	34.6	75.3
Mostly boat-based fishing, and some shore-based fishing	8	69	9.9	85.2
Only boat-based fishing	12	81	14.8	100.0

Q4. When fishing, I would say that:

State – Federal Waters	Count	Total	Percent	Total Percent
I always fish in State waters (0-3 miles from shore)	42	42	52.5	52.5
I usually fish in State waters, but sometimes in Federal waters (>3 miles)	17	59	21.3	73.8
I fish about equally in State and Federal waters	14	73	17.5	91.3
I usually fish in Federal waters, but sometimes in State waters	5	78	6.3	97.5
I always fish in Federal waters	2	80	2.5	100.0

Q5. In the past 12 months, approximately how many days did you engage in each of the following types of fishing?

Types of Fishing	Zero Days n	Zero Days %	1-7 Days n	1-7 Days %	8-14 Days n	8-14 Days %	15-21 Days n	15-21 Days %	22-31 Days n	22-31 Days %	32-100 Days n	32-100 Days %	101-365 Days n	101-365 Days %	Mean
Offshore trolling	5	9.4	25	56.6	9	17.0	4	7.5	1	1.9	1	1.9	8	15.1	32.2
Tuna hand-lining	11	24.4	13	28.9	2	4.4	7	15.6	2	4.4	1	2.2	9	20.0	43.4
Deep bottom-fishing	13	31.7	6	14.6	5	12.2	7	17.1	1	2.4	9	22.0	0	0.0	24.0
Shallow bottom-fishing	10	21.3	10	21.3	6	12.8	3	6.4	6	12.8	12	25.5	0	0.0	19.3
Reef trolling	20	51.3	7	17.9	6	15.4	3	7.7	1	2.6	2	5.1	0	0.0	7.0
Spear-fishing	11	22.0	2	4.0	5	10.0	5	10.0	11	22.0	16	32.0	0	0.0	28.0
Whipping/casting	10	21.3	9	19.1	16	34.0	8	17.0	3	6.4	1	2.1	0	0.0	10.0
Trapping	28	75.7	5	13.5	2	5.4	2	5.4	0	0.0	0	0.0	0	0.0	2.2
Netting	27	79.4	4	11.8	2	5.9	1	2.9	0	0.0	0	0.0	0	0.0	1.7

Q6. On average, what percent of your catch is…

Percent of Catch	Zero Percent n	Zero Percent %	1-25 Percent n	1-25 Percent %	26-50 Percent n	26-50 Percent %	51-75 Percent n	51-75 Percent %	76-100 Percent n	76-100 Percent %	Mean
Catch and release	21	58.3	11	30.6	2	5.6	1	2.8	1	2.8	8.9
Consumed at home	0	0.0	15	20.0	23	30.7	20	26.7	17	22.7	53.5
Given to relatives	7	13.7	37	72.5	5	9.8	1	2.0	1	2.0	19.0
Given to friends/neighbors	6	9.5	47	74.6	10	15.9	0	0.0	0	0.0	16.8
Given to crew	13	36.1	20	55.6	3	8.3	0	0.0	0	0.0	10.7
Provided for a cultural event	18	62.1	11	37.9	0	0.0	0	0.0	0	0.0	5.0
Exchanged for goods/services	17	54.8	13	41.9	1	3.2	0	0.0	0	0.0	7.3
Sold for income	15	45.5	8	24.2	5	15.2	3	9.1	2	6.1	20.9

Q7. Please indicate the extent to which you agree or disagree with the following statements concerning the decision-making process for creating and locating MPAs around CNMI. Please read each statement carefully. While some statements may seem similar, each statement is different.

	Strongly Disagree		Moderately Disagree		Slightly Disagree		Neutral		Slightly Agree		Moderately Agree		Strongly Agree		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	Mean
a. Fishermen have sufficient opportunity to voice their opinion on where an MPA is located	2	2.5	5	6.2	13	16.0	24	29.6	20	24.7	9	11.1	8	9.9	4.4
b. I am satisfied that fishermen's views are adequately represented in the decision-making process on where to locate MPAs	1	1.2	3	3.7	12	14.8	29	35.8	20	24.7	11	13.6	5	6.2	4.4
c. I am satisfied with decision-makers' attempts to understand fishermen's views regarding where to locate an MPA	3	3.7	4	4.9	13	16.0	27	33.3	21	25.9	4	4.9	9	11.1	4.3
d. Decision-makers are serious about involving fishermen in the process of deciding where to locate an MPA	1	1.2	1	1.2	14	17.3	30	37.0	16	19.8	10	12.3	9	11.1	4.5
e. Decision-makers are not interested in the views of fishermen when deciding where to locate an MPA	1	1.2	3	3.7	16	19.8	32	39.5	14	17.3	9	11.1	6	7.4	4.3
f. Decision-makers allow fishermen to voice their opinions on where to locate MPAs, but they don't encourage us to do so	1	1.2	2	2.5	6	7.4	33	40.7	19	23.5	13	16.0	7	8.6	4.7

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Q7. (Cont.)

	Strongly Disagree		Moderately Disagree		Slightly Disagree		Neutral		Slightly Agree		Moderately Agree		Strongly Agree		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	Mean
g. The fishermen invited to attend meetings on where to locate MPAs do not represent all fishermen	3	3.7	1	1.2	3	3.7	30	37.0	17	21.0	16	19.8	11	13.6	4.8
h. Some fishermen's opinions about where to locate an MPA seem to matter more than others' opinions	1	1.2	2	2.5	3	3.7	35	43.2	15	18.5	11	13.6	14	17.3	4.9
i. All stakeholders involved in decisions about where to locate an MPA have consistently been treated as equals in the process	3	3.7	4	4.9	14	17.3	37	45.7	15	18.5	3	3.7	5	6.2	4.1
j. Decision-makers have always taken the opinions of fishermen seriously when deciding where to locate an MPA	8	10.0	3	3.8	10	12.5	36	45.0	18	22.5	3	3.8	2	2.5	3.9
k. The procedures followed by decision-makers for deciding where to locate an MPA is the same for every MPA	4	5.0	6	7.5	11	13.8	49	61.3	8	10.0	2	2.5	0	0.0	3.7
l. The people who make the decisions on where to locate an MPA change too often	1	1.2	2	2.5	8	9.9	34	42.0	20	24.7	6	7.4	10	12.3	4.6

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Q8. Please indicate the extent to which you agree or disagree with the following statements regarding the accuracy of the information used to locate an MPA in CNMI.

	Strongly Disagree		Moderately Disagree		Slightly Disagree		Neutral		Slightly Agree		Moderately Agree		Strongly Agree		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	Mean
a. Decision-makers have all the information they need before they determine where to locate an MPA	8	9.9	9	11.1	19	23.5	25	30.9	14	17.3	5	6.2	1	1.2	3.6
b. Decision-makers do a good job ensuring that the information they use in locating an MPA is accurate	4	4.9	9	11.1	21	25.9	31	38.3	11	13.6	3	3.7	2	2.5	3.7
c. The information that decision-makers use to locate an MPA is accurate, but incomplete	2	2.5	6	7.4	6	7.4	27	33.3	34	42.0	3	3.7	3	3.7	4.3
d. In the past, decision-makers have located an MPA based on inaccurate information	1	1.2	3	3.7	6	7.4	36	44.4	13	16.0	7	8.6	15	18.5	4.7
e. Fishermen are often unsure about the accuracy of the information used by decision-makers to locate an MPA	2	2.5	4	4.9	3	3.7	38	46.9	24	29.6	10	12.3	0	0.0	4.3
f. Fishermen are able to have new information added to the public discussion on where an MPA should be located	8	9.9	6	7.4	9	11.1	42	51.9	14	17.3	1	1.2	1	1.2	3.7

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Q9. Please indicate the extent to which you agree or disagree with the following statements regarding the correctability of the information used to locate an MPA in CNMI.

	Strongly Disagree		Moderately Disagree		Slightly Disagree		Neutral		Slightly Agree		Moderately Agree		Strongly Agree		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	Mean
a. The process decision-makers follow in locating MPAs allows fishermen to correct information they believe to be incorrect	4	4.9	4	4.9	16	19.8	34	42.0	20	24.7	1	1.2	1	1.2	3.9
b. Fishermen have been successful in getting decision-makers to reconsider their decisions after an MPA has been created	7	8.6	6	7.4	16	19.8	39	48.1	9	11.1	2	2.5	2	2.5	3.6
c. Decision-makers are willing to remove an MPA that is not working, or is determined to be ill-advised or mis-located	12	14.8	9	11.1	18	22.2	37	45.7	2	2.5	3	3.7	0	0.0	3.2
d. Decision-makers are willing to revisit their information if fishermen believe it is wrong	9	11.1	9	11.1	12	14.8	35	43.2	11	13.6	4	4.9	1	1.2	3.6
e. There is a formal appeal process open to fishermen if they disagree with the quality of the information being used to locate an MPA	7	8.6	7	8.6	16	19.8	44	55.4	6	7.4	1	1.2	0	0.0	3.5
f. Once a decision is made about an MPA location, it is final and there is no method for appealing it	5	6.2	2	2.5	5	6.2	35	43.2	19	23.5	5	6.2	10	12.3	4.4

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Q10. Please indicate the extent to which you agree or disagree with the following statements.

	Strongly Disagree		Moderately Disagree		Slightly Disagree		Neutral		Slightly Agree		Moderately Agree		Strongly Agree		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	Mean
a. Information about CNMI MPA fishing rules and regulations is easy to find	4	4.9	10	12.3	19	23.5	8	9.9	21	25.9	14	17.3	5	6.2	4.2
b. Fishermen are notified of public hearings in plenty of time to be able to attend	6	7.4	11	13.6	21	25.9	17	21.0	17	21.0	9	11.1	0	0.0	3.7
c. Public hearings are scheduled at times convenient for fishermen to attend	5	6.3	8	10.0	18	22.5	20	25.0	8	10.0	14	17.5	7	8.8	4.1
d. Public hearings are scheduled at locations convenient for fishermen to attend	2	2.5	8	9.9	16	19.8	20	24.7	13	16.0	17	21.0	5	6.2	4.3
e. I am informed about any updates to fishing rules and regulations in plenty of time to be able to make any necessary adjustments to my fishing practices	7	8.6	8	9.9	22	27.2	22	27.2	16	19.8	5	6.2	1	1.2	3.7

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Q11. To what extent do you make use of the following sources for current information about fishing in CNMI?

	No Use		Almost No Use		A Little Use		Some Use		A Lot of Use		Not Applicable *		
	n	%	n	%	n	%	n	%	n	%	n	%	Mean
a. Fishing magazines	17	21.0	6	7.4	9	11.1	25	30.9	13	16.0	11	13.6	3.2
b. Government agency publications	5	6.2	8	9.9	24	29.6	34	42.0	10	12.3	0	0.0	3.4
c. Newspapers	9	11.1	5	6.2	21	25.9	31	38.3	15	18.5	0	0.0	3.5
d. Bait and tackle shops/companies	1	1.2	1	1.2	11	13.6	41	50.6	27	33.3	0	0.0	4.1
e. Fishing clubs/organizations	10	12.3	12	14.8	7	8.6	20	24.7	24	29.6	8	9.9	3.5
f. Television	23	28.4	8	9.9	9	11.1	13	16.0	14	17.3	14	17.3	2.8
g. Talking with other fishermen	1	1.2	0	0.0	6	7.4	22	27.2	52	64.2	0	0.0	4.5
h. Internet sites	12	15.2	4	5.1	7	8.9	21	26.6	33	41.8	2	2.5	3.8
i. Conservation organization publications	20	24.7	6	7.4	14	17.3	25	30.9	9	11.1	7	8.6	3.0
j. Radio	14	17.5	8	10.0	13	16.3	23	28.7	17	21.3	5	6.3	3.3

1=No use, 2=Almost no use, 3=A little use, 4=Some use, 5=A lot of use, 6=Not applicable, *Not included in mean score

Q12. Please indicate the extent to which you agree or disagree with the following statements regarding the decision-makers who determine where to locate an MPA.

	Strongly Disagree		Moderately Disagree		Slightly Disagree		Neutral		Slightly Agree		Moderately Agree		Strongly Agree		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	Mean
a. Decision-makers rely too much on political pressures, and not enough on scientific data when deciding where to locate MPAs.....	1	1.3	0	0.0	3	3.7	23	28.7	16	20.0	14	17.5	23	28.7	5.3
b. Decision-makers suppress their own personal preferences when deciding where to locate an MPA	1	1.3	2	2.5	2	2.5	30	37.5	24	30.0	16	20.0	5	6.3	4.8
c. Decision-makers are more interested in biological considerations than in the welfare of fishermen when locating an MPA	4	5.0	1	1.3	6	7.5	29	36.3	15	18.8	15	18.8	10	12.5	4.7
d. Those deciding on where to locate MPAs give equal consideration to biological, economic and cultural factors.....	2	2.5	1	1.3	10	12.5	42	52.5	18	22.5	4	5.0	3	3.8	4.2
e. Decision-makers already know where they want to locate an MPA, and the public input sessions are merely a required formality they will later ignore	1	1.3	0	0.0	2	3.8	35	44.9	20	25.6	11	14.1	9	11.5	4.8

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Q13. When it comes to the ethicality of decision-makers involved in locating an MPA,

	Strongly Disagree		Moderately Disagree		Slightly Disagree		Neutral		Slightly Agree		Moderately Agree		Strongly Agree		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	Mean
a. Decision-makers show concern for fishermen during the process of locating an MPA	5	6.3	7	8.8	18	22.5	27	33.8	23	28.7	0	0.0	0	0.0	3.7
b. Fishermen feel welcome at meetings where decisions on where to locate an MPA are being discussed	4	5.0	5	6.2	15	18.8	30	37.5	23	28.7	3	3.8	0	0.0	3.9
c. Decision-makers consider the safety of fishermen when making decisions about where to locate an MPA	4	5.0	6	7.5	20	25.0	38	47.5	11	13.8	1	1.3	0	0.0	3.6
d. Professionally, decision-makers have an obligation to fairly consider the interests of fishermen when deciding where to locate an MPA	3	3.8	4	5.0	6	7.5	28	35.0	18	22.5	5	6.3	16	20.0	4.7
e. Decision-makers try their best to balance the needs of the environment with the needs of fishermen and their communities when deciding where to locate an MPA	3	3.8	8	10.0	7	8.8	34	42.5	23	28.7	5	6.3	0	0.0	4.0

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree

Q14. When thinking about MPAs in CNMI overall, to what extent do you consider the following to be fair or unfair?

	Extremely Unfair		Moderately Unfair		Somewhat Unfair		Neutral		Somewhat Fair		Moderately Fair		Extremely Fair		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	Mean
a. The decision-making process for deciding where to locate MPAs around CNMI	6	7.6	8	10.1	12	15.2	35	44.3	14	17.7	4	5.1	0	0.0	3.7
b. Treatment of all fishermen during the process of deciding where to locate an MPA	3	3.8	11	13.9	17	21.5	37	46.8	7	8.9	4	5.1	0	0.0	3.6
c. How fishing regulations within an MPA are decided	1	1.3	9	11.4	26	32.9	27	34.2	13	16.5	3	3.8	0	0.0	3.7
d. The role fishermen play in the ongoing management of MPAs	4	5.1	7	9.0	18	23.1	28	35.9	14	17.9	7	9.0	0	0.0	3.8
e. The openness and transparency of the process that decision-makers use to locate MPAs	6	7.6	11	13.9	11	13.9	31	39.2	16	20.3	4	5.1	0	0.0	3.7

1=Extremely unfair, 2=Moderately unfair, 3=Somewhat unfair, 4=Neutral, 5=Somewhat fair, 6=Moderately fair, 7=Extremely fair

Q15. In general, how have CNMI MPAs affected the number of fishing trips you take?

Effect of MPAs on Number of Fishing Trips	Count	Total	Percent	Total Percent
I take far fewer fishing trips because of MPAs	7	7	8.9	8.9
I take fewer fishing trips because of MPAs	19	26	24.1	32.9
I take about the same number of fishing trips, even with the MPAs	51	77	64.6	97.5
I take more fishing trips because of MPAs	1	78	1.3	98.7
I take many more fishing trips because of MPAs	1	79	1.3	100.0

Q16. To what extent have the following MPAs limited <u>where you most prefer to fish</u>?

MPA	Not Limited n	Not Limited %	Slightly Limited n	Slightly Limited %	Somewhat Limited n	Somewhat Limited %	Moderately Limited n	Moderately Limited %	Very Limited n	Very Limited %	Strongly Limited n	Strongly Limited %	Completely Limited n	Completely Limited %	Not Applicable * n	Not Applicable * %	Mean
a. Managaha	11	13.6	3	3.7	10	12.3	13	16.0	14	17.3	5	6.2	10	12.3	15	18.5	4.1
b. Bird Island	12	14.8	3	3.7	7	8.6	14	17.3	14	17.3	5	6.2	8	9.9	18	22.2	4.0
c. Forbidden Island	15	18.5	2	2.5	6	7.4	16	19.8	11	13.6	5	6.2	8	9.9	18	22.2	3.8
d. Laulau Bay	15	18.5	3	3.7	7	8.6	12	14.8	11	13.6	8	9.9	7	8.6	18	22.2	3.8
e. Lighthouse Reef	13	16.0	5	6.2	6	7.4	10	12.3	15	18.5	7	8.6	7	8.6	18	22.2	3.9

1=Not limited, 2=Slightly limited, 3=Somewhat limited, 4=Moderately limited, 5=Very limited, 6=Strongly limited, 7=Completely limited, 8=Not Applicable, * Not included in mean score

Q17. Thinking about whether or not an MPA has affected your fishing activity, to what extent have the following aspects of your fishing trips improved or become worse due to where an MPA is located?

Fishing Trip Aspects	Much Worse n	%	Worse n	%	Somewhat Worse n	%	No Change n	%	Somewhat Better n	%	Better n	%	Much Better n	%	Not Applicable * n	%	Mean
a. Overall expenses for individual fishing trips	7	8.6	4	4.9	17	21.0	42	51.9	3	3.7	3	3.7	0	0.0	5	6.2	3.5
b. Catch per unit effort	1	1.2	3	3.7	15	18.5	44	54.3	10	12.3	3	3.7	0	0.0	5	6.2	4.0
c. Access to the type of fish I desire to catch	2	2.5	1	1.2	19	23.5	49	60.5	3	3.7	2	2.5	0	0.0	5	6.2	3.7
d. Fish landings	2	2.5	0	0.0	19	23.5	52	64.2	1	1.2	2	2.5	0	0.0	5	6.2	3.7
e. My actual financial earnings	0	0.0	0	0.0	8	11.1	57	70.4	2	2.5	2	2.5	1	1.2	10	12.3	4.0
f. Predictability of my financial earnings	0	0.0	1	1.2	12	14.8	53	65.4	3	3.7	3	3.7	0	0.0	9	11.1	3.9
g. Average distance I must travel to launch my boat (miles, 1-way)	1	1.2	0	0.0	20	24.7	42	51.9	7	8.6	3	3.7	0	0.0	8	9.9	3.9
h. Average distance I must travel in my boat while fishing (miles)	1	1.3	4	5.0	22	27.5	38	47.5	1	1.3	6	7.5	1	1.3	7	8.8	3.8
i. Average time of a fishing trip (hours)	1	1.2	2	2.5	18	22.2	44	54.3	7	8.6	3	3.7	0	0.0	6	7.4	3.8
j. Amount of fish caught for home consumption	2	2.5	2	2.5	26	32.1	33	40.7	7	8.6	2	2.5	2	2.5	7	8.6	3.7

1=Much worse, 2=Worse, 3=Somewhat worse, 4=No change, 5=Somewhat better, 6=Better, 7=Much better, 8=Not Applicable, *Not included in mean score

Q18. To what extent do you agree or disagree with the following statements concerning how the location of MPAs has affected you?

Effect of MPA	Strongly Disagree n	%	Moderately Disagree n	%	Slightly Disagree n	%	No Neutral n	%	Slightly Agree n	%	Moderately Agree n	%	Strongly Agree n	%	Not Applicable * n	%	Mean
a. Ocean conditions where I must now fish are less safe than where I fished before	4	4.9	5	6.2	7	8.6	37	45.7	15	18.5	2	2.5	2	2.5	9	11.1	3.9
b. I do not know the areas where I now have to fish as well as my previous fishing areas	5	6.2	2	2.5	14	17.3	37	45.7	9	11.1	1	1.2	2	2.5	11	13.6	3.8
c. It is less safe now because I have to travel farther to reach a fishable area	2	2.5	2	2.5	9	11.3	30	37.5	24	30.0	1	1.3	3	3.8	9	11.3	4.2
d. My boat is not adequate to travel safely to other fishable areas	3	3.7	7	8.6	9	11.1	31	38.3	15	18.5	2	2.5	2	2.5	12	14.8	4.0
e. I cannot use my preferred fishing method/technique in other fishing areas	3	3.7	4	4.9	12	14.8	34	42.0	13	16.0	2	2.5	6	7.4	7	8.6	4.1
f. I do not have the appropriate equipment to fish in other areas	4	4.9	4	4.9	14	17.3	30	37.0	11	13.6	1	1.2	9	11.1	8	9.9	4.1

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree, 8=Not Applicable, *Not included in mean score

Q18. To what extent do you agree or disagree with the following statements concerning how the location of MPAs has affected you? (cont.)

Effect of MPA	Strongly Disagree		Moderately Disagree		Slightly Disagree		No Neutral		Slightly Agree		Moderately Agree		Strongly Agree		Not Applicable *		Mean
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
g. I spend more time traveling to where I now fish because of where MPAs are located	2	2.5	2	2.5	10	12.3	33	40.7	17	21.0	3	3.7	4	4.9	10	12.3	4.2
h. I now fish for a different species because of where the MPAs are located	5	6.2	2	2.5	10	12.3	35	43.2	12	14.8	1	1.2	4	4.9	12	14.8	4.0
i. The waters I now fish in are more crowded due to the location of MPAs	2	2.5	6	7.4	10	12.3	33	40.7	13	16.0	3	3.7	4	4.9	10	12.3	4.0
j. My costs to fish have increased due to the location of MPAs	4	5.0	5	6.3	7	8.8	42	52.5	9	11.3	0	0.0	4	5.0	9	11.3	3.9
k. The waters I now fish in are less productive than the waters where MPAs are located	2	2.5	7	8.6	11	13.6	31	38.3	11	13.6	6	7.4	5	6.2	8	9.9	4.1

1=Strongly disagree, 2=Moderately disagree, 3=Slightly disagree, 4=Neutral, 5=Slightly agree, 6=Moderately agree, 7=Strongly agree, 8=Not Applicable, *Not included in mean score

Q19. To what extent do you believe the following statement is fair or unfair?
When thinking about MPAs in CNMI, I feel that the overall process decision-makers use to locate an MPA is:

Overall Fairness	Count	Total	Percent	Total Percent
Extremely Unfair	1	1	1.3	1.3
Moderately Unfair	5	6	6.5	7.8
Somewhat Unfair	23	29	29.9	37.7
Neutral	30	59	39.0	76.6
Somewhat Fair	15	74	19.5	96.1
Moderately Fair	3	77	3.9	100.0
Extremely Fair	0	77	0.0	100.0

Mean Fairness = 3.8 (Somewhat unfair to Neutral)

1=Extremely unfair, 2=Moderately unfair, 3=Somewhat unfair, 4=Neutral, 5=Somewhat fair, 6=Moderately fair, 7=Extremely fair

Q20. Are you?

Gender	Count	Total	Percent	Total Percent
Male	66	66	81.5	81.5
Female	15	81	18.5	100.00

Q21. What is your age?

Age in Years	Count	Total	Percent	Total Percent
18-19	9	9	11.1	11.1
20-29	26	35	32.1	43.2
30-39	20	55	24.7	67.9
40-49	12	67	14.8	82.7
50-59	10	77	12.3	95.1
60-69	3	80	3.7	98.8
70	1	81	1.2	100.0

Mean Age = 35.3 years