

## **Guest Editorial: Witnessing the monk seal's extinction in the Black Sea**

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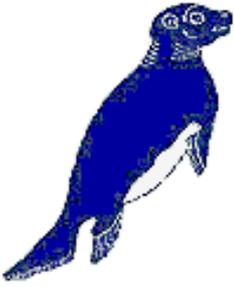
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## Guest Editorial

Vol. 4 (2): November 2001

### WITNESSING THE MONK SEAL'S EXTINCTION IN THE BLACK SEA

Cem Orkun Kıraç

Along Turkey's Black Sea coasts, the actual existence of the Mediterranean monk seal remained a myth to us for years. When Gökhan Türe, co-founder of METU Subaqua Society, first told me about the live monk seal captures that had taken place near Ereğli, I could only imagine the incredible scenes of local men trying to catch the animals inside the dark caves along the cliffs. In 1988, during a long term survey in Ereğli, we tracked down Sükrü Aydın, an old fishermen known locally as the "bear catcher" because of the many seals he had netted and sold on to fairs, travelling shows and zoos. From his reminiscences, we were even able to trace two monk seals that had ended up in Ankara Zoo in 1957 and 1961.

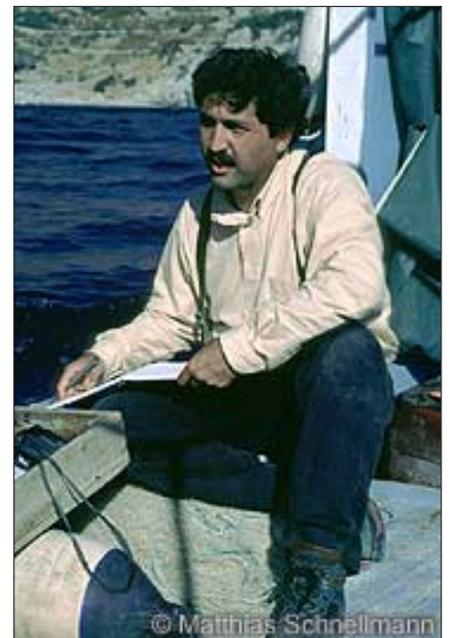
Our interviews with local fishermen also indicated a substantial reduction in the frequency of seal sightings during the late 1980s. Our follow-up survey in 1994 showed that monk seals had become extinct in the vicinity of Ereğli. Despite this major setback, we still needed to know what was happening to monk seals along the remainder of Turkey's central Black Sea coasts.

Our subsequent surveys in 1993, 1995 and 1997 covered the long stretch of coast between Akcakoca and Trabzon. It was important for us to know if there was still a viable monk seal population that might respond to urgent conservation efforts. Although our team discovered about 50 coastal caves along unspoilt cliffs that appeared suitable for breeding or resting, and spent months conducting observations, we failed to find a single trace of a living monk seal. Apart from that disappointment, what shocked us most of all was the scarcity of fish observed during our dives.

It seemed unlikely that the disappearance of the seals and plunging fish stocks could be unrelated. During interviews with some 150 local people, mostly fishermen, we collected over 200 reported seal sightings, but these covered the period between 1993 and 1997, and the majority of fishermen had made only single observations during that 5-year period!

Indeed, from the information that we were gathering, it was clear enough that the Mediterranean monk seal had been reduced from relative abundance to virtual extinction within a human lifetime. Monk seal distribution ranged from Igneada in the western reaches of the Black Sea to Yakakent in the east (though its easternmost appearance was at Mersin village, Ordu). Old fishermen told us of herds of monk seals dashing out of caves when disturbed; of male seals challenging each other in territorial fights sometimes lasting several hours. In contrast to the Aegean coast of Turkey, our research at the Black Sea showed that habitat destruction and disturbance by tourism actually played a negligible role in the decline of the monk seal population. The dominant factor here was direct killing and live capture. Historically, locals exploited the seals for their fat and skin and the animals were also targeted by fishermen in the bounty hunting of dolphins during the 1970s. Both dolphin and seal were regarded as the fisherman's arch enemy, damaging nets and stealing fish.

Between Akcakoca and Sinop, villagers reminisced about how they or their fathers had boiled down their killed seals to produce lighting oil, sometimes also selling the pelts to companies in larger cities to manufacture leather. In neighbouring mountain villages, poverty during the 1940s and 1950s had driven inhabitants to hunt monk seals to



[\(click to enlarge\)](#)

produce “çarık”, a primitive yet durable shoe made either of ox or seal skin. Seal skin was also processed to make harnesses for oxen used in ploughing.

Live seal captures brought additional profit to a few enterprising fishermen. Before he died in 1996, Aydin reported capturing at least 21 monk seals, although I suspect it was much more. Another fisherman, Tunc, claimed that he and Aydin had captured dozens, and perhaps even as many as a hundred monk seals inside the sea grottos between Igneada and Doganyurt, fulfilling orders received from fairs, zoos and showmen between 1948 and 1973.

Although our own surveys had failed to find any trace of surviving monk seals, it was still comforting to know that there had been sightings among local fishermen up until 1997. In the years that followed we still expected to receive news of additional observations. As time passed, however, our disappointment and unease intensified. It wasn't that sightings had simply dwindled but that, during this entire period, not even one monk seal observation or encounter had been reported. There was silence even from the Cide, Doganyurt and Sinop coasts where the majority of seal sightings had been collected during the 93-97 period.

And finally, when I drove from Sinop to Akcakoca in July 2001 for a monk seal television documentary, a week of surveys among our old friends confirmed that there had been no seal sightings, no incidences of damage to the stationary nets of artisanal fishermen and no half-chewed turbot catch – a simple but effective indication of monk seal presence – in short, no proof of a living monk seal in the last four years!

The evidence at our disposal now strongly suggests that the Mediterranean monk seal may have become extinct throughout the Black Sea. Given the hectic marine traffic through the Bosphorus, and the handful of seal survivors in the Marmara that are already teetering on the brink of extinction, natural recolonisation of the Black Sea seems doubtful.

It is unlikely that the monk seal's passing in the Black Sea will be met with anything but silence or a brief shrug of regret. And yet, if only for the historical record, it is important to acknowledge how apathy, indifference, lack of judgement and ecological awareness all conspired to bring about its demise.

During the late 1970s, the Ministry of Agriculture supplied ammunition to fishermen to hunt dolphins, even though endangered monk seals were commonly victims of these “official bullets”. Despite numerous resolutions urging action, relevant government departments, universities and NGOs did little or nothing to address the monk seal's alarming decline.

When I first became acquainted with the species, I remember being impressed by expert opinion describing its ecological role in the marine environment. The monk seal was at the head of the food chain we were told; it was an ‘indicator’ species, whose increase or decline would reveal the health of the marine ecosystem. What would befall the seal might eventually befall humans as well. Can it be that government officials and academics read such information, but didn't really believe it? Perhaps the ecologists were being alarmist again? If so, perhaps it is time they looked again. The monk seal in the Black Sea is gone. The marine ecosystem is collapsing. Fish stocks have hit rock bottom, unable to withstand the pressures of industrial fleets. Many artisanal fishermen are virtually destitute and many are desperate to sell their boats.

The monk seal's probable extinction in the Black Sea is a milestone in the history of the species yet the event, however tragic, calls for far more than sorrow or regret. The same kind of events are now unfolding in other areas, the Marmara, the Aegean, the eastern Mediterranean. Isn't it time that governments finally recognised that monk seals are truly the ecological indicators of the health of the sea upon which we all depend?

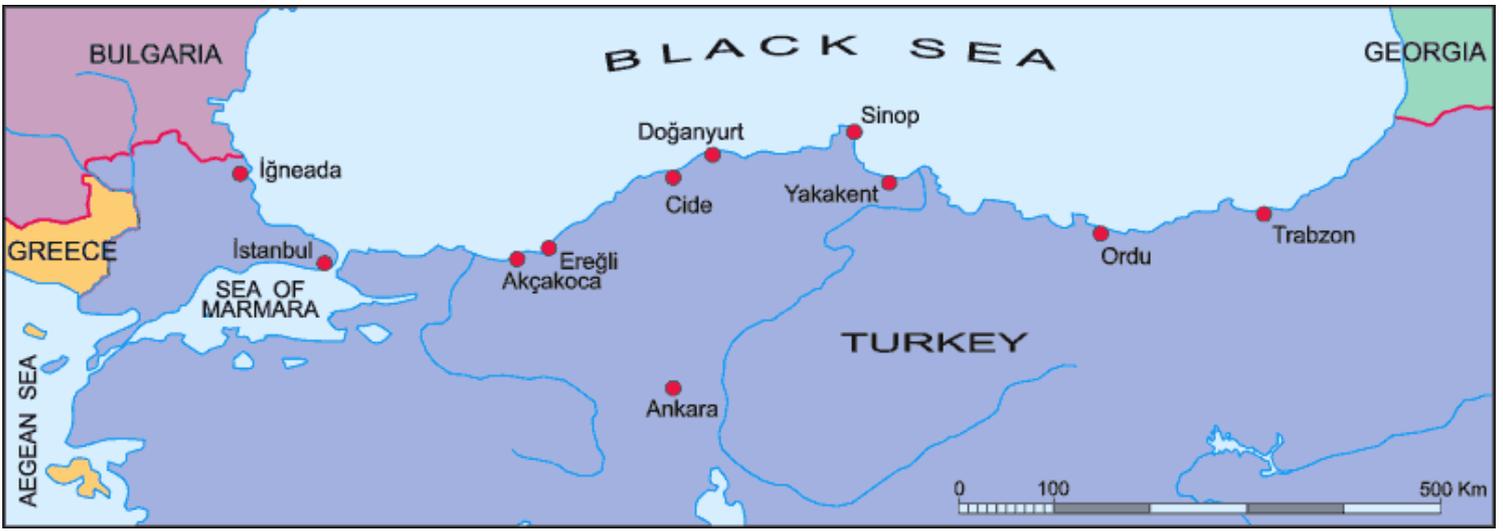
**Cem Orkun Kiraç**, [SAD-AFAG](#), Turkey, October 2001.

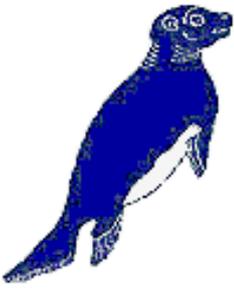
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## International News

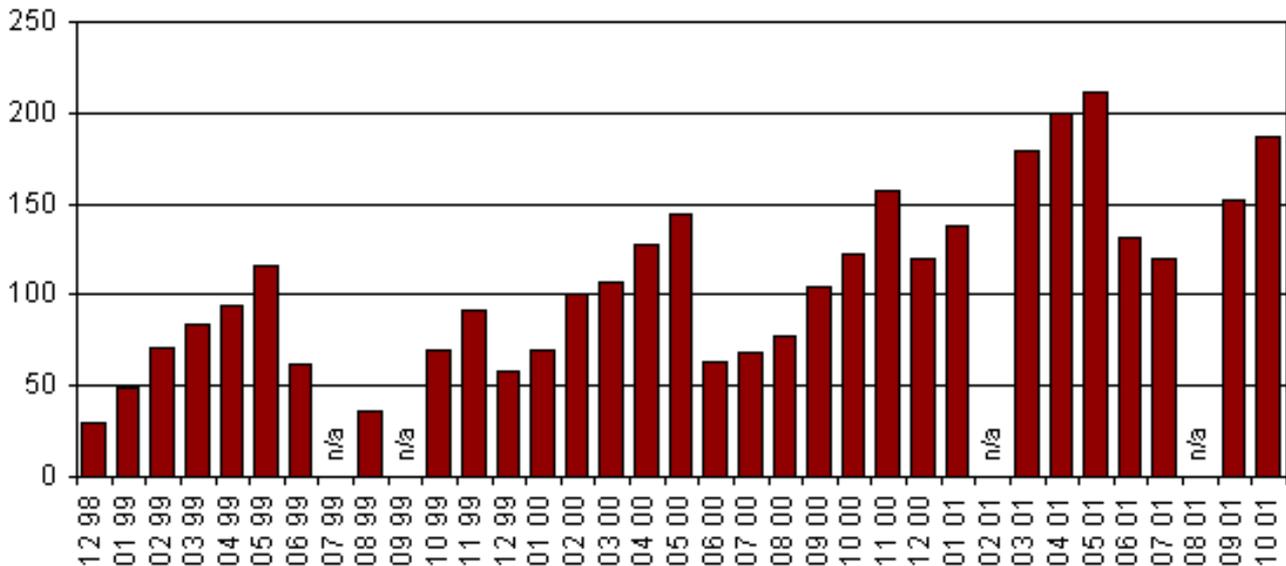
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### How you use monachus.org

In December 1999 we began using an online statistics programme to provide some indication of how [www.monachus.org](http://www.monachus.org) is being used by the public. In the period since then, the average trend in visitor numbers shows a clear increase, subject to seasonal fluctuations.

During the last two years, average visitor numbers have almost doubled, reaching 211 per day in May 2001. On the 15th of the same month, 357 people visited the site, the highest ever recorded in a single day.

monachus.org: average daily visitors



Surges in visitor numbers generally coincide with publication of TMG in May and November, but also with school semesters. Many visitors look for general information on the monk seal and visit the [Monachus Profiles](#) section, but TMG remains the main attraction. Increasingly, readers – rather than browsing through the journal online – are downloading it as a PDF file from the [Monachus Library](#). The first six issues have been requested between 1200 and 4100 times each in this way.

Another “best seller” in the Library is “The Mediterranean Monk Seal – Conservation Guidelines” with over 3400 downloads so far, followed by “Captive Breeding and the Mediterranean Monk Seal – A Focus on Antibes Marineland” with 1500.

Reader interest is also evident in the environmental impact of mass tourism around the Mediterranean, as reflected by increasing downloads of publications such as the WWF Mediterranean Programme brochure “Responsible Tourism in the Mediterranean – Current Threats and Opportunities” which has so far been requested 820 times.

Those who have written or published papers, posters, reports or other works relating to monk seals are encouraged to lodge their work with the Monachus Library, thereby making it available to a wider international audience. If you have material you would like to place in the Library, please contact: [librarian@monachus.org](mailto:librarian@monachus.org). – Matthias Schnellmann, [monachus.org](http://monachus.org).

### Workshop attracts international attention

Despite current international political tensions, organisers expect over 60 participants from 11 or more countries to attend the Population and Habitat Viability Assessment Workshop (PHVA) in Valsain, Segovia, Spain, 10-13 November 2001.

The Workshop will focus on efforts to implement a regional recovery plan for *Monachus monachus* in the Eastern Atlantic, integrating conservation actions by range states under the auspices of the Convention on Migratory Species, or Bonn Convention [see [Mauritania & Western Sahara](#) news, TMG 4 (1): May 2001]. The Plan, linking conservation efforts by Madeira (Portugal), the Canary Islands (Spain), Morocco and Mauritania, is being coordinated by Dr. Luis Mariano González of Spain's Ministry of the Environment.

Key components include:

- Creating a network of new and existing marine protected areas.
- Regulating fishing activities that affect seals or their food sources, including the legal requirement that fishing techniques employed must reduce the risk of incidental capture in fishing gear.
- Rescue, rehabilitation and reintroduction of "at-risk pups".
- Encouraging the monk seal's return to historical habitat more favourable for pup survival – mainly open beaches sheltered from waves and terrestrial predators.
- Ensuring tranquillity in breeding and resting areas by restricting access to monk seal caves, including regulation of research activities.
- Social assistance schemes to help local, artisanal fishermen.
- Non-invasive research that will step up data gathering and continue to monitor monk seal populations and habitat.
- Environmental education and public awareness to bring the conservation message to local people.

As indicated in previous issues of TMG, some aspects of the Plan have proved highly controversial to certain sectors of the scientific community, not least of all the commitment to eradicate invasive research in monk seal habitat, and the proposal to pre-emptively remove pups from caves during storm warnings in an attempt to reduce high infant mortality. In part, the Valsain Workshop is being convened expressly to debate and address such concerns.

Reports on the status of the species in the region will be presented by representatives from Mauritania, Morocco, Portugal and Spain, followed by a presentation on the latest draft of the recovery plan, now known as the Action Plan for the Mediterranean Monk Seal in the Eastern Atlantic. The meeting is then scheduled to break up into Working Group sessions to debate scientific, technical and political issues in greater detail.

Reflecting a growing recognition that monk seal conservation is truly an international affair that demands concerted international action, the Workshop will also expand its scope beyond the Eastern Atlantic region. Conference presentations are scheduled on the Hawaiian Monk Seal Recovery Plan and the Mediterranean Monk Seal Action Plan in Greece.

Further information on the Workshop can be obtained from [Fundación CBD-Hábitat](#), Madrid.

A full report on the Workshop will appear in our next issue.

## Valencia online

As indicated in our last issue [France peddles lost cause, TMG 4(1): May 2001], participants of the April 2001 RAC/SPA (Regional Activity Centre for Specially Protected Areas) meeting in Valencia, Spain, roundly defeated an attempt by France and members of the Secretariat itself, to resurrect the controversial cause of Mediterranean monk seal captive breeding. Working group members were of the opinion that *in situ* conservation measures still hold the best hope for the survival of the species.

The report of the meeting, finally obtained by TMG from sources other than RAC/SPA, states in part: "The Coordinator of the Working Group reported on the group's deliberations, stressing that there had been general agreement not to support the Secretariat's proposal [to institute captive breeding], as it was considered to be premature, since participants believed that all the other measures for the conservation of the Monk seal had not been implemented."

An electronic version of the report is available for download in the [Monachus Library](#) in PDF format:

**RAC/SPA.** 2001. Report of the fifth meeting of national focal points for specially protected areas, Valencia, Spain, 23-26 April 2001. United Nations Environment Programme. Mediterranean Action Plan. Regional Activity Center for

## Symposium cancelled in Sardinia

Security scares and negative impacts on international travel have been blamed for the postponement of the 2001 International Symposium on Society & Resource Management, to have convened in La Maddalena National Park, Sardinia, 7-11 November. Co-hosted by the University of Sassari and Colorado State University, a central theme of the conference was to have been "Global Challenges of Parks and Protected Area Management", with issues such as management and guarding, alternative economic opportunities and ecotourism all becoming major talking points. Despite a scheduling conflict with the Population and Habitat Viability Assessment Workshop in Segovia, Spain [see [Workshop attracts international attention](#), above], the Symposium was expected to be of significant interest to segments of the monk seal conservation community, particularly those responsible for remedying serious management failures in existing protected areas in the Mediterranean. Indeed, a monk seal workshop within the Symposium, coordinated by Prof. Federico Niccolini of the University of Pisa, had been expected to focus on such issues.

The organisers have recently expressed their intention to reschedule the Symposium for October 2002. Further information is available at the ISSRM web site: <http://www.cnr.colostate.edu/nrrt/ssrm>.

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## Caribbean News

Vol. 4 (2): November 2001

### CARIBBEAN MONK SEALS OR HOODED SEALS?

**Antonio A. Mignucci-Giannoni & Peter Haddow**

Caribbean Marine Mammal Laboratory, Universidad Metropolitana &  
Seal Conservation Society

The Caribbean or West Indian monk seal (*Monachus tropicalis*) lived in the waters of the Gulf of Mexico, Florida, Bahamas and Caribbean Sea up until the middle part of the last century. The last confirmed sighting of a Caribbean monk seal was in 1952 and several surveys in the 1970s and 1980s indicated that the species was extinct. However, even as recently as the late 1990s, researchers were still looking for evidence that this extinction was a myth and that Caribbean monk seals still roamed these tropical waters.

Unconfirmed sightings of pinnipeds in the tropics of the Western North Atlantic have fed the hope of finding individual monk seals still alive there. So is the Caribbean monk seal really extinct?



Hooded seal in rehab at the Caribbean Stranding Network facility in Puerto Rico

In 1993 and 1996, two hooded seals (*Cystophora cristata*) stranded in Puerto Rico and the Virgin Islands respectively, suggesting that previously unconfirmed sightings might have been stray arctic seals, even as far-fetched as this long-distance travelling may seem. Well, these anomalous findings have not stopped since. Marine mammal conservation and rehabilitation organizations have been astounded at the large number of hooded seals that have so far stranded or been sighted down both the western and eastern coasts of the North Atlantic.

A species of the far north, hooded seals are distributed from Svalbard in the east to the Gulf of St. Lawrence in the west, giving birth in the spring on the drifting heavy pack ice in four main concentrations: near Jan Mayen Island (between Norway, Iceland and Greenland), off Labrador and northeastern Newfoundland, in the Gulf of St.

Lawrence, and in the Davis Strait (between Canada and Greenland).

Hooded seal juveniles in particular have been known to wander fairly large distances off the beaten track, and individuals have been found far south in previous years. However, never before to the extent witnessed this year. By the end of October more than 100 individuals, either dead or live stranded, had been reported from as far south as the Caribbean island of Antigua in the west and the Canary Islands in the east. A third of these were reported in or after June. Individuals of the species have been reported from the eastern seaboard of the United States (from Maine to North Carolina), Bermuda, Bahamas, Turks and Caicos Islands, Puerto Rico, Anguilla, St. Barthélemy, the United Kingdom, Ireland, Germany, Denmark, France, Spain and Portugal.

The reasons for these hooded seal wanderings are currently unknown, but an increasing number of strandings and sightings have been reported in the past six years. The Caribbean Marine Mammal Laboratory at the Universidad Metropolitana in Puerto Rico, and the Seal Conservation Society in the United Kingdom are coordinating, in participation with government organizations, research establishments and rescue and rehabilitation organizations, the collection and analysis of stranding data and samples in order to attempt to determine the cause of this anomaly. Among the factors that are being examined are annual stranding patterns and the pathological condition, toxicology and virology of each seal.

The hooded seals being found are mostly emaciated and dehydrated, many suffering from heat exhaustion, and are in need of immediate medical assistance to secure their survival. A number of the seals are still in rehabilitation on both sides of the North Atlantic, including one at the Caribbean Stranding Network rehabilitation facility in Puerto Rico. The Laboratory is hoping, in conjunction with colleagues in North America and Europe, to tag or satellite track a number of the rehabilitated seals when they are released as the information gained from such tracking may shed some light on the reasons for this unusual event.

Back to the initial question – is the Caribbean monk seal extinct? It certainly is. It is easily within the bounds of possibility that previous reports of “Caribbean monk seals” have, in fact, been of occasional stray hooded seals. Confirmed reports of seals in the tropical western Atlantic in recent years have all been of hooded seals, whereas there has been no evidence of Caribbean monk seals in the region during the past 50 years. It appears that the hooded seals are increasingly straying far into new territories, even those a long distance away from their home in the far north, and are visiting the tropical beaches previously enjoyed by the sadly demised Caribbean monk seal.



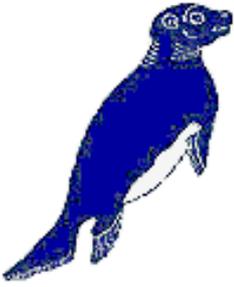
A hooded seal stranding victim undergoing veterinary examination

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## Hawaiian News

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### Pups on target

The U.S. Navy announced on 22 June that it had measured and tagged the first Hawaiian monk seal pup known to have been born on Kahoolawe, a former bombing target island situated off Maui in the main Hawaiian Islands. The operation was conducted in association with the National Marine Fisheries Services (NMFS) and Parsons-UXB, the corporation contracted by the Navy to clear Kahoolawe of military debris and unexploded ordnance. With more than 300 people a day being airlifted to the island to work on the cleanup operation, Parsons-UXB made a point of telling its work crews to stay clear of the pup. A 200-metre radius exclusion zone was also established around the animal.

Then, on 25 July, a pregnant female again gave birth at the popular resort of Poipu Beach on Kauai's southern shore, apparently oblivious to holiday crowds. According to NMFS officials and volunteers of the Kauai Monk Seal Program, it was the second time in as many years that the seal had given birth and nursed her pup on Poipu's white sands [see [Rare birth on Kauai](#), TMG 3(2) November 2000].

According to conventional wisdom, *Monachus schauinslandi* was extirpated from the Main Hawaiian Islands some 2000 years ago, following the arrival of the first human settlers. That effectively left the species clinging to survival among the remote atolls and sand banks of the Northwestern Hawaiian Islands (NWHI) chain. Recent births and other sightings closer to home, however, are leading to a reassessment of those historical assumptions. The U.S. Marine Mammal Commission, in its 2000 Annual Report to Congress [[Monachus Library](#)] notes that, although "the development of monk seal colonies in the main islands is not without risks..." recolonisation "...could significantly improve prospects for long-term conservation of the species by establishing a larger, more widespread metapopulation."

NMFS is currently conducting aerial surveys over the Main Hawaiian Islands, hoping to gain a clearer impression of monk seal population numbers. Educated guesses – albeit a risky pursuit where population assessments are concerned – suggest that as many as 70 monk seals may live around the 'downtown islands' [see [Monk Seals in the Main Hawaiian Islands](#), TMG 3(1): May 2000].

So far this year, 7 monk seal births have been recorded around the Main Hawaiian Islands: 3 on Kauai, 2 on Molokai, 1 on Hawaii, and 1 on Kahoolawe. The latter two, reports Jason Baker of NMFS' Protected Species Investigation, are the first documented births on the Big Island and Kahoolawe.

#### Sources:

NMFS; Honolulu Star-Bulletin, 28 June 2001; Endangered seal chooses Hawaiian beach to give birth – again, Agence France Presse English, July 25 2001.

### Under review

The Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, established by outgoing President Bill Clinton [see "[Living rainbow](#)" may benefit monk seals, TMG 4(1): May 2001] may be in trouble. Following the stated policy of the Bush administration of routinely reviewing every Executive Order issued by the former President during his last months in Office, the establishment of the Reserve is now coming under the scrutiny of the U.S. Secretary of Commerce.

While there are no clouds hanging over the survival of the Reserve, supporters have recently mounted a vigorous campaign to prevent any abrogation or dilution of its protection measures.

The Reserve, which incorporates most of the remote Leeward chain of atolls, shoals and reefs curving into the Pacific northwest from the main inhabited Hawaiian islands, is the world's second largest marine protected area after Australia's Great Barrier Reef. It is said to incorporate 70 per cent of U.S. coral reefs. Aside from constituting the primary habitat of the Hawaiian monk seal, the Reserve also provides refuge for marine turtles and migratory sea birds.

President Clinton's move to create the Reserve complemented action by President Theodore Roosevelt in 1909 when he established a National Wildlife Refuge in the area.

Following representations by fisheries interests, however, which have remained highly vocal in their opposition to restrictions in the area, the Bush administration is said to be reconsidering the Reserve's governing regulations. This is in spite of the fact that commercial and recreational fishing is permitted to continue at pre-designation levels throughout most of the Reserve. Because of the area's remoteness and rough seas, commercial fishing activity consists of just ten demersal fishing boats. A segment of the bottomfish fishery, however, has been found in breach of the U.S. Endangered Species Act. In a 2000 district court judgement, it was blamed for hooking monk seals, feeding seals unwanted fish containing ciguatera toxin, and even bludgeoning seals. As a result of the same court judgement, a commercial lobster fishery operating in the NWHI was closed after evidence was presented implicating it in the death by starvation of monk seal pups at the plummeting *Monachus schauinslandi* colony at French Frigate Shoals [see [Judge issues ruling in "monk seal starvation" case](#), TMG 4 (1): May 2001].

Despite these findings, fisheries interests are now pressuring President Bush and Commerce Secretary Donald L. Evans to downgrade restrictions, and allow an expanded fishing effort utilising gear currently prohibited because of its injurious ecological impact.

Source:

[Actionnetwork.org](#). August 2001. Ocean action: [Help protect the Northwestern Hawaiian Islands Coral Reefs](#). American Oceans Campaign.

## Marine Mammal Commission forecasts continuing decline

The Marine Mammal Commission's Annual Report to Congress appeared later than usual this year, preventing us from covering the 2000 edition in our May issue. Thanks to the MMC, however, a PDF version of the Hawaiian monk seal chapter has been added to the [Monachus Library](#) [see reference below]. It is recommended reading for anyone who wants to learn more about population trends and abundance on each of the occupied Northwestern Hawaiian Islands (NWHI), on perceived natural and human threats to the species, on management and political developments, and on the species' natural recolonisation of the Main Hawaiian Islands.

Interpreting survey results from these population centres, the report concludes that: "The most obvious overall trend over the past four decades is one of declining beach counts. Although the counts indicate that the decline was halted in the 1990s, poor pup and juvenile survival remains a serious problem impeding population recovery. This poor survival has effectively created an aging population. That is, the proportion of adults in the population has grown over recent years, while the proportion of juveniles and subadults has declined. As a consequence, pup production has remained relatively high, but recruitment of breeding animals into the population has decreased. Because of this shift, pup production may decrease in the near future as productive adult females are lost to the population through aging and mortality and are not replaced by maturing females. This pattern was observed at Kure Atoll, where pup production declined from about 30 pups per year in the early 1960s to a single pup in 1986. The same pattern appears to be occurring at French Frigate Shoals, where recruitment has been poor for a decade and pup production is expected to drop considerably in the near future. Because of the numerical importance of the French Frigate Shoals colony, these changes will strongly influence the dynamics of the whole population" [see [Judge issues ruling in "monk seal starvation" case](#), TMG 4 (1): May 2001]. The MMC report notes, however, that positive growth is occurring in some populations, such as Pearl and Hermes Reef, Midway Atoll and Laysan Island.

**Marine Mammal Commission.** 2001. Hawaiian monk seal (*Monachus schauinslandi*). Pages 54-70 in Chapter III, Species of Special Concern, Annual Report to Congress, 2000. Marine Mammal Commission, Bethesda, Maryland. [Available in the [Monachus Library](#)].

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## Mediterranean News

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### Croatia

Members of Croatia's [Mediterranean Monk Seal Group](#) (Grupa Sredozemna Medvjedica) undertook field expeditions in the Vis archipelago during the May-September period. The islands in the archipelago comprise Vis, Bisevo, Svetac, Palaguza and Susac. Former and potential habitat was checked for any trace of monk seal presence, but none was detected, despite several recent sightings reports. Three new caves were found during the survey that appear promising as monk seal habitat, one on the south coast of Vis and two on Palaguza.

During the same period, three exhibitions were held under the banner "The Sea is Alive", as well as a workshop for kindergarten and school children. Numerous educational lectures promoting marine conservation awareness and the protection of the monk seal were also held. – Jasna Antolovic, MMS Group.



MMS Group researchers at Palaguza. From left to right, Pave Fadic, Adriana Borcic, Marta Blazevic and Jasna Antolovic.

### Greece

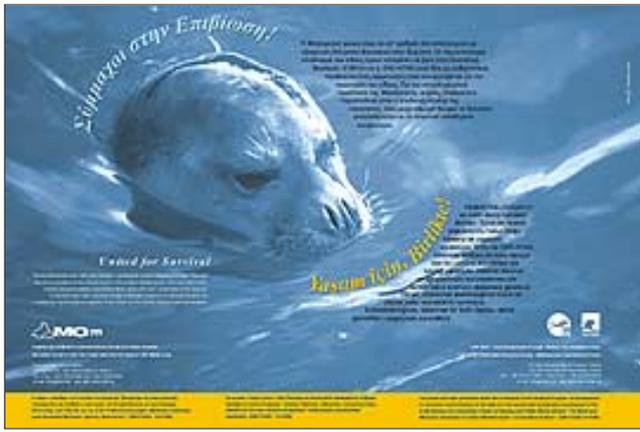
#### Season's recruits

The first monk seal birth of the new pupping season was recorded by [MOM](#) researchers in August. The newborn pup was observed with its mother in a cave on the island of Piperi, in the strictly protected core zone of the National Marine Park of Alonissos-N. Sporades. To date, four additional newborn pups have been recorded in the Park.

Further south on the island of Kimolos in the Cyclades archipelago, MOM is striving to establish a second marine park, based on experience gained through eleven years' work in the N. Sporades. The first newborn pup of the season was recorded on 8 September by the field team established by MOM to monitor the seal population as part of the EU LIFE-Nature programme. The biologist responsible for research in the area, Katerina Anagnostopoulou, reports that four more pups have been recorded to date. Since the breeding season is still in progress, we expect more good news from both areas. – Panos Dendrinis, MOM.

#### Greek-Turkish liaison

In an initiative funded by the Greek Ministry of Environment [the Bilateral Development Cooperation and Assistance Programme], MOM has embarked on a cooperative venture with its Turkish counterpart, the Underwater Research Society-Mediterranean Seal Research Group (SAD-AFAG). The two organisations plan to learn from each other's experiences in science, conservation and management through project exchange visits, and share information on monk seal sightings. The project was formally announced on World Environment Day (5 June) during the inauguration of the National Centre for the Environment and Sustainable Development in Athens. In July, a 6-strong



A joint MOm-SAD/AFAG poster marks a new-found Greek-Turkish cooperation in monk seal research and conservation

SAD-AFAG team made its way to Alonissos for an introduction to monk seal conservation activities in the Northern Sporades Marine Park. MOm biologists and staff members made their reciprocal trip to Turkey in September, visiting the Foça Specially Protected Area and the Karaburun Peninsula. – Kalliopi Gorgorapti, MOm.

## Bones galore at Gerakas

During mid-May a team assembled by MOm at the Gerakas Research Station on Alonissos set about cleaning and



Sorting monk seal bones at Gerakas

cataloguing an array of monk seal bones and complete skeletons that the organisation has collected during the last decade.

Analysis of the bone samples allows valuable information to be gleaned on various aspects of the species' biology, including its evolution and genetic potential, morphological and nutritional data, and longevity.

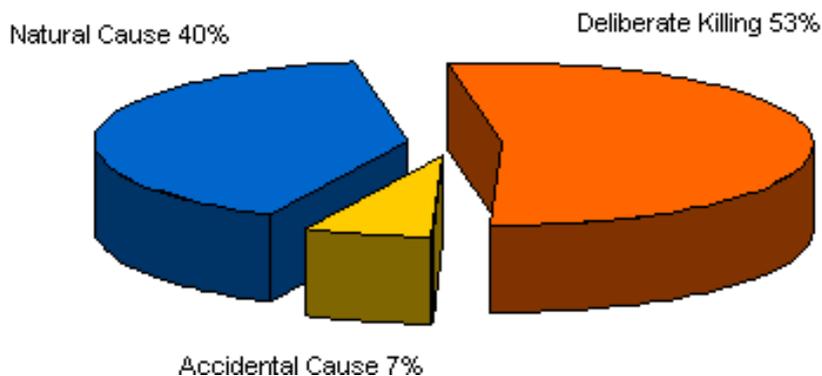
Because of the scarcity of Mediterranean monk seals and their elusive nature, biological samples of the species are rare. However, from autopsies carried out in various parts of Greece during the past decade, MOm researchers have collected bone samples or entire skeletons from 34 different monk seals. – Eugenia Androukaki, MOm.

## Uncertain causes

MOm's Rescue Team carried out several necropsies during the spring and summer on monk seals found dead in the Aegean and the Ionian Seas.

Two young female seals were discovered dead in April and May respectively on the island of Kefallonia and in N. Aghialos, Volos. Determination of the cause of death in both cases was not possible due to the animals' advanced state of decomposition. An analysis of necropsy results from 2000, however, reveals that deliberate killing still represents the single greatest cause of mortality in monk seals in Greece.

### CAUSE OF DEATH FOR ADULT SEALS BASED ON AUTOPSY - MOm 2000



A third casualty, a weaned female newborn seal, was found dead in May on the island of Kimolos, the prospective marine park that is already designated a Natura 2000 site. Called to the area, MOm's Rescue Team determined that the seal was young, about 6 months old, and in an advanced state of decomposition. Although biopsy analysis did not allow determination of the cause of death, local residents claimed that the seal had died due to entanglement in fishing nets.

Two additional seals were found dead on beaches at Mandoudi on the island of Evia and at Keratea in Attica, in June. These were also young female seals caught in fishing nets. Necropsy samples were taken to confirm the initial

diagnosis for both animals of death due to suffocation. Drowning due to entrapment in fishing nets constitutes one of the most significant causes of death for young Mediterranean monk seals. – Eugenia Androukaki, MOm.

## **LIFE funding for Natura 2000 areas**

Earlier this year, MOm was granted EU funding for the cornerstone of its conservation strategy in the Aegean – the establishment of Natura 2000 protected areas for the monk seal at the islands of Kimolos-Polyaigos in the Cyclades, and Karpathos-Saria in the Dodecanese [see TMG, *passim*].

In recognition of its efforts, the EU General Directorate for the Environment's LIFE-Nature programme awarded MOm almost 900,000 euros, or 60% of project requirements. Following standard procedure, the remainder of the 1.5 million budget is expected to come from other sources acquired by the organisation or provided by its supporters. The programme, entitled *The Mediterranean seal: Conservation actions in two Greek NATURA 2000 sites*, will run for four years (January 2001 – February 2005), and is supported by the Ministry of Environment and the Prefecture of the Cyclades. A proportion of the additional funding required to meet some of the programme's budget shortfall will, it is understood, be provided by these official bodies.

The primary objective in both areas is the conservation of monk seals and their habitat through the implementation of specific management actions that are designed to counter identified threats while encouraging the participation of local stakeholders. Indeed, the management actions at both NATURA 2000 sites, based on already completed Special Environmental Studies [see [Natura 2000 areas continue to attract support](#), TMG 3(1): May 2000] are tailored to the unique socio-economic conditions prevailing at each site.

Reflecting the renewed impetus that EU support has afforded the programme, MOm has recently established a permanent presence on both island complexes in an effort to maintain effective communication with local government and stakeholders.

Other priorities listed in the LIFE-Nature programme include ongoing LIFE monitoring in monk seal habitat and educational and public awareness activities. As part of its aims in this sector, on 15 June this year MOm established an Information Centre in the old Customs House at Diafani, N. Karpathos, generously provided by the Local Community of Olympos.

Based on its decade-long experience of guarding the National Marine Park in the Northern Sporades [see [All at Sea](#), this issue and [Guarding continues in the Sporades](#), TMG 4(1): May 2001] MOm also intends to establish a trial guarding project in both the Kimolos and Karpathos areas, using locally-recruited guards who would undergo special training, and fast, well-equipped speedboats. – Stella Adamantopoulou, MOm.

## **'Terrorist attack' on Zakynthos Marine Park**

The National Marine Park of Zakynthos, established in 1999, was hit by a string of arson attacks in mid-October. The area, whose protection has been a contentious issue for almost a quarter of a century, was created primarily to protect nesting sites of the critically endangered marine turtle, *Caretta caretta*, although some of Zakynthos' last monk seals are also known to venture into the area. Die-hard elements within the tourism and development sectors, however, have always vigorously opposed efforts to establish the Park. According to the Environment Ministry and WWF Greece, the attacks – in which fires were apparently set on four separate fronts – were timed to coincide with the Council of State's rejection of appeals against the Park's framing Presidential Decree. Firemen, backed up by two planes and two helicopters, fought the wind-fanned blaze that eventually destroyed extensive sections of forest near turtle nesting beaches before being brought under control. A spokesman for the Environment Ministry called the fires "terrorist attacks on nature."

# **Madeira**

## **Breeding at Deserta Grande**

Monk seal research continued in the Desertas Islands strictly protected reserve during summer. In the southwest of Deserta Grande – the main reproduction area – regular observations were made of a group of 5 (non-identified) individuals, one of which was a pup probably born in May outside of the typical reproductive season. Observations suggest that there are now two different monk seal groups using the same area in different seasons to reproduce. – Rosa Pires, Parque Natural da Madeira.

## Madeira island observations

Sporadic observations of monk seals continue to be reported by the public from around Madeira, reinforcing the belief among researchers that the species might be in the process of recolonising the main island, where it was previously considered eradicated [see [Are monk seals recolonising Madeira island?](#) TMG 4(1): May 2001]. Of particular significance were the multiple sightings during one week in August – presumably of a single seal – by numerous people in bathing complexes along the south coast, from Santa Cruz to Funchal. Reflecting the rarity of the event, Madeira's local press gave it high prominence in its reporting. – Rosa Pires, Parque Natural da Madeira.



A juvenile seal at the Desertas Islands

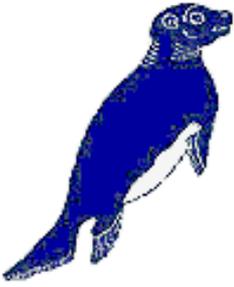
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# Mediterranean News

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Vol. 4 (2): November 2001

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## Mauritania & Western Sahara

### Pupping season on the Côte des Phoques

As of 30 October 2001, 22 monk seal births were recorded during the year at the 'Cabo Blanco' (Côte des Phoques) colony. Of these, 10 pups subsequently died, giving a pup mortality rate of 45.40%.

Most of the pups were born during the second half of the year, coinciding with the peak reproductive season in September-October.

One pup didn't even see the light, but was found as a totally developed fetus inside her dead, stranded mother.

This year, births began to occur during the second half of September. Pups born during this period usually survive since storms and high swells, although occurring throughout the year, are most frequent from October to February or March.

The current year, however, has proven an exception because, from the 7 pups which were born in September, the first 4 perished during several storms that hit the area. Three of these pups were not even found in the breeding caves (during storms and high swell, visibility inside the caves diminishes significantly) but were discovered stranded on the beaches at the south of the colony.

The fourth pup, found to be still alive by the [Fundación CBD-Habitat](#) researchers who monitor the colony, was immediately rescued and transported to CNROP (National Centre for Oceanographic Research and Fishing) facilities for rehabilitation.

During October, 11 pups were born at the colony, 3 of which have died so far. – Miguel Angel Cedenilla & Pablo Fernández de Larrinoa, Fundación CBD-Habitat.

### Pup rescued at 'Cabo Blanco'

On 18 September 2001 at 9:45 a.m., Fundación CBD-Habitat researchers observed a monk seal pup being driven by ocean currents at the southern part of the cliffs which form the Côte des Phoques. Any attempt to rescue the pup at sea was judged impossible because of high waves and swell.

Instead, members of the rescue team followed the pup as it was being driven south by the currents, until an open beach offered them an opportunity to recover the animal. They recognised the pup as soon as it was in their arms. It was P-23/01, a female pup born in cave number 1 just 4 days earlier.

The pup rested in the encampment for one or two hours. She was very inactive, with a swollen head (probably from being thrown against a rock by storm waves), and a low temperature. The rescue team subsequently took the pup to CNROP rehabilitation facilities where first aid was administered [see Seal pup in rehab, below]. – Miguel Angel Cedenilla & Pablo Fernández de Larrinoa, Fundación CBD-Habitat.

### Seal pup in rehab

On 18 September a stranded monk seal pup was found on a Mauritanian beach by two Fundación CBD-Hábitat researchers, reports the [Seal Rehabilitation & Research Centre](#) (SRRC).

The pup was immediately taken to the rehabilitation unit of the National Centre for Oceanographic Research and Fishing (CNROP) in Nouadhibou, established with the technical and financial assistance of the Netherlands-based SRRC.



The pup, a female, was approximately one week old when it was found, measured 118 cm and weighed just 17 kilos. She was suffering from a head wound – the cause of which was uncertain – and an infection around the umbilical cord.

At the CNROP's request, Marrije Verspuij, head of the SRRC's seal care department, and Lenie 't Hart, founder-director of the Pieterburen operation, travelled to Mauritania to oversee the pup's veterinary care and rehabilitation. Latest reports suggest that the pup has made an impressive recovery.

### **Non-infant mortality recorded**

Since January 2000, CBD-Habitat researchers have found 8 non-infant monk seal corpses on beaches to the south of the Côte des Phoques colony. Of these, 2 were adults, 4 were subadults, and 2 were juveniles.

One of the adults bore injuries to a foreflipper (it appeared to have been cut), and a fragment of gillnet was discovered in its stomach. A female subadult was found to be carrying a well-developed fetus.

Tissue samples were sent to different laboratories for analysis in the hope of determining cause of death (Virological analysis: S. Kennedy, Veterinary Science Division, Belfast; Histopathology: M. Hernández, Laboratorio Forense de Vida Silvestre, Madrid). – Miguel Angel Cedenilla & Pablo Fernández de Larrinoa. Fundación CBD-Habitat.

### **Raising issues**

Monk seal experts from as far afield as Mauritania, the USA and Greece are expected to arrive in Segovia, Spain on 9 November to attend the 4-day Population and Habitat Viability Assessment Workshop on the Mediterranean monk seal in the Eastern Atlantic. For a preview, please turn to [Workshop attracts international attention](#), International News.

### **Fisheries under threat**

The latest bulletin issued by Pêchecops, Mauritania, and the Coalition for Fair Fisheries Agreements in Brussels, charges that the latest 5-year fishing agreement between the EU and Mauritania "is tantamount to signing the death warrant of Mauritania's national fisheries sector." The bulletin states that authorised cephalopod fishing boats have been increased from 42 to 55 under the new regime, despite compelling scientific evidence that octopus stocks in Mauritanian waters are already overexploited. The bulletin is available for download in the [Monachus Library](#):

**Pêchecops/CFFA.** 2001. A new Mauritania-European Union fisheries agreement protocol: overexploitation of Mauritania's cephalopods is up for auction. Pêchecops, Mauritania, & Coalition for Fair Fisheries Agreements, Brussels, August 2001: 1-4.

# Turkey

## Eleventh hour reprieve for Cilician pups

During the last week of October, SAD-AFAG was informed by the Coast Guard authority that the ban in force against trawling and purse-seining in the Cilician Basin Marine Protected Area had been lifted.

Subsequent discussions with the Ministry of Agriculture and Rural Affairs in Ankara suggested that the decision had been provoked by an administrative error during renewal of the Annual Fisheries Circular, which made the limits of the ban unclear.

The ban was created in 1999 between Cape Sancak (Aydincik) and Cape Kizilliman (Bozyazi), and extended as far as Turkey's 12-mile territorial limit. While prohibiting all types of industrial fishing, the ban permitted long line and gill net fishing, thereby helping SAD-AFAG's effort to bring artisanal fishers – the traditional enemies of the monk seal – into the conservation process.

METU-IMS (Middle East Technical University, Institute of Marine Sciences) and SAD-AFAG have been monitoring the recovery of the depleted marine ecosystem for the last three years, and the scientific data that has been gathered clearly demonstrates the necessity of maintaining the trawler ban. Fish stocks have staged a dramatic recovery in the area, benefiting artisanal fishers, monk seals and the marine ecosystem as a whole [see [No-Fish-More-Fish](#), TMG 4 (1): May 2001].

It was, however, virtually inevitable that any resumption of trawling in the area would rapidly wipe out those gains, posing a direct threat to the survival of newborn pups. The area is considered the primary surviving breeding habitat of the monk seal in Turkey, but depletion of the animal's food source would almost certainly have a negative impact on the recovery of the population.

The Cilician seals, however, were eventually given an eleventh hour reprieve after a barrage of phone, email and fax appeals convinced the Ministry of Agriculture to restore the ban.

We thank our supporters for their prompt action, particularly the Game and Wildlife Protection and Development Foundation, and the United Nations Development Programme, the main sponsor of the Cilician project. – Gül Moran, SAD-AFAG.

## Seal observations on Karaburun

SAD-AFAG's [Karaburun Project Office](#) continues to gather monk seal sightings data around the Karaburun Peninsula, which forms the western arm of the Bay of Izmir. In the twelve months since September 2000, 154 observation records have been collected, 24 of which were recorded directly by SAD – AFAG team members. – N. Ozan Veryeri, SAD-AFAG.

## Cave research

At least part of Karaburun's attraction for monk seals must lie in the Peninsula's largely uninhabited and undeveloped coastline. While the presence of the species has been known for many years, however, considerable gaps remain in our knowledge of the seal's breeding habitat, particularly along the northern and western reaches of the Peninsula. The issue is of particular significance for the adjacent Foça Specially Protected Area, which has few suitable breeding caves of its own, and for SAD-AFAG's plans to establish a satellite reserve on Karaburun. Sightings data suggest that both Foça and Karaburun monk seal populations are closely inter-related and may form a single breeding unit [see [Commuting monk seals](#), TMG 4(1): May 2001].

To learn more, the Karaburun team undertook cave research along the north and west coast from 12-15 September 2001 to gain a better understanding of potential breeding locations. Two caves were found during the mission whose characteristics appear suitable for monk seal breeding. – N. Ozan Veryeri, SAD-AFAG.

## Pupping season opens

SAD-AFAG researchers have so far counted 3 monk seal pups during the 2001 pupping season. Two pups were found along Cilician Basin coasts in late August and early September, while a single infant was found on the

Karaburun Peninsula in October.

During cave checks on 5 October in the Mordogan district of Karaburun, researchers encountered the newborn pup with its mother. On different occasions during the same day, three female seals were observed outside the breeding cave, raising the possibility that Karaburun will see other pregnant seals give birth this season. The new pup, however, faces significant dangers, not least of all from fishing nets that have entangled and drowned a majority of pups born in the Foça SPA and adjacent coasts in recent years [see [Snared and Drowned](#), TMG 4(1): May 2001].

With the pupping season still young, SAD-AFAG hopes for additional births from most of its project areas. – Ali Cemal Gücü & N. Ozan Veryeri, SAD-AFAG.

## Premiere in Foça

A 55-minute monk seal documentary premiered at the “Fishermen and Sea Documentaries Festival”, held in Foça from 29 August – 2 September 2001.

Directed by Mustafa Ünlü and Selda Meral, and produced by KA Productions in cooperation with SAD-AFAG, a documentary entitled “The Mediterranean” was filmed along Turkey’s extensive coastline, from Bozyazi in the Mediterranean, to Bodrum, Datça, Foça and Karaburun in the Aegean, and the long coastal stretch from Akcakoca to Sinop in the Black Sea.

The film, which was screened in both Turkish and English, focused mainly on the memories and experiences of fishermen and other locals who had come into contact with monk seals. The documentary also emphasised the importance of the conservation of monk seals as an endangered species, both from ethical and ecological points of view.

AFAG used its own appearance in the film to announce the possible extinction of the monk seal in the Black Sea [see [Witnessing the monk seal’s extinction in the Black Sea](#), this issue]. That tragic news was juxtaposed with footage of the adult male seal called “Derin” – filmed on Çavus Island near Bodrum – that promises new hope for the survival of the species along Aegean and Mediterranean coasts of Turkey.

Various other activities accompanied the film festival, both serious and light-hearted. Apart from a forum on sustainable fisheries, traditional fishermen also participated in boat races, and competitions in repairing nets and tying hooks. The aim of the festival, organised by SAD-AFAG and Union of Documentary Film Makers, was to convince artisanal fishermen that they are an integral part of the marine ecosystem and, as such, must be a key player in marine conservation issues. – Cem Orkun Kiraç & Yalçın Savas, SAD-AFAG.

## Monk seal focus at National Geographic

An article on Mediterranean monk seals in Turkey, authored by SAD-AFAG’s Yalçın Savas, appeared in the September 2001 issue of National Geographic’s national edition.

The article, “Son sığınak” or “Last refuge”, provides a brief history of monk seal conservation in Turkey as well as basic information about the biology and conservation of the species. A distribution map and unique monk seal photographs taken by SAD-AFAG researchers complete the article.

For Turkish readers, the web site of [National Geographic Turkey](#) offers further information about monk seals, and also allows visitors to send monk seal postcards. – Cem Orkun Kiraç, SAD-AFAG.

## Two new hopes in the Aegean

Two previously unidentified monk seals were observed by SAD-AFAG researchers in the tourism-intense Bodrum area during the summer [see [Cover Story](#), TMG 2(2): November 1999].

The first sighting took place in July, when SAD-AFAG’s Foça Project director Yalçın Savas observed a young male seal swimming around Bodrum’s off-lying Çavus Island. The animal was subsequently named “Derin” (which means “Deep”) and took his place among the other identified seals of Turkey in SAD-AFAG’s database.

An adult female monk seal was observed during the same month by Murat Draman, President of the Board of the Underwater Research Society (SAD). The seal was floating calmly in front of an underwater cave entrance on the Karaada Island, south of the Bodrum Peninsula.



(click to enlarge)



"Derin" at Çavus Island



An unidentified female at Karaada Island

The small archipelago, together with the last unspoilt stretches of the nearby Kūdūr Peninsula are considered critical habitat for the survival of Bodrum's few remaining monk seals, under intense and increasing pressure from ever-expanding tourism in the area [see [Circus time at Kūdūr](#), TMG 4(1): May 2001]. – Yalçın Savas, SAD-AFAG.

## Guarding complications in Foça

Despite suffering a chronic fuel shortage, SAD-AFAG and the Foça fishermen's cooperative have managed to maintain limited guarding patrols within the Foça Specially Protected Area. The recent severe economic crisis in Turkey compelled the Local Governorship to slash the fuel allowance for the operation of the patrol boat, the *Cevre* [see [Patrols resume in Foça](#), TMG 3(2): November 2000]. Bureaucratic complications, in which responsibility for the operation and funding of the boat is shared by multiple government agencies, has not helped matters. Last year, for example, even responsibility for *Cevre*'s fuel allowance was shared by the Foça Harbourmaster, Foça Agriculture Directorate and the Coast Guard. These problems have inevitably harmed patrolling efficiency.

SAD-AFAG is therefore seeking sponsorship for the full running costs of *Cevre*, including fuel, maintenance and repair. – Yalçın Savas SAD-AFAG.

## New look

Initially launched at the start of the year, AFAG's web site, [www.afag.org](http://www.afag.org), has recently undergone a significant face lift and now features a more detailed look at the organisation's monk seal conservation and research activities in Turkey. Since February 2001, over 2000 readers have visited the site.

Aside from information on the biology and current status of the species, visitors can also find out how to help the monk seal by supporting AFAG projects or becoming an AFAG member. – Yesim A. Öztürk, SAD-AFAG.

### Net Watch

On the southern coast of Turkey, they've never been keen on seals. The local name for them is *bocu* – the same name given to the wolf, and for similar reasons. The wolf is seen as the enemy of nomads, which many people living here used to be. When they began earning their living from the sea, their fear and loathing transferred to seals...

"People only started to settle on the coast in the last few decades," says Ali. "I know fishermen who don't know the names of fishes. Many didn't even know there were seals in the water. For those that did, the seal was a sort of devil."

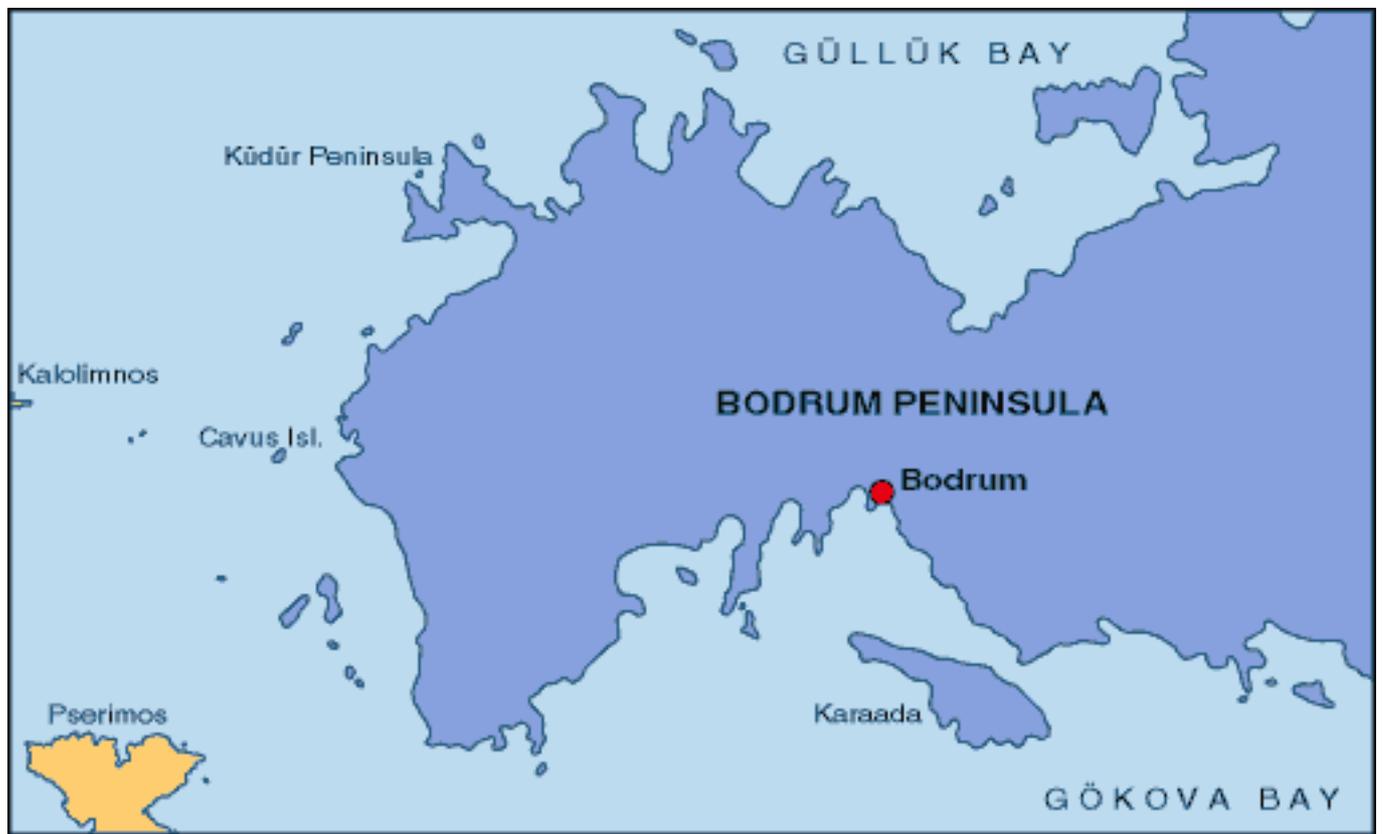
Source: <http://www.bbc.co.uk/nature/animals/features/89act.shtml?survey>

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## Cover Story

Vol. 4 (2): November 2001

### THE ISLANDS AT THE END OF THE LINE

Exploring the N. Sporades Marine Park

William M. Johnson

Sailing east from the swelling tourist resort of Skiathos, the landfalls become increasingly tranquil and untouched by the modern world. Up ahead, beyond the craggy outlines of Alonissos, lie uninhabited islands whose shores have never known a hotel complex, a pedalo, a souvenir boutique or a disco nightclub. Possibly, they never will. When the President of Greece added his signature to a long-awaited decree in May 1992, the outlying islands of the Northern Sporades archipelago were suddenly transformed into one of the Mediterranean's most outstanding wildlife sanctuaries.



[\(click to enlarge\)](#)

On a clear day, Alonissos' higher slopes offer some of the most breathtaking views to be had anywhere in the Aegean. But it's from a vantage point high on the island's mountainous spine that the visitor can really begin to appreciate the magnitude of this venture in ecological and cultural preservation. In a sweeping eastern panorama, islands and rocky islets like circling moons, scatter out into the Aegean blueness towards the Park's outer rim, its boundaries encompassing some 2200 square kilometres. Forested, craggy, or bound by precipitous red cliffs, each island possesses its own distinct identity. Forming a narrow channel with Alonissos is the low snaking island of Peristera, uninhabited except for the few fishing families who have built a cluster of rickety houses on its western shore. Beyond, a pair of islets known as the Two Brothers form a gateway to rocky Skantzoura. To the northeast loom the graceful contours of Kyra Panaya, its recently restored Byzantine monastery looking out over the rugged outlines of Yura and Prasonisi. Further still, visible through the lingering mist, lies Piperi with its pine-forested crown and cave-riddled cliffs. A few degrees north the Park's outermost island, Psathura, barely raises its volcanic face from some of the windiest and storm-tossed stretches of the Aegean.



© Matthias Schnellmann

Solitary whales and schools of dolphin migrate through these waters, large stretches of which have been put off-limits to industrial-scale fishing. Species sighted in the area include the common dolphin (*Delphinus delphis*), striped dolphin (*Stenella coeruleoalba*) and the long-finned pilot whale (*Globicephala melas*). Making their

ponderous way towards distant nesting sites are also Loggerhead turtles (*Caretta caretta*). The seabed finds extensive Posidonia sea grass meadows, various species of sponge and also the endangered red coral (*Coralium rubrum*). Among the numerous bird species finding refuge in the Park is the cliff-nesting Eleonora's falcon (*Falco eleonora*) and the red- black- and yellow-billed Audouin's gull (*Larus audouinii*), one of the rarest gulls in the world. Rare wildflowers, some endemic to these islands, also take advantage of the absence of human footprints.

But if there is one species that symbolises the Park's identity, it is the Mediterranean monk seal, Europe's most endangered marine mammal. Although estimates are hard to come by – both because of the shyness of the species and its mysterious seasonal movements – it is thought that as many as 55 seals may live around these shores. If so, that would make the National Marine Park of Alonissos, Northern Sporades (NMPANS) the species' largest surviving colony in the Mediterranean.

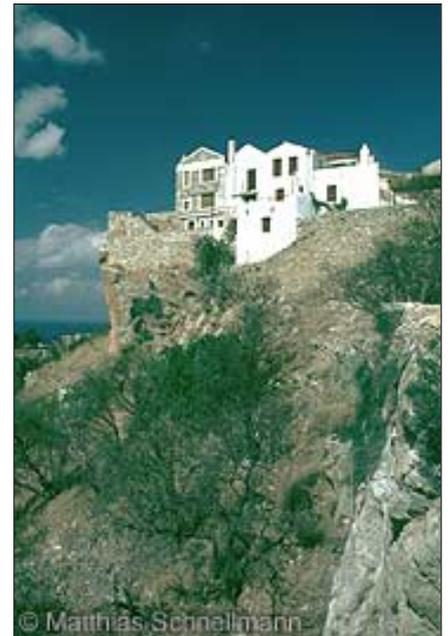
## Of pirates, red wine and dynamite

Though not always content or sure of its role, **Alonissos** could be described as the capital of the Marine Park archipelago. Some 2800 people live on this mountainous island of dense pine woods, olive groves and pebble shores. Along its wild and wind-torn northern coastline, sheer cliffs plunge into a cobalt sea. Couvouli, its highest peak at 476 metres, is sometimes dusted with snow in winter.

During the Middle Ages the island was known as Liadromia, in classical times as Ikos. At the rust-red cliffs of Kokkinokastro (literally 'Red Fortress'), archaeologists have unearthed ancient city walls, pot shards, tombstones and graves.

Perched on a precipitous rocky hilltop, 250 meters above the sea, there is Palaia Chora or "Old Alonissos", a village dating back to the 10th century. The medieval Aegean, it seems, could be a lawless place. The old town's steep slopes formed a natural fortress against marauding pirates, but it still fell to the raiders. The last pirate to loot the town was reputedly the infamous Barbarossa in the sixteenth century, then acting at the behest of the Sultan of the Ottoman Empire.

Narrow stone-flagged streets wind their way between the two-storey stone houses, scarlet bougainvillea cascading from wooden balconies. Here and there, ruined, roofless shells of houses can still be seen, a stark and eerie reminder of the earthquake that struck in 1965, virtually destroying the town.



Palaia Chora or "Old Alonissos"

Restoration has proceeded at a lightning pace in recent years, bringing a sudden windfall to Alonissos' building trade and tourist industry. Foreign cash may have bankrolled the restoration, with Britons, Germans and Italians snatching up the ruins for holiday or retirement homes, but the building effort has remained largely faithful to Alonissos' historical and cultural identity. Palaia Chora becomes a ghost town in winter, its houses, tavernas and village shops all boarded up. From their deserted terraces on a clear day, even the snowy peak of Mt. Olympus, legendary home of the ancient gods, looms in the distance.

A meandering stone pathway leads down to **Patitiri**, the island's port town that is so maligned for its noise and ugliness – even though it possesses a certain indefinable charm that grows on you.

Except for a few poor fishing and trading huts, Patitiri was never an ancient settlement. As towns go, it grew up almost overnight following the 1965 earthquake, which goes some way towards explaining the flat-roofed, concrete-box architecture. Refugees from ruined Palaia Chora flocked to nascent Patitiri. For two long winters they lived in tents, unable to move the authorities to provide grants and loans to repair their houses. When the Colonels seized power in 1967, they decreed that the homeless should be rehoused in a new district in Patitiri. In came the concrete mixers and up went row after row of substandard housing, the legacy of which can still be seen today along the town's shabby streets.

A visit to the privately-owned Historical and Folklore Museum in Patitiri is to see how markedly things have changed on Alonissos over the last hundred years. Down in the Museum basement, illuminated displays offer windows on a lost world – the crafts and tools of people that, like their sepia daguerreotype portraits, have all succumbed to the inevitability of time. Here's the smithy, anvil and furnace at the ready to shoe a horse or mule. Here's the barber's shop, equally equipped to pull rotten teeth as to razor a three-day stubble. The tailor, the potter, the cobbler, the weaver... you'd be hard-pressed to find any of them now, as the island slides towards Cash 'n Carry mentality like everywhere else.

Behind one window there's a replica of a traditional Alonissos house, complete with rounded fireplace, wooden crib,

loom. Slung over coat hooks in a corner are a pair of thonged peasant sandals, believed to be of seal skin. Except for the reminiscences of old men, voices that become fainter year by year, there are few historical records of how local people set about hunting seals. A Dutch map dating back to the 17th century depicts a walrus over a misshapen rendition of Alonissos, suggesting that long ago traders may have visited the Sporades to buy skins and oil.

Up until the early 1950s the island's main occupation was agriculture, with farming families cultivating barley, maize and grapes over the steep terraced slopes. Alonissos gained fame for its high grade red wines but, in 1953, a virus epidemic struck and the vines began to wilt and die. Within two years virtually every vine on the island had succumbed to disease. Forced to adjust, many farmers turned to fishing, an industry that rapidly established itself as the economic mainstay of the island.

Once a sleepy harbour, Patitiri was gradually transformed into a bustling little port. By the 1970s, some forty caiques were registered to professional fishers on the island.

Few visitors to Alonissos can have equated these graceful wooden boats, capable of reflecting a rainbow of colour into the dark Aegean, with something as sinister as the extinction of an endangered species. And yet for many years these bobbing caiques represented the single greatest threat to the survival of the monk seal.

Like their counterparts throughout the eastern Mediterranean, the traditional fishermen of Alonissos saw the monk seal as a fish-stealing, net-destroying pest, one they would have few qualms about shooting, clubbing to death or even dynamiting given the opportunity. In lashing out at the seal, however, they were actually creating only a convenient scapegoat for their economic woes. As their deteriorating circumstances ultimately forced them to recognise, local fishing grounds were being brought to the brink of collapse not by the handful of seals that survived, but by invading industrial trawlers from distant parts of Greece, and by illegal fishing methods practised by a minority of their own kind – dynamite and chemical fishing, the use of small-mesh nets in fish spawning grounds.

Inflicting the most damage of all was the so-called *gri-gri* fishery, purse-seine trawlers that fish with gas-fired phosphorescent lights, and nets up to one kilometre long. In their wake, they'd habitually leave a thickening trail of dead fish – non-target species, fish unknown to the marketplace, or young fish too small to sell. According to local fishermen, the trawlers were guilty of dumping several tons of such 'wastage' every night, ultimately bringing ruin to fish breeding grounds.

There'd been talk about a Sporades Marine Park as early as 1976, but by 1981 local fishermen had become so frustrated by broken government promises, declining catches and the continuing pillage by trawlers that they took matters into their own hands, threatening to massacre the seals unless they received compensation. To all intents and purposes, the colony was now being held to ransom. With no one expecting the Greek authorities to take action, a small British conservation charity – the Fauna & Flora Preservation Society – launched an emergency public appeal through The Sunday Times. That raised sufficient funds to donate a fish refrigeration unit to the Alonissos Fishing Cooperative. The move proved instrumental in persuading local fishermen that the conservation route was still worth trying. Government and conservation bureaucracies being what they are, however, the Alonissos fishermen were still destined for a long, rough ride. It was not until 1986 that the gri-gri trawlers were at last banned from operating within a 1.5 nautical mile radius of island coasts within the NMPANS.

## Odysia

The research vessel Odysia undertakes regular research missions into the heart of the Marine Park. The Hellenic Society for the Study & Protection of the Monk Seal – or MOM to use its more recent alias – bought this traditional wooden caique from a Syros shipyard in 1990 with a grant from the International Fund for Animal Welfare. The organization made its second home in the Sporades the same year and, since then, has played an instrumental role in the founding and operation of the NMPANS, deploying its own fast patrol boat to guard monk seal habitat, and running exhibition centres in Patitiri and Gerakas.

At the fishing village of Steni Vala, MOM also operates the Mediterranean's only intensive care station for orphaned monk seal pups, the Seal Treatment and Rehabilitation Centre (STRC). Established with the technical and financial support of the Seal Rehabilitation and Research Centre in Pieterburen, Holland, this small prefabricated cabin has saved several monk seal lives over the last decade.

Most infant seals treated by the rescue unit appear to be the victims of winter storms, possibly being washed out of



The founder of the Historical and Folklore Museum, Costas Mavrikis, with peasant sandals reputedly of seal skin

unsuitable caves by wave surges. The ailing pups are usually discovered on isolated beaches by sympathetic locals who then notify the authorities. After receiving an alert, MOM immediately dispatches its rescue team to the site to examine the pup and administer first aid. Then by ferry, fishing boat, car or plane the weak and shivering pups, carried in wicker baskets and swathed in blankets, are transported to the STRC on Alonissos. When they're first discovered, the pups are usually suffering from exhaustion, starvation and hypothermia, and are immediately given oral rehydration therapy – a life-saving mixture of water and salts. A few days later, they're introduced to a nourishing porridge made of minced fish and water. Although force-feeding is necessary initially, the seals gradually learn to eat on their own. Frozen herring – the staple diet for many a marine mammal in captivity – is then introduced to their diet, de-boned in an effort to reduce the risk of digestive complications, to which monk seal pups in captivity are particularly susceptible (MOM expects to substitute locally caught fish in future operations). The aim of the rescue team is to build up the body weight of the foundlings to about 50 kilos to prepare them for their release back into the wild.

Once pronounced fit by the attending veterinarian, tagged for future identification and inoculated against the seal distemper virus, the pups are quickly reunited with the sea. These so-called “cold releases” do not depend on halfway houses to acclimatise the rehabilitated animals to their former wild ways or to teach them how to catch live prey. While such schooling is routinely accorded to more socially complex marine mammals, like dolphins, seals generally demonstrate keener instinctive skills in readaption. The fat reserves that make pups look like bloated balloons on release day act as additional insurance, giving them some breathing space until they're able to catch their own food. Although the pups often need some coaxing to test the waters, they quickly turn their backs on the anxious humans on the shore that rescued and raised them.



Feeding a reluctant orphan in the STRC in Steni Vala

### Did you know?

Rescued monk seals Theo & Dimitri were flown out to Holland for rehabilitation in 1987. They returned to Greece courtesy of an Olympic Airways flight that by chance was also carrying the Minister of Culture and former actress, Melina Mercouri. Illustrating the enduring nature of Greek myths and legends, outraged fishermen voiced their suspicions that Mercouri was having the seals bred en masse in Holland to repopulate the Aegean.

If there was one exception to the rule, it was Theodoros, Alonissos' most famous monk seal. This Skopelos orphan was the first patient to be treated in the Steni Vala STRC, but returned injured after his first release in 1991, demanding another bout of rehabilitation. It was during this second stint, apparently, that the seal became imprinted on his human nurses.

If you happened to be in the vicinity at the time, it was not exactly the kind of behaviour you'd miss. Theodoros, the supposedly bashful monk seal, could be seen playing with children at the shore, gazing with forlorn guilt at the fishermen mending their seal-damaged nets, stealing beach towels for a more comfortable nap or hopping aboard any convenient dinghy in the harbour to snooze in the sun. In Steni Vala harbour he was even sighted clambering into a rowing boat to lie in the arms of an old fisherman.

Critics can say what they like about rehab science, but Theodoros probably did more to change hostile local attitudes towards his species than any public awareness programme, book, film or leaflet has ever done. His term as monk seal envoy drew to a close in 1993. By then on the brink of sexual maturity, he was already beginning to shun human contact, apparently for the companionship of his own kind. He was last sighted around neighbouring Skopelos, swimming and playing with a larger, adult seal.



Theodoros: Fisherman's friend

Since 1987, 13 orphaned monk seals have undergone rehabilitation – either in Pieterburen or Steni Vala. Of these,

6 have been returned to the protected waters of the Sporades Marine Park and 7 have perished, usually as a result of complications associated with their stranding. While the number of orphans encountered may seem insignificant in conservation terms, supporters of rehabilitation believe that every life counts when a species is teetering on the brink of extinction. (In addition to the pups, the MOM rescue team has also treated six ailing monk seal adults *in situ*, one of which died).

An ambitious 1992 plan, to construct a dedicated monk seal rescue centre on Alonissos, was subsequently shelved as a result of cost concerns and lack of candidate animals. Contrary to expert opinion at the time – which predicted up to 20 orphaned pups being found every year with an efficient Aegean-wide alert system in place – rescues have been few and far between. MOM's prefabricated intensive care station, however, is due for replacement. Concluding an agreement with the government, the organisation has taken over the running of the much-maligned Biological Station at Gerakas bay, an EU-funded white elephant that had been standing largely idle for two decades. Exhibition centre, library, and a brand new rehabilitation unit have all been added to the Station, which lies towards the northeast tip of Alonissos, along a dementedly twisting mountain road. There are rumours that Gerakas may one day also be the site of a captive breeding experiment, though MOM is saying little about any such plans at present. A more pressing priority, apparently, is to obtain legal access to the Station. Due to one of those twilight zone oversights to which Mediterranean bureaucracies seem particularly prone, the Athens authorities neglected to purchase any land with their Gerakas plot that might actually allow free access to the outside world. As a result, the Station is now literally fenced in by a single goatherder who remains stubbornly unmoved both by promises of compensation and threats of compulsory purchase.

## Stepping stones

In terms of the Marine Park, Alonissos is like the last staging post to the cluster of islands ahead. Once you've left the sleepy fishing villages of Steni Vala and Kalamakia behind, you're entering a world which seems suspended in a different time. And perhaps it is. Tour boats may intrude in summer, but on these, the so-called Deserted Islands, roads, cars, shops, electric current and other modern conveniences appear to belong to a future not yet even imagined.



The monastery on Kyra Panaya

**Kyra Panaya**, with its rounded hills, gentle undulations and olive groves, is still owned by the ancient monastery of Megisti Lavra on the northeastern tip of Mt. Athos, visible on a clear day some 50 miles to the north. Because religious edicts on the Holy Mountain prohibit even the presence of female animals, it was the small tenant farm at Aghios Petros that supplied goat's cheese to Mt. Athos' oldest monastery. By 1992, Giorgos and Paraskevoula Georgis were the only human inhabitants on the island, pottering about their vegetable garden, tending their goats and chickens. The farm has since been abandoned – according to some, the victim of Marine Park regulations that penalise not only modern threats but also traditional pursuits.

On a high green bluff on the east coast stands Kyra Panaya's 18th century monastery – originally founded in the 9th century – its blue bell tower and stone roof looking out over a sweeping expanse of sea and a scattering of islands. Once a safe haven for fishermen marooned by stormy weather, the monastery is also deserted now, its last remaining monk having returned to Mt. Athos almost two decades ago.

Another Byzantine monastery sits atop the island of **Skantzoura**, a little isolated world encircled by its own islet-moons. Despite unique architectural features, the monastery has fallen into ruin now. According to local legend, it was at some point during the 1960s that the last monk to inhabit the monastery, brother Nimnos, spied a seal fast asleep on the rocky shore and decided that he'd try to catch the animal. On the Holy Mountain, so it is said, monks turned seals into harness leather, shoes, lamp oil and medicine whenever the need or the opportunity arose. So Nimnos, convinced he was onto a bright idea, crept towards the shore with a length of rope, tying his mule to the neck of the sleeping seal. No sooner had he secured the knot – so the story goes – than the seal awoke in panic and scrambled into the sea, dragging the hapless mule with it. As the desperate seal plunged beneath the waves to escape, so the mule frantically thrashed about in the water, barely able to keep its flaring nostrils above the surface. Only when the rope snapped on the crude wooden saddle were the two unfortunate animals spared, the mule scrambling ashore, none the worse for wear, the seal streaking off through the Posidonia, its prejudices about humans probably reaffirmed.

Far more arid and desolate than its neighbour, **Yura** has little in the way of forest cover or maquis – the myrtles, heaths, arbutus, cork oak, and ilex that traditionally cover Mediterranean coastal hills and mountainsides. Clinging to its steep slopes are other low shrubs that have adapted to the arid soil, bringing a blaze of burnished red and copper

to the island in spring. Here and there, the rare Cretan maple can also be found, and in the east, fig trees reputed to reach a height of five metres.

Passing its untamed shores, observant explorers can sometimes catch a fleeting glimpse of the island's wild goat – according to some, an endemic species related to the Cretan wild goat (*Capra hircus aegagrus*).

About an hour's climb from the landing point is the Cyclops' Cave, its mouth partially hidden by trees. Treacherous underfoot, a trail hewed out of stone spirals its way down into the darkness until at last you reach a large cavern with subtly-shaded stalactites and stalagmites. The cave complex is still largely unexplored but archaeologists have discovered stone and bone tools, including hooks, knives, and pots, dating back to 10000 BC. Despite protests by tour agencies on Alonissos, the Cyclops' Cave remains strictly off-limits to tourists.

Of the lesser islands in the NMPANS, several are notable for distinctive landmarks. On the tiny islet of **Papou**, lying between Kyra Panaya and Yura, can be found the remains of yet another monastery, including evidence of terraced gardens where the monks that once lived here – a handful at most – cultivated whatever fruits and vegetables the rocky soil allowed. The little chapel remains intact, if in dire need of repair.

With its highest point hardly exceeding ten metres, little can be seen when approaching **Psathura** except for a lonely stone lighthouse, which towers over this tiny dune- and scrub-covered islet lost in a seemingly endless sea.

The lighthouse keepers and their families that once lived here have been superseded by automation; they bade farewell to the island more than a decade ago.

Submerged ruins are said to be visible just off the island's shores, allowing snorkellers to discover traces of ancient streets and houses – assuming they can ever find their way to this mysterious sunken city.

Along the white, sand-ribbed shore to the south, the fragrant and graceful sea daffodil (*Pancratium maritimum*) still grows undisturbed. The occasional seal has also been known to emerge from the water here and loaf about in the sun.



The sea daffodil on Psathura

**Piperi**, with its precipitous, brittle and cave-riddled cliffs, forms the heart of the Sporades monk seal refuge. In the translucent light of dusk, the sky becomes flecked with numerous Eleonora's falcons, the air resounding with their piercing hunting cry. Above, after climbing a steep and treacherous path, you suddenly enter the greenness and almost virginal serenity of the island's pine forest. There's few traces of human presence here: the old tin cups nailed to the trees, where Piperi's owners once tapped the bark for the oozing amber resin that gives retsina its distinctive taste; and higher still, on the crown of the island, another abandoned monastery – a whitewashed chapel with a cupola-shaped stone roof, and a couple of tumbledown houses.



Mounting an automatic camera in a seal cave on Piperi

There is no safe anchorage at Piperi, a characteristic that somehow enhances the island's fortress-like identity. Even fishermen who once dropped anchor here for the night would keep a close watch on the wind and the swell, always on the alert for a sudden change in weather that would send them scuttling towards Yura for shelter.

Here, in the highly protected Red Zone of the Park, the seal caves are strictly out of bounds to all but authorised researchers, and vessels are prohibited from approaching any closer than three nautical miles to Piperi's coastline.

Odyssia's researchers use their inflatable boat when cave checks are called for. To keep disturbance to the minimum that the methodology itself allows, the engine is turned off at a distance, the final approach being made with paddles. In cases where the entrance is too narrow or the swell too

high, team members swim into the caves.

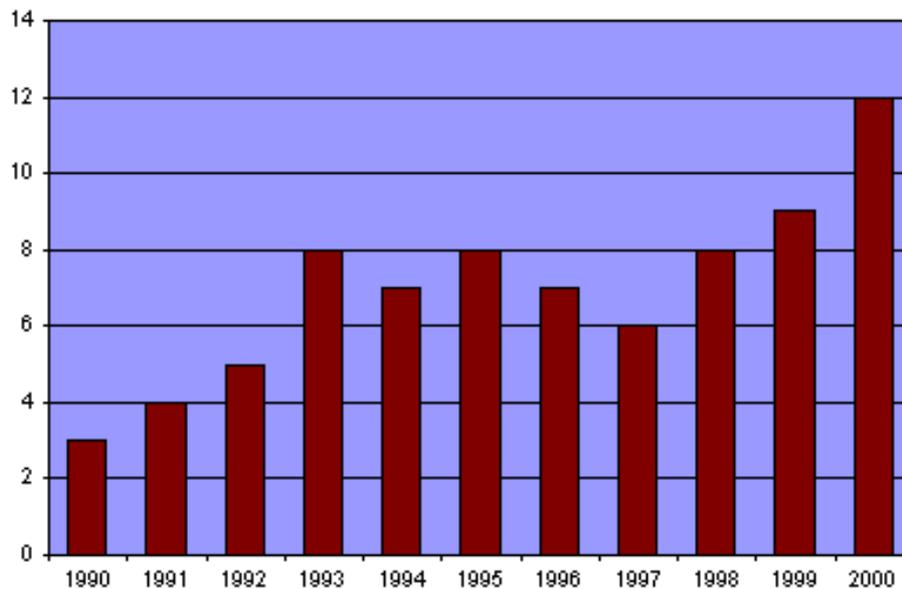
The monk seal's acute sensitivity to human disturbance has made potentially invasive scientific research a hot target for those who believe the animals would be far better off just left in peace. In an effort to reduce their own intrusions, MOM researchers have deployed automatic cameras in several seal caves to monitor behaviour and the welfare of individual animals. Funds permitting, they also hope to install infrared-illuminated video cameras that would beam

live pictures back to the research station at Gerakas. Cameras mounted at strategic points around the island would also act as a high-tech deterrent to those tempted to enter the Piperi exclusion zone. A plan to establish a warden station on the island, to improve guarding efficiency and allow research from non-invasive observation posts, has been gathering dust for years, another victim of funding constraints and practical difficulties associated with Piperi's remoteness and forbidding topography.

A mass of raw data has been collected over the past decade, some promising potentially valuable insights into little known aspects of the species' biology and behaviour. While much of it still waits to be processed, analysed and published – a casualty of more pressing conservation priorities – MOm is convinced that research in monk seal habitat is not a matter of satisfying idle scientific curiosity, but of offering tangible benefits for the long term recovery of the species.

Sometimes, after nightfall, eerie, siren-like cries come echoing across the water from Piperi's caves, the sound of a female seal in labour or a mother nursing her pup.

### Pup production in the NMPANS



Ten years after the establishment of the NMPANS, it seems that more pups are being born at Piperi than at any time in recent history. Lately, infant seals have even been seen huddled together, six to one cave – an astonishing spectacle for those who have been accustomed only to plummeting birth rates and population extinctions [see [Baby boom in the Sporades](#), TMG 3(2): November 2000]. From 1990 to 2000, MOm researchers counted 77 newborn pups in the Park. Good enough reason, you would think, to establish the network of protected areas in the Aegean that has been promised for a quarter century. Sad to say, even proving that the monk seal *can* be saved from extinction is still not getting through to people in high places – particularly those who find it more convenient to believe that the species is a lost cause.

For further reading, turn to our companion article from the Sporades, [All at Sea](#)

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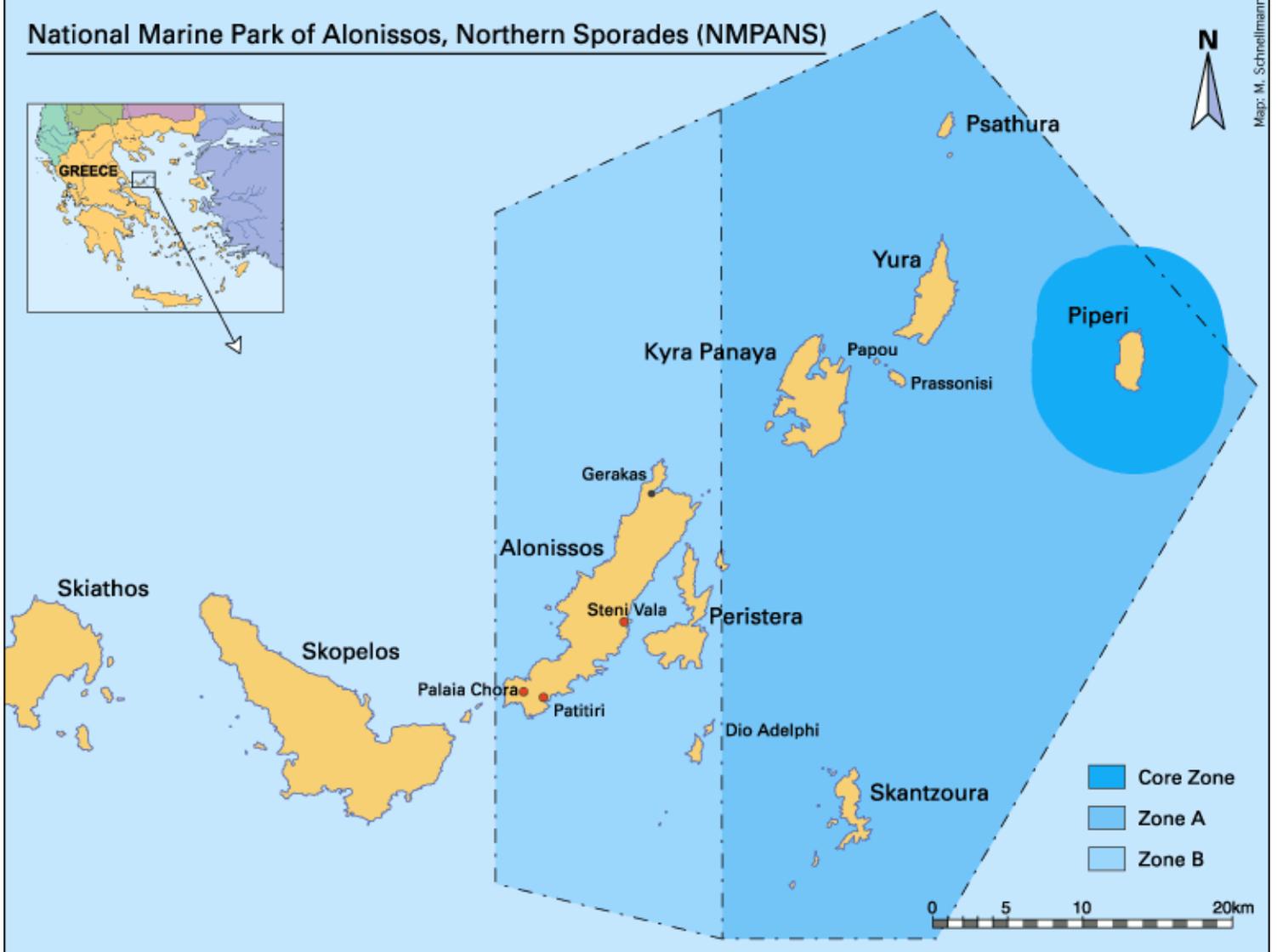
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# National Marine Park of Alonissos, Northern Sporades (NMPANS)



Map: M. Schnellmann





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# Perspectives

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Vol. 4 (2): November 2001

## ALL AT SEA

### Adrift in the Northern Sporades Marine Park

**William M. Johnson**

A yacht drifts lazily along a shore fringed with Aleppo pines, its crew on the look-out for a secluded cove to drop anchor for the night. Sightseeing cruisers ply through the Alonissos-Peristera channel, tour guides talking ten to the dozen about everything the Marine Park has to offer. Virtually alone on the island, a group of hikers makes its way along the cliff-top pathway to the Byzantine monastery of Kyra Panaya. People linger in the tavernas of Steni Vala, watching the fishermen mending their nets under the tamarisk trees. A patrol boat edges out into the Aegean blueness towards the outer islands, making sure that these protected waters remain pristine.

Idyllic images have never really been in short supply in the National Marine Park of Alonissos-Northern Sporades (NMPANS). You can find them on almost any whitewashed street or mountain pathway, any higher elevation that offers a view over the Park's constellation of islands. The trouble is, appearances can be deceptive. As an outsider, one simply *assumes* that everything is alright. One assumes that there is movement towards a clear goal. That there is some kind of master plan that has inspired and galvanised the local community. That someone has a vision of what the Marine Park is and what it should be.

Unfortunately, that is not really the case. Even though a quarter century has elapsed since it was originally proposed as Greece's first Marine Park, and even though 10 long years have gone by since it was officially established by Presidential Decree, the NMPANS still has no management plan, no management authority, no day-to-day operational staff, no office, no budget, and precious little hope that things will change for the better any time soon.

As it is at present, the Sporades Marine Park could best be likened to a rudderless boat, so pushed and pulled by prevailing currents that it is entirely incapable of setting a course most suited to its own unique needs. The fact that most people on Alonissos now view the NMPANS with a mixture of pessimism, indifference and hostility should probably be seen as the drifting boat's distress flare.

Although it has experienced its ups and downs, periods of enthusiasm as well as periods of disillusionment, the Marine Park's aimless drift is not a new phenomenon. In fact, events over the last decade – encompassing everything from guarding against illegal activities to promoting alternative development opportunities – reveal that official complacency or indifference towards management issues has already taken a serious toll upon the Park's long-term viability.

### On patrol

With 2200 square kilometres of sea and islands within its boundaries, patrolling the NMPANS is clearly a major challenge. Given the capacity for both deliberate and inadvertent law-breaking – anything from illegal trawling and dynamite fishing to curious tourists blundering into monk seal caves – an efficient guarding system is clearly indispensable. And yet despite fitful attempts over the years to encourage the authorities to take their responsibilities seriously, it has essentially fallen upon the shoulders of a single NGO – MOM – to implement guarding activities within the Park. Without their efforts, in fact, it is likely that the NMPANS would still have no guarding system at all.

For several years leading up to the Park's founding, the Port Police on Alonissos had no more than a rowing boat to



[\(click to enlarge\)](#)

meet its responsibilities. By 1992, international organizations were still appealing for a patrol boat to be stationed permanently on the island. A year later, prominent Greek shipowner, the late George P. Livanos, was persuaded to donate two high-powered patrol boats to the Port Police authority, for transfer to the Alonissos station. What happened next is symbolic of the way that Greek officialdom can make even the simplest, most straightforward task seem like the trials of Sisyphus. During the first few months, these rugged 'Top Gun' inflatables – equipped with enough horsepower to deliver a SWAT team to a crime scene at 100 kph – remained marooned in Patitiri harbour while the local Port Police department awaited its fuel allowance from Athens, and additional funds to install radar and VHF radios. Reports on the island suggest that the farthest they were prepared to venture was to neighbouring Steni Vala where – even if there were no obviously illegal activities to swoop down upon – their crews could at least enjoy a seafront *kafedaiki*. Once they received their equipment upgrades, the boats were finally ready for patrol and yet, as far as can be discerned, this has never occurred on a regular basis. Apparently the victims of their own insatiable thirst for fuel, and budget-cutting in Athens and Volos, the boats continued to languish in harbour for years to come. One, the larger of the two craft, was subsequently transferred elsewhere, evidently with little regard for the original purpose of its donation to Alonissos – the guarding of the NMPANS.



'Top Gun' inflatables marooned in Patitiri

In the absence of effective policing, illegal activity flourished, with perpetrators seemingly determined to test and challenge the Park's abilities to fend off attack. There were frequent reports of dynamite and chlorine fishing along the area's secluded coastlines. Industrial trawlers that had been banished from the area began to sneak across the Park's borders again, apparently confident that no action would be taken against them.

By 1992, the violations had become so persistent that the artisanal fishermen of Alonissos were losing what little faith they had in the conservation process. This was an alarming development given the fact that their traditional hostility towards the monk seal was being held in abeyance by a single thread – the belief that fish stocks (and thus their own livelihoods) could only recover once the industrial fleets had been chased from the Park for good. To make matters worse, speargun fishers, equipped with fast inflatables, continued their summer invasion of the islands, regardless of regulations limiting the sport to certain key areas in the B Zone of the Park.



A *gri-gri* trawler intercepted by a MOm patrol

Pirate *gri-gri* trawlers continued to operate with virtual impunity until MOm finally took matters into its own hands and launched its own fast patrol boat, the *Alonissos*, in 1991, purchased with funds from the International Fund for Animal Welfare (IFAW). In its run-ins with the intruders, MOm soon discovered that guarding can be a dangerous business. During one of its first night patrols that intercepted a trawler fishing illegally, a MOm team member was struck down with a metal bar. Later, an infant seal, aged only ten days, was found dead, a subsequent autopsy revealing that it had been killed with a sharp object.

This independent – albeit officially sanctioned – guarding initiative suffered from one major drawback: the crew of the *Alonissos* lacked any official warrant to issue fines or make arrests. That stumbling block was overcome when the Port Police agreed to provide an officer to accompany the

patrols when circumstances dictated it. Newly empowered, it was decided to strike back against trawlers.

In 1993 the *Alonissos* apprehended one of the most brazen *gri-gri* trespassers, the trawler *Yannakis*, laying nets in the A Zone of the Park. Arrested and charged, the owner-captain was hauled before the Volos law courts and subsequently received a seven months' suspended jail term. With his boat impounded, it is likely that a far greater penalty was being exacted in lost earnings.

Although targeting only one ship, legal action against the *Yannakis* fired warning shots across the bows of all trawlers tempted to flaunt the NMPANS regulations. The case marked a turning point in guarding the Park against illegal industrial fishing.

Time and familiarity have done much to obscure the fact that a non-governmental, non-profit charity is responsible for guarding what is, after all, a *National Marine Park*. Although privatising official obligations for the sake of competitive pricing and efficiency may actually favour such a policy, there is little evidence to suggest that such reasoning is at work in the NMPANS. Indeed, the Greek government provided only basic operating costs for patrols

in the 1998-1999 period, and only 50% in 2000. Footing the remainder of the guarding bill has been the prerogative of MOm's own members and supporters, and international conservation charities such as IFAW. Even equipment is not provided by the state. For its replacement patrol boat purchased in 1997, MOM was obliged to rely on a bank overdraft at normal commercial interest rates, with some board members' personal property acting as collateral for the loan. All things considered, it is difficult to escape the conclusion that the government is exploiting the organisation's altruistic principles to serve as an alibi for its own indifference.

### **NMPANS Milestones**

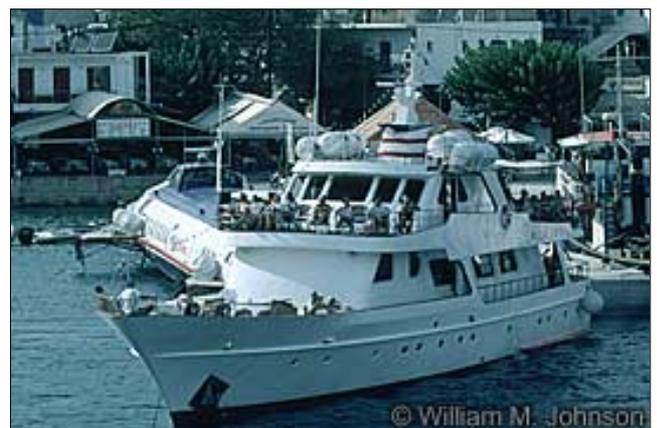
- 1976: German wildlife filmmaker Dr. Schultze-Westrum proposes that a marine park be established at the "deserted islands" of the Northern Sporades to protect the Mediterranean monk seal...
- 1986: A Prefectural Decision issued by the Prefecture of Magnesia orders the protection of the monk seal in the Northern Sporades...
- 1988: A Common Ministerial Decision, issued by the Ministers of Environment, Agriculture and Merchant Marine (subsequently renewed for a further 2 years) lays the groundwork for the NMPANS and allows it to operate pending required legislation...
- 1992: The NMPANS is officially established by Presidential Decree...
- 1996: The Environment Ministry offers a private sector tender for a NMPANS management study, including the creation of a management body, the drawing-up of revised Park regulations, and the drafting of a Presidential Decree ready to submit to the Council of State. The contract calls for the study to be submitted within 380 days...
- 2001: The island council of Skopelos petitions the government to join the NMPANS. Further delays in establishing a management body appear inevitable.

### **The tourism dilemma – threats & opportunities**

Like most islands in the Aegean, Alonissos has staked its future on tourism, and yet the industry remains largely ambivalent in its attitude towards the NMPANS.

It is here that the Marine Park management authority is most conspicuous by its absence. With no forum capable of encouraging informed debate – let alone of devising a blueprint for the island's future economic development – the idea that Alonissos tourism could evolve in harmony with the Marine Park remains little more than a pipe dream.

The result is that tourism here has continued to drift inexorably towards the high-capacity, summer-intensive model, seen most close at hand on the popular resort island of Skiathos. The irony of this is unlikely to be lost on those who are familiar with the habit of Alonissiot to turn up their noses at the cultural decay, noise and vulgarity that has swept over their neighbour since it first became Mecca to charter-jet tourism in the 1970s. Alonissiot, so it is claimed, want a different kind of tourism, one that will preserve some element of the island's cultural integrity, that will not ruin the natural environment, that will not erect multi-storey eyesores in towns and villages. In short, the people of Alonissos are said to want a tourism that will contribute to quality of life rather than steal it away from them.



Tour boats and hydrofoils unloading in Patitiri

With profits often speaking louder than principles, however, Alonissos continues to follow in the despised wake of its neighbour.

While there is no airport on Alonissos, "Flying Dolphin" hydrofoils (and, more recently, state-of-the-art catamarans) provide a rapid service from Volos, Thessalonika and Aghios Konstantinos, a couple of hours' drive away from Athens. With the tantalising prospect of charter flights in mind, exploratory excavation work for an airport got underway in 1984 on a fortuitous plateau of land on the island's otherwise craggy mountain range. The project, the legacy of which can still be seen today in a remote field littered with boulders, appears to have been abandoned because of lack of investment capital rather than any particular conviction that Alonissos should count itself lucky not to be competing in the charter jet rat race.

Given the sudden deluge of tourists already swamping the island during the brief high season in July and August, it would be hard to imagine how Alonissos could cope with such an invasion. Despite having no airport of its own, charter flight holidaymakers still manage to shuttle in from Italy, Britain, Germany and Holland, using Skiathos as their arrival and departure point. Those visitors are swelled by others arriving from Athens and Thessalonika. Once the summer season is in full swing, the island also starts absorbing an overspill of tourists from neighbouring Skiathos and Skopelos. By the time August comes around, hotels, guest houses and restaurants are bursting at the seams, turning an otherwise tranquil, even sleepy, island into a bustling holiday resort. Flotillas of yachts, tour boats offering excursions to the outer islands, and speed boats dashing from one beach to another add to the summer mayhem.

All this poses a serious dilemma for those who must monitor the Park's 2200 square kilometres, guarding against intrusions into monk seal caves, forest fires, illegal speargun fishing and other threats [see [Guarding continues in the Sporades](#), TMG 4(1): May 2001]. Mass tourism has been implicated in the decline and eradication of the monk seal in several Mediterranean countries, and remains a clear and present danger to the last strongholds of the species in Greece and Turkey [see [Mass tourism and the Mediterranean monk seal](#), TMG 2(2): November 1999]. Pregnancy in monk seals may also coincide with the holiday season, imposing an additional stress burden to which the species is already acutely susceptible.

Based on a two-month high season with high-capacity occupancy and fast client turn-around, this intense, conveyor-belt brand of tourism also presents other, long-term threats to the integrity of the NMPANS. The vast majority of visitors in this tourism bracket are drawn to Alonissos for reasons other than the existence of its Marine Park. Most have scant interest in the area's endangered wildlife or its unspoiled landscapes, unless it is to make a barbecue on a deserted beach. Few will go out of their way to learn more about the Park, even though some will take advantage of cruises plying among the islands and hear guides spouting information of dubious accuracy over the loudspeakers.

The danger is that if Alonissos expends more effort in intensifying the summer tourist trade – with all the road and concrete developments that will entail – it may well end up alienating the very people who would be drawn to the island's Marine Park. Says Yiannis Vlaichos, of the Ecological and Cultural Movement of Alonnisos: "Unfortunately, the general attitude of people is that tourism can deliver a big return for a small investment. In the short term this may be good economically, but in the long term, catastrophic."

"Although local beliefs on whether tourism has increased after the establishment of the Marine Park are divided, tourists accommodation capacity and tourists arrivals show an increase of 10.5% and 21.3% respectively between 1992 and 1999. Furthermore, this increase is considerably higher than that observed for the neighbour islands of Skiathos and Skopelos. Although part of the trend could be attributed to the fact that Alonnisos is a new destination not yet saturated, it seems that the tourists surveyed appreciate those qualities of the island that could possibly make it an ideal ecotourism destination. Ecotourism is also highly compatible with the Marine Park's objectives and the sustainable development of the island..." – Maria Trivourea, 2001.

Severe water shortages, forest fires, roads and houses being built at a frantic pace, traffic jams in a town that only saw its first car in the mid-1960s, are beginning to look like worrying omens for an island so uncertain over its own future.

Convinced that its summer tourism is becoming too intense for the island's infrastructure and ecology to bear, some on Alonnisos are eager to see a fundamental shift in focus that would promote the Marine Park as a unique ecological and cultural preservation zone.

This idea – still far too vague to be called a plan – would place greater emphasis on 'nature watch' excursions, on walking tours, sailing and other ecologically-friendly pursuits. Encouraging this type of ecotourism to the island, it is thought, would help restrain further expansion of the high summer tourist trade by attracting visitors in spring and autumn. In this scenario, the Marine Park would become a lure for travellers who have grown weary of the usual noisy and overcrowded holiday resorts. Says Kostas Efstathiou, owner of the Paradise Hotel and Albedo Travel in Patitiri: "Alonissos shouldn't play the game of touristic competition with other islands, but should use the Marine Park to distinguish itself from other destinations."

## Chicken & Egg

Over the years, some in the business community have taken the personal initiative to pursue opportunities offered by the Park's creation. Cruises through the NMPANS have increased, as have guided walking tours. Three years ago, after considerable pressure, the *Nomarchia* (Prefecture) also opened up a 40 kilometre network of restored

pathways on Alonissos. And yet despite these small steps forward, developing ecotourism on the island faces several major obstacles. The most important of these is lack of off-season amenities.

“Unfortunately, we are in a chicken and egg situation,” explains Diogenes Theodorou, who owns and operates Alonnisos Travel, a tourist agency on the harbour front of Patitiri. “We can’t persuade the shops, hotels and restaurants to remain open in the off-season months if there are no tourists, and we can’t attract tourists unless we have a package of boat trips, hiking tours and other activities on offer.”

Diversification of activities is also deemed essential in order to promote ecotourism abroad. Says Pakis Athanassiou, owner of Ikos Travel: “There’s no way you can fool big companies that 14-day water excursions are possible. If we want to offer off-season ecotourism holidays, it will require a major investment in infrastructure and a whole package of activities.”

Amenities specifically developed for nature travellers, however, are few and far between. Although Alonissos might be spectacular for bird-watchers, for example, there are currently no hides or identified observation points on the island. No hotel has yet adopted a Marine Park theme or is operated along clearly ecological lines. No taverna can yet be found serving organically-grown food.

To make matters worse, local government has gained the reputation of smothering rather than cultivating Alonissos’ ecological image. According to critics, public works projects, instead of dovetailing with the Marine Park concept, are still rooted in old “dynamite-and-bulldozer” thinking, so evident on other tourism-intense Aegean islands.



Eleonora's falcon

The use of EU development funds, supposedly earmarked for environmental improvements in the Park during the years 1996-1999, continues to be a source of controversy. Singled out for particularly harsh criticism is the 12 km asphalt road to Gerakas on the remote northeastern tip of the island, where Alonissos’ infamously impractical Biological Station had previously been constructed with another EU handout. Critics also point to numerous dust tracks that have been gouged out of the landscape, criss-crossing their way haphazardly through forests, and bringing traffic to beaches that could formerly only be reached by boat or footpath. Says Pakis Athanassiou: “The island is being crucified with new roads, many of them nonsensical.”

Further compromising the Park’s ecological image, Alonissos makes no effort to collect aluminium cans and bottles for recycling, and no effort to encourage less reliance on the all-pervasive plastic shopping bag. Waste management currently consists of dumping all types of trash into a landfill – admittedly an improvement over the previous method, which saw refuse being unloaded over a cliff into the sea.

Local indifference towards ecology appears to be compounded by a similar nonchalance towards cultural preservation. It is unlikely to be entirely coincidental, in fact, that many of the treasures that now grace the Historical and Folklore Museum were rescued from an ignominious fate at the Municipal rubbish tip by the single-minded efforts of the Museum’s founder, Costas Mavrikis. The fact that few locals have ever set foot in the Museum is also a telling reminder that Alonissos has yet to realise the role cultural preservation must play in promoting the island’s ecotourism credentials.

## The obstacle course

For those favouring the ecotourism route, there’s no shortage of enthusiastic ideas when contemplating the Marine Park’s future. They include the restoration of Byzantine monasteries on the outer islands, opening-up additional hiking trails, horseback riding, sailing and scuba diving courses. There also remains the long standing priority of giving Patitiri a much needed facelift by planting trees and requiring traditional red tiled roofs instead of the ugly concrete rooftops that currently dominate the town. The difficulty is putting these ideas into practice.

“Ecotourism is still a new concept here,” explains Kostas Efstathiou, “and it won’t happen overnight.”

The question is, will it happen at all? Despite a few hesitant steps, progress in transforming the NMPANS into an internationally recognised ecotourism destination has been hampered by lack of coordination, lack of investment capital and lack of expert guidance. There is currently no official body capable of acting as a forum for debate on such crucial issues. Arguably, such a forum would be essential to articulate development opportunities, tailor them to Alonissos’ unique needs and attributes, and provide the necessary framework to promote initiatives and bring them to completion.

Even if the NMPANS management authority were already functioning, there is no guarantee that it would have either the mandate or the competence to act in this capacity.

## The ecotourism risks

Despite the innocuous reputation it currently enjoys, uncontrolled but loudly hawked “ecotourism” activities have become a growing threat to protected areas and target species in several countries, with wild animals such as whales, dolphins and seals suffering harassment by well-intentioned visitors.

Without clear management procedures that seek to inform, guide and strike a dynamic balance between conservation and development interests, it is likely that ecotourists drawn to the NMPANS will become part of the problem rather than the solution.

The implications are seen even today on Alonissos. With no management body to establish precise operating procedures, and with a listing of Park regulations still to be published, confusion reigns over restrictions which vary from area to area according to zone designation [see map; an English translation of the NMPANS regulations is available in the [Monachus Library](#): NMPANS 1992].

“Tourists regularly come into the office and ask me to explain it to them,” says Diogenes Theodorou, “but even I don’t know where it’s legal to swim, snorkel and sail.”

Indeed, after 14 years in the wilderness, there is still no definitive guidebook to the Marine Park’s fauna and flora, no map lucidly explaining regulations, no official leaflet distributed to every hotel room and visiting yacht.

### Did you know?

In 1995 and 1996, the Greek army mounted live-fire exercises against the island of Skantzoura in Zone A of the NMPANS, allegedly setting scrubland on fire and damaging a stretch of protected coastline. The Minister of Defence subsequently apologised to Parliament for the blunder, but in mitigation pleaded ignorance of the Marine Park’s existence. Critics point out that any management authority worthy of the name, even if it had been unable to bring about a cease-fire in the first attack, would at least have prevented a repeat bombardment the following year.

As the Park continues its directionless drift, local businesses are beginning to view it as a dead-end rather than an avenue for advancement, as a place strangled by regulation, and offering few benefits.

“The Park is too closed and restrictive at the moment,” complains Diogenes Theodorou, echoing the views of many on the island. “It’s very difficult to tell visitors ‘you can’t go here and you can’t go there’ – it makes them angry. Strict rules are necessary, of course, but the Park should welcome people and not drive them away.”



The renovation of the monastery at Kyra Panaya, technically illegal under Park regulations

According to some critics, fatal flaws in the 1992 Presidential Decree will prevent the Marine Park from ever reaching its full potential in terms of ecotourism and cultural preservation. Regulations laid down in the Decree, they claim, are muddled, irrational, and penalise traditional land use activities that did much to shape the islands. Under the current regulations regime, for example, restoration of monasteries and other historical landmarks in the A Zone of the Park is technically illegal, as is the care and cultivation of ancient olive groves on Kyra Panaya. To make matters even worse, claims Kostas Efstathiou, Alonissos travel agencies are even guilty of breaking Park regulations with their guided nature tours to the outer islands. Critics point out that as well as being muddled and sowing confusion over arbitrary sub-zoning, the Decree also attempts, through its regulations, to micro-manage issues that would be better delegated to a management authority. Those

responsible for the day to day operation of the Park, they insist, would be in a far better position to impose or lift temporary restrictions according to prevailing conditions.

## Losing faith

Given the bureaucratic delays, broken promises and wasted opportunities, it is perhaps little wonder that local attitudes towards the NMPANS have soured dramatically in recent years. In fact, a recent sociological study for a UK university (Trivourea 2001) reveals consistently negative views towards the Marine Park over a broad cross-section of Alonissos society (even though most interviewees expressed the belief that a management authority would significantly improve matters).

Like the tourism sector, the local fishing industry also complains about being cheated out of the promised benefits of the NMPANS. Artisanal fishers charge that the authorities have reneged on an agreement that would have allowed them to turn their caiques into “water taxis” and ferry tourists around the Marine Park. They also claim that illegal trawling persists within the NMPANS, despite guarding efforts, and that their catches continue to dwindle as a result. According to members of the Alonissos Fishing Cooperative, the island’s traditional fishers can only survive at all because of seasonal tuna fishing, and lucrative exports of bluefin tuna to Japan. Although that may be an exaggeration, with no management authority to set scientific priorities or to allocate funding, even vital research into fish catches and stocks has remained in limbo.



Landing a tuna catch on Alonissos

Ever since President Constantine Karamanlis signed the decree that officially brought the NMPANS into being in May 1992, a follow-up edict – the now-infamous “Second Presidential Decree”, establishing detailed operational rules, and appointing a management authority – has been promised routinely “in the months to come”. It has, however, manifestly failed to materialise. Why should that be?

Even in a country where conspiracy theories are two a penny and bureaucracy is well known for being far more Byzantine than the architecture, there are few plausible explanations for the delays afflicting the NMPANS. Local people appear to be of the opinion that government procrastination is about as inevitable as fate itself. Some argue that the government gains from consigning the Park to a long-running administrative limbo: it does not have to push forward the draft decree to compete in an already crowded legislative agenda; nor does it have to tap scarce financial resources to operate a management body, hire staff and to pay for guards and patrol boats.

Whether there is any truth to that ostensibly cynical view remains to be seen. However, the Environment Ministry in Athens does appear to have far more room to manoeuvre than it is currently willing to concede. In fact, article 6 of the founding Presidential Decree empowers the Ministry of Environment to establish a Temporary Management Committee. Despite the numerous problems afflicting the Park, that Committee has never once functioned as a legally constituted body.



NMPANS: a monk seal success story despite persistent management failures

Although it is impossible to say if it reflects official thinking, Ministry of Environment functionaries visiting Alonissos have been heard to reject any blame for the current NMPANS malaise. In their view, the Alonissos business community alone bears responsibility for not seizing the development opportunities offered by the establishment of the Marine Park. In contrast, local entrepreneurs insist that it is the state of chronic uncertainty perpetuated by the government that has restrained greater financial investment in the NMPANS. The same Athens functionaries are also reputed to be of the opinion that the government has fulfilled its duty and accomplished its mission in the NMPANS – the protection of the critically-endangered Mediterranean monk seal. If so, they appear to be entirely oblivious to the plans and promises so liberally scattered by their predecessors over the last decade.

While the mayor the Alonissos recently expressed his hope to The Monachus Guardian that the NMPANS management authority would be formed “in the months to come”, it now appears that this long-awaited action may be delayed for several more years. The reason is likely to give many people pause for thought. Although Alonissos may not yet have realised the potential of its unique Marine Park, the same cannot be said for neighbouring Skopelos’ shrewd and charismatic mayor, Stamatis Perissis, who sees opportunities galore in the NMPANS. As a result, Skopelos has now expressed its wish to join the Marine Park, a request that has apparently gained the sympathetic support of both Volos and Athens. In order to accommodate the island, however, prospective coastal protection zones must be mapped, and rules, regulations, and decrees all re-drafted. Aside from suffering yet another intolerable delay, the danger for Alonissos is that it will now face

marginalization as its larger, wealthier neighbour exerts its influence over the NMPANS.

Although in the present climate on Alonissos it is easy to forget the headway that has been made in the NMPANS over the years [see sidebar], in gambling so extravagantly with time, the authorities risk losing the only thing that will keep Greece's flagship Marine Park afloat – local commitment.

### Did you know?

**With voices of discontent becoming ever more insistent, it is easy to forget the important strides that *have* been made in the Sporades Marine Park over the years:**

- Where the survival of the monk seal is concerned, Alonissos has witnessed a marked shift in public opinion over the last decade. Says Kostas Efstathiou: "Today, few people would even think of harming a monk seal." Apparently confirming that view, no seals have been recorded deliberately killed in the NMPANS over the last 10 years.
- Industrial trawlers have been banished from the area, benefiting traditional fishers and encouraging recovery of fishing grounds.
- Anecdotal accounts suggest that fish stocks have increased dramatically in the no-fishing zone at Piperi.
- Guarding has slashed violations within the Park. This is in stark contrast to the former conditions in the current Red Zone, witnessed by University of Athens researchers in 1985: "...numerous speedboats travelling day and night with amateur fishermen, 2-3 purse-seine boats fishing close to the southern coast of the island, dozens of *Falco eleonora* shot by fishermen... divers, tourists and photographers exploring every corner of the island... after 12 days of extensive research in the shelters on Piperi, the presence of no more than 2 adult seals was recorded..."
- In one of the few conservation success stories anywhere for *Monachus monachus*, pup production in the NMPANS has increased dramatically since the Park's founding, with newborn pups being observed every year.
- A 40 kilometre network of restored pathways has been opened on Alonissos for nature watchers and hikers.
- Several key cultural landmarks have undergone restoration, including the 7th century chapel at Agia Anargiri on Alonissos, and the 18th century monastery on Kyra Panaya.
- In stark contrast to Patitiri – which would do well to consider a major facelift, including rigorous traffic planning and pedestrian rezoning – the old town of Alonissos has undergone something of a renaissance in recent years, repairing much of the damage wreaked by the 1965 earthquake. It is now widely regarded as one of the most aesthetic of restored traditional villages in the Aegean.

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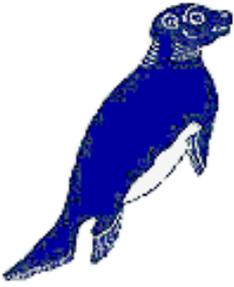
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## In Focus

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### HANGING BY A THREAD \*

David M. Lavigne & William M. Johnson

**Monk seals are among the rarest marine mammals on the planet. They need people-free coastlines to thrive, but in the Mediterranean, one of their last bastions, most coasts are crowded tourist hotspots. Does Europe's monk seal face the same fate as its Caribbean cousin?**

They can dive to depths of 200 metres or more, travel hundreds of kilometres between colonies, navigate mountainous seas with disarming nonchalance, dazzle onlookers with their agility, speed and grace, and detect fish movements with their whiskers. Even so, monk seals have failed to impress humans sufficiently to avoid being consigned to the extinct and endangered species lists of the twentieth century.

Monk seals were named by Johann Hermann in the eighteenth century after he watched a captured individual arching itself up against the edge of its container. He wrote, "It looked from the rear not dissimilar to a black monk in the way that its smooth round head resembled a human head covered by a hood, and its shoulders, with the short stretched feet, like two elbows protruding from a scapular..."

Three modern species are recognised: the Hawaiian monk seal *Monachus schauinslandi*, endangered, currently numbering 1,300-1,400 animals and declining at a rate of about 5 per cent per year; the Caribbean monk seal *M. tropicalis*, declared extinct by IUCN-The World Conservation Union in 1996; and the Mediterranean monk seal *M. monachus*, critically endangered and now thought to number fewer than 550 animals.



Life's a beach. A Hawaiian monk seal basks in the sun on Midway Atoll.

After surviving for millions of years, are these seals simply 'relict species', approaching the end of a natural evolutionary process? Are they no longer able to adapt to naturally changing environmental conditions? Or are humans to blame? Have we hunted them so extensively, and so disturbed and destroyed their habitats that they are simply unable to cope? To answer these questions, we need to go back to the very beginning of their story.

Monk seals are pinnipeds – a group of marine carnivores that includes true seals, fur seals, sealions and the walrus. Evidence now suggests that the pinnipeds first appeared in the north-eastern Pacific, along the coast of present-day California, some 23 million years ago. Initially, they radiated throughout the North Pacific, eventually entering the Atlantic Ocean via the Central American Seaway, an ancient waterway that once separated North and South America.

No one knows exactly when monk seals first reached Hawaii. Nor is it known if the ancestors of Hawaiian monk seals originated in the Pacific Ocean or in the Atlantic basin. What is known is that the Hawaiian monk seal is a 'living fossil', because some of its characteristics are more primitive than those of its earliest known relatives that lived on the east coast of North America 14-16 million years ago. Monk seals, therefore, could have made their way to Hawaii as early as 15 million years ago. Today, the Hawaiian monk seal inhabits the North-western Hawaiian Islands (NWHI) – the 'Leeward Chain' of largely uninhabited atolls and sandbanks curving off into the Pacific

north-west of the main Hawaiian Islands. A few additional seals live and reproduce around the more densely populated main islands.

In contrast to the Mediterranean monk seal, for which records date back more than 2,500 years, nothing is known of the Hawaiian monk seal in antiquity – it was not even formally identified and named (by the German scientist Paul Matschie) until 1905. Written reports of its existence begin with the Russian explorer Lisianski, who in 1805 observed seals on the Hawaiian island that now bears his name.

Records from voyages of the *Aiona* in 1824 and the *Gambia* in 1859 suggest that the species was severely reduced by unregulated seal hunts in the early to mid-1800s. If Hawaiian monk seals were hunted to precariously low levels by the late 1800s, they must have staged a partial recovery during the first half of the twentieth century. But there is no documentation for this either, because the first range-wide scientific surveys did not start until the late 1950s. Since then, we know the population has declined by about 60 per cent.

The species was listed in the first IUCN Red Data Book of endangered mammals – published in 1966 – as ‘vulnerable’. In 1976, it was listed as a ‘depleted species’ under the US Marine Mammal Protection Act and subsequently declared an endangered species under the US Endangered Species Act. It was only then that dedicated long-term efforts to study and protect the Hawaiian monk seal were launched in earnest.

Threats confronting the species include accidental entanglement in fishing gear and other marine debris, deliberate killing by fishermen and a serious decrease in food availability affecting the largest surviving breeding colony. Though relatively low marine productivity in the region may be partly to blame, commercial fisheries are also implicated in the crisis, and have been accused of causing the starvation of an endangered species by overfishing the seal’s food sources.

Thanks to a last-minute Executive Order by Bill Clinton, monk seal habitat in the NWHI will soon be incorporated into the single largest protected area ever created in the US – the North-western Hawaiian Islands Coral Reef Ecosystem Reserve – designed to safeguard fragile coral reef habitat along the entire 1,930km of the Leeward Chain. The Presidential decree clearly emphasises a commitment to the precautionary principle, in which endangered species and habitats are given the benefit of the doubt over any temptation to indulge in fuzzy or uncertain science for the sake of economic interests.

Returning to our journey through time, some ancestors of modern monk seals moved through the Central American Seaway, eventually establishing a foothold in the Caribbean. Again, the history of the Caribbean monk seal and its relationship with humans remains unclear, though we have found some evidence to suggest that native tribes hunted it for its meat and hides. The species appears to have entered its fatal tailspin only after Europeans first journeyed to the New World. Observing Caribbean ‘sea wolves’ on the coast of Santo Domingo in 1494, Columbus promptly ordered his crew to kill eight of the animals for food, paving the way for intensive exploitation of the species by settlers and traders who came in his wake. In 1707, the naturalist and physician Hans Sloane wrote that fishermen would catch 100 seals during a single night in the Bahamas, the animals’ blubber being melted down to produce lamp oil. Log-books from shipwrecked galleys also record that marooned sailors ate the seals. Some of the last surviving colonies were slaughtered for natural history museums. During a single expedition to the Triangles off the Yucatan Peninsula in December 1886, for example, collectors killed 42 Caribbean monk seals, whose stuffed bodies and constituent parts were subsequently sold to some of the world’s most prestigious institutions. According to conventional wisdom, the last authentic record of a living Caribbean monk seal dates to 1952, when a small colony was observed on Serranella Bank, south-east of Jamaica.



Fated seal. The only known photograph of a Caribbean monk seal – taken at Bronx Zoo in 1909. The species was formally declared extinct in 1996.

Since that time, sporadic observations of mystery seals in the Caribbean have been reported, much like UFO sightings [see [Caribbean monk seals or hooded seals?](#) this issue]. But there is no photographic evidence of these, and most observers cannot realistically be expected to distinguish between a Caribbean monk seal, another pinniped species or even a manatee. Some of the reported sightings have probably been of wayward young hooded seals *Cystophora cristata*, other North Atlantic seals beyond their normal range, or even escapees (including sealions) from captive facilities. To complicate matters, manatees and monk seals display a striking similarity when they float on the surface, a behaviour that, in both cases, reputedly contributed to the rise of mermaid legends.

Having reached the Caribbean, monk seals and their relatives continued their dispersal eastward through the Atlantic basin, eventually leaving one final species to colonise the Mediterranean and the coasts and adjacent islands of North-west Africa. In contrast to its tropical cousins, the Mediterranean monk seal, immortalised by such ancient luminaries as Homer, Aristotle, Hippocrates, Plutarch and Pliny, has long played a prominent role in human mythology and culture. Today, it clings to survival along desolate, cliff-bound coasts in Greece, Turkey, Madeira and along the Western Sahara. Most of the large colonies that once graced Mediterranean shores appear to have been

wiped out during the Roman era as a result of intensive hunting for the seal's pelt and fat, its meat and its perceived medicinal properties. In a startling indication of how little things have changed in 2,000 years, ancient texts also report how fishermen persecuted the species, angered by stolen catches and damaged nets.

For centuries thereafter, large herds continued to survive along the Atlantic seaboard of North-west Africa. It was not until 1434 that Portuguese explorers landed on these pristine coasts and discovered an estimated 5,000 'sea-wolves' inhabiting the Rio d'Oro. According to the official chronicler of the expedition, the seals – presumably unaccustomed to the human threat – presented easy targets, and many were killed, their pelts destined for European markets. Similar expeditions wiped out herds in the Canary Islands and Madeira.

Though the species continued to survive in small colonies along many Mediterranean and Black Sea shores until the middle of the twentieth century, it has since faced a losing battle against a barrage of forces: mass tourism, coastal urbanisation, industrial overfishing and the wrath of traditional fishermen, who still see the seal as a convenient scapegoat for damaged nets and dwindling catches. A few decades were all that were needed to deplete and eradicate the species from entire regions.

Today, the monk seal is virtually extinct in the western and central Mediterranean, and in the Marmara and Black Seas. Though thousands of islands, inaccessible coastlines and the monk seal's contemporary habit of shying away from human contact have all conspired to make population estimates an extraordinarily inexact science, the best guess is that only 379-530 individuals now survive. Those bleak statistics make *M. monachus* Europe's most endangered marine mammal.



*Monachus monachus* current distribution  
(click to enlarge)

Habitat destruction and disturbance has, in some respects, been an even more lethal and enduring foe than hunters and hostile fishermen. Historical records tell us that herds of monk seals once occupied open sandy beaches, shoreline rocks and great arching caves in the Mediterranean. Since then, though, steadily increasing human pressures have driven the animals to colonise far more marginal habitats. Caves, many with underwater entrances and inner haul-out areas, continue to provide a refuge for resting, breeding and nursing, and yet there is evidence to suggest that even these habitats have continued to deteriorate as seals attempt to avoid harassment and disturbance. In recent years, seals have been seen in caves that are, in reality, little more than water-filled crevices. Animals using such shelters, which offer no beaches or haul-out areas, are obliged to sleep and rest while floating in the water.



Suitable cave habitat for Mediterranean monk seals to rest, give birth, and nurse their pups has deteriorated over time, due to human harassment and disturbance.

Despite high-level overtures by the United Nations and others, the tourism industry has so far ignored pleas for it to play a constructive role in the conservation process. The stark fact remains that mass tourism poses a clear and present danger to the survival of the species throughout the eastern Mediterranean, even in the few monk seal protected areas that currently exist. Without a network of well-managed and well-guarded marine protected areas (MPAs) – a priority that has been recognised for at least 20 years – there can be little hope for the survival of the species.

The fate of the Mediterranean monk seal was again called into question in 1997, when its largest surviving colony on the Côte des Phoques in the Western Sahara, then numbering some 317 animals, suddenly fell by 70 per cent. The mass die-off led to considerable blood-letting among scientists and conservationists, unable to determine

whether they were dealing with a toxic algal bloom (the most likely hypothesis) or a morbillivirus epidemic (see BBC Wildlife, July 1997). Incidental casualties of the die-off included a controversial Spanish plan to translocate some of the colony's monk seals to the Canary Islands, and a related scientific research programme at odds with many in the monk seal conservation community because of its invasive methods.

Since then, Luis Mariano González of Spain's Ministry of Environment has been leading efforts to implement a Regional Recovery Plan for the species under the auspices of the Convention on Migratory Species (also known as the Bonn Convention). The plan links the range states – Madeira (Portugal), the Canary Islands (Spain), Morocco and Mauritania – in an ambitious effort to set up a network of new and existing MPAs, and to monitor the population by non-invasive scientific means.

Despite attempts by some scientists to attribute the monk seals' decline to the 'doomed relict species' theory, it is impossible to ignore the significance of human impacts on the species. Ranging from uncontrolled killing to habitat

destruction, these appear to have doomed the Caribbean monk seal and to have brought the Mediterranean and Hawaiian monk seals into perilous decline. Nonetheless, the record also shows that monk seals do seem capable of recovery, given adequate protection from human threats. It is, for example, unlikely to be coincidental that the only subpopulations of Hawaiian monk seals that are currently stable or increasing are those occupying uninhabited atolls or areas where human activities have been curtailed. Similarly, in the Mediterranean, where efficient, well-guarded MPAs have been set up for them, there is also evidence of recovery. The population in Madeira's strictly-protected Desertas Islands Nature Reserve has jumped from between 6 and 8 in 1988 to 23 individuals today, and there has also been something of a baby boom recently in the Northern Sporades Marine Park in Greece and Turkey's Cilician Basin.

Such examples give cause for hope – and for despair. For, even though there is now some evidence that monk seals could be saved from a looming extinction, there are still too few people in positions of power who think it is worth the effort.

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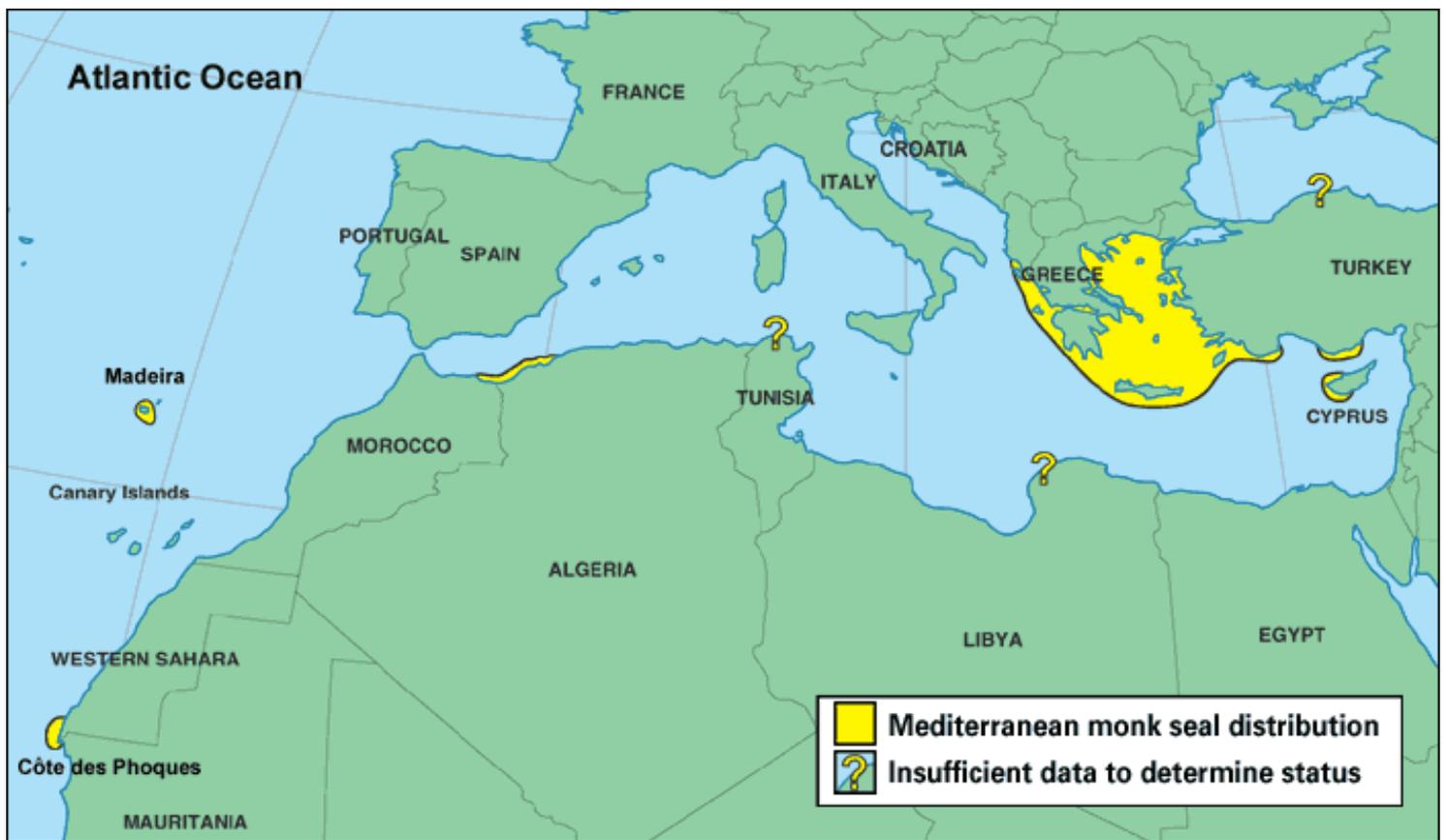
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# Letters to the Editor

Vol. 4 (2): November 2001

## Back to the future

I suspect a research scientist, hoping to continue where he had left off, coined the saying “never go back”.

Recently, I proved the futility of hoping that nature would have a natural protector in time. Returning to Rhodes brought back a flood of memories – something to savour since it was from this Eastern Aegean island that we had first encountered the rare, elusive *Monachus* [see [Monachus in Memoria](#), TMG 3(1): May 2000].

In 10 days we drove 689 kilometres along the coastline of this wonderful old island. We revisited bays and caves still lightly touched by the ubiquitous foot of the human. We talked to fishermen, tourist guides, charter boat captains, and with those who could still communicate in the beach tavernas. We talked to the captains of the daily ferry boat running to Simi, Lindos, and other tourist attractions on the eastern coast of Rhodes, and of the hydrofoils to Kos, Chios, Patmos and other islands of the intricate Greek archipelago. The same questions, the same results. The “*fokia*” was unknown, had not been seen for many, many years.



[\(click to enlarge\)](#)

We gave up our allegiance to Rhodes and took the new high-speed catamaran to Tilos. The *chora* had changed but it was easy enough to escape to the more sedate parts of the island, where we went through the same question-same answer routine. Perhaps the new Telios were matching the speed of their new Norwegian catamaran and had no time for the slow moving, but rapidly dwindling, *Monachus*. This island, though, may have potential as another seal sanctuary. The new transport system produces only a limited influx of humans – unfortunate for the shipowners, but good for marine wildlife.

We moved on to one of the most fascinating of the Greek islands, Nisyros, where in 1974 we moored for a week and experienced a full step back into another century. This is a volcanic island with a smoking sulphurous cone of some size. Dormant it may be, dead it certainly isn't. In the 70s we discovered a large abandoned spa, and a talkative, cigarette-begging priest who became our guide and showed us a subterranean church, now desolate and abandoned. The town had also changed. Ferries now run from Kadamana on Kos, Rhodes and other points north. Buses run to the hotdog stand at the edge of the volcanic cone.

We were able to stay at a hotel equipped with running water – something of a mystery as the island was considered dry in the 70s, and still has no desalination plant. As an island, Nisyros towers above others because of its turbulent history and former isolation. It has been ravaged by explosions of nature, by Turkish invaders and the German army. Ghost towns cling to the sides of the calderas, filled with the reek of fire and brimstone. Tourism has also struck, drawn by the fires of hell, the gently puffing smoke from the bubbling cauldron of the 500 metre-wide cone. Again the same questions – some to old friends, some to fishermen and ferryboat captains – “*fokia*”? During earlier surveys, it was here that we'd met with the full-blown wisdom of the Nisyriot fisherman who, when asked if he ever saw seals, said “yes”; when asked how many, replied: “every fisherman has his seal”. This not only meant that they had accepted them as part of their lives; it also suggested that the seals had become opportunistic feeders.

Slowly we drove around the island, taking several days. A far cry from the deserted village where the cigarette-smoking papas had told us of seal kills, Pali is now a bustling centre, with a new harbour. Further along the coast, we came to the island's long pebble beaches, lying far below the almost deserted village of Emporios. Here at last was sanctuary, we thought, our chance to remake *Monachus*' acquaintance – but only a charming family of naked Russians occupied the 6-kilometre beach. Neither seals were seen, nor sightings made for many years, despite the potential for hundreds on this putative breeding site.

We returned to the village and on the cliff edge ordered Greek *kafe* from a surly waiter, who had little else to do all day but stare at the sea. Just as we left I asked him where he got his fish. “Athens,” he replied. We

turned and there, not more than 100 metres from his restaurant, was our *fokia*. I spun around and asked the waiter, “do you see many?” “No,” he said. “Do the fishermen still shoot them?” “No – no need. Fishing is now a hobby, tourism pays for everything.”

Had we been offered the one solution that might give *Monachus* a chance? Here, the seal was no longer considered in competition with those who made their living from the sea. From one sighting and one disgruntled waiter came a slight glimmer of hope for the seal’s future.

We travelled on to Turkey, again using one of the modern catamarans that have superseded the old slow ferries. In fact customs procedures now exceed the travel time from Rhodes to Marmaris by several hours. We revisited the old haunts of the seals in the Bay of Marmaris, but saw only fish farms, modern hotel complexes, tour boats, and mobile aquatic ice cream vendors. What was once a small, fortified town in the 70s was now spreading 10 kilometres along the beach where we had once sighted *Monachus*.

So what was the result of this two-week trip? Pessimism for the seal in some of its old haunts in southern Turkey; a curious sign of hope in Nisyros where a seal or two may have survived centuries of hostility by fishermen; open beaches on both Tilos and Nisyros awaiting the return of the prodigal seal.

The chance encounter with the seal in Nisyros brought my sightings record over 37 years to 8 individuals. Those were intensive mail surveys, along with several years of surveys from clifftops, boats and helicopters. The success rate is not high and I have to wonder, if I survive another decade, will *Monachus*?

*Keith Ronald, Guelph, Canada*

### **Mystery sightings in the Bahamas**

While on a scuba diving trip to San Salvador, the Bahamas, this past week [July-August 2001] we saw a strange thing. We encountered a monk seal in the harbour of Riding Rock Inn, much to the amazement of everyone in the dive group and on the island.

The seal has been in the harbour there for the last two days and we had no idea who to tell.

We hope you or maybe somebody you know can help this poor creature and obviously its other relatives in the area.

*Wayne & Cher Bamberger, St. Petersburg, Florida.*



### **And in Antigua...**

Last April my husband and I vacationed in Antigua. During our stay, we circled the island on a chartered catamaran cruise. One side of the island faces the Atlantic, while the other is in the Caribbean Sea. During the trip we saw many fish, dolphins and birds (including tropic birds!).

I sat at the front of the boat with my feet hanging over the side – and I saw a seal. It came up and put its face out of the water so that I saw its head, face, eyes, whiskers, and body. Then it tilted its head back and used its flippers to dive to avoid the boat. It was fifteen feet away from me and I saw it clearly. When I yelled to the others to look, the crew members laughed at me. “No, man... seals don't live here...,” they snickered. “It must’ve been a turtle.” I’ve been deep sea fishing many times and have seen hundreds of turtles. This was no turtle. I saw its eyes. I saw the shape of its head, its fins, its body. It was a seal.

The new issue of the National Geographic mentions the Caribbean monk seal, and so I decided to research my sighting online. The seal I saw was in Antigua. Are there any other seal species native to the area?

*Jeanne Peabody, USA.*

✓ **Editor’s note:** Antonio A. Mignucci-Giannoni of the Caribbean Marine Mammal Laboratory, Universidad Metropolitana, Puerto Rico, and Peter Haddow of the Seal Conservation Society, U.K., address these “mystery” sightings in an article specially written for TMG: [Caribbean monk seals or hooded seals?](#)

### **Speargun fishing in Foça**

I am a French speargun fisher and am going on holidays at the Club Med near Foça [Turkey], situated close

to the Siren Rocks. I was wondering whether speargun fishing is prohibited in this area, or whether I need to apply for a license. I practise speargun fishing without scuba gear.

If it is strictly prohibited, what about free-diving (without any weapon)? Also, are any diving or speargun fishing restrictions in place at nearby Hayirsiz island?

*Jérôme Lescure, France.*

✓ **Yalçın Savas, of the [SAD-AFAG Aegean Programme](#) office in Foça, replies:**

Basically, daytime speargun fishing that is non-commercial in nature is permitted along all Turkish coasts for Turkish citizens. Speargun fishing with scuba gear anywhere and at any time of night is prohibited. In addition, entering seal caves is also prohibited by law.

Foreign tourists are only allowed to fish if they come to Turkey with an 'A' Class tourist agency which has an "Amateur Fishery Tourism Permit", or if the agency possesses a "special fishing permit" issued in the name of the tourist(s) concerned.

Snorkelling is not prohibited in general. Scuba diving is prohibited along many stretches of coast (including Foça) but tourists can apply to one of many dive centres that have been established to promote and organise diving tourism in certain concentrated areas.

In the Foça Specially Protected Area (SPA), human activities at the Siren Rocks (western coast of Orak Island) are strictly limited. In this area, only the professional, artisanal fishermen of Foça are allowed to enter for fishing, without anchoring. All forms of human activity on the Siren Rocks are otherwise prohibited. The same restriction applies to Hayirsiz island which also forms part of the Foça SPA. Tourists intending to visit Foça are invited to contact the [SAD-AFAG](#) office for further information.

## Albanian puzzles

*Monachus monachus* is listed as regionally extinct [RE] in the [IUCN] Redlist data base for Albania. Do you have an approximate date when it might have become extinct in Albania?

*Michael Nieswiadomy, University of North Texas, USA.*

✓ **Editor's reply:** Albania has always been a hazy spot on the monk seal distribution map [see [The numbers game](#), TMG 3(1): May 2000]. Field research along potentially favourable coastal habitat proved impossible during the communist dictatorship years under Enver Hoxha (1946-1985). As a result, it has never been clearly established whether there ever was a resident monk seal population as such in Albania. Much of the coastline topography appears unsuitable, with the possible exception of the Karaburuni peninsula, dominated by steep cliffs. There also appear to be suitable sea caves in the nearby area of Reza E Kanarit, where a joint Albanian-Croatian survey reported finding traces of monk seal presence in 1999 [see [Field research in Albania and Croatia](#), TMG 2(2): November 1999]. To make matters rather more complicated, it is entirely possible that there continues to be seasonal movements of seals into Albanian waters from the Ionian Islands of Greece, where there is a resident population. Formerly, it was also suspected that seals resident in the Croatian islands (now extinct) undertook similar movements.

## Cilician fishermen speak out

We are living in the village of Demiroren Koyu on the Mediterranean coast of Turkey. We make our living by fishing with small boats (7-9 meters). We are in trouble with the monk seals. We lay our fishing nets in the evening and collect them early in the morning. You should see the condition of the nets. A net which is 1000 meters long generally lasts only one month, but afterwards the net has lots of holes made by the seals. We are poor people and cannot afford to buy new nets every month. The seals are also eating most of the fishes we catch. We do not want to harm these animals and so far we have not. But we also need to think of ourselves and our families. It is an urgent situation. We need help.

*Halifi Gungor, Ali Deniz, Ugur Tufan, Mustafa Tag, Demiroren Koyu, Anamur, Mersin, Turkey (letter written on the fishermen's behalf by Naki Tez).*

✓ **The following reply is provided by Ali Cemal Gücü & Gül Moran, [SAD-AFAG Mediterranean Programme](#):**

The Cilician Basin lies in the northeastern part of the Mediterranean Sea, between the island of Cyprus and

the Turkish mainland. Its unspoilt coasts provide a home to endangered monk seals, some of whose last remaining breeding caves are also found in the area. Despite the fact that fish stocks – the only food source for monk seals – are at a level that can only sustain a small-scale artisanal fishery, the fishing fleet in the region has rapidly expanded to industrial-scale, with boats equipped with huge, unselective trawl nets and purse seines. Consequently, within the last fifteen years the area has been heavily exploited. The uncontrolled development of the industrial fishery not only negatively affected the local economy – i.e. through a drop in catch per unit of effort (CPUE) and a loss of income – but also resulted in the loss of biodiversity. Therefore, today, all parties evidently accept that an effective policy is necessary for the recovery and the survival of the ecosystem supporting not only endangered marine mammals and turtles, but also local and other fishermen.

Recently, joint conservation efforts in the region by Middle East Technical University-Institute of Marine Sciences (METU-IMS) and the Underwater Research Society-Monk Seal Research Group (SAD-AFAG), yielded the establishment of five protected coastal sites encompassing primary monk seal habitat, and the creation of a no-trawling area, including a No-Fishing Zone. In this way, the fish stocks in a large area (12 x 16 n. miles) are reserved for the exclusive use of the monk seal and local artisanal fishermen. The No-Fishing Zone is considered the only effective tool to preserve the ecosystem's biological diversity and the only hope for its recovery. Even at the end of the first year of protection, promising signs of improvement were observed in some demersal stocks, and a significant increase in the CPUE of the artisanal fishermen was reported.

In an ecological sense, the artisanal fishermen and the monk seal, being at the top of the food chain, are competitors. They depend on the same food source. Confrontation is inevitable and one may hinder the livelihood of the other.

What SAD-AFAG is trying to achieve is the creation of a community-based marine ecosystem conservation model, in which local stakeholders are unified for their common future, are sensitive to the utilization-conservation balance, and are in harmony with the ecosystem. Therefore, one of the major tasks of the project is to show to everyone, from ministers to local fishermen, that the protection measures established for the sake of the monk seal will also help the recovery of a depleted ecosystem. When the health of the ecosystem is restored and sustained, this will be beneficial not only for the monk seal but for all those who depend upon it.

Unfortunately, human greed has led this small group of cunning fishermen from Anamur to exaggerate the losses they've suffered from the seals, and to issue thinly veiled threats to slaughter the animals unless they receive compensation.

When the news reached us, we called the fishermen to a meeting in our Bozyazi office, where the idea of human-monk seal coexistence was again explained to them. They were also reminded that artisanal fishermen had already gained important privileges by having the right to use the largest marine protected area in the country. To defuse any remaining threat, they were warned that any harassment of monk seals in the area would put them first on the list of suspects.



Anamur fishermen meeting in SAD-AFAG's Bozyazi office

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## Recent Publications

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- **Bildt, M.W.G. van de.** 2001. Morbillivirus infection in a bottlenosed dolphin and Mediterranean monk seal from the Atlantic coast of West Africa. *Veterinary Record* 148(7): 210-211.
- **Bonotto, S.** 2001. Aspects of pollution on the coastal ecosystems of the Mediterranean Sea. *Aquatic Conservation – Marine and Freshwater Ecosystems* 11(4): 319-323.
- **Henderson, J.R.** 2001. A pre- and post-MARPOL annex V summary of Hawaiian monk seal entanglements and marine debris accumulation in the Northwestern Hawaiian Islands, 1982-1998. *Marine Pollution Bulletin* 42(7): 584-589.
- **Jackson, J.B.C.** et al. 2001. Historical overfishing and the recent collapse of coastal ecosystems. *Science* 293 (27 July 2001): 629-638.
- **Kretzmann, M.B., N.J. Gemmell, & A. Meyer.** 2001. Microsatellite analysis of population structure in the endangered Hawaiian monk seal. *Conservation Biology* 15(2): 457-466.
- **Lavigne, D.M. & W.M. Johnson.** 2001. Hanging by a thread. *BBC Wildlife* 19(8) August 2001: 54-60.
- **Mignucci-Giannoni, A.A., & D.K. Odell.** 2001. Tropical and subtropical records of hooded seals (*Cystophora cristata*) dispel the myth of extant Caribbean monk seals (*Monachus tropicalis*). *Bulletin of Marine Science* 68(1): 47-58.
- **Pêchecops / CFFA.** 2001. A new Mauritania-European Union fisheries agreement protocol: overexploitation of Mauritania's cephalopods is up for auction. *Pêchecops, Mauritania, & Coalition for Fair Fisheries Agreements*, Brussels, August 2001: 1-4. [Available in the [Monachus Library](#)].
- **RAC/SPA.** 2001. Report of the fifth meeting of national focal points for specially protected areas, Valencia, Spain, 23-26 April 2001. United Nations Environment Programme. Mediterranean Action Plan. Regional Activity Center for Specially Protected Areas, Tunis: 1-142. [Available in the [Monachus Library](#)].
- **Salman, A., M. Bilecenoglu, & H. Güçlüsoy.** 2001. Stomach contents of two Mediterranean monk seals (*Monachus monachus*) from the Aegean Sea, Turkey. *Journal of the Marine Biological Association of the United Kingdom*, 81(4): 719-720.

### In press

- **Neyisci, T.** 2001. Conservation of monk seals (*Monachus monachus*) and ecotourism. Proceedings of the Fifth International Conference on Mediterranean Coastal Environment, 23-27 October, Hammamet, Tunisia. Vol. 1: 195-204.

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