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People and the Mediterranean Monk Seal (*Monachus monachus*): A Study of the Socioeconomic Impacts of the National Marine Park of Alonissos, Northern Sporades, Greece

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Abstract

The National Marine Park of Alonissos, Northern Sporades (NMPANS) in Greece is one of the few areas worldwide dedicated to the protection of the critically endangered Mediterranean monk seal (*Monachus monachus*). The impacts of the establishment of this protected area on the local monk seal population have been thoroughly documented for the last 20 y; in contrast, little is known of the socioeconomic impacts from the establishment of the park on the residents of the island of Alonissos. The aim of this study was to record, using a methodological approach based on Social Impact Assessment, the attitudes of residents and visitors of Alonissos and to assess the social and economic impacts generated by the establishment and management of the NMPANS. The majority of the residents of Alonissos acknowledged the importance of the marine park in promoting the public image of the island, a fact they believed had not yet resulted in major improvements to their livelihood. They believed that the establishment of the park had led to considerable economic losses to the local fishing industry and expressed concerns on the effects of the park on the local human social structure and traditions. Positive effects were detected primarily from the tourism sector. Visitors to Alonissos valued the area for its natural beauty but were disappointed by the lack of coordinated effort to promote these natural resources. Based on the findings of this study, we conclude that the NMPANS has been generally successful in meeting its biodiversity goals but considerably less effective in attaining basic measures of socioeconomic success. If the population's socioeconomic expectations from the establishment of the park are to be fulfilled, the newly established management body of the park must improve communication and establish working collaborations with the local population of Alonissos.

Key Words: conservation, Mediterranean monk seal, *Monachus monachus*, economic impacts, local people, National Marine Park of Alonissos, Northern Sporades, Greece, management

Introduction

In the face of species extinction rates that have exceeded 100 to 1,000 times their pre-human levels (Pimm et al., 1995), 193 Parties to the Convention on Biological Diversity agreed in 1992 to "achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional, and national levels as a contribution to poverty alleviation and to the benefit of all life on Earth" (United Nations Environmental Program [UNEP], 2002, p. 305). Having arrived at the year 2010, the self-imposed UNEP deadline, it is clear that the goal identified in 1992 has not been achieved. Rates of biodiversity loss continue to increase, and several species of wildlife are being driven toward extinction annually. However, systematic conservation efforts have produced a few notable exceptions, including marine mammals such as the Northern elephant seal (*Mirounga angustirostris*) and the humpback whale (*Megaptera novaeangliae*) (Hoelzel et al., 1993; Hoffmann et al., 2010).

These species, which have rebounded from likely extinction, would not have achieved success without the protection of various critical habitats through the establishment of protected areas (Chape et al., 2005). The current general scientific consensus supports that the establishment of Marine Protected Areas (MPAs) is of paramount importance for the conservation of marine biodiversity and for the sustainable economic development of the seas (Agardy, 1994;

Salm et al., 2000). MPAs are currently among the most important tools of marine conservationists, especially for the protection of marine megafauna (Hooker & Gerber, 2004; Hoyt, 2004; Reeves, 2009). Numerous studies have focused on evaluating the ecological effects of the establishment of MPAs both inside and outside their boundaries (Boersma & Parrish, 1999); still, very few studies have dealt with the equivalent social and economic effects of MPAs (Carter, 2003; Pelletier et al., 2005).

The Mediterranean monk seal (*Monachus monachus*) is currently the most endangered pinniped on earth (International Union for Conservation of Nature [IUCN], 2010), with an estimated total population of fewer than 600 individuals. Mediterranean monk seals are threatened by habitat destruction and fragmentation, negative interactions with fisheries that include deliberate killings and accidental entanglements in fishing gear, stochastic events, and pollution (Johnson et al., 2006; MOm, 2007). The largest remaining population of Mediterranean monk seals survives in the Greek waters of the Ionian and Aegean Seas, where the species is protected by strict laws, and population numbers appear to be stable (MOm, 2007, 2008, 2009a). Creation of a functional network of MPAs, and their effective management and operation, is a priority conservation action for the protection of this monk seal species in Greece (Archipelagos/MOm, 1996; Notarbartolo di Sciara et al., 2009).

Situated in the northwestern Aegean Sea (Figure 1), the National Marine Park of Alonissos, Northern Sporades (NMPANS) was the first MPA established in Greece. In the early 1970s, scientists realized that this area of the Aegean Sea was one of the few remaining habitats of the critically endangered Mediterranean monk seal (Schultze-Westrum, 1977; Kumerloeve, 1982). But it was not until 1992 that the area was declared a National Marine Park by a Presidential Decree in order to protect the natural and cultural environment of the region in general, and the largest known population of Mediterranean monk seals in particular (*Hellenic Republic National Gazette*, Issue 519, 1992, 5301).

Since the establishment of the NMPANS and because of the critically endangered status of the Mediterranean monk seal, most scientific research in the area has focused on the biology and dynamics of the target species population (Dendrinos et al., 1994, 1999, 2007a, 2007b, 2007c; Politikos & Tzanetis, 2009). Additionally, Karamanlidis and colleagues have examined the intensity of human activity in the park and its impact on habitat use by monk seals (Karamanlidis, 1997; Karamanlidis et al., 2004). In contrast, only two studies have dealt with the potential socioeconomic effects of the establishment of the NMPANS (Trivourea, 2001; Oikonomou & Dikou, 2008).

The aim of this study was to document the attitudes of the residents of and visitors to Alonissos and to assess the social and economic impacts on the residents of the area that have been generated by the establishment and the up-to-date management of the NMPANS. A parallel aim was to provide recommendations for the effective future management of the NMPANS as at the time of this study no management authority for the MPA was established nor was a management plan operational.

Materials and Methods

Study Area

The NMPANS has a surface area, including all land masses, of approximately 2,200 km^2 with a circumference of 180 km; it is divided into two zones, Zone A and Zone B, with varying degrees of protection (Figure 1). Zone A includes five large and several smaller uninhabited islands and the marine area surrounding them. Regulations on all activities vary between the different islands in Zone A. Stricter protection measures have been implemented for the island of Gioura, where visitors may not approach closer than 400 m to the island's coast. Medium-size professional fisheries (i.e., purse seines and trawlers longer than 12 m) are strictly regulated: nonprofessional fishing is not allowed in this zone except at a distance of 500 m from the island of Skantzoura. Most areas of Zone A are open to tourism and small-scale traditional professional fisheries (i.e., vessels smaller than 12 m). The Core Zone of the NMPANS is located within Zone A and includes the uninhabited island of Piperi and the marine area of 3 nmi around it. The coast of Piperi represents the area with the highest concentration of suitable monk seal caves

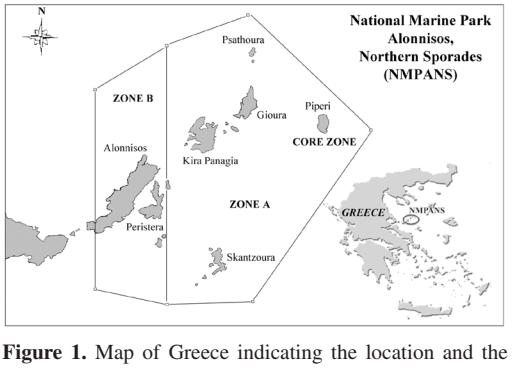

Figure 1. Map of Greece indicating the location and the various protection zones of the National Marine Park of Alonissos, Northern Sporades

in the region (Dendrinos et al., 2007c). No human activity is allowed within this Core Zone, except scientific research and management.

Zone B includes the only inhabited island of the NMPANS (Alonissos), several smaller islands, and the marine area around them. In this section of the NMPANS, most human activities are allowed. During this study, the total population of Alonissos included 2,985 residents (General Secretariat of National Statistical Service of Greece, 2001). Their main economic activities included fishing, stock farming, agriculture, and tourism (Christou, 1987). According to Christou (1987), Alonissos was the biggest coastal fisheries center in the Prefecture of Magnesia. One hundred local vessels were used for fishing, of which 59 belonged to members of the Fisheries Co-operative of Alonissos (Hellenic Ministry of the Environment, Physical Planning and Public Works, 1997). In fact, fisheries and the tourism sector were the most common occupations for the residents of Alonissos (Hellenic Ministry of the Environment, Physical Planning and Public Works, 1997), while some fishermen also gained income from agriculture, stock farming, or tourism. During this study, the management of the NMPANS was under the responsibility of the Hellenic Ministry of the Environment, Physical Planning and Public Works, located in Athens, and no management body had been established locally.

Study Design

In order to assess the social and economic impacts generated by the establishment and operation of the NMPANS, a methodological model based on a Social Impact Assessment (SIA) (Becker, 1997; Burdge, 2004) was adopted. The SIA, as defined by Hough (1991) and later modified by Fortin & Gagnon (1999), "is a tool that, through the systematic gathering and analysis of social data, can be used to assist in predicting the impacts of alternative courses of action on human societies" and that "can also be used retrospectively to identify and mitigate adverse effects in ongoing projects" (Fortin & Gagnon, 1999, p. 203). SIA is increasingly utilized in policymaking and plan implementation as an institutional procedure, subject to specific requirements of laws and regulations. It is also utilized as a research, open procedure that takes place at the community level as was the case in this study. Quantitative and qualitative data were combined as they both contributed important information to the assessment procedure.

During the preparatory phase that included an initial literature review and informal conversations with individuals familiar with the NMPANS, the main stakeholders of the particular MPA were identified. Following that, in preparation of the elaboration of the questionnaires for the local residents and visitors of the NMPANS, semistructured interviews were conducted with at least one representative from each stakeholder group, which covered the following four major thematic areas:

1. What were the social and economic benefits for the local community anticipated from the park prior to its establishment?
2. Had these expectations materialized and in what way?
3. What advantages and disadvantages were brought to the local community by the establishment of the park? Who benefited and who lost from the establishment of the park and in what way?
4. What improvements were essential so that the park would contribute more socially and economically to the local development and to the people's lives?

In total, 13 preparatory interviews were conducted. Two representatives were interviewed from the Hellenic Ministry of Environment, Physical Planning and Public Works and the MOm/Hellenic Society for the Study and Protection of the Monk Seal. One representative was interviewed from the Municipality of Alonissos, the Port Police Authority of Alonissos, the Women's Agrotourism Co-operative of Alonissos, the Ecological and Cultural Society of Alonissos, the High School of Alonissos, the Restaurant and Entertainment Enterprises Owners Association of Alonissos, the History and Folklore Museum of Alonissos, and the Hotel Owners Association. Although an initial interview was conducted with the president of the Fisheries Co-operative of Alonissos, it was later withdrawn on his own initiative. Subsequently, a collective statement formulated among its members was provided.

The key topics identified as the most important by the main stakeholders provided the foundation for the development of two questionnaires that were used to survey residents and tourists with respect to their attitudes and expectations of the MPA. The surveys were conducted on site in Alonissos island, the only inhabited island of the NMPANS, in the summer of 2001. The first questionnaire addressed the attitudes and expectations of Alonissos residents and included a set of open-ended general background questions and 12 closed-ended questions that could be answered through a multiple-choice selection. Due to the limited availability of the local population, resulting from their long working hours during the tourism season, random sampling was not feasible. Instead, residents from all five major settlements

of Alonissos (i.e., Palaia Chora, Patitiri, Rousoum Gialos, Steni Vala, and Votsi) were asked in person by the researcher to participate in the survey when met on the street. Also, due to time limitations, every second shop in the five major communities of Alonissos was visited, and both owners and employees were asked to participate. The second questionnaire examined attitudes and expectations of the visitors to Alonissos; this questionnaire included 11 open- and closed-ended questions and was conducted in person by the researcher and was given only to the tourists found during the day at the main beaches of Alonissos island. The researcher marked himself the selected choice for the closed-ended questions and recorded the full answer for the open-ended questions.

Data from the questionnaires were augmented by secondary data that included population statistics, information regarding the annual number of tourists, and statistical data regarding the development of tourist accommodation capacity since 1992 (General Secretariat of National Statistical Service of Greece, 2001). Also, economic trends data were examined in association with the questionnaire responses; the relevant data were provided by the National Bank of Greece (N. Trivoureas, pers. comm., 18 June 2001), based on the activities of the local bank branch.

Results

Survey of the Residents of Alonissos

In total, 96 questionnaires were completed by residents of Alonissos, while only seven people refused to participate, leading to a response rate of 93.2%. The locals questioned represent 3.45% of the total resident population officially registered in the municipality records. In view of the fact that about 30% of the registered locals in fact reside elsewhere in the country, we consider the sample representative of the actual resident population. Forty-seven percent of respondents were female and 53% male. Of the interviewees, 17%, 17%, 13%, and 10% were private employees, commercial traders, fishermen, and public servants, respectively. The remaining 43% were of different occupations with percentages less than 5%. (Table 1 provides a summary of the descriptive statistics of the respondents.) The majority of the interviewees were between 25 and 44 y of age (62%), while 55% had completed high school or other higher education.

With respect to the perception of the overall importance of the NMPANS, the majority of residents responded that this MPA played a significant role in promoting Alonissos to the outside world (Question 1; i.e., 49% believed that the NMPANS helped Alonissos become famous within Greece and abroad to a large degree and 34% to a moderate degree) and provided an important opportunity for socioeconomic development of the island (Question 4; i.e., 48% to a large degree and 19%

Table 1. Summary of descriptive statistics of local residents interviewed

Nationality	**(%)**	**Occupation**	**(%)**
Greek	99	Public servant	10
Dutch	1	Fisherman	13
		Retired	2
Gender	**(%)**	Restaurant owner	5
Male	53	Tourists' accommodation owner	3
Female	47	Private company employee	17
		Commercial trader	17
Age	**(%)**	More than one (at least one in tourism)	6
Less than 17	6	Other	27
18-24	6		
25-34	35	**Settlement of Residence**	**(%)**
35-44	27	Patitiri	60
45-64	21	Votsi	22
65+	5	Palaia Chora	10
		Steni Vala	5
Education	**(%)**	Rousoum Gialos	2
Primary school	26	Other	1
Gymnasium (junior high school)	19		
Lyceum (high school)	35		
Higher education	20		

to a moderate degree). Most interviewees also believed that visitors to the island showed a considerable interest in the park (Question 3; i.e., 58% to a large degree and 24% to a moderate degree). In contrast, almost half of the surveyed Alonissos residents (Question 2; i.e., 40% in total) did not believe that the creation of the NMPANS contributed significantly to the protection of the local Mediterranean monk seal population and the natural environment in general (Table 2).

Regarding economic impacts (Table 3), a bit more than half of the residents of Alonissos (56%) did not believe that the establishment of the NMPANS had a significant impact on their income over the past 5 y (Question 5). Despite this response, a large proportion of residents (40%) believed that the establishment of the NMPANS resulted in a considerable increase in local tourism (Question 6). In relation to sociological impacts (Question 7; Table 4), 64% of the residents of Alonissos believed that the increase in tourism had a significant effect on their society through the distortion of human ties, 48% believed that the increase in tourism had a significant effect on their society through the abandonment of traditional professions, and 46% believed that the increase in tourism had a significant effect on their society through the creation of new opportunities for meeting other people from other areas of Greece or other countries. Roughly 50% of the interviewees replied that the establishment of the NMPANS had little or no effect on the development of new public infrastructures (e.g., roads, ports, etc.) for the island. Furthermore, the majority (77%) of the residents believed that the establishment of the NMPANS had a significant negative impact on the livelihood of local fishermen (Table 5). In contrast, these same respondents considered that the effect of the NMPANS on the livelihood of people working in the tourism industry was either positive (44%) or had no impact (46%).

In order to mitigate the perceived negative effects on fisheries by the NMPANS, the majority of the resident responders (i.e., 63% perceived the effect to be strongly negative and 16% moderately negative) believed that compensation for damage to fishing gear by monk seals should be provided (Table 6). In addition, the establishment of a management body of the NMPANS with participation of the local society (61%), the reduction of fisheries regulations (49%), and the increased involvement of fishermen in tourism (45%) would also help alleviate some of the negative effects of the park. In contrast, resident responders did not believe that a more intensive guarding of the NMPANS would have a significant positive effect on the livelihood of local fishermen.

Since the establishment of the NMPANS through state and European Union funds allocated to nature conservation, several projects related to community infrastructure have been completed (i.e., road paving, construction of two fishery ports, landscaping works at the main port of Alonissos, completion of the island's heliport). These projects were used frequently (48%), occasionally (19%), rarely (17%), or never (17%) by

Table 2. Local perceptions regarding the overall importance of the NMPANS

Question	To a large degree (%)	To a moderate degree (%)	To a small degree (%)	Not at all (%)
1	49	34	9	8
2	34	26	20	20
3	58	24	16	2
4	48	19	17	16

Q1: Did the NMPANS help Alonissos become famous within Greece and abroad?
Q2: Is the existence of the NMPANS important for the protection of the Mediterranean monk seal and the natural environment of Alonissos?
Q3: Do the visitors of Alonissos ask about the NMPANS and are they interested in learning about it?
Q4: Is the NMPANS an important opportunity for the socioeconomic development of Alonissos?

Table 3. Local perceptions regarding the economic impact of the establishment of the NMPANS

Question	Increased considerably (%)	Remained the same (%)	Decreased considerably (%)
5	21	56	13
6	40	46	14

Q5: Your income in the last five years has . . .
Q6: After the establishment of the NMPANS in 1992, tourism has . . .

Table 4. Local perceptions regarding the socioeconomic effects of the establishment of the NMPANS through the increase of tourism

Question 7	Significant effect (%)	Moderate effect (%)	Small effect (%)	No effect (%)
A	48	17	24	11
B	64	12	15	9
C	46	25	17	12
D	24	28	27	21

A: Abandonment of traditional professions
B: Distortion of human ties
C: Creating opportunities for meeting new people
D: Development of new infrastructure

Table 5. Local perceptions regarding the establishment of the NMPANS and its effects on the local tourism and fishing industry

Question	It has benefited considerably (%)	It has not benefited or lost (%)	It has lost considerably (%)
8	44	46	9
9	3	18	77

Q8: How has the establishment of the NMPANS affected the local tourism industry?
Q9: How has the establishment of the NMPANS affected the local fishing industry?

Table 6. Local perceptions regarding the effect of proposed changes in the NMPANS in relevance to the livelihood of local fishermen

Question 10	Strong effect (%)	Moderate effect (%)	Small effect (%)	No effect at all (%)
A	14	16	17	48*
B	63	16	6	10
C	45	23	15	12
D	61	13	16	5
E	49	9	13	22

A: More intensive guarding of NMPANS
B: Suitable compensation regulations for net damages by monk seals
C: License to transport visitors to the NMPANS with their boats
D: Institution of a management body with the participation of local people
E: Reduction in fisheries regulations
* Proposed changes A, B, C, and D were not answered by 5%, and E was not answered by 7% of the people interviewed.

residents of Alonissos who participated in the survey (i.e., Question 11).

Finally, regarding the survey-proposed potential changes to the NMPANS that could improve the socioeconomic living standards on the island, the residents of Alonissos believed that the establishment of a management body (74%), the development of additional activities within the park that are not related to the Mediterranean monk seal (74%), and the construction of additional community infrastructure projects (67%) would have the strongest positive impact (Table 7). In contrast, the expansion of the NMPANS so as to include natural areas of neighboring islands, was not considered by the vast majority of residents (83%) to be an appropriate measure for improving the socioeconomic situation on Alonissos island.

Survey of the Visitors of Alonissos

In total, 101 questionnaires were completed by visitors to Alonissos island. None of the visitors who were asked to participate in the survey refused to do so. The visitor responders were from Greece (45%), the UK (19%), Germany (8%), Denmark (7%), and Italy (6%), with the remaining responders (15%) originating from various other countries.

Visitors came to the island for various reasons. The most frequent among them include the landscape (23%), the tranquility (17%), the solitude

Table 7. Local perceptions regarding the effect of proposed changes in the NMPANS on the socioeconomic living standards on the island of Alonissos

Question 12	Strong effect (%)	Moderate effect (%)	Small effect (%)	No effect at all (%)
A	74	16	8	2
B	67	13	15	5
C	74	15	9	2
D	6	2	9	83
E	51	19	21	9

A: Establishment of the management body of the NMPANS
B: Infrastructure development due to the marine park to improve quality of life
C: Development of more activities connected to the marine park so that the monk seal is not the only attraction for visitors
D: Inclusion of neighbor islands to the NMPANS
E: Environmental education of local people and visitors in regard to the NMPANS

(14%), the natural beauty of the area (12%), and the NMPANS (7%). Most of the visitors (71%) knew prior to their arrival that Alonissos was part of a National Marine Park, but only 33% of them thought that the NMPANS was what they expected it to be. Reasons why visitors were disappointed by the NMPANS included the fact that they did not see any monk seals and that tourists' trips operating in the area did not provide enough information on the aims of the NMPANS, the natural environment or the ecology of the area, nor the status of the local monk seal population. Reasons for being disappointed also included the inadequate implementation of the park's regulations and the general lack of appropriate signage and infrastructure (e.g., roads, nature paths, bird-watching kiosks, etc.). Visitors who thought the NMPANS was better than what they expected it to be were surprised by its size and the fact that it was an open natural area and not an enclosed setting. About half of the visitors staying on the island had visited or were planning to visit other areas of the park. Only 9% of visitors felt in some way limited during their visit by existing regulations of the park (Table 8). The majority (78%) of all visitors interviewed responded that they would be willing to pay an entrance fee in order to visit the uninhabited areas of the NMPANS (even though it was free of charge at the time of the study). Indicative of the visitors' overall satisfaction is that 96% of those interviewed stated that they would visit the island again and that they would recommend Alonissos to their friends as a place to visit.

Mass media (29%), a travel guide for Greece (13%), a travel agent in the country of origin (11%), and the MOm/Hellenic Society for the Study and Protection of the Monk Seal Information Center (9%) were the main initial sources of information about the NMPANS.

Secondary Data

The secondary data used to augment the survey responses included tourism- and community infrastructure development-related statistics and figures on economic trends which were provided upon request from the National Statistical Service (General Secretariat of National Statistical Service of Greece, 2001) and from the local branch of the National Bank of Greece (N. Trivoureas, pers. comm., 18 June 2001).

Since the establishment of the NMPANS, tourism-related statistics indicate that Alonissos exhibited a considerable increase in tourism. In particular, between 1992 and 1999, the mean annual increase in the accommodation capacity

Table 8. Visitors' attitudes towards the NMPANS and the island of Alonissos

Question	Yes (%)	No (%)
2	71	29
3	33	34
4	58	42
5	78	22
6	9	91
7	100	--
8	96	4

Q2: Did you know before your arrival that Alonissos is part of a National Marine Park?
Q3: Was the NMPANS what you expected it to be?
Q4: Have you visited or are you planning to visit areas of the NMPANS other than Alonissos (i.e., the marine areas or the uninhabited islands where access is allowed)?
Q5: Would you be willing to pay an entrance fee to visit areas of the NMPANS other than Alonissos?
Q6: Was your visit in any way limited by the restrictions of the NMPANS?
Q7: Would you recommend Alonissos as a place to visit to your friends?
Q8: Would you visit Alonissos again in the future?

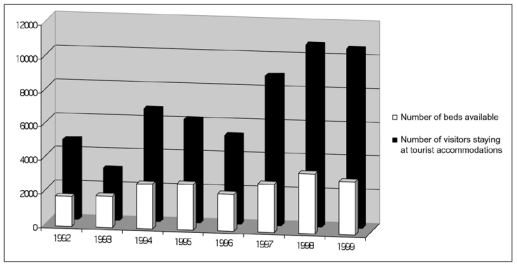

Figure 2. Annual statistics of beds available and visitors staying at tourist accommodations at the island of Alonissos in the Northern Sporades, Greece (General Secretariat of National Statistical Service of Greece, 2001)

of Alonissos (i.e., number of beds available) was 10.5%. It is of interest to note that, in the same period, the relevant figures for the more developed neighboring islands of Skiathos and Skopelos were 2.4% and -9.5%, respectively. At the same time, Alonissos also exhibited a mean annual increase of 21.27% in the number of tourists arriving to the island's tourist accommodations (Figure 2). This figure is substantially higher than for figures recorded on neighboring Skiathos and Skopelos islands, where the number of tourist arrivals increased by 5.7% and 5.9%, respectively.

As an indication of the economic activity on Alonissos, the percentages of three major banking activities from the local branch of the National Bank of Greece, which was fully operational in 1996, are presented in Table 9. The mean annual increase between 1996 and 2000 in private deposits in Drachmas was 48.2%, while deposits in foreign currency were 134.8% and the purchase of foreign currency was 158.4%. It should be noted that the corresponding figures (mean annual change) at the same time for Skiathos Island were 21.8%, 19.8%, and 65.4%; and for Skopelos Island, they were 21.2%, 19.8%, and 65.4%. Still, as Alonissos is a smaller (tourism) market, any major banking transaction could have had a significant effect on the described percentages.

Discussion

The successful establishment and effective management of an MPA, especially in areas with small and rural communities, are considered to be closely linked with the acceptance, participation, and active involvement of residents (Kelleher & Recchia, 1998; Badalamenti et al., 2000). The NMPANS, one of the few MPAs in Greece, has been the subject of ongoing interest and concern as to whether it has managed to achieve such local support. The present study shows that it has had, at best, limited success towards this goal.

Based on background information collected during the preparatory interviews with key stakeholders, it seemed that when the NMPANS was established, and despite expressed concerns, the local community did generally embrace the creation of a marine park in their region. Although future expectations of the local community were not formally recorded at that time, key issues raised and gains anticipated related to protection of natural resources, including fish stocks; job creation; and increased tourism. Furthermore, as the local community was relatively isolated and underdeveloped, it was also expected that the creation of the NMPANS would attract the attention of central authorities that would result in greater support for the general development of the island. Since the establishment of the NMPANS, however, as reported by most of the stakeholder representatives during the preparatory interviews, local support and acceptance have not followed a steady course, and the park itself has been the subject of ongoing debate within the small community of Alonissos, especially in terms of gains achieved and costs suffered. The present study, which was conducted almost a decade after the establishment of the park, is in fact the first attempt to record and assess the perceptions and attitudes of residents with respect to impacts of the NMPANS on their livelihood and on the overall development of their community.

It is important to first note that the public perception regarding the impact of the NMPANS on the conservation of the natural environment

Table 9. Economic activities of Alonissos as recorded by the local branch of the National Bank of Greece, 1996 to 2000 (unpub. data)

	1996 (annual % change)[1]	1997 (annual % change)	1998 (annual % change)	1999 (annual % change)	2000 (annual % change)
Deposits in drachmas	107	25	68	24	17
Deposits in foreign currency	280	116	298	-32	12
Purchase of foreign currency from tourists	-38	80	756	-26	20

[1]Each of the above percentages is given in comparison with the preceding year.

of the area was mixed. While the majority of the interviewed residents seemed to believe that the marine park has an important role in the socioeconomic development of the island, a considerable percentage of those interviewed (40%) considered the MPA of little or no importance to the conservation of the natural environment of their area. In a similar survey conducted in 2005 (Oikonomou & Dikou, 2008), local perceptions remained mixed, with fishermen being the responders with the most negative comments on the impact and importance of the NMPANS for the conservation of nature. In contrast, local high school students and visitors (both domestic and foreign) felt that the existence of the NMPANS was important, if not absolutely necessary, for the protection of the local Mediterranean monk seal and for the overall conservation of the natural environment of the area. This has been supported further by the scientific data regarding the status of the Mediterranean monk seal population in the area that show the monk seal population to be stable and births of monk seal pups to have increased over the last decade, especially in the Core Zone of the park (Dendrinos et al., 2007a, 2007b, 2007c).

At the time of this study, the vast majority of residents acknowledged the importance of the NMPANS in promoting the public image of Alonissos; however, it seems that this marine park was not considered by the same individuals to have directly resulted in an improvement to their livelihoods. The majority of replying residents responded that they did not see a change in their income; these respondents identified only fishermen and people working in the tourism sector as the principally affected local groups.

The sector perceived to have suffered the greatest negative impact related to the establishment of the NMPANS was the local fishermen. In fact, the vast majority (77%) of the residents interviewed believed that the local fishermen suffered considerable losses. The negative impact of the NMPANS to local fishermen was documented in additional detail in the 2001 collective statement of the Fisheries Co-operative of Alonissos provided at the beginning of this study. Local fishermen expressed their discontent because they believed that their initial acceptance and commitment to the fishery regulations of the park were misused and manipulated and that the marine park actually resulted in limiting their access to several of their traditional fishing grounds. An additional key complaint of local fishermen was the lack of monetary compensation for fishers' net damages caused by monk seals; however, although direct monetary compensation might be popular among fishermen, it would be difficult to finance. Additionally, financial compensation for losses has been viewed with caution by central authorities and conservationists, and despite some effort to develop alternative remuneration plans for loss, other forms of compensation did not materialize. One example includes a proposal for the purchase of a tourist boat (with state support) for the fishermen to establish a tour operation in the park's marine area and uninhabited islands, with revenues given to the Fisheries Co-operative of Alonissos. Local fishermen rejected this proposal: the attitude of discontent and general lack of trust between Alonissos fishermen and state authorities were likely contributing factors. Conversely, local fishermen had already experienced the consequences of breaking the park's fisheries regulations (Karamanlidis et al., 2004), incurring fines, which added further to their frustration and negative attitude. Similar discontent was also documented by Oikonomou & Dikou (2008) a few years later when all interviewed fishermen seemed to believe that the park had not benefited them but had actually harmed them: 87% of the fishermen stated that the park's regulations had negatively impacted their profession. It is evident, at least in the minds of the residents, that the NMPANS resulted in a strong conflict with the local fishery sector.

Similar issues regarding fisheries arising from the establishment of MPAs have been reported in several other places in the world (Baelde, 2005; McClanahan et al., 2005; Tissot et al., 2009; Mascia et al., 2010); however, several cases also have been documented where establishment of an MPA led to measurable benefits (i.e., higher fish catches, increased catch rates, reduction of fishing effort) to the adjacent fishing communities (e.g., McClanahan & Mangi, 2000; Russ et al., 2004). Resolving this perceived conflict will not be achieved without a thorough evaluation of the magnitude of the conflicts—that is, recording and actually quantifying the losses reported by fishermen, especially in view of the almost complete lack of data on fish catches, on the status of the local fishery grounds, on the status of key fishery species, and on actual damages to fishing gear that might be related to the behavior or existence of marine mammals such as Mediterranean monk seals and dolphins within the park. Recently, a new project was implemented by MOm/Hellenic Society for the Protection of the Monk Seal with the support of the European Commission (MOm, 2009b) in order to measure the Mediterranean monk seal and fishery conflict at the national level in Greece and to propose measures at both the national and local scale to address and mitigate such conflict. The alternative policies developed as part of this project also could be applied in the case of the NMPANS, providing a feasible

compensation mechanism for the Alonissos local fishermen and thus alleviating the existing negative situation.

When the NMPANS was established, residents anticipated that most benefits from the marine park would be related to tourism. The results of this study support this expectation and reveal that a substantial percentage of locals consider the tourist sector to have benefited from the NMPANS. Although local perceptions on whether tourism increased after the establishment of the marine park were mixed, tourist accommodation capacity and tourist arrivals showed a respective annual increase of 10.5% and 21.3% between 1992 and 1999. Furthermore, this increase is considerably higher than that recorded for the neighboring islands of Skiathos and Skopelos. Although part of this trend might be attributed to the fact that Alonissos was a new destination not yet saturated, it is evident that the tourists surveyed appreciated the "natural" qualities of the island. The existence of the marine park and the natural characteristics of Alonissos island and of the surrounding area could make the NMPANS an ideal ecotourism destination, an activity highly compatible with this marine park's objectives as well as the sustainable development of the island. In fact, the majority of all local groups (i.e., tour operators, hoteliers and rental room owners, fishermen, government officials, NGOs [non-governmental organizations], students, and tourists) who were interviewed again in 2005 postulated that the development of ecotourism in association with the NMPANS could constitute an important pillar for increased tourism development (Oikonomou & Dikou, 2008). Under such circumstances, a small-scale local tourism industry can dominate where locals have competitive advantages, where expected profits from tourism are considered not appealing enough for large tourism firms, and when a small-scale tourism industry might be favored as a way to minimize adverse effects of tourism on protected areas (West & Brechin, 1991). Thus, local tourism policies should focus on ecotourism development by fostering improvements to the existing infrastructure and upgrading accommodations and other services provided, an issue noticed both by residents and visitors, and keeping upgrades in tune with the "natural" characteristics and the aims of the NMPANS.

When examining whether the NMPANS had an important effect on their society, residents appeared to have mixed views. It could be argued that an obvious boost to the local economy caused by the establishment and operation of the marine park would not have gone unnoticed by local people; however, local attitudes lead us to believe that such reinforcement either did not occur or failed to be recognized by the residents. Despite some positive responses in relation to social benefits, increased income, and new developmental opportunities, the majority of the local residents do not believe the park has had the anticipated positive impact on their livelihoods. Management deficiencies, bureaucratic delays, and lack of compensatory measures have resulted in a considerable percentage of the local residents believing that the marine park does not constitute an important opportunity for the economic and social development of the island. In summation, the predominant local perception is that the NMPANS has failed to link the protection of the marine park with the lives and future of the people of Alonissos. Contrary to local perception of the community's economic development are the results from the secondary data on Alonissos' economic activity. These data suggest that the local economy has grown, if only slightly, following the establishment of the NMPANS. The public infrastructures of Alonissos (e.g., roads, ports, heliport, nature paths) also exhibited a steady increase or improvement, and the influx of tourists increased substantially after the establishment of the NMPANS. Furthermore, local bank deposits in drachmas that could be largely attributed to residents increased considerably, while banking activities linked with foreign visitors also increased between 1996 and 2000. Still, a direct relationship between these positive economic trends and the NMPANS was not readily established. It may be of interest to note that all residents did not view the increase in tourism, and related economic development, positively. Several concerns were expressed by a considerable proportion of the locals interviewed about the negative effect of tourism on the local social structure and its traditions. Similar social problems associated with increased tourism in protected areas, such as communal disintegration, have been reported from other communities worldwide (Stem et al., 2003).

The NMPANS faces challenges similar to what other MPAs around the world have experienced, namely how to achieve biodiversity conservation goals within the context of the host community's development. The NMPANS appears to be an example of an MPA that has been generally successful in meeting its conservation goals (i.e., protection of the local Mediterranean monk seal population [MOm, 2007]) but has been considerably less effective in attaining basic measures of social success. This is a discrepancy that has been observed in other MPAs (Christie, 2004; Oracion et al., 2005). As noticed in several other national parks (West & Brechin, 1991), the local fishing community of Alonissos was the first to experience direct effects because of enforced restrictions.

A major local economic activity, fishing became the subject of regulations when the marine park was established. In various other national parks, the local communities faced restrictions related to natural resource utilization that led residents to view the parks as not good neighbors (Myers, 1972; Fortin & Gagnon, 1999). Also, economic losses experienced by local communities because of park wildlife are not uncommon (Mishra, 1982; Dixon & Sherman, 1990); and in certain cases, annual fees have been granted in order to compensate for these losses (Western, 1982).

At the time of this study, the centralized government responsible for the management of the NMPANS did not actively nor directly involve local authorities and individual members of the community in decisionmaking processes. Effective management of the NMPANS that provides direct benefits to residents and includes active participation in all stages of its operation is essential for the park's long-term sustainability and for achieving the outlined conservation goals. This has been an effective management policy worldwide (Brechin & West, 1990; Wells & Brandon, 1992; Badalamenti et al., 2000). It is evident both from this study and from the subsequent survey conducted in 2005 (Oikonomou & Dikou, 2008) that all local groups felt left out of the management process; resident groups considered their participation imperative to active management schemes of the marine park. The need for an appropriate local conservation and development strategy for the NMPANS, ideally combining top-down and bottom-up models (Hough & Sherpa, 1989), was apparent and could only be addressed by an organized management scheme. Indeed, in 2003, the central government established a management body for the NMPANS, with a board consisting of members from both central and local authorities, local stakeholders (e.g., hoteliers and fishermen), and NGOs. The composition of this management body guaranteed the participation of multiple stakeholders and, with open dialogue and negotiation in management actions, it would have a good chance of achieving both its biodiversity conservation and social success goals (Brechin et al., 2002). Unfortunately, the management body remained inactive until 2007 because of an almost complete lack of funding to support a managing agency and staff. From 2007 to 2009, even though some funding became available, there were bureaucratic delays and a lack of an overall strategy for conservation and management actions. The few initiatives taken did not resolve the accumulated problems, did not improve the conservation status of the marine park, nor did they alleviate the existing discontent of both residents and other stakeholders (MOm, pers. comm., 1 March 2010).

Despite the current dire financial situation in Greece, recent positive developments within the newly reorganized Ministry of Environment, the establishment of a new board for the NMPANS with better representation and improved expertise, and the potential of adequate funding may pose a new and important opportunity to bring the largest MPA of the country back on track for effective conservation of its natural environment and to contribute to the sustainable development of the local community. It is imperative, however, that a concerted effort should be exerted by both the central authorities and the newly established management body of the NMPANS to improve communication and to establish working collaborations with the local society and with all relevant stakeholders to effectively and efficiently apply a concrete plan of conservation actions in tune with the needs and expectations of the local society.

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