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Vol. 5 (1): May 2002

Guest Editorial

THE PLIGHT OF THE MONK SEAL

Henrique Costa Neves

Last December I was alone, hidden behind rocks on a pebble beach somewhere on Deserta Grande, one of the three small islands which form the Nature Reserve of the Desertas Islands, 22 km off Madeira Island.

I spent almost twenty-two hours in this particular spot, entranced and delighted at the sight of two adult female monk seals caring and feeding a couple of newborn pups. Again in this breeding season, and for four years now, some seals of the colony have been coming ashore onto this open beach to give birth and rear their pups, completely at ease.

While I was there, filming, taking pictures and a lot of notes in my field book, I also had the opportunity of reflecting upon the story of the monk seals and their time on Earth. It is incredible how a species, a very old species of about twelve million years, eventually became one of the most endangered animals on the planet, even after co-existing with man for many centuries, sometimes in a relationship of mutual trust.

The persecution, the irrational ambition and the negligence of men drove this species to the brink of extinction – and in many areas of its range, continues to do so.

How could this be averted?

Meanwhile, as my mind was occupied by these thoughts, another adult seal approached the beach and, without any hesitation at all, scrambled over the pebbles to join the group that had been there almost three hours, lying in the sun in complete abandon.

It was then that I realised that these particular monk seals were gradually reacquiring an ancient natural behaviour, a behaviour that human persecution and the need for defence and survival had suspended for many years, storing it away in the species' genetic structure, instinct and memory.

Nowadays, only humans can save the monk seal and for this we need to apply our intelligence, our willpower and our understanding of priority.

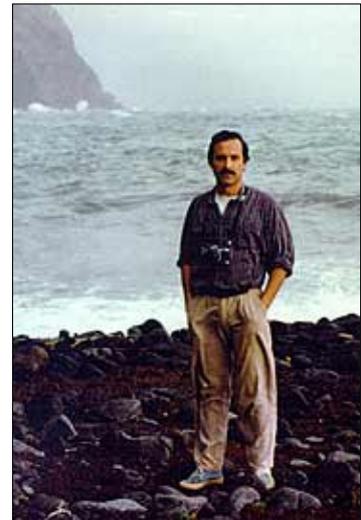
The monk seal's recovery in the Desertas provides clear evidence that if we humans give the species the opportunity and the right to live, then Mother Nature will respond with generosity and wisdom, making redundant the sophisticated and expensive scientific research programmes that too often dominate recovery plans for endangered species.

Life is simple, the important thing is to give Nature a chance.

More and more, we see the encouraging signs of governments and conservationists taking on the cause of the monk seal and pledging their commitment. As long as we can keep up that momentum, then I will continue to be optimistic about the future of the monk seals of Portugal, Greece, Turkey and Cap Blanc. Why? Because the monk seal now has more friends than ever, including people whose valuable efforts are devoted to the recovery of the species. As long as this continues, I think I can safely foresee an optimistic XXI century for this marvellous pinniped.

Henrique Costa Neves, Funchal, Madeira, April 2002

Henrique Costa Neves, until recently Director of the Parque Natural da Madeira, has been personally involved in monk seal conservation since August 1988, when he and his co-workers first landed on Deserta Grande to begin construction of the warden station. In January this year he was appointed environmental councillor for the City Council of Funchal and, aside from his other duties, continues to devote time and effort to the recovery of Madeira's monk seals.





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The Monachus Guardian moves home

The editorial team welcomes readers to the new home of **The Monachus Guardian**, the world's only Internet journal dedicated to monk seals, their shrinking habitat, and the forces threatening their survival.

If you have been a regular visitor to our publication in the past, we suggest you bookmark the new site (www.monachus-guardian.org) now for added convenience.

In addition to current and back issues of The Monachus Guardian, readers will also find other familiar and well-trusted resources on site, including the recently-updated [Monachus Library](#), and [Monachus Profiles](#). Time permitting, we also hope to develop another recently-registered Internet domain, www.monachus.info, publishing a comprehensive catalogue of monk seal information resources available online, indexed by subject.

We also take this opportunity of extending our warmest thanks to the hundreds of readers who have written in to express their support for the continued publication of The Monachus Guardian [see [Letters to the Editor](#)].

Although the survival of the journal has been placed in serious jeopardy by the abrupt departure of its former sponsor and publisher [[Breaking News archive](#)], we decided to proceed with the May issue as originally planned, encouraged by growing institutional support from other quarters and deepening ties with frontline monk seal conservation organizations. Such support makes it all the more likely that we will be able to publish the November 2002 issue as originally planned, and also secure longer-term financial backing.

PS: If you have not already signed our [online Petition](#), but find The Monachus Guardian a valuable source of information on the study and conservation of monk seals and their threatened habitats, please take the time to add your 'signature' to the list. Your voice can be persuasive! – the team @ TMG.

Prince issues appeal

Although no longer involved in monk seal conservation on an operational level, the Bellerive Foundation and long-time friend of the monk seal, Prince Sadruddin Aga Khan [[Guest Editorial](#), TMG 2(2): November 1999], reacted swiftly to news of TMG's possible closure, pledging emergency aid that the Geneva-based organisation hopes will act as a "catalyst" to encourage wider institutional funding support for the journal.

In issuing an appeal to a number of other international conservation organisations, the Prince expresses his hope that the NGOs will match his commitment and also seek ways in which TMG can be put on a more stable, long-term footing.

"Given its proven track record," writes the Prince, "and a growing support base that is so vital to the conservation of any endangered species – let alone one as neglected as the Mediterranean monk seal – we believe that TMG warrants continued backing."

Readers wishing to support the Prince's appeal on behalf of The Monachus Guardian, either by taking out a voluntary subscription to the journal, or making a straightforward donation, will find further details on our new [Seal Appeal](#) page. Alternatively, please contact the [editor](#) by email or the offices of the [Bellerive Foundation](#).



Annotated bibliography online

Several years in the making, the first public edition of the **Annotated Bibliography on Mediterranean monk seals** has now been published in electronic (PDF) format by The Monachus Guardian, and is available for download from the [Monachus Library](#). [Karamanlidis, A.A. and W.M. Johnson, eds. 2002. Annotated Bibliography on Mediterranean monk seals (*Monachus monachus*). Version 1.0. The Monachus Guardian: 1-105.]



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Although a work in progress (new editions are likely to be issued as new citations are added and others confirmed for accuracy), the bibliography currently consists of some 1300 references relating to the world's most endangered pinniped, *Monachus monachus*.

As indicated in its accompanying introduction, the Bibliography was inspired in part by the difficulties that researchers and conservationists face in keeping track of numerous articles relating to *Monachus monachus* that are published every year – often in

obscure journals with a limited, local distribution, and in a variety of different languages. Although access to information

often takes a back seat to other research priorities, the compilers believe that it is precisely this accumulated knowledge that is indispensable to the design and application of appropriate conservation measures for the Mediterranean monk seal.

Public and private libraries in Greece, Turkey, Germany, Switzerland, the U.K. and Canada were contacted, both to gather new relevant citations and to check the accuracy of existing references. Citations that have been confirmed against the original publication appear in black typeface, while those that have yet to be verified in this manner appear in grey.

The Bibliography focuses on Mediterranean monk seal related material written after the first modern scientific description of *Monachus monachus* by the German naturalist Johann Hermann in 1779. For an extensive overview of material written prior to Hermann's work, researchers are advised to consult Johnson & Lavigne (1999).

The Annotated Bibliography on Mediterranean monk seals is being made available as a cross-platform Adobe Acrobat PDF file. The electronic format offers distinct advantages over the paper-based alternative, not least of all the ability to fast-search the document according to author, year of publication, and published journal.

In order to facilitate searches according to specific topics, keywords were assigned to every reference. The keyword list employed is based on the model compiled and used by the [Seal Conservation Society](#) in its own Seal Bibliography. This list was extended in order to facilitate reference searches according to geographical area.

In order to improve future editions of the Bibliography, we ask readers to report any citation errors or omissions they may find. New references are, of course, also welcome. Please contact us at one or both of the following email addresses:

Alexandros A. Karamanlidis
alexkaram@hotmail.com

William M. Johnson
editor@monachus-guardian.org

Rehab workshop convenes in Liege

A workshop on seal rehabilitation convened in Liege, Belgium, on 7 April, an adjunct to the 16th Annual Conference of the European Cetacean Society. Organised by Jeny Adroukaki of the [Hellenic Society for the Study & Protection of the Monk Seal](#) (MOM) and Yvan Larondelle of the Université Catholique de Louvain, Belgium, the Workshop – entitled *Rehabilitation in theory and practice: protocols, techniques, cases* – attracted some 40 participants from 12 countries.

A pinniped rehabilitation workshop was considered long overdue, in part because of the wide-ranging experience that has been brought to this relatively new science over the past decade. Originally the preserve of ardent amateurs and volunteers, pinniped rehabilitation has become increasingly sophisticated in recent years, as professional veterinarians and biologists strive to develop and perfect techniques governing rescue, treatment, rehabilitation and release into the wild. Particularly where species are severely endangered, such as the Mediterranean monk seal, rescue and rehabilitation is generally considered an important component of conservation strategy.

A keynote speech, delivered by Prof. A.D.M.E. Osterhaus, Department of Virology, Erasmus University, Rotterdam, focused on seal rehabilitation history in Europe and the need for specific techniques and protocols. Oral presentations of relevance to monk seals included:

- **Androukaki, E. E. Fatsea, L. 't Hart, T. Kuiken, A.D.M.E. Osterhaus, E. Tounta and N. Komnenou.** 2002. Treating stranded Mediterranean monk seal pups in Greece.
- **Jensen, T.H., L. 't Hart, A.M. Jiddou, K. O'M Fall and A.D.M.E. Osterhaus.** 2002. Successful rehabilitation of a monk seal in Mauritania.
- **Mozetich, I., M. A. Cedenilla, P. Fernández de Larrinoa, L. M. González, J. Layna, F. Aparicio, L. F. López Jurado and P. López.** 2002. Juvenile and subadult survival of wild and rehabilitated Mediterranean monk seal (*Monachus monachus*) at Cabo Blanco (western-Sahara, Mauritania).
- **Robinson, I, A.J. Charles, D.M. Smith, I. Mozetich, M. A. Cedenilla, P. Fernández de Larrinoa, L. M. González, J. Layna, F. Aparicio, L. F. López Jurado and P. López.** 2002. Inclusion of an acclimatization phase in the rehabilitation of a Mediterranean monk seal from the western Sahara.

In the round table discussion that followed, chaired by Dr. Ian Robinson of the RSPCA's Norfolk Wildlife Hospital, participants exchanged views on the reintroduction of rehabilitated animals into the wild, including criteria, risks, advantages and post-release monitoring.

A workshop report, with abstracts, is expected to be published in due course. – Jeny Adroukaki, MOM.

Acoustic deterrents and monk seals

The proceedings of the Workshop on Interactions between Dolphins and Fisheries in the Mediterranean, held in Rome last year, has been published by the convenors, the [Istituto Centrale per la Ricerca Applicata al Mare](#) (ICRAM). Given the fierce competition over dwindling fisheries resources in the Mediterranean, the workshop expressed concern that monk seals may be at risk from increasing deployment of acoustic deterrent devices. The report states in part:

"In considering the potentially adverse effects on other components of the Mediterranean ecosystem, monk seals are of particular concern. Turkey and the Greek islands are the two main areas where monk seals are still found. Acoustic deterrents could affect monk seals in at least two ways. The noise could keep them away from preferred haul-out areas, or attract them to nets (the 'dinner bell' effect) and thus contribute to entanglement or exacerbate conflict with fishermen. Most monk seal mortality in the Mediterranean is thought to be the result of retaliation by fishermen against seals because of perceived competition or damage to catch and gear. Ketten pointed out that there is no audiogram for the Mediterranean monk seal and that the existing audiogram for the related Hawaiian monk seal (*Monachus schauinslandi*) is based on a single animal whose hearing curve has some characteristics that suggest its responses may have been affected by disease or age.

The workshop underlined the importance of obtaining better information on monk seal hearing so that the potential effects of acoustic pollution on this highly endangered marine mammal could be properly assessed.

Also, noting that the breeding and haul-out areas of Mediterranean monk seals are extremely circumscribed, the workshop strongly recommended that any use of acoustic devices in or near such areas be considered carefully. In the absence of good information to the contrary, a precautionary assumption would be that acoustic deterrents could adversely affect the recovery of this species.”

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

ICRAM. 2001. Report of the Workshop on Interactions between Dolphins and Fisheries in the Mediterranean: Evaluation of Mitigation Alternatives, Roma, 4-5 May 2001. Edited by Randall R. Reeves, Andrew J. Read and Giuseppe Notarbartolo di Sciarra. Istituto Centrale per la Ricerca Applicata al Mare, Via di Casalotti 300, 00166 Roma: 1-44.

WWF Mediterranean website

The WWF Mediterranean Programme Office has launched its own website at the following URL: www.panda.org/mediterranean. A statement issued in January states that the site has been designed as a reliable tool for journalists, providing regularly updated news items and an extensive archive on conservation issues affecting the region.

WWF. 2002. WWF launches Mediterranean website. Press release, 21 January 2002. [Available in the [Monachus Library](#)].

IFAW bows out

As indicated elsewhere in this issue, readers of The Monachus Guardian (TMG) reacted quickly to January’s breaking news that a sudden loss of funding was likely to force the closure of both the journal itself and its former Internet domain, monachus.org. Within a few hours of our appeal being launched, over 70 petition signatures and letters of support had been received from around the world, reflecting a broad cross section of TMG readership: grassroots monk seal conservation organisations, prominent scientists in the field of marine mammalogy, university professors, teachers, students, journalists and many others. With days, the 70s had turned into hundreds.

The International Fund for Animal Welfare (IFAW), TMG’s main backer since 1998, announced in late December that it had decided to “terminate its direct financial involvement in monk seal conservation” because of post-September 11th financial constraints and a need to “prioritize” its activities.

IFAW has been a significant player in international monk seal conservation for more than a decade, supporting the establishment of Madeira’s Desertas Islands reserve, purchasing a patrol boat and scientific research vessel for the Northern Sporades Marine Park in Greece [TMGs, *passim*], and also funding guarding activities there [see [IFAW provides funding bridge](#), TMG 3(2): November 2000, & [All at Sea](#), TMG 4(2): November 2001]. Through its affiliate organisation in Canada – the International Marine Mammal Association (IMMA Inc.) – it also joined the Bellerive Foundation in leading two successful, international campaigns to prevent the capture of monk seals for dubious captive breeding experiments in France [Johnson & Lavigne 1994, [Monachus Library](#)].



IFAW-Odyssia, MOm’s research vessel

Noting this distinguished track record, several TMG readers have expressed regret and disappointment at IFAW’s decision [[Letters to the Editor](#)].

In addition to the biannual Internet edition, casualties of the mid-contract budget-cutting also included the annual Print Edition of TMG and further development of other web resources, such as Monachus Profiles and the Monachus Library.



MOm patrol boat, Alonissos

The Internet Edition of TMG is currently read in over 50 countries, with each issue reaching at least 10,000 people. The annual hardcopy edition, incorporating both the May and November issues, has hitherto been mailed to libraries, universities, government departments, teachers, industry and others in over 40 countries.

Guarding activities in the Northern Sporades Marine Park, periodically funded by IFAW, looked set to become yet another cost-cutting casualty.

An editorial lockout, imposed following the publication of our 20 February [breaking news](#) item was unfortunately not rescinded. With its editorial integrity in doubt, the TMG team reluctantly concluded that the journal would have to be transferred to a new Internet address, the current www.monachus-guardian.org.

IFAW has since insisted that it has not abandoned monk seal conservation entirely, although details of any new potential initiatives have yet to materialise.

While lamenting the IFAW decision, several readers have also expressed the view that it was at least partly brought about by missed opportunity – the way in which a succession of international conservation organisations have conspicuously failed to capitalise on their former commitment and generosity towards the monk seal.

To anyone who has been involved in its conservation for more than a year or two, the critically-endangered Mediterranean monk seal has always seemed the perfect candidate for a sustained, international fund-raising and education campaign. And for compelling reasons:

- Shy, appealing, charismatic it may be, but the monk seal is also an ecological indicator species – a living symbol of every threat and injury the Mediterranean has to bear. Its population continues to dwindle because of overfishing, habitat destruction and disturbance, and pollution. What better way to bring these urgent ecological issues home to the public than the figurehead Mediterranean monk seal?

- Where adequately protected, Mediterranean monk seals are staging a recovery, eloquently refuting the claims of those who once reasoned that the species was "unsaveable." Grassroots organisations have already demonstrated that they can deliver a conservation success story to potential donors given sufficient backing [see TMGs, *passim*].
- Over a 100 million people visit the Mediterranean every year. Mass tourism is probably the single greatest threat to the survival of the species [see [Mass tourism and the Mediterranean monk seal](#), TMG 2(2): November 1999], and yet there has never been any concerted action within this sector either in terms of vital public awareness efforts or potentially lucrative fund-raising.



Monachus monachus:
Symbol of an ailing sea

The burning question is, why the inexplicable neglect?

TMG acknowledges with thanks IFAW's former generous support and looks forward to welcoming the organisation back into the monk seal conservation fold in the very near future.

EndQuote

"In one letter of support, Harun Güçlüsoy of the Turkish organisation [SAD-AFAG](#) referred to the publication [The Monachus Guardian] as the 'international voice of the grassroots organisations working in Greece, Turkey and elsewhere.'"

– Seal Conservation Society, Pinniped News Digest, 5 March 2002

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Hawaiian News

Vol. 5 (1): May 2002

More harassment in islands 'downtown'

A female monk seal was found lying beside her dead pup on the beach fronting the Poipu Sheraton hotel on 25 March, according to reports from Kauai. Although apparently a still birth, the death has again raised questions regarding harassment of monk seals on the Main Hawaiian Islands.

As noted in previous issues, there have been at least two known monk seal births on this popular beach in the last two years, despite the proximity of holiday crowds [[Rare birth on Kauai](#), TMG 3(2): November 2000; [Pups on target](#), TMG 4(2): November 2001].

Although historically rare around the main Hawaiian Islands, as many as 70 monk seals may be scattered along the coasts of Hawaii, Oahu, Maui and Kauai, according to sources at the National Marine Fisheries Service [see [Monk seals in the main Hawaiian Islands](#), TMG 3(1): May 2000].

The fact that some Hawaiian monk seals have been unwilling to slink away and disappear beneath the waves whenever humans appear on the scene has led to increasing instances of disturbance and, in some cases, deliberate harassment [[He didn't eat the seal, did he?](#) TMG 2(1): May 1999; [High levels of human interaction with a Hawaiian monk seal on the island of Maui](#) and [Fourth of July pup probably killed by boat](#), TMG 3(1): May 2000; [Q39 returns to "Harassment Beach"](#), TMG 4(1): May 2001].

According to information received by TMG, residents of Kauai's South Shore have voiced concern over "anti-seal" sentiment in the area, and have also reported death threats against the animals. Street rumour and lack of ecological awareness may be at least partly to blame. What appears to have been a tiger shark attack on a surfer a day prior to the Poipu female's miscarriage was subsequently blamed on the seal.

As in the wake of previous harassment incidents, NOAA/NMFS, state and local authorities have all been blamed for not doing enough in terms of education and enforcement. Such criticism, however, may be somewhat unfair when government agencies are contending with potent economic interests. The Marine Mammal Commission notes that Poipu beach has been closed on occasion at the request of NMFS to protect seals. "This and similar actions at other beaches around Hawaii," the MMC reports, "have adversely affected tourism and have strained relationships between the Service and state and local agencies." While seals "do need to be monitored closely to ensure that people do not approach or molest them," it continues, NMFS "does not have staff to monitor seals constantly, and therefore it has relied on volunteers to watch seals and educate the public about their endangered status and requirements for their protection." [See [Marine Mammal Commission warns of continuing decline](#), below.]

[Kauai Monk Seal Watch](#), an all-volunteer group of local residents, continues to do what it can to guard seals in populated areas.

Oahu sightings

Two of our readers, April and Spencer Moseley, are reporting regular sightings of a male monk seal from their beach-front home on the Main Hawaiian Island of Oahu. In contrast to recent troubling events on Kauai and Maui, local residents, police and NMFS officials appear to be taking concrete steps to guard the animal. Please turn to [Beach visitor](#), Letters to the Editor, for further details.

Catch of the day

The latest 90-day mission to retrieve lost and discarded fishing gear from the Northwestern Hawaiian Islands (NWHI) returned to port in November, its three chartered vessels loaded down with 25 tons of potentially lethal nets, lines and other marine debris.

The ongoing effort has seen government agencies and private organisations join forces to combat the fisheries pollution scourge in the NWHI, an isolated area that has nevertheless been turned into a marine debris dumping ground by prevailing ocean currents [see [Marine debris on the table](#), TMG 3(2): November 2000].

The clean-up partners include NOAA, Ocean Conservancy, the U.S. Coast Guard, Hawaii Sea Grant, and the U.S. Fish and Wildlife Service.

While more than 60 tons of derelict fishing gear has so far been extracted from the area, experts warn that another 100 tons remains, entangling and drowning curious monk seal pups, marine turtles and seabirds, and damaging coral reefs.



Beach visitor, Oahu

A recently-published scientific study conducted during one of the clean-up phases (in 1999) reports that “Trawl netting was the most frequent debris type encountered (88%) and represented the greatest debris component recovered by weight (35%), followed by monofilament gillnet (34%), and maritime line (23%).” [see Donohue et. al in [Recent Publications](#)].

A related study, the results of which were published in the Marine Pollution Bulletin in July last year [see Henderson in [Recent Publications](#)] registered 173 entanglements of Hawaiian monk seals in the NWHI from 1987 to 1996. Henderson reports that “Pups and juvenile seals were more likely to become entangled than older seals, and became entangled primarily in nets, whereas entanglement of subadults and adults was more likely to involve line.”

Government officials and their NGO counterparts hope that scientific tests on the accumulated net debris will eventually yield a coherent picture of its origins, helping to convince other Pacific Rim nations to tackle seriously what has long been a major ecological problem.

Bush accused of undermining Ecosystem Reserve

Environmental campaigners continue to accuse George W. Bush of undermining the recently designated Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, established by outgoing President Bill Clinton in December 2000 [[“Living rainbow” may benefit monk seals](#), TMG 4(1): May 2001; [Under review](#), TMG 4(2): November 2001].

The Ecosystem Reserve, the single largest protected area ever created in the U.S., incorporates the NWHI chain of reefs and atolls. Also encompassing the Hawaiian Islands National Wildlife Refuge, it forms the principal habitat of the endangered Hawaiian monk seal (*Monachus schauinslandi*), thought to be declining by about 5% a year.

The Earthjustice Legal Defense Fund, which successfully sued the National Marine Fisheries Service over overfishing-related monk seal starvations at French Frigate Shoals in the NWHI, [[Judge issues ruling in “monk seal starvation” case](#), TMG 4(1): May 2001] warned in January that fishing industry pressure on the Bush administration – most notably in the guise of the Western Pacific Regional Fisheries Management Council – was putting the Reserve in jeopardy. Earthjustice attorney Paul Achitoff charged that the Bush administration had “failed to do the Department of Commerce’s duties under the executive order to put the reserve into operation... The administration has tried to stop the reserve from ever being established, and we fully expect the administration to now try to strip the reserve of its protections...”

Source: [Attorneys Allege Bush Fails as an Environmental Defender](#), Environment News Service, 8 January 2002.

Talking points

Describing it as a “historic moment”, [KAHEA – the Hawaiian-Environmental Alliance](#), has appealed to concerned citizens to make their voice heard during the last stages of the designation process that will establish detailed management regulations governing the NWHI Reserve. The alliance has issued a document in an effort to encourage wider public debate of the perceived threats to the Reserve.

Public comment, says KAHEA, must be submitted in writing to the NOAA by Friday, May 17, 2002 [see Talking Points document for contact details].

“At Sanctuary meetings on each island,” declares KAHEA in its public appeal, “NOAA representatives will ask for input on how the proposed NWHI Sanctuary should protect this fragile region. Please help to identify the wide range of threats to the NWHI ecosystem including the possibility of the expansion of commercial activities, planned cruise ship access, unsupervised and excessive ‘research’ activities, military activities, dumping and a wide range of other threats to the integrity of the NWHI ecosystem. The federally-funded Western Pacific Regional Fishery Management Council has been leading an all-out attack against protections for the NWHI.”

Source: [KAHEA](#). 2002. Talking points. Help protect the NWHI: 1-3. [Available in the [Monachus Library](#)]

Marine Mammal Commission warns of continuing decline

The Marine Mammal Commission’s Annual Report to Congress for 2001 paints a gloomy – if uneven – picture of the Hawaiian monk seal’s long-term survival hopes, noting a continuing population decline in key areas. Among the Report’s findings:

- Mean beach counts at French Frigate Shoals have declined by nearly two-thirds since the late 1980s (although the rate of decline has slowed since the mid-1990s).
- Despite evidence that numbers were slowly but surely increasing at Pearl and Hermes Reef, Midway Atoll, and Kure Atoll, and stabilising at Laysan and Lisianski Islands, “Beach counts in 2001 suggested a marked decline at all major breeding colonies.”
- Survival of juvenile seals is also in jeopardy: “At all atolls except Pearl and Hermes Reef, there was a marked decline observed in 2001 in the survival rates of one-year-old seals (i.e., the 2000 cohort).”
- Multiple, unexplained seal deaths in the NWHI during 2001 obliged the National Marine Fisheries Service to declare an “unusual marine mammal mortality event” and to undertake an investigation under the provisions of the Marine Mammal Protection Act: “The mortality event designation was triggered by the discovery of four dead juvenile monk seals on Laysan Island over a nine-day period in early January 2001. A field team, including a veterinarian, was dispatched to examine dead seals on Laysan Island as well as at other atolls. During this and subsequent population monitoring work, one adult and 12 juvenile monk seal deaths were reported at several breeding colonies between early January and early July. Necropsy results revealed that the animals were emaciated, suggesting that an inability

of weaned pups and seals between the ages of one and two to find food was the most likely explanation for the deaths. As of the end of 2001 analyses of tissue samples had revealed no signs of infectious diseases, natural or anthropogenic toxins, parasitism, or injuries although further testing remained to be done.” Lack of available food has also been implicated in the deaths of juvenile seals at French Frigate Shoals, with overfishing being held to blame in federal court [see [Judge issues ruling in “monk seal starvation” case](#), TMG 4(1) May 2001].

- Shark predation continues to take a heavy toll on monk seal pups at French Frigate Shoals. In 1999, it was estimated that 25 percent of the pups born during that year had been killed by sharks. As a result, a contingency plan was formulated to reduce the threat by culling sharks patrolling along pupping beaches [see [Marine Mammal Commission sees overfishing as culprit](#), TMG 3(1): May 2000]. With eleven pups thought to have been killed by sharks in 2001 (about 17 percent of the pups observed during the field season) and six others injured, the plan was implemented: “A large majority of the shark-related deaths, disappearances, and injuries has occurred at one of the atoll’s islands, Trig Island. In response, five sharks exhibiting predatory behavior were culled, and 18 weaned pups were moved from Trig Island and Round Island, where predatory sharks were also seen patrolling the beach, to other islands in the atoll.” [For a different perspective, see [Killing sharks at FFS is unacceptable](#), Letters to the Editor, this issue.]
- Monk seals are “becoming more common in the main Hawaiian Islands. As a result, they have been hauling out on public beaches with increasing frequency to rest, molt, and give birth to their pups. Molting seals and mother-pup pairs may remain on a beach for several days to several weeks. On public beaches, this can lead to interactions between monk seals and beachgoers that are difficult to manage. In some cases, people have deliberately molested hauled-out seals, and seals have threatened and, on occasion, bitten people...”

The MMC’s Annual Report to Congress is recommended reading for anyone who wants to learn more about population trends and abundance of monk seals in the Northwestern Hawaiian Islands, 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. The relevant chapter is available in electronic form from the [Monachus Library](#):

Marine Mammal Commission. 2002. Hawaiian monk seal (*Monachus schauinslandi*). Pages 63-76 in Chapter III, Species of Special Concern, Annual Report to Congress, 2001. Marine Mammal Commission, Bethesda, Maryland.

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Bulgaria

Philately revisited

Those keeping track of monk seal sightings in the colourful and often highly imaginative habitat of the postage stamp [see [Monk Seal Philately](#), TMG 3(2): 2000] may be interested to hear of a Bulgarian block issued to commemorate the “International Day for the Protection of the Black Sea.”

That particular sentiment may be somewhat belated where *Monachus monachus* is concerned – the species is reliably considered extinct in Bulgarian waters and may only be a heartbeat away from meeting a similar fate throughout the remainder of the Black Sea [see [Witnessing the monk seal's extinction in the Black Sea](#), 4(2): November 2001]. The centrepiece of the block is a 0.65 lev stamp depicting the flat fish *Scophthalmus maeoticus*. On the borders that compose the block are depicted a dolphin (probably *Delphinus delphis*), a gull and a seal.

The eradication of the species from Bulgaria, coupled with a liberal dose of philatelic poetic license, may go some way towards explaining why the seal's depiction is more reminiscent of a monkey than a monk...



Facts & figures

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Greece

Sporades receives ministerial commitment

A two-day official visit to Alonissos, Northern Sporades, by Greece's Deputy Minister of Environment, Ms. Rodoula Zisi, appears to have restored a vital measure of confidence in the future of the country's first National Marine Park.

Disenchanted by more than a decade of inaction [see [The Islands at the End of the Line](#) and [All at sea – Adrift in the Northern Sporades Marine Park](#), 4(2): November 2001], conservationists, fishermen, taverna owners, hotel and tour agency operators alike assembled in Alonissos' port town, Patitiri, on 15 March to hear the deputy minister answer a question that has been haunting the NMPANS ever since it was first established by Presidential Decree in 1992: when will a management authority be appointed to oversee the long-term planning and day-to-day operation of the Park?

To her credit, Ms. Zisi faced the seemingly intractable NMPANS dilemma with characteristic intensity, hosting a Town Hall meeting to hear local opinion and encourage public debate, undertaking the long pilgrimage to the Biological Station at

Gerakas to learn more about monk seal conservation spearheaded by MOM, and holding a press conference to deliver the government's verdict:

- The long-awaited NMPANS Management Authority will be formally established by June 2002.
- "Board members" of the Management Authority will include local stakeholders whose economic interests are tied to the NMPANS, such as the fisheries and tourism sectors. NGO conservation interests will also be represented (considering its long involvement in the Northern Sporades and its national scope, MOM would obviously be the common sense choice).

While some observers have attributed this apparent burst of official energy to campaign vote swaying in upcoming local elections, it is likely that EU legal action against Greece over delays in the National Marine Park of Zakynthos [see [Challenge in the Ionian](#), this issue] is also playing a role in government anxiety over the state of the NMPANS.

Although it may be in the nature of politics to invite public cynicism over questionable motives and broken promises, those convinced of the government's sincerity in this instance also point out that the Deputy Minister has a personal interest in seeing the NMPANS management issue resolved once and for all. Rather than being an unelected civil servant – the type of official normally assigned to deal with the NMPANS – Deputy Minister Zisi is also Member of the National Parliament for Volos, the Prefectural capital of Magnesia, of which Alonissos is a part.

That is not to say that it will all be plain sailing from here. Even with the best of intentions, bureaucratic delays in Greece tend to be the norm rather than the exception. While the Management Authority may be formally constituted in June as publicly announced, it remains unclear whether it will actually be able to function as intended until the Council of State has ratified its founding legal framework.

Conservation and business interests alike have generally applauded the Deputy Minister's announcement, believing that the Management Authority will finally be able to help the NMPANS achieve its full potential, particularly in integrating economic development and ecotourism opportunities into the conservation process.



Deputy Minister of Environment, Ms. Rodoula Zisi (centre), visiting the MOM-operated Biological Station at Gerakas

It has to be said, however, that even the Management Authority's most ardent supporters are likely to face a twinge of anxiety when it convenes for the first time and sets about taking strategic decisions that may alter the future of the Marine Park and lives of its inhabitants forever. The NMPANS, after all, has operated in a kind of legal twilight zone for years, and although this took its inevitable toll on public support and goodwill, protection of the Mediterranean's largest surviving colony of monk seals has been a conservation success story. That has only been possible by maintaining restrictions that have shielded the population from potential harm.

The danger now is that the Management Authority – simply by reflecting its diverse constituency that justifiably views the Park as being far more than a monk seal refuge – may choose to implement measures potentially injurious to the colony. Such decisions might include re-opening the core zone to traditional fishing, relaxing restrictions on tourism in specific areas, and assigning exclusive responsibility for guarding to state agencies unmotivated by the ecological importance of the area. Despite such potential pitfalls, it is commonly acknowledged that the Marine Park will only have a meaningful future at all if and when the diverse voices of stakeholders are heard through the Management Authority.

Although Deputy Minister Zisi took great pains to convince the Alonissos public of her commitment to the Marine Park, mixed signals are still emanating from the Environment Ministry in Athens. The government has been relying on NGO commitment and generosity for a good number of years to implement essential scientific research, guarding and educational activities in what is, after all, a *National* Marine Park. Despite a clear contractual obligation to reimburse MOM for these projects, however, not one Euro has been received by the NGO since 1 January 2001, a lapse that is already threatening to disrupt the organisation's other conservation priorities.

Orphaned pup fails to survive

A young monk seal pup was found abandoned on the coasts of the Eastern Aegean island of Lipsi on 3 December 2001. After administering first aid on site, MOM's Rescue Team transferred the seal to the Rehabilitation Centre on Alonissos [see [The Islands at the End of the Line](#), 4(2): November 2001] by way of Leros and Pythagorion, but the pup failed to respond to treatment, eventually succumbing to a lethal infection. A subsequent necropsy confirmed that the pup – named Andreas by MOM – had suffered from a systemic infection, probably viral in nature. – Jeny Androukaki, MOM.

Uncertain causes

MOM's Rescue Team also performed two other seal necropsies during the winter period, the first involving a pup discovered on 24 October 2001 by MOM researchers in the National Marine Park of Alonissos, N. Sporades (NMPANS). Found partially buried by rocks in a known seal cave, the animal had sustained multiple injuries. According to the findings of the necropsy, performed at the Biological Station of Gerakas on Alonissos, the pup had probably been driven onto the rocks during storm conditions.

A second necropsy was performed in Karpathos on 14 November 2001 on an adult male seal that had clearly sustained a serious back injury. Cause of death, however, could not be determined because of the animal's advanced state of decomposition. Although it remains uncertain whether the seal sustained its back injury before or after death, further clues are being sought by means of a comparative photographic study, in which images of the necropsy are compared with those contained in a database of animal injuries (caused by boats, propellers etc.). – Jeny Androukaki, MOM.

Season's recruits

Following established practice, MOM's research team continued to monitor key monk seal habitat during the winter pupping season. According to the final tally, 8 pups were born in the Northern Sporades Marine Park, 9 in Kimolos-Polyaigos in the Cyclades and 3 in Karpathos-Saria in the Dodecanese. Kimolos-Polyaigos and N. Karpathos-Saria are designated Natura 2000 sites where MOM, under a 4-year EU-LIFE funding grant, is actively engaged in research and monitoring, education and public awareness, pilot surveillance, and MPA management design in consultation with local communities [TMGs, *passim*]. Kimolos-Polyaigos has been proposed as a marine park, while Karpathos-Saria, with support from local inhabitants, is slated to become an eco-development area.

The two prospective reserves are home to significant colonies of monk seals. Between 1997 and 2000, the population in Kimolos-Polyaigos was estimated at 30-45 seals by MOM researchers, while 15-25 individuals were thought to inhabit the North Karpathos-Saria complex.

Despite repeated pleas from Karpathos, from MOM and the international conservation community, the Greek government still appears to be dragging its feet in formalising the legal status of the two protected areas. – Panayiotis Dendrinis, MOM.

Education offensive

MOM continued to push its education and public awareness campaigns during 2001. Around a 100 educational presentations were carried out at the Zoological Museum of the University of Athens up until the end of May last year, while two electronic libraries were set up for children in the relatively remote communities of Kimolos and N. Karpathos, key areas in the campaign to establish marine reserves.

Sixty MOM volunteers enabled five Information Centres to be operated during the summer months, in Patitiri, Steni Vala, Gerakas and Skopelos in the Northern Sporades, and in Diafani in N. Karpathos. Around 15,000 people visited the Centres.

Groundwork for future progress in the field of environmental education also continues.



During January 2002, meetings were held with junior and senior level teachers from the islands of Kimolos and Karpathos, as well as with Coordinators for Environmental Education on the islands of Milos and Rhodes. MOM emphasised the monk seal's ecological importance, and also seized the opportunity to showcase its own conservation efforts through the EU LIFE programme.

In Karpathos, children attending the elementary and nursery schools of Olympos and Diafani were acquainted with the rare marine mammal living in their midst and afterwards coloured the seal's underwater world in imaginative drawings. – Maria Dimitropoulou, MOM.

Meeting of minds

An initiative linking Greek and Turkish monk seal NGOs in a 14-month cooperative venture has run its course, with both sides expressing their satisfaction with the results. Funded by the Greek Ministry of Environment [the Bilateral Development Cooperation and Assistance Programme], the project allowed MOM and its Turkish counterpart, SAD-AFAG, to share valuable work experience in science, conservation and management through project exchange visits. In July 2001, a 6-strong SAD-AFAG team made its way to Alonissos for an introduction to monk seal conservation activities in the Northern Sporades Marine Park, while MOM biologists and staff members made their reciprocal trip to Turkey in September, visiting the Foça Specially Protected Area and the Karaburun Peninsula.



MOM and SAD-AFAG staff members at the Biological Station at Gerakas, Alonissos

Workshop-style discussions enabled the two organisations to identify the most promising avenues for the exchange of technical expertise, while field demonstrations allowed the teams to compare respective methodologies, particularly in population monitoring, surveillance and guarding

As an integral part of the program, MOM provided its Turkish neighbour with various educational equipment and field gear, donated by the Ministry of Environment, Spatial Planning and Public Works. A special poster was designed to commemorate the partnership [[Greek-Turkish liaison](#), TMG 4(2): November 2001]. Acknowledging its value to their respective conservation and research efforts, both organisations have voiced the hope that their fruitful cooperation will continue. – Kalliopi Gorgorapti, MOM.

Media donates air time

January-February 2002 saw seven national, two Cycladic and two Dodecanesian television channels broadcast MOM's seal conservation message as a free public service announcement. In recognition of MOM's efforts to establish new protected areas in the Aegean, the importance of Kimolos and North Karpathos was emphasised. The message appeared 242 times during the allotted period, ratings statistics revealing that 83.4% of the TV audience between the ages of 25-54 viewed the announcement on average 6 times per person. Greek TV stations agreed to broadcast the message following its approval as a public service announcement by the National Broadcasting Commission. Advertising agency Adel Saatchi & Saatchi, Modiano S.A. Television & Cinema Productions also donated time and resources in preparing the message for broadcast. –

Honoured in ancient Greece

According to recent reports in the Greek press (see *Ta Nea*, 7 February 2002], archaeological excavations on the Eastern Aegean island of Rhodes have unearthed an ancient burial ground containing both monk seal bones and human remains.

Archaeologists investigating the site believe that the skeleton of the seal, buried near an ancient wall in the vicinity of the island's commercial port, is more than 2000 years old. The fact that the seal was honoured with proper burial marks a unique discovery in Greek archaeology.

Athens daily *Ta Nea* reports that the archaeologist in charge of the excavations, Lefteris Platon, "says that the ancient Greeks used to bury their beloved animals, mainly dogs, but that the case of a buried seal is a first. He suggests that the animal may have frequented the area, tame or semi-wild, evoking the love of people who conferred proper burial rites upon it after death."

Dog bones, and the remains of 5-6 human adults, were found in the same burial ground.

The seal skeleton has been measured at 1.70m and has been conserved by the Archeological Service.

For more information on monk seals in the ancient world:

Johnson, W. M., & D. M. Lavigne. 1999. Monk seals in antiquity. The Mediterranean monk seal (*Monachus monachus*) in ancient history and literature. *Mededelingen* 35: 1-101. The Netherlands Commission for International Nature Protection. [[Online abstract](#)]

Italy

Sporadic sightings continue in southern Italy

In the summer of 2000 a monk seal sighting was photographically documented in the MPA of Capo Carbonara, situated in southeastern Sardinia [see [Sighting spurs government action](#), TMG 3(2): November 2000]. Other observations were subsequently reported from the same region and from southern Puglia during the course of the same year. Monk seal sightings have continued to be signalled during the course of 2001 and up until a few weeks ago. A summary of each sighting record is described below.

Date	Hour	Area of sighting	No. of animals	Comments
28.08.2000	15:30	A few miles off Bari, southeastern Italy	1	A single monk seal is observed emerging at the prow of a boat; the duration of the sighting continues for a few minutes as the animal lingers on the sea surface.
Third week, September 2000	9:00	Southeastern Sardinia	2	Two monk seals are observed from a 50 metre high cliff at about 20 metres distance from the coast.
29.01.2001	12:00	Southwestern Sardinia	1	A single animal is observed at a 50 metre distance from the coast.
27.06.01	20:15	Central western Sardinia	1	A single animal is observed by a family of tourists, as it emerges and stations for several seconds at the surface of the water a few metres from the shoreline of a beach.
22.08.01	17:30	Northern Sardinia	1	A single animal is observed stationing at the surface of the water, at an approximate distance of 1.5 nm from the coast.
Third week, March 2002	6:30; 9:00	Golfo di Squillace, southwestern Italy	1	A single animal is observed by several fishermen during two consecutive days during the early hours of the morning at about 50 metre distance from the coast.
10.04.02	8:30	MPA of Capo Rizzuto, southwestern Italy	1	A single animal is observed at a 10 metre distance from the coast.
16.04.02	18:00	MPA of Capo Rizzuto, southwestern Italy	1	A single animal is observed surfacing and swiftly diving within a small inlet.
29.04.02	13:00	Port of Crotona, southwestern Italy	1	A single animal is observed swimming within the smaller port of Crotona, at a 100 metre distance from the entry of the port.

Note: This information is part of a database on monk seal sightings shared between [ICRAM](#) and [Gruppo Foca Monaca](#).

Although monk seal observations in Sardinia are a rare but not unusual event, the repeated reported sightings of a phocid during the spring of 2002 along the Ionic coasts of southwestern Italy are a puzzling event, especially since the species' presence in this area was last documented in 1903. The absence of photographic documentation does not allow further conclusions and confirmations but the sightings must nevertheless be taken into account in view of phocid movement and dispersal capacity. – Giulia Mo, ICRAM.

Net Watch

Summer location spotting... Alonissos

"Everyone seems tempted to describe the island of Alonnisos, in the Sporades, as Skiathos 20 years ago... Winning features: Fabulous shades of water, especially around the sea caves. Try to spot a shy monk seal or dolphin..."

Ferrying around...

"Alonissos is the quietest of these islands, but the nightlife is there if you go looking for it. After dinner in Old Alonissos, I popped into one of Patitiri's disco-bars for a nightcap and somehow didn't get home till 6am. This put the mockers on a planned boat trip to the nearby monk seal colony, but a local confided that you're more likely to see a martian than one of these endangered animals."

Sources: The Guardian, Saturday May 5, 2001. [Summer location spotting](#) by June Field / The Guardian, Saturday January 27, 2001. [Ferrying around](#) by Phil Daoust.

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Madeira

Beach life, Desertas-style

Henrique Costa Neves, former director of the Parque Natural da Madeira, and currently environmental councillor for the city of Funchal, reports that two monk seal pups have again been born on the open beaches of the Desertas Islands Reserve [see [Guest Editorial](#), this issue]. With habitat deterioration (most notably pupping in caves whose characteristics cannot meet the biological needs of the species) and human disturbance being increasingly cited as one of the greatest threats to the survival of *Monachus monachus*, the phenomenon of seals returning to rest and give birth on protected open beaches is being seen as a major conservation success [TMGs, *passim*]. Historical records dating back to ancient Greece speak of herds of monk seals occupying sandy beaches and shoreline rocks [see [Monk seals in antiquity](#), TMG 2(1): May 1999, and [Mass tourism and the Mediterranean monk seal](#), TMG 2(2): November 1999].

After being alerted by the Reserve's wardens on 27th November, writes Henrique, "I promptly travelled to the Desertas and spent 23 hours on the spot with the aim of identifying the adult mothers (they were identified as being "Desertinha" and "Birisca"). We have observed similar behaviour during the last four years, but this time another non-breeding female joined the group. It is fantastic to have the privilege of seeing 5 seals (3 adults and 2 pups) laying at the sun, for hours and hours, without demonstrating any fear or anxiety, in a undisturbed environment."

Desertas in focus

Exceptional photographs of monk seals and the Desertas Islands have been published in National Geographic Portugal, the work of Luis Quinta, a specialist in underwater photography. The images accompany a detailed description of the conservation experience at the Desertas by Parc Natural da Madeira biologist Rosa Pires, and Gonalo Pereira.

The issue (April 2002) can be accessed on line at:
<http://www.nationalgeographic.pt/revista/0402/feature8/default.asp>.

Other photographs of Luis Quinta can be viewed at: www.luisquinta.com.

Pups, sightings and other news

Rosa Pires, biologist at the Parc Natural da Madeira, reports that at least 3 monk seal pups have been born in the Desertas Islands Reserve this season.

Over on the main island of Madeira, the Parc launched a public competition to find names for the new infants.

Monk seal sightings around Madeira also continue [see [Homeward bound](#), this issue, and [Madeira island observations](#), TMG 4(2): November 2001]. Observations have been reported from Camara de Lobos (literally, "Chamber of the Sea Wolves", one of the first settlements on Madeira that, in the 15th century, drew its name from the numerous monk seals that congregated there) and even in the bay of Funchal, the island's capital.



Monk seals at the Desertas Islands (Luis Quinta © www.luisquinta.com)

Mauritania & Western Sahara

Rescue, release and post-release monitoring of Weam

On 18 September 2001, [Fundaci3n CBD-Habitat](#) technicians Hamdy M'Barek and Mulay El Haya sighted a monk seal pup being driven away from breeding caves by ocean currents at the southern part of the cliffs which form the C3te des Phoques. The pup was rescued after several attempts [See [Pup rescued at 'Cabo Blanco'](#), and [Seal pup in rehab](#), TMG 4(2): 2001], and brought ashore. She was identified as P-23/01, a female born in cave number 1 just 4 days earlier. The animal's symptoms gave immediate cause for concern: exhaustion, dehydration, swollen head (probably from being dashed against a rock by storm waves), and low body temperature.

The pup, later named Weam, was immediately transported to the rehabilitation facilities of the National Centre for

Oceanographic Research and Fishing (CNROP) in Nouadhibou, established with the technical and financial support of the Netherlands-based [Seal Rehabilitation & Research Centre](#) (SRRC). At CNROP's request, nursing and veterinary personnel were quickly dispatched from Pieterburen to lend assistance.

The rehabilitation process lasted 6 months. Upon attaining an optimum pre-release weight of 60 kilos, specialists of Fundación CBD-Habitat and the Spanish Ministry of Environment attached two plastic tags to her rear flippers, and a satellite transmitter to her head to facilitate tracking.

On 27 February Weam was released in the area known as Barco de Azúcar, around 3 kilometres south of the colony's breeding caves. Since then, members of CBD-Habitat have undertaken intensive monitoring of the seal, both through visual contact and satellite tracking.



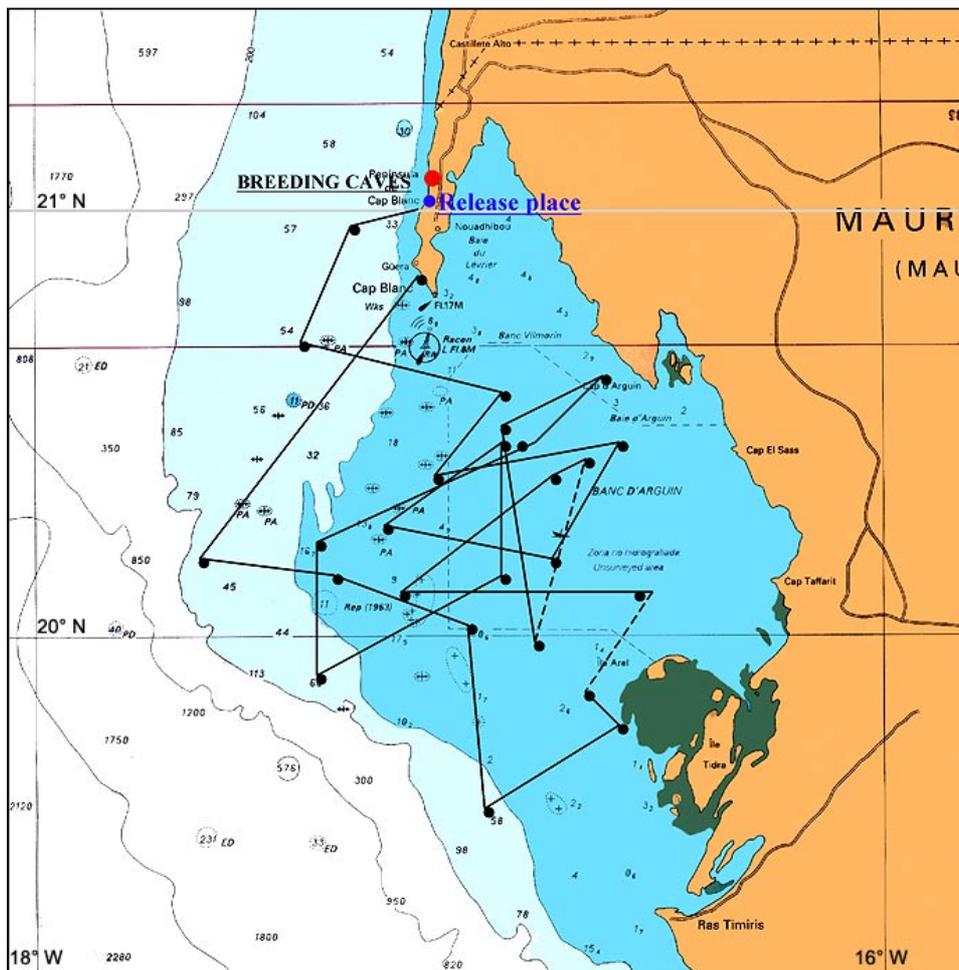
Weam, with satellite tag

Immediately after the release, Weam moved south about 2 kilometres, displaying behaviour patterns that showed the seal's need to adapt to its new environment and to the open sea conditions.

She became accustomed to hauling-out on two small beaches located between rocky outcrops. In the water, she habitually moved very close to the shoreline, performing frequent dives in search of food in the intertidal area, although she was never observed eating. Nevertheless, during the 17 days in which she remained in this area and the subject of visual monitoring, she showed no symptoms of weight loss or of related lack of activity.

During a big storm on 14 February, Weam moved continuously towards the south until she reached an open stretch of sea below the Cabo Blanco peninsula, adjacent to the central area of the [Parc National du Banc d'Arguin](#) (See map). Here she remained almost a month, moving back and forth in various directions and completing trajectories similar to those performed by another rehabilitated monk seal which was released in 1997 under similar conditions.

This area of Mauritanian sea may possess some ecological conditions which encourage released seals to remain during the dispersal phase – such as abundance of food and shallow waters. With the exception of those portions that lie within National Park limits, however, this stretch of sea is also characterised by intense fishing activity, and could pose a danger for Weam's survival.



Weam's post-release movements. N.B. Identified locations are only approximate

On 12 April, satellite transmissions indicated that the seal had returned to the Cabo Blanco peninsula area, keeping close to the shore. The observation team was quickly re-activated and on 14 April sighted Weam sleeping on a sandy beach between two cliff areas very close to the Satellite Reserve of the Banc D'Arguin National Park. Her physical condition appeared normal. Rear flipper tags were still in place and the satellite transponder was operating as expected.

Battery life of the transmitter expired during this period, but direct monitoring in the field continues in collaboration with local fishermen. The seal has been observed on several occasions since mid-April on the Atlantic coast of the Cabo Blanco peninsula, the last time on 2 May, sleeping on a beach around 10 km south of the breeding caves. Monitoring continues. – Miguel Angel Cedenilla, Ingrid Mozetich and Pablo Fernández de Larrinoa, Fundación CBD-Habitat.

Pupping season update



© Miguel Angel Cedenilla/CBD-Habitat
Mother and pup at Cabo Blanco

CBD-Habitat.

As reported in November's issue of The Monachus Guardian [[Pupping season on the Côte des Phoques](#), TMG 4(2): November 2001], 11 pups were born at the Cabo Blanco colony during October 2001 (3 of which subsequently died). From then until the end of 2001, only 3 additional pups were born, of which 2 survived to the age of the first moult.

An examination of final figures for the year shows that the total number of pups born during 2001 was 26, 13 of which died, thus giving a neonatal mortality rate of 50%. All deceased pups died during the first week of life. Mortality rates therefore continue to maintain the same high levels as in previous years.

During the first months of 2002, from 1 January to 30 March, 2 more pups were born in the colony. – Miguel Angel Cedenilla, Ingrid Mozetich and Pablo Fernández de Larrinoa, Fundación

International workshop wrestles with Atlantic issues

As previewed in the last issue of TMG [[Workshop attracts international attention](#), TMG 4(2): November 2001], a Population and Habitat Viability Assessment Workshop (PHVA) was convened in Valsain, Segovia, Spain on 11-13 November 2001, hosted by the Spanish Ministry of Environment and the Conservation Breeding Specialist Group (CBSG) of the IUCN, with Dr. Ulysses Seal acting as chair.

The principal aim of the PHVA was to consult the scientific community, monk seal experts, the authorities of range states and other relevant parties, on the wide range of issues relating to the Monk Seal Recovery Plan in the Atlantic [TMGs, *passim*], in the hope and expectation that technical aspects could be improved.

The Plan has already been officially endorsed by representatives of the four nations directly involved in the conservation of the Mediterranean monk seal in the region – Mauritania, Morocco, Portugal and Spain – under the auspices of the Bonn Convention.

Organised by [Fundación CBD-Habitat](#), the Workshop attracted 62 participants, of which 18 were official representatives of the range states.

On the basis of their perceived expertise, the participants – or 'assistants' as the Workshop preferred to describe them – were assigned to 7 different working groups, each one corresponding to a set of conservation actions proposed by the Recovery Plan. In individual brainstorming sessions, each group subsequently developed and expanded upon those actions, and later presented their findings to the Workshop for interim comment and review. By the close of the Workshop, each group had submitted its own report.

The recommendations of the working groups will appear in their entirety in the PHVA Final Report, to be published shortly. However, some of the Workshop's most significant proposals include:

- The establishment of a permanent Secretariat to administer the Recovery Plan.
- The formation of an expert working group by the range states for the monitoring and execution of the Plan.
- The provision of aid to Morocco and Mauritania for the implementation of the Plan in their respective countries.
- Continuation of current control and monitoring measures in monk seal colonies, providing an early warning system against possible catastrophic events.
- Improving efforts to reduce adult mortality. The modelling working group showed that the Cabo Blanco population is decreasing and that an increase in adult survival of no less than 10% is needed for the population to recover.
- Implementation of measures to reduce the impact of fisheries on the monk seal. During the Workshop, fisheries biologists from Spain, Morocco and



PHVA, Valsain: Cold weather, heated debate (© W.M. Johnson)

Mauritania developed a Fisheries Plan to identify, quantify and reduce monk seal interaction with fisheries (direct interaction causing mortality through entanglement or deliberate killing, and indirect impact in the reduction of food resources required by the seal population).

- Surveying existing marine reserves in the Atlantic.
- Establishing an emergency response system in Morocco and Mauritania to manage potential catastrophic events and other serious hazards to the monk seal population.
- Organising a special workshop on the Plan's rehabilitation and reintroduction components, including the rescue of healthy pups deemed at high risk.

The latter – involving the pre-emptive removal of pups from caves during storm warnings in an effort to reduce high infant mortality at Cap Blanc [TMGs, *passim*] – remains one of the most controversial aspects of the plan, and one that defied resolution during the Workshop. The working group therefore recommended that a dedicated workshop be convened at a later date to discuss the issue in greater detail and also to formulate protocols for rescue, rehabilitation and release of pups.

Despite freezing temperatures in the Valsaín mountains – around -8° C one morning – heated debate was also evident in the management working group. It was, nevertheless, able to reach consensus and produce a final report after prolonged discussion.

Although most assistants had never previously participated in a PHVA organised by CBSG/IUCN, and were taken aback by its unfamiliar format – particularly the way in which the divided groups only focused on specific aspects of the Plan – the Workshop's final accomplishments probably more than made up for any initial discomfort.

Aside from issues on the technical front, one of the Workshop's most remarkable feats was undoubtedly the way in which experts from profoundly different fields (toxicology, virology, population dynamics, protected areas, public awareness, fisheries, etc.) could be brought together under one roof with the aim of achieving one common objective, the conservation of an endangered species.

The Workshop's final report, currently under preparation, will serve as a technical support document for the management and conservation authorities of the range states concerned. – Luis Mariano Gonzalez.

Editor's note: An electronic version of this report will be lodged in the [Monachus Library](#) as soon as it becomes available.

CBSG/IUCN. 2002. Population and Habitat Viability Assessment Workshop (PHVA), Valsaín, Segovia, Spain, 11-13 November 2001. IUCN Conservation Breeding Specialist Group (CBSG) and Ministry of Environment, Spain.

Morocco

Morocco issues monk seal stamp

In what appears to be a first for the country, Morocco has issued a 6.50 dirham postage stamp in honour of the Mediterranean monk seal. For more information on how the species is represented on the world's postage stamps, turn to [Monk Seal Philately](#), TMG 3(2): 2000.



Facts & figures

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Turkey

Newborn seal still survives, despite entanglement fears



Ege Vira

“Ege Vira”, who was born in October 2001 and is the latest *Monachus* offspring in Izmir bay, continues to survive despite a spate of lethal entanglement episodes in recent years [see [Pupping season opens](#), TMG 4(2): November 2001, & [Snared and Drowned](#), TMG 4(1): May 2001].

Observations made by AFAG researchers around the breeding cave near Mordogan on the Karaburun Peninsula have confirmed that both pup and mother are healthy, and have encountered no serious threats so far.

The survival of Ege Vira has exceptional significance because three monk seal pups born in Izmir bay within the last 4 years have drowned due to entanglement in fishing nets, making it the single greatest threat to monk seal pups in the area. Ege Vira is now 6 months old and AFAG’s field experience indicates that the pup’s

survival chance is higher as it increases its size and strength. AFAG, in close cooperation with local artisanal fishermen and the Ministry of Agriculture, is now studying the feasibility of fisheries management measures for Karaburun that would substantially reduce the risk of entanglement to monk seal pups. – Ozan Ververi and Nuray Ververi, SAD-AFAG Aegean Program.

A Land Rover with distinction

The Land Rover of Turkey’s pioneering monk seal researcher and conservationist, the late Prof. Bahtiyе Mursaloglu, has been donated to AFAG by her only daughter, Prof. Dr. Burcin Erol [see [Bahtiyе Mursaloglu](#) 1918-1999, TMG 2(1): May 1999].

The legendary 1969-model Land Rover served Mursaloglu’s research needs for years, transporting her, her students, colleagues from abroad and equipment the length and breadth of Turkey, up mountains in search of land mammals, along the coast in search of monk seals.

Its history an inspiration, the Land Rover will, we are sure, continue its faithful service to monk seal conservation through AFAG’s own efforts. – Cem Orkun Kiraç, SAD-AFAG.



The mission continues: Bahtiyе Mursaloglu’s 1969-model Land Rover

Coastal zone management project commences

An EU-funded initiative – “Conservation and Management of Biodiversity Hotspots: Developing a Mediterranean Network” [see [Funding injection](#), TMG 3(1): May 2000] – was launched in March 2002 under the Short and Medium Term Environmental Action Programme (SMAP). Coordinated by WWF MedPO based in Rome, the initiative involves four Mediterranean coastal countries – Turkey, Morocco, Algeria and Lebanon – where each designated project site is represented by an endangered species and its characteristic habitat.

In Turkey, the species is represented by the Mediterranean monk seal and its coastal habitats by the following study and conservation areas: Foça (extending up to Yeni Foça); the adjacent Karaburun Peninsula near Izmir; and Aydıncik (near Bozyazi, where AFAG’s Mediterranean Office is based).

In principle, the project aims to improve the conservation status of key biodiversity hotspots in the Mediterranean region. On a practical level, it seeks to implement effective management plans in selected coastal areas as pilot schemes and demonstrative examples of how integrated nature conservation and socio-economic development can be achieved through innovative partnerships with relevant stakeholders.

Anticipated results in Turkey include:

- Management plans for the conservation of the Foça, Karaburun and Aydıncik hotspot sites, to be prepared according to guidelines that call for a participatory approach among stakeholders.

- Tangible socio-economic benefits for local populations living in and around the hotspots generated by pilot economic activities – such as line fishing by amateurs and excursions for tourists using the boats of local fishermen. These are designed to operate as incentives to encourage sustainable management of the areas concerned.
- Innovative mechanisms to encourage partnerships between local stakeholders, non-governmental organisations and the authorities.
- Heightened local ecological awareness, including an increased level of acceptance of conservation objectives for the hotspots.

The project is due to last 22 months, and actively involves 10 AFAG staff members. – Cem Orkun Kiraç, SAD-AFAG.

Dead pup found on Datça

On 23 March 2002, Sezer Çete of AFAG's Datça liaison office reported that a monk seal pup had been found dead at Kizlan, on the northern coasts of the Datça Peninsula, a remote area characterised by steep, rugged cliffs. A joint onsite investigation by the Datça Gendarmerie Command and SAD-AFAG discovered the heavily decomposed body of a pup, almost 1m long, on Kizlan beach.

The Gendarmerie subsequently issued a site observation report on the death, and the corpse was buried in order to obtain the skeleton for examination at a later date. Initial observations were unable to determine the cause of death. – Cem Orkun Kiraç and Harun Güçlüsoy, SAD-AFAG.

AFAG attends MPA workshop in Dalaman

AFAG participated in a workshop on marine protected areas in Dalaman on 22-24 January 2002, organised by the Turkish Society for the Protection of Nature (DHKD) and WWF Turkey.

The workshop's central theme was the Legislative and Managerial Dimension of the Marine Protected Area Concept in Turkey, a crucial issue for AFAG as it strives to create a network of protected areas for the monk seal and establish sound management plans in existing reserves.

Sponsored by WWF MedPO and the Agriculture, Fisheries and Nature Management Attaché of the Netherlands Embassy in Ankara, the Workshop attracted both NGO and governmental participation. Attending NGOs included the Turkish Society for the Conservation of Nature (DHKD), WWF Turkey, SAD-AFAG, and the Turkish Marine Research Foundation (TUDAV). Government interests were represented by the Undersecretariat for Maritime Affairs, Ministry of Agriculture, Coast Guard Command, Ministry of Tourism, Ministry of Culture and Ministry of Forests (General Directorate of National Parks). Turkey's main universities and institutes of higher learning were also represented, including Istanbul University (Institute of Marine Sciences and Business), Akdeniz University, and Middle East Technical University (Institute of Marine Sciences).

The lack of MPA status in Turkey was a key discussion point. At present, different government ministries and agencies are responsible for different types of legislative marine or coastal protection, such as National Parks (Ministry of Forests), Specially Protected Areas (Authority for the Specially Protected Areas), SIT areas (Ministry of Culture) etc. The end result – confusion of responsibility and fragmentation of effort – demonstrates the need for a pooling of legislative responsibility within the management authorities established for each Marine Protected Area [see [Endgame](#), this issue].

In closing, the Workshop called for further analysis of the proposal's legal implications, including consultation with legal advisors of relevant government agencies. A follow-up meeting was also recommended, to be held under the auspices of the Ministry of Environment. – Harun Güçlüsoy, SAD-AFAG Aegean Program.

Reports contradict Black Sea extinction claims

Reports from the eastern reaches of the Turkish Black Sea appear to have contradicted recent claims that *Monachus monachus* has become extinct in the region.

Last year, following expeditions to the area, SAD-AFAG researchers concluded that there was compelling evidence to suggest that the species had finally been eradicated from the Black Sea. Those findings were presented in a detailed article by Yalçın Savas published in National Geographic Turkey in September 2001, and were also carried in the November issue of TMG [Witnessing the monk seal's extinction in the Black Sea, TMG 4(2): November 2001]. Following publication a reader from Ordu, on the eastern Turkish Black Sea coast, wrote to National Geographic, refuting SAD-AFAG's claims and insisting that monk seals – based on personal observation – continued to survive in the area.



Black Sea monk seal expedition 2001

Although false sightings information is reported from time to time, the description of the animal and other details provided by the Ordu school teacher appeared convincing enough at first glance to warrant further investigation.

A SAD-AFAG research team, comprising Yalçın Savas, Ayhan Tonguç and Rosa Llop, a Spanish marine biologist and AFAG volunteer, subsequently travelled to Ordu to make further enquiries, relying on partial financial support from National Geographic Turkey.

Thorough interviews conducted among locals and fishermen, and a 3-day field investigation by boat along Ordu's coastline were, however, unable to establish a monk seal presence in the area.

Based on previous experience, SAD-AFAG believes that sightings reports may, in fact, be confusing monk seals and otters,

whose population appears to be increasing along Turkey's Black Sea coasts. Despite many "monk seal sighting" claims, only one local observation record dating back to 1998 appears credible. – Yalçın Savas and Cem Orkun Kiraç, SAD-AFAG.

AFAG seminar for dive guides

As part of its continuing effort to limit potential disturbance to endangered monk seals by water sports and tourism, AFAG provided an audiovisual presentation for divers during a "dive guide training seminar and selection program" in Fethiye, SW Turkey, in April 2002. Of the approximately 70 divers in the audience, 50 were dive guide candidates from Turkey's various coasts. The presentation, entitled "the story of the monk seal", was held in collaboration with the Turkish Underwater Sports Federation.

N. Ozan Veryeri, an experienced diver and also AFAG's Karaburun Project Executant, was on hand to provide additional information on monk seal biology, population and distribution, threats, legislation and protection, thus furnishing dive guide candidates with the minimum degree of knowledge that should, by rights, be an integral requirement of their vocational training. Water sports and tourism, including diving, can pose serious risks of disturbance and harassment to monk seals [see [Liberated scuba divers may endanger monk seals](#), TMG 4(1): May 2001, & [Mass tourism and the Mediterranean monk seal](#), TMG 2(2): November 1999]. Divers in Turkey are thought to encounter monk seals in and around caves or elsewhere underwater fairly frequently, making the educational effort that much more important.

The divers' response to the presentation and seminar was unexpectedly encouraging. Dive guide candidates asked thought-provoking questions, and also engaged in heated debate about monk seals and their protection, including the controversial "no diving zones" issue [[Liberated scuba divers may endanger monk seals](#), TMG 4(1): May 2001]. Some divers also provided information on seals encountered during their dives – sightings records that were subsequently added to SAD-AFAG's "fokdata" monk seal data base.

In recognition of the seminar's results and diving's significance for monk seal conservation, SAD-AFAG expects to continue its collaboration with the Underwater Sports Federation. – Cem Orkun Kiraç, SAD-AFAG.

Datça's pristine bays face construction threat

As a result of routine field research on the Datça Peninsula in January 2002, SAD-AFAG volunteer staff member Sezer Çete discovered that a 4-5 acre plot of land at the remote Baglarozu bay near cape Knidos had been fenced off, suggesting imminent construction work.

Sezer's report, which was submitted to AFAG's Ankara Coordination office, states that a cooperative formed by a group of employees at the Ministry of Forests is intending to build a recreational facility on this pristine bay. The construction, AFAG believes, would spell disaster for these uninhabited reaches of the Datça Peninsula, opening the floodgates to additional road, tourism and recreational development. In view of the potential gravity of the situation, AFAG has addressed an appeal to relevant government agencies – including the Ministry of Environment, Ministry of Culture, Datça Town Governor, Muğla Provincial Governor and the Authority for Specially Protected Areas – asking that action be taken to clamp down on both legal and illegal developments on the Peninsula.

Baglarozu bay lies within the borders of the Datça Specially Protected Area and is also protected by 1st Degree Natural and 3rd Degree Archaeological SIT status (Ministry of Culture). – Cem Orkun Kiraç and Çağrı Öner, SAD-AFAG.

Fishermen's Festivals for Foça and Bozyazi

Following its success last summer, the "Fishermen and Sea Documentaries Festival" [see [Premiere in Foça](#), TMG 4(2): November 2001] will be held again this August, supported by Foça Municipality and the Foça Fishery Cooperative.

Down on Turkey's southern coast, the "First Bozyazi Nature Festival" will be held on 29 June - 1 July, its AFAG Mediterranean Program organisers drawing inspiration from many of the popular events and activities that marked the Foça festival last summer, and did so much to raise public awareness of marine ecological issues.

All AFAG members and monk seal enthusiasts are welcome at both festivals. Please contact AFAG for further details. – Yesim Öztürk, SAD-AFAG.



Foça 2001: Artisanal fishermen take part in a net-mending competition

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Cover Story

Vol. 5 (1): May 2002

ENDGAME: THE FIGHT FOR MARINE PROTECTED AREAS IN TURKEY

Yalçın Savas and Cem Orkun Kiraç

SAD-AFAG

Turkey, one of the great peninsula countries of the world, is unique, bordered as it is by four bodies of sea having a distinct ecology and oceanography: the Black Sea, the Sea of Marmara, the Aegean and the Mediterranean. With links to the Atlantic via Gibraltar and the Red Sea through Suez, these seas have brought considerable marine species diversity to Turkey.

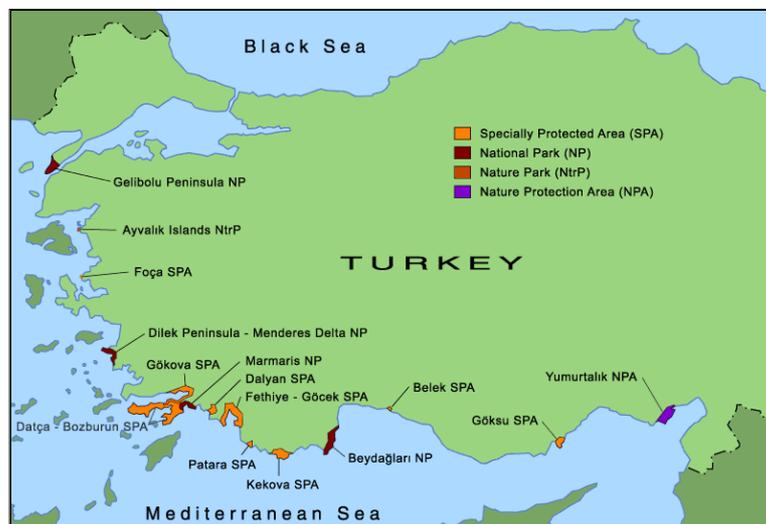
The fragile health of Mediterranean coastal ecosystems is symbolised by a number of rare, threatened and endangered species. These include two endangered species of sea turtle, the loggerhead *Caretta caretta* and the green *Chelonia mydas*, the otter *Lutra lutra*, Audouin's gull *Larus audouinii*, the migratory summer visitor Eleonora's falcon *Falco eleonora*, the endemic sea grass *Posidonia oceanica* that still grows in extensive meadows in many areas and, last but not least, the Mediterranean monk seal *Monachus monachus*, Europe's most endangered species, of which fewer than a 100 individuals still survive along Turkish coasts.



Monk seal pup Derya, born in the Foça SPA

Today, if lucky and patient enough, nature lovers still have a reasonably good chance of observing these species. On the other hand, the monk seal's disappearance from the Black Sea, and Marmara, and its dwindling populations along the Aegean and Mediterranean coast must be viewed with great apprehension. The sharp decline and fragmentation in the population was first recorded during the 1970s (Berkes et al. 1979, Ronald & Duguay 1979). Since then, the species has been brought to the verge of extinction in the Black Sea [see [Witnessing the monk seal's extinction in the Black Sea](#), TMG 4(2): November 2001] and it is fast losing its hold in the Marmara, where only a few individuals survive (Kiraç et al. 1998). Realistically, the only populations that can still be considered viable are those inhabiting the Aegean and Mediterranean coasts of Turkey.

The degradation of coastal habitats in Turkey first began in earnest in the 1970s, with damage accelerating by the decade due to intense and unplanned coastal urbanization, including new roads being driven into formerly pristine areas. Disturbance and harassment of wildlife by tourists has also penetrated the remotest reaches of Turkey's coastlines, including dark and inaccessible monk seal caves. Overfishing and illegal fishing has only worsened this bleak picture of Turkey's coastal deterioration. Ironically, although the country's first marine protected area was declared as long ago as 1966 along the shores of the Dilek Peninsula National Park (covering a marine zone extending 1 km. offshore), there has been little or no progress so far in instituting effective management measures for any of the country's established marine protected areas.



Turkey's MPAs

Despite that obvious shortcoming, the Turkish authorities have succeeded in establishing many coastal protected areas under a variety of different statutes and legal mechanisms. Together (counting only NPs and SPAs) these constitute more than 10% of the total Turkish coastline. At the very least, this has resulted in protection against a deluge of coastal zone development investment schemes often pursued without any form of environmental impact assessment. Unfortunately, lack of efficient management and resources is seriously undermining the viability of many of these areas.

MPA legislation

In Turkey, there is no single law that regulates marine protected areas. There are, however, six basic legal mechanisms which frame the issue on a national scale and these can be divided into two main categories: **a)** marine and **b)** coastal / land based.

Marine based legislation

The oldest of these legal instruments is the **Aqua Products Law** (No. 1380), first issued in 1971 and subsequently revised in 1986. The Ministry of Agriculture (MoA) is responsible for applying this legislation that seeks to regulate exploitation of marine and other aquatic organisms, and which stipulates that every decision related to fishing must be announced through an official gazette called the 'Aqua Products Circular'. According to the law, MoA personnel have primary responsibility for its enforcement. If needed, however, other official bodies may be called upon to fulfil this duty, including the coast guard, police, the gendarmerie forces, and, in the absence of these, even village aldermen (*muhtar*). The Aqua Products Law, on the other hand, does not incorporate nor define any marine or coastal protected area status.

Under the law, the Ministry of Agriculture is responsible for preparing any legislation deemed necessary to protect aqua products as well as other commercially insignificant but ecologically valuable marine species, including sea turtles and the monk seal. MoA exercises its obligations through the biannual Aqua Products Circular, prepared and applied by the General Directorate of Protection and Control under the guidance of an advisory board formed by MoA officials, universities, fishing cooperatives and unions, aquaculture enterprises and fisheries institutes.

Coastal / land based legislation

1. The **Law on National Parks** (No. 2873), issued in 1983, contains four different types of protected area designation:

National Park: Defined as areas that, from a scientific and aesthetic point of view, possess a rare natural and cultural value. While they may offer protection to wild flora and fauna against logging, hunting and fishing, National Parks may also be exploited for recreation and tourism purposes.

Nature Park: Areas rich in flora and fauna and suitable for recreational use.

Nature Monument: Applied to areas formed by nature or natural events and having exceptional scientific value.

Nature Protection Area: Aimed specifically at conserving rare and endangered species and ecosystems, NPAs offer greater protection from disturbance, with human activities strictly limited to scientific research and educational training.

According to the Law on National Parks, the MoF may designate protected status if the candidate areas lie within registered forest lands; if not, the decision is the preserve of the Council of Ministers. The law also states that MoF must obtain approval from other relevant ministries on implementing any management plan for National Parks. For protected areas other than NPs, the Ministry need only consult the Ministry of Tourism (MoT).

The law assigns responsibility for guarding these protected areas to the "Forest Rangers" of the MoF. Infringements in NPs are subject to the Law on Forests (No. 6831), Law on Hunting (No. 3167) and the Law on Aqua Products (No. 1380), with fines being levied in double. In other cases, 1-6 months' imprisonment may apply.

2. The **Law on Protection of Cultural and Natural Assets** (No. 2863), issued in 1983, defines all cultural and natural assets – known or to be discovered – as "State Property".

Governed by the Ministry of Culture, the law allows "SIT" status to be conferred upon designated areas, offering varying degrees of protection. First degree SIT status, for example, effectively prohibits any kind of construction, while 2nd and 3rd degree restricts the type and extent of construction permitted.

The Ministry of Culture's (MoC) "Higher Council for Protection of Cultural & Natural Assets" determines the general principles governing SIT protection areas, and forms local Protection Councils that are required to implement those principles in terms of formation and management of candidate reserves. According to its founding legislation, any governmental organization (including municipal authorities) and the courts must abide by the decisions of local Protection Councils. Infringements are subject to heavy fines or 2-5 years' imprisonment.

The law attaches special importance to underwater cultural and natural assets, and specifically prohibits "sport diving" in defined underwater SIT areas. Following the introduction of this law, the MoA also banned professional diving for aqua product harvesting in such areas.

3. The **Law on Environment** (No. 2872), issued in 1983, assigns authority to the Council of Ministers to declare **Specially Protected Areas** (SPAs), for areas deemed of national or international significance.

The first three SPAs were established along Turkey's SW coast at Gökova, Köycegiz-Dalyan and Fethiye-Göcek in July 1988. The Authority for Specially Protected Areas (ASPAs) was established a year later to fulfil responsibilities relating to the creation and management of SPAs. Although originally a subsidiary of the Prime Ministry, the ASPA was transferred to the Ministry of Environment in August 1991. During the following decade (1988-1999) ASPA designated another 10 SPAs, 6 of which are coastal – making 9 coastal SPAs in total. Within the SPA structure, "Sensitive Zones" are defined as nature reserves in which human usage must be strictly regulated and controlled by a sufficient number of adequately trained and equipped personnel.

Existing coastal & marine protected areas in Turkey

By means of these various laws, Turkish governments during the 1980s distributed legal responsibility for environmental protection among four ministries. While marine protection status is only defined specifically in the Law of Protection for Cultural and Natural Assets, all other statutes are also legally applicable to the sea.

As a result of these various legal mechanisms, all four ministries have exercised their respective authority autonomously to establish coastal and marine protected areas in Turkey.

The MoF, even before the advent of the National Park law, took the first step forward for marine conservation by establishing the Dilek Peninsula National Park in 1966. This was followed by the declaration of the Olimpos–Beydaglari National Park in 1972. A year later, Gelibolu Peninsula Historical National Park was established, followed by Marmaris National Park in 1996. Dilek Peninsula NP was enlarged to include the precious wetland of nearby Menderes Delta in 1994.

Apart from National Park status, Nature Protection Area and Nature Park status have also been employed by the MoF to establish coastal and marine protected areas. Studies by the Ministry's General Directorate of National Parks and Game-Wildlife are continuing in order to increase the number of protected areas defined by the NP law. Although seven are coastal and marine, the total number of protected areas controlled by MoF is 141, having a total area of 8,315.72 km². MOF's coastal and marine protected areas amount to 1,637.80 km² and cover a combined coastline more than 380 km long.

The nine coastal SPAs established under the Environment Law cover a combined surface area of 3,841.5 km² and a coastline more than 960 km long. "Sensitive Zones" have already been defined in some areas, such as the Siren Rocks in the Foça SPA protecting caves used by monk seals (following SAD-AFAG's recommendation to ASPA) and Iztuzu Beach in Dalyan-Koycegiz SPA used by nesting *C. caretta*. At present, the Authority for Specially Protected Areas has no intention of adding to the current network of 13 SPAs in Turkey.

In accordance with the Protection of Cultural and Natural Assets Law, many stretches of Aegean and Mediterranean coast are designated as 1st Degree Natural SIT Areas and thus closed for development. Ever-increasing in number, the total area of coast under SIT protection is difficult to estimate. This is the most easily applicable of all protected area designations in Turkey, and the penalties for infringements are also the severest of all. Local Protection Councils wield considerable power, even over local government and other legislation, to the extent that any development, even if previously fully approved, will have its planning permission revoked following designation as a Natural and Archaeological SIT area. While the PC's decree can be challenged in court, the plaintiff must be in possession of compelling scientific evidence to have any hope of overturning the decision.

To date, the MoC has underwater SIT areas in 58 localities, of which 5 are in the Black Sea, 5 in the Sea of Marmara, 25 in the Aegean and 23 in the Mediterranean. These are mainly concerned with protecting archaeological treasures, although recently some were established to protect monk seal breeding sites from potential disturbance caused by divers. All other 1st Degree Natural SIT areas along Turkish coasts (largely concentrated in the Aegean and the Mediterranean regions) are mainly terrestrial although some do extend into the sea in various shapes and sizes. The largest of these coastal-marine SIT areas were established around the Resadiye Peninsula (Datça), Kekova and on the western coasts of the Gulf of Antalya. Since Natural SIT status can easily overlap with other forms of legal protection, extensive areas within NPs, nature parks, nature protected areas and SPAs have also been declared 1st Degree Natural SITs, constituting an additional defence against coastal development.

Although no protected area status is defined by the Law on Aqua Products, the MoA has established some areas in which fishing is regulated, either by total prohibition or by permitting only low-impact fishing methods. Two no fishing zones were established within the marine area of Dilek Peninsula National Park (some 200 meters wide) and in Olimpos–Beydaglari National Park, incorporating the small archipelago of Bes Adalar that is an important monk seal habitat. Another, in Kizilliman Bay in south Turkey, was established around a cave suitable for monk seal breeding following research by SAD-AFAG's Mediterranean Programme team. MoA has also banned industrial fishing methods (trawling, purse-seining etc.) in three individual coastal zones (Foça, Yalikavak and west Icel) in support of monk seal conservation efforts. By permitting only low-impact fishing in these zones, it is hoped that artisanal fishers will find some relief from their severe economic hardship, and begin to realise that they will benefit from the conservation process.

Turkey's protected areas and monk seals

Although levels of protection vary considerably, and population numbers and trends are often ill-defined, monk seals are found in a number of Turkey's coastal and marine protected areas, including:

- The four SPAs of Foça, Gökova Bay, Datça-Bozburun and Fethiye Bay (Ministry of Environment of Turkey 1991), which have also been included in a list of prospective "Monk Seal Protected Areas" proposed by SAD-AFAG.
- The National Parks of Dilek Peninsula–Menderes Delta and Olimpos–Beydaglari.
- The Kūdūr Peninsula. In 1990, a local initiative approved by the Yalikavak Municipality established a monk seal protection zone (prohibiting coastal development) along the western shores of the Kūdūr Peninsula in the heavily touristic Bodrum region [TMGs, *passim*]. Its protection status was confirmed when the entire peninsula was declared a 1st degree natural SIT area in November 1998 [[Kūdūr Peninsula Declared Protected Area](#), TMG 2(1): May 1999].
- Five Ministry of Culture 1st Degree Natural SIT areas in the Cilician Basin [[Reserve Areas Established in the Cilician Basin](#), TMG 1(2): December 1998].

Monk seals also benefit from fisheries-related legislation, as indicated earlier:

- A small No Fishing Zone (1 km long and a few hundred meters breadth), was established by the MoA in January 1999 on the western shores of Kizilliman near Bozyazi in the Cilician Basin. As reported in previous issues of TMG, scientific research has demonstrated a marked recovery in fish stocks, raising hopes that the same model might be applied successfully in other areas.

MSPAs still on the drawing board

In 1998, SAD-AFAG recommended that 12 specially designed Monk Seal Protected Areas (MSPAs) be established to

protect key populations of the species in Turkish waters. The list of sites, based on two decades of accumulated knowledge and data, includes 2 coastal zones in the Black Sea, 2 in the Marmara, 5 in the Aegean and 3 in the Mediterranean. Subsequent meetings of the National Monk Seal Committee (NMSC) however, a body coordinated by the Ministry of Environment, decided to proceed only with five sites initially, with the remaining 7 to be considered at a later stage [see [Five sites set to become Monk Seal Conservation Areas](#), TMG 3(1): May 2000]. The decision making process, however, has continued to face obstacles and delays, most notably on disagreement between the Ministry of Environment and the Ministry of Development on the authorization for preparation of development (and zoning) plans for each area, delineating basic management requirements on such issues as core zones (breeding caves where no human activities should be permitted), buffer zones (allowing some intermediate human activity), allocation of aquaculture areas, diving and other pursuits.



The Bodrum Peninsula as seen from Karaada Island, part of a proposed MSPA being squeezed by tourism and development pressures

Little or no progress on establishing these vital monk seal sanctuaries, however, is likely to be seen until the NMSC members can authorize the preparation of management zoning plans. Powerful economic interests have also tended to exert a negative influence upon the creation of refuges for the monk seal (TMGs, *passim*), with the Ministry of Tourism voicing its opposition to several proposed MSPAs, particularly in the Foça-Karaburun and Bodrum locations.

Problems in marine protected areas

Inadequate management

Despite their number and diversity, marine protected areas in Turkey suffer from very similar problems that can only compromise their ultimate effectiveness.

Management is generally inadequate in both planning and execution, with integrated coastal zone management – where both human and environmental factors are included in the protection equation – still an alien concept in most areas.

While NPs and SPAs generally possess rudimentary management plans, other types of protected area, such as SIT zones that offer strict protection against construction, often do not.

As a general rule, even where management plans do exist, regulation and enforcement is weak. Historically, this has had a significant impact on monk seals and their conservation in Turkey, often creating the comforting illusion that protection does exist, even if it is not legally enforced.

Indeed, lack of effective management and its stark effects can be seen in two National Park areas that were, at least in part, originally intended to protect monk seals, Dilek Peninsula and Olimpos–Beydaglari.

Didier Marchesseaux (1989) estimated that as many as 20 individual seals inhabited the Dilek Peninsula in 1987. Today, however, it appears that monk seals are extremely scarce, according to information received from local people as well as the NP Director. Lack of management and lack of enforcement must be considered primarily to blame for that decline, particularly a failure to address the hostility of local artisanal fishermen by bringing them into the conservation process. Summer tourism, forestry road construction, and illegal hunting continues to threaten the area. The last confirmed monk seal sighting, by a dive guide from Kusadasi, was of a lone individual in January 1997 [see [Dynamite, Seals and the Dilek Peninsula NP](#), TMG 3(1): May 2000] – although a few unconfirmed observations are reported from time to time.



Monk seal habitat in Olimpos–Beydaglari NP – under siege from summer tourism and water sports

Inadequate enforcement is also risking monk seal breeding sites in the Olimpos–Beydaglari NP. The Besadalar islands lying off Cape Gelidonya have been a recognised monk seal haunt since 1978, when Fikret Berkes reported a sighting of 5 seals, including several young (Berkes 1978). Local fishermen, divers and tourists continue to report monk seal sightings within Olimpos NP borders, and yet intensifying summer tourism, particularly water sports, is posing a serious threat to the viability of the NP in protecting monk seals.

Problems specific to organization

Lack of qualified staff, inadequate funding, equipment and training is also a common phenomenon. National Parks often lack the resources to build up and maintain a detailed knowledgebase of their respective ecosystems, including their fauna and flora. Particularly where population trends are concerned, inadequate knowledge can obviously exacerbate management problems.

While NPs possess local directorates with a clearly-defined organisational structure, the capacity to operate as required is clearly limited by lack of qualified personnel and equipment. Both of these shortcomings have a severe impact on monitoring and guarding.

The Authority for Specially Protected Areas (ASPAs) has local directorates in only 2 of 13 SPAs (Göksu and Köycegiz-Dalyan) thus seriously limiting its ability to monitor and detect illegal activities. Such inefficiency poses a serious

threat to vulnerable coastlines where monk seals live, and it is often left to concerned NGOs and local citizens to report instances of illegal constructions of houses, tourist facilities or roads. In fact, SAD-AFAG has alerted the ASPA to illegal construction activity within its SPAs on several occasions since 1993.

Cultural and Natural Assets Protection Councils (CNAPC) are located in various districts of Turkey, responsible for assigning and administering the Ministry of Culture's SIT protection status. As a rule, the Councils generally rely on advice and expertise from outside sources, including specialised institutes, universities and NGOs. Particularly when compared to other alternatives, protection status can be swiftly conferred upon a designated area by the SIT procedure. While this has led to the creation of numerous SIT areas with varying degrees of protection, and although penalties for infringement can be harsh and act as an efficient deterrent against prohibited activities, this legal protection mechanism too, has no integrated research or surveillance component.

A case in point is the 1st degree Natural SIT area at Kotan-Sigacik, just south of Çesme on the Aegean coast. It was in this area, during the early 1980s, that the pioneering monk seal researcher and conservationist Prof. Bahtiye Mursaloglu began her groundbreaking studies in mother-pup relations, at times observing up to 7 seals occupying a single cave. Returning to the same shelter several years later, Mursaloglu lamented the fact that she could find only a single seal (Mursaloglu, pers. comm., 1993), despite its remoteness from human activity. The decline, she concluded, was symptomatic of the seal's declining fortunes all along Turkey's coastline. Indeed today, despite 1st degree status, the cave that was once home to a large family of seals appears to be only very rarely used or even to have been abandoned entirely.



Patrolling the Foça SPA: undermined by lack of funds and bureaucratic confusion

Even in Turkey's flagship SPA for monk seals, Foça, guarding efforts have been sporadic and haphazard for a number of years [TMGs, *passim*], largely due to lack of funding and political will, coupled with the inevitable bureaucratic confusion resulting from the involvement of multiple government agencies.

Other potential problems lie in inter-ministerial relations, and a tendency towards fragmentation, resulting in gaps overlaps in responsibility, duplication and conflict of effort.

All the relevant ministries (MoE, MoF and MoC), for example, have the authority to extend protected areas into marine zones, both in existing reserves and those pending official designation. The same ministries are also able to impose regulations on designated marine protection zones, and to convey their decisions to the MoA and coast guard for the purposes of enforcement. The ministries, however, have never seized that opportunity, except in the creation

of marine protection zones at Dilek and Olimpos by the MoF. The principal reason for this reluctance is a lack of concept of marine protection, together with absence of expert staff to design and tailor management plans to the specific needs of each individual area concerned.

The way ahead

Many of these problems are begging for solutions, particularly where conservation is faced with the daunting task of ensuring adequate protection for critically-endangered species such as the monk seal. Turkey, like other Mediterranean states, has certain legal obligations under international treaties to establish and manage reserves properly and yet as they stand at present, MPAs in Turkey are not fulfilling the promise expected of them. Achieving meaningful protection for the monk seal and its threatened habitats calls for the following actions as a matter of priority:

1. All protected areas must have detailed management plans, tailored to the unique needs of each in terms of species biodiversity, habitat, human impacts etc. Multi-disciplinary scientific research programmes are required in order to provide the knowledgebase for designing these management plans. Above all, plans must be based on the concept of integrated coastal zone management, encouraging practical ways in which local human communities can play their role in the conservation process.
2. Management authorities should be structured in such a way as to facilitate practical cooperation between the various government ministries, departments and enforcement agencies concerned, thus helping to eliminate gaps and overlaps in authority that currently exist. At the same time, there is also a need to ensure that bureaucratic complications do not hinder efficient, day-to-day operation of the protected areas.
3. The structure of day-to-day management operations should reflect the need for flexibility, allowing the management authority to adapt regulations to changing circumstances, such as those governing fishing, public access etc.
4. Specialised training in protected area management and guarding needs to be extended and improved in relevant government ministries.
5. An adequate supply of funding and equipment is essential in order to achieve efficient protected area management.
6. Research programmes designed to monitor potential changes in protected area ecosystems should form part of the integrated management plan, and involve universities and NGOs under coordination of the relevant management authority.

With the monk seal population still dwindling along much of Turkey's coastline, it is also vital that rapid progress be made in establishing the network of specially-designed MSPAs in the key habitat areas of the species. It is unlikely that *Monachus monachus* will survive in Turkey without these MPAs and management reforms to existing protected areas.

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In Focus

Vol. 5 (1): May 2002

HOMeward BOUND

Are monk seals returning to Madeira's São Lourenço peninsula?

**Alexandros A. Karamanlidis, Rosa Pires,
Henrique Costa Neves and Carlos Santos**

When reflecting on the life history of the Mediterranean monk seal over the past century, one might be tempted to liken it to a mathematical equation. Human development in coastal areas, competition between monk seals and fishermen for dwindling marine resources, and the inexorable thirst of the tourism industry for unspoiled beaches have led most monk seal populations to the brink of extinction with almost mathematical certainty. The list of capes, bays, peninsulas, islets and other places that once used to be home to the Mediterranean monk seal is as long as it is tragic. Despite the recognition that habitat loss must be countered with the creation of marine protected areas (MPAs), little has been done to achieve that aim. Consequently, monk seals have disappeared from much of their former range. In the central and western Mediterranean, it is likely that the species has already fallen well below survival limits. The second half of the 20th century also witnessed the eradication of monk seals from the Black Sea and Marmara (Kiraç 2001).

Following the same, all-too-familiar pattern, the archipelago of Madeira was also on its way to becoming another monk seal graveyard. Commercial exploitation and deliberate killings by fishermen had reduced population numbers dramatically, leaving only 6-8 individuals clinging to survival at the remote Desertas Islands by 1984 (Reiner & Santos 1984).

The 1990s, however, marked the beginning of a fundamental shift in human attitudes towards this rare seal, symbolising the profound manner in which planned and dedicated human action can benefit an endangered species. In order to protect *Monachus monachus*, the Parque Natural da Madeira Service (PNMS) initiated a Monk Seal Conservation and Monitoring Project in 1988, and the Desertas Islands were declared a Nature Reserve in 1990. Because of those determined efforts, the monk seal population of the Desertas staged a remarkable recovery, and is currently estimated at 24 individuals (Pires & Neves 2001). Future prospects for the species in the archipelago appear bright since the Desertas colony has been witnessing births of pups on a regular basis, and monk seal sightings on the main island of Madeira have been steadily increasing over the past few years (Pires 2001).



The São Lourenço peninsula, with locations of identified caves

Despite these early signs of success, PNMS reckons that the struggle to save the species in the archipelago is not yet over. Acknowledging the fact that suitable monk seal habitat in the area is limited, yet essential for the recovery and survival of the species, PNMS has long been considering the possibility of establishing another MPA for the species, this time on the main island of Madeira.

The remote São Lourenço Peninsula is considered the most promising candidate for such a venture, since it lies at the easternmost tip of the island and is closest to the Desertas Islands. Historical sightings also suggest that São Lourenço may

have been a favourite haunt of the species in the past. Because of its outstanding natural beauty and its ecological importance, the peninsula has been protected since 1982 as part of the Parque Natural da Madeira (PNM). Then in 1996, the peninsula's northern reaches were acquired by the Regional Government of Madeira and the São Lourenço Nature Reserve created. Soon after, PNMS began guarding the area and monitoring monk seals. In 2001, the entire peninsula and surrounding sea up to a depth of 50m were classified as a Site of Community Importance (SIC) and included in the Natura 2000 Network, a European Union initiative to create numerous protected areas to preserve endangered species and habitats.



São Lourenço's precipitous cliffs

In order to evaluate São Lourenço's potential as an MPA (rather than as a terrestrial reserve only), PNMS gathered historical information on the presence of the species in the area, and also carried out an on-site survey to identify and assess potential monk seal habitat. Accomplishing the first stage was relatively straightforward, with researchers consulting the PNMS database of monk seal sightings, and various bibliographic sources. The second stage, however, required investigation of the peninsula itself – a task easier said than done! Fortunately, our team could benefit from past experience in surveying the peninsula. A survey carried out in 1993 managed to locate and evaluate numerous caves in the area (Neves 1994) and served as a valuable guide to our research efforts.

The topography of the São Lourenço peninsula is heavily influenced by its geographical location and prevailing climatic conditions. Positioned along a northwest to southeast axis and facing the predominant north-northeast trade winds, the peninsula acts as a wave breaker for the Atlantic swell. Battering the coastline for centuries, the waves have left their mark on the north side of the peninsula. Towering cliffs up to 100m high plunge directly into the ocean, lending the impression of natural Cyclopean walls. Even on the calmest days (few and far between) the Atlantic Ocean has the power to generate meter-high waves, making the area exceptionally unfriendly to mariners, fishermen – and would-be monk seal conservationists.

The south side of the peninsula, in contrast, is sheltered from the worst of the weather and is characterised by low cliffs with colourful rock formations and narrow beaches.

Our survey of the peninsula took place in April-May 2001, our team making use of the warden's station *Casa do Sardinia* as a base of operations, and a small inflatable to reconnoitre the coastline. Located strategically at the foot of a small hill in the middle of São Lourenço, the warden's station provided a panoramic view over both sides of the peninsula, allowing us to judge the weather before venturing out to sea. As far as creature comforts were concerned, it also offered a hospitable kitchen to regenerate our battered bodies, and even modern entertainment to raise our spirits.

Our survey's methodology was based on applied techniques developed in monk seal monitoring programmes in the eastern Mediterranean. We entered caves by dinghy or by snorkelling in during low tide, but only after an initial inspection determined that no animal was present. Human disturbance of monk seals remains one of the greatest threats to the species and must be avoided even during scientific research. Once inside, we checked the caves for signs of earlier seal presence, such as movement tracks, lingering smell, hair, or any other evidence, such as saliva, blood, placenta *etc.* Before leaving, we also recorded the natural characteristics of the shelters, since cave habitat and its possible deterioration has become a central issue in the conservation of the species. In order to minimise potential disturbance to the monk seals, the entire inspection process usually lasted less than 10 minutes.



Casa do Sardinia

Despite thorough planning and preparation, our expedition very nearly fell foul of the only factor on the peninsula difficult to predict. Weather. During our stay, we experienced firsthand why São Lourenço had achieved its fierce reputation. Day after day, huge Atlantic waves kept on battering the north side of the peninsula, confining our research efforts to the south side or keeping us holed up for several days at a time in the warden's station.

Taking advantage of a lucky break in the bad weather, our strenuous efforts finally paid off and we were able to survey the entire coastline of the São Lourenço Nature Reserve. Within the study area, we identified, explored and charted 38 different sea caves, 10 of which are located on the south and 28 on the north side of the peninsula. The difference in topography between the two sides is also evident in the caves we visited. Most shelters on the south side have small entrances leading through a short tunnel-like entrance, to a small beach (10-20 m²). Caves on the north coast, however, provided a stark contrast, usually dwarfing in almost every measurable dimension the shelters on the south side. Two caves, in particular, illustrate this phenomenon. The cave found adjacent to the islet Ilheu do Guincho has an entrance tunnel approximately 100m long and leads to a beach big enough to accommodate almost every breeding monk seal in the archipelago. Even this shelter, however, cannot quite match the cave located about one km to the east. Boasting an entrance the size of the Arc de Triomphe and an entrance tunnel as large as a subway shaft, cave No. 25 can proudly claim to be the "King of Caves" on the north side of the São Lourenço peninsula. After travelling almost 500m with the dinghy through the entranceway (estimations over the distance travelled vary according to how brave-hearted the members of the expedition were), we were still unable to see the end of the tunnel... For obvious reasons, this cave remains the only one that the team did not manage to fully chart!

Based on our knowledge of the monk seal's cave usage preferences at the Desertas Islands (Karamanlidis et al. 2002), we judged four shelters suitable for resting and breeding, while a further 18 were considered only suitable for resting.

In a preliminary survey of the coastline northwest of the Reserve, we also identified many other potential seal shelters. Unfavourable weather conditions, however, prevented us from inspecting these caves. The breaking waves and high seas

may also have been responsible for wiping away cave-use evidence in the seal shelters we were able to enter.

Despite the absence of such simple, tell-tale evidence, and without disregarding the possibility that no seals might have been present in the area during our survey, other factors were sufficiently compelling to convince us that São Lourenço might yet become an important habitat for the species.

First, we had found sea caves whose characteristics seemed well-suited for monk seal breeding and resting. Second, we had gathered firm evidence of the historical presence of the species in the area. Despite the remoteness of the Peninsula, consultation of the PNM sightings register and other sources revealed more than 20 monk seal records during the past century. It appears that a small colony managed to survive at São Lourenço up until the end of the 1970s but since then, the seal's presence has been recorded only sporadically.

Available evidence is still insufficient for us to determine whether the occasional, continued sightings around the peninsula represent visiting animals from the Desertas Islands colony, or a small, undetected group on São Lourenço itself. The presence of the species was most strikingly confirmed during the last days of May (2001), when a lone monk seal was seen feeding near the islet of Ilhéu do Guincho.

Demonstrating its commitment to the cause, PNM started up a Monk Seal Conservation and Monitoring Project at the São Lourenço Nature Reserve in 1996, following a model already established for the Desertas Islands. PNMS also set up three observation points within the Reserve (Observation Point No. 1 at the area of Ilhéu do Guincho, Observation Point No. 2 overlooking the bay with the caves designated SLNR 20, 21 and 23, and Observation Point No. 3 at cave PSLN 28), an initiative that appears well justified considering the results of our survey.

Initially, caves within the Reserve were protected from land, but not from the sea. The management plan designating São Lourenço as part of the Natura 2000 Network, seeking to redress this legislative oversight, has now created a marine protection zone to a depth of 50 meters.

With the population expanding in the Desertas Islands, and with evidence suggesting that monk seals may be dispersing towards Madeira in search of food, and perhaps even breeding habitat, the adequate protection of the São Lourenço peninsula becomes all the more important (Pires 2001).

From what we have seen firsthand, the peninsula does possess the kind of habitat that seals already enjoy in the MPAs of the Northern Sporades and the Desertas, but only adequate protection – and time – will determine whether monk seals will re-colonise this lonely, weather-beaten stretch of coast.



A juvenile monk seal in the Desertas Islands

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Perspectives

Vol. 5 (1): May 2002

CHALLENGE IN THE IONIAN

An interview with Ioannis D. Pantis, President of the National Marine Park of Zakynthos



Ioannis Pantis, with guards, in the National Marine Park of Zakynthos

According to Greek mythology, the Ionian Sea derives its name from Io, the nymph whose beauty so enchanted Zeus that Hera, in a fit of jealous rage, had her stung by a gadfly. Maddened with pain, Io plunged into the sea which came to bear her name.

The Ionian Island of Zakynthos, with its emerald sea and pine-clad mountains, was baptised by the Venetians "the flower of the Orient" (Fior' di Levante), while Dionysios Solomos, the father of modern Greek poetry and a native son, wrote, "Zakynthos could make one forget the Elysian Fields".

As in the legend of Odysseus, where Penelope's beauty and Odysseus' kingdom attract several rival suitors, so did the Ionian Islands attract its fair share of "admirers". Over the centuries Romans, Byzantines, Turks, Normans, Franks, French and British all tried to bring the Ionian Islands into their own sphere of influence. It was not until 1864 that the archipelago became incorporated into the newly established Greek State. Slowly but surely, the islands began to attract a new type of admirer. Tourists. Over the years, the trickle turned into a flood, with hotels and tavernas, marinas and even airports sprouting over the archipelago, eventually threatening the very essence of the Islands and what they have represented throughout history. Natural beauty.

The "Pax touristica", however, has recently been disturbed by the creation of the National Marine Park of Zakynthos (NMPZ), an area dedicated to the protection of the Ionian's natural heritage, endangered sea turtles and monk seals. Judging from

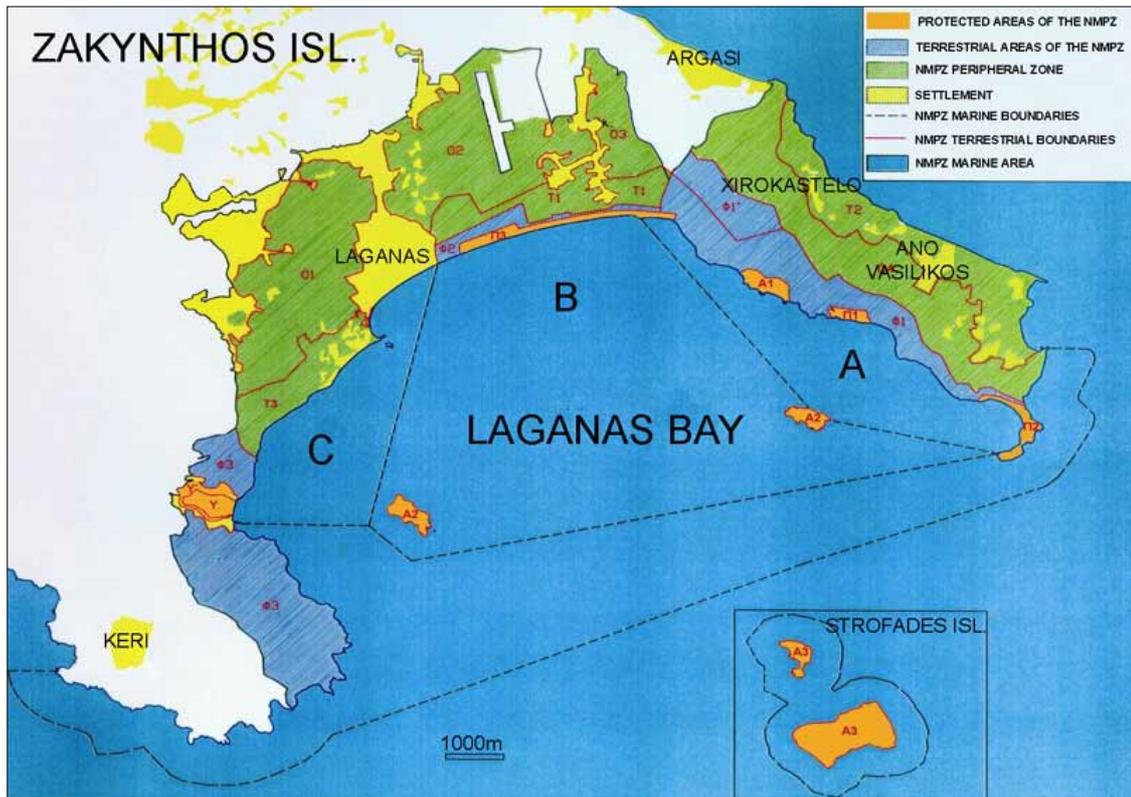
recent arson attacks against the Park, and summary judgements against the Greek state by the European Court for failing to implement EU environmental directives, not every Zakynthian is content with this new ecological reality. But what is the Marine Park of Zakynthos, and why is it polarising public opinion? We caught up with Ioannis Pantis, President of the NMPZ, to learn more...

Q. Tell us something about the history of the Marine Park. When was it established? What is its aim?

A. The President of the Greek Republic signed the Presidential Decree [Gov. Gazette, 906/D, 22-12-1999] on 1 December 1999, establishing both the National Marine Park of Zakynthos (NMPZ) and its management authority. The Park is situated in Laganas Bay, which is located in the southern region of Zakynthos Island. The primary objective of the Marine Park is to protect the natural environment of Laganas Bay while aiding the local communities to continue developing their economy.

Q. Describe the Park for us, its size, and various protection zones...

A. The Marine Park comprises 2 maritime zones totalling 8,918 hectares. The core maritime zone is split into three sub-zones, Zone A, Zone B and Zone C. In Zone A no boating or recreational fishing is permitted, in Zone B boats may travel at a speed of 6 knots but may not anchor, and in Zone C boats may travel at a speed of 6 knots and anchor. The maritime zone is surrounded by 7 terrestrial core zones (A1, A2, P1, P2, P3, Y and Y') and 3 zones of protection of habitats (F1, F2 and F3). These protection zones are surrounded by buffer zones of ecotourism development (4 zones) and zones of controlled tourism development (3 zones). The two islands of Strofadia, situated 40 nautical miles off the island of Zakynthos, also form an integral part of the Marine Park. The maritime area of the Park is 89.2 km², the terrestrial area 14.2 km² and the buffer zone 31.2 km².



NMPZ

Q. What is the significance of the Park's core zones in terms of threatened and endangered species?

- A.** The core zones of the Park protect the most important nesting sites of Loggerhead turtles [*Caretta caretta*] in the Mediterranean, as well as habitat of the critically endangered Mediterranean monk seal. The protective measures in force in the terrestrial areas also provide refuge for migratory birds, as well as key plant and invertebrate species. Furthermore, the entire area is actually characterised by a variety of habitats of European interest including sand dunes, *Posidonia oceanica* [sea-grass] beds and submerged reefs, as well as hundreds of species of fauna and flora, some of which are of great importance, such as the sea daffodil (*Pancratium maritimum*).



A Loggerhead turtle: newfound protection in the NMPZ

Q. How important is the Marine Park for the survival of the Loggerhead turtle?

- A.** According to the IUCN Red Data Book, Mediterranean loggerhead sea turtle populations are considered to be under threat of extinction. Greece hosts the only loggerhead nesting sites in Europe. Zakynthos hosts the largest nesting site in Greece with 1000-2000 nests being laid annually on the six nesting beaches, with one beach in particular, Sekania, being the second most densely nested beach by loggerhead sea turtles in the world. In regions of Crete (Rethymno, Hania) and the Peloponnese (Kyparissia and Lakonikos) 500-800 nests are laid annually. Finally, there are other areas in Greece with less than 100 nests laid annually, such as Kefallonia [Zakynthos' neighbouring island].

On Zakynthos, the six loggerhead nesting beaches form the core zones of the National Marine Park. Sekania beach is completely protected, with access prohibited by road and by sea, except for research purposes.

Q. What role is science playing in the conservation programme?

- A.** Archelon [the Sea Turtle Protection Society] monitors all sea turtle activity on all of the six beaches in the Park. There is a tagging programme, a morning survey programme to record the total number of turtle emergences each night, and a percentage of nests are excavated after hatching in order to determine the hatching success rate.

Q. Is research providing any statistical data on the effectiveness of marine turtle conservation efforts?

- A. The Marine Park has only been in existence for 1.5 years, but the breeding cycle of sea turtles is estimated to start after a 20-30 year maturation period. Even 17 years of monitoring data collected by Archelon is not enough to gauge the effects of conservation activities on this long-lived animal!
- Q. The Mediterranean monk seal is also a critically-endangered species. Is there any suitable monk seal habitat within the Park's boundaries? If so, is the Park offering protection to Zakynthos' threatened monk seal population?**
- A. The main habitat of the monk seals is the west coast of Zakynthos, an area that does not belong to the Marine Park. Sightings suggest that the population numbers about 12, of which 2 or 3 have been observed using the Marine Park.
- Q. To what extent are monk seals a focus of research by scientists associated with the Park?**
- A. At present there is no research being undertaken for the monk seals of Zakynthos, although in the recent past both WWF Greece and Archipelagos have conducted research around the island.
- Q. Is there any hope that a satellite reserve might be established to protect surviving monk seals and monk seal habitat on Zakynthos?**
- A. As a result of those scientific studies, a management plan for the west coast of Zakynthos and for the habitats of the monk seals, was prepared and submitted to the Greek government, proposing the establishment of a protected area.
- Q. To what extent is monk seal habitat now under increasing tourist pressures because of the establishment of the Park? Are we, perhaps, sacrificing one endangered species for another?**
- A. Because of the topography of the west coast of Zakynthos – steep hills and inaccessible beaches – there has been no increase in coastal development in the area, despite the slight increase in tourist numbers. Hence, monk seal habitat has not been severely affected by the creation of the Marine Park. In fact, with its public awareness programme and the information it supplies to visitors, I believe the Marine Park can only benefit the monk seals of Zakynthos.



West coast monk seal habitat: under siege by summer tourism?

- Q. How is the Park's management structure formulated and how does it operate on a practical basis?**
- A. According to the Presidential Decree that established the NMPZ, the Park is governed by a Management Authority that determines management objectives. This authority comprises the President of the Marine Park and nine members, including representatives of the Zakynthian Prefecture and local society, the Ministry of Environment, and private environmental organisations. On average, the Management Authority convenes meetings once or twice every month. Although it acts under the supervision of the Ministry of Environment, the Management Authority is actually constituted as a private, non-profit body. [Day-to-day operation of the Park – the responsibility of several full-time staff working in liaison with law enforcement agencies – is overseen by the Management Authority.]
- Q. Are local interests adequately represented?**
- A. Six out of ten members of the Management Authority are actually representatives of Zakynthian society. In addition, the Prefecture Council of Zakynthos has the task of forming a committee in which all Zakynthian stakeholders will participate.
- Q. What kind of resources does the Park receive in order to implement its management plan?**
- A. In 2001, the first year of the Park's operation, there were two income sources. The first was from the Greek Government with a total of Euro 146,735 and the second from the European Union, through a LIFE Environment project, with a total of Euro 284,666. These funds covered the operation of the Management Authority of the Park, the guarding and protection of the loggerhead nesting beaches, public awareness of Park visitors and the construction of signs and guarding huts, and the publication of informative material.
- Q. What efforts are being made to involve young locals in the management of the Park?**
- A. The Management Authority is making a great effort to involve the locals (and especially those from the Park's immediate surroundings), either in the Park's scientific research scheme, in guarding or in public awareness.
- Q. The protection of turtle nesting sites and the establishment of the Marine Park has been dogged by controversy for many years. The EU, attempting to pressure the Greek authorities to establish the Park and an effective management authority, has taken legal action against Greece on a number of occasions in an effort to force compliance with EU directives. On the other hand, in 2001, a deliberate arson attack against the Park underlined the lingering hostility that some people obviously still feel towards the protection of the area. What comment do you have on these incidents?**

- A. The fire incident burned about 200 hectares of Park area on 11 October 2001 [see '[Terrorist attack' on Zakynthos Marine Park](#), TMG 4(2): November 2001]. As confirmed by the fire brigade service of Zakynthos, this was arson. From the outset, the Management Authority condemned such actions that destroy the natural environment of the Park. In addition, the NMPZ compiled a study for the restoration of the burned area.

On the 30th of January the European Court of Justice announced judgement against the Greek Government for "failing to fulfil its obligation to implement effective and strict protection for the sea turtles *Caretta caretta* on Zakynthos" [Case C-103/00, see Further Information, below].

This conviction was handed down because, up until 1999, Greece did not implement the required protection measures for the habitat of Laganas Bay. It should be noted, however, that the European Court of Justice appreciated positively the establishment of the National Marine Park of Zakynthos. The Commission of the European Communities, the Greek Ministry of Environment and the Management Authority of the NMPZ are co-operating in order to implement the required protection measures and to ensure the protection of the natural environment within the Park area.



The bad old days. Tourism development versus turtle conservation, Zakynthos-style, circa 1980

- Q. Negative attitudes towards the planning, creation and existence of the Park have been a subject of international controversy for many years. Which sectors of the local community are most opposed to the Park, and why?**

- A. It has to be understood that, within the Park's boundaries and buffer zones, live about 7000 people who are mainly occupied in agriculture and tourism. The main reactions against the creation of the Park are coming from those who have been directly affected by the protection measures: landowners. Unfortunately, until now, no compensation measures have been activated for these people. One of the main objectives of the NMPZ is to have these measures implemented.

- Q. What efforts, if any, are being undertaken by the Management Authority to improve public awareness of the Park's objectives?**

- A. The NMPZ has already launched public awareness and environmental education schemes on the island, as well as bringing worldwide attention to Zakynthos via the first Nature Film Festival and Ecotourism Symposium. Two information stations are operated for visitors, one at Gerakas in co-operation with a local landowner, and one at Zakynthos town, and daily slide shows are given in hotels.

- Q. Guarding is central to the integrity of any protected area. Can you describe the guarding regime in operation in the NMPZ, its organisation and strength, its equipment supply and training?**

- A. The Guards hired by the Marine Park are primarily responsible for guarding all entrances to loggerhead nesting beaches in Laganas Bay. The Guards are all Zakynthians, hired from the local communities within and bordering the Marine Park. In 2001, 41 Guards were hired to protect the beaches 24 hours a day from May to October. During the day, they inform beach visitors about the protection laws, advising them to stay within 3-5 metres of the sea. After sunset and before sunrise the Guards enforce the law, whereby no-one is permitted to access the nesting beaches. The Guards' responsibility is to inform visitors of the existing laws and to record all illegal activities, such as horse riding on the beaches *etc.* The government law enforcement agencies, such as the Police or Port Police, are informed of any illegal activities and it is their responsibility to ensure the law is obeyed. For this reason the Marine Park and the government law enforcement agencies work in close co-operation.

The marine zones are guarded by the Greek Port Police in co-operation with the NMPZ. The Port Police of Zakynthos have been supplied with a boat by the Ministry of Environment, with the aim of patrolling the maritime area of the park on a daily basis. In addition, if the Marine Park Guards observe illegal activities, such as boats entering Zone A or water sports in zones A, B or C, the Port Police are immediately informed so they can take the required actions.

Prior to their employment, the Guards were all required to participate in a training scheme by skilled NMPZ personnel and the sea turtle protection organization [Archelon].

- Q. Has action been taken against those violating Park regulations?**

- A. Yes. During 2001 the Port Police reported 50 cases of illegal activities within the marine area. All of those responsible were fined. Furthermore the NMPZ, in co-operation with the Land Service Department and the Police of Zakynthos, have performed checks on businesses operating on the nesting beaches. On 12 July 2001, 60 illegal beach umbrellas were removed from the nesting beach of Kalamaki. On 10 September one beach umbrella operator was sentenced in court to 3 months' imprisonment for exceeding the number of beach umbrellas allowed on Gerakas beach. The Police have also helped with the problem of deliberate horse riding activities on the nesting beaches. The perpetrators have been stopped and fined on four separate occasions for riding horses on Laganas beach.

- Q. How are local economic interests being brought into the conservation process? Is the tourism industry viewing the Park's creation as a threat or an opportunity?**
- A. One of the main aims of the Management Authority is to help native Zakynthians exploit the Park's economic potential and help the tourist industry benefit from the NMPZ. As such, the NMPZ enjoys good co-operation with the tourist industry and the stakeholders within the Park area.
- Q. Can tourism as it exists today on Zakynthos really be compatible with the conservation objectives of the Marine Park?**
- A. Thirty years ago, the main occupation for locals was agriculture, but since then development has turned increasingly towards tourism. Today, Zakynthos development is focused on mass tourism. Unfortunately, this type of tourism consumes natural resources and destroys the natural environment. Therefore the NMPZ is aiming to encourage ecotourism and other sustainable development opportunities in the Park and its surroundings. In co-operation with local and foreign stakeholders, the NMPZ is already planning to launch a project for the certification of "Environmental Friendly" businesses, and to assist in the general promotion of sustainable development in the area.
- Q. Are any additional measures required from the government in terms of additional legislation in order to ensure greater efficiency in the Park's operation?**
- A. Yes. The compensation scheme for the affected landowners, the delineation of the beaches, and the cadastral plan of Zakynthos.
- Q. How do you see the future of Zakynthos and the Marine Park?**
- A. The only way that Zakynthos can continue to develop successfully is through the conservation of the natural environment and the promotion of sustainable development. This is the future that the Marine Park envisages for Zakynthos and especially for the area encompassed by the Marine Park.

Our objective is that the NMPZ will attract visitors who respect the environment. This will be achieved with various infrastructure projects, as well as our public awareness efforts. The Marine Park is already in the process of setting-up information centres, putting up visitor information signs, creating nature trails and underwater 'paths' for snorkelling and diving.

One of the mottoes of the Marine Park is that "informed visitors are the best allies for the protection of the natural environment". We believe, in fact, that only if Zakynthos can attract the ecologically aware and if development follows a course that respects the natural environment, will there be a future for the critical habitats and the endangered species that exist within the National Marine Park of Zakynthos.

– Interviewers: Alexandros A. Karamanlidis, William M. Johnson.

Biography

Ioannis Pantis was born in 1957, in Agioi Pandes, Zakynthos. In 1980 he received his biology degree from the Aristotle University of Thessaloniki (AUTH) and in 1987, his PhD from the same institution. He works as an Assistant Professor in the Ecology division of the Department of Biology of AUTH. In 1999 he became President of the European Ecological Federation. Since 17 July 2000, he has been Honorary President of the "Organisation of the National Marine Park of Zakynthos", the first Management Authority ever for a protected area in Greece.

Acknowledgements

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Further information on the Web

The National Marine Park of Zakynthos: <http://www.nmp-zak.org/>

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Earth, Sea, Sky. Information on wildlife and natural habitat management, Sea Turtle rescue, Monk Seal research and volunteer projects in the Greek Ionian. <http://www.earthseasky.org>

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NOTES ON THE DESCRIPTION AND THE TYPE MATERIAL OF THE HAWAIIAN MONK SEAL OR LAYSAN SEAL, *MONACHUS SCHAUINSLANDI* MATSCHIE, 1905

Peter J.H. van Bree

Zoological Museum, University of Amsterdam
P.O. Box 94766, NL-1090 GT Amsterdam, the Netherlands

Due to linguistic difficulties, rather little is known about the description and type material of the Hawaiian monk seal in the English-speaking world. It may therefore be useful, in a journal dedicated to monk seals, to publish a few notes on the original description of the species and its type material.

Events were set in motion with the three month stay of the German scientist, Prof. Dr. Hugo H. Schauinsland – later to become director of the Uebersee-Museum in Bremen – on the Hawaiian coral island of Laysan in 1896-1897 (part of the Leeward Chain, or Northwestern Hawaiian Islands). From Laysan and other Pacific islands, he brought back much biological and ethnographic material. He wrote an article in German about his stay on Laysan, of which an English translation was published by M.D.F. Udvardy in 1996 (Schauinsland 1996). Among the material he collected was the complete skin of a seal, a complete skull, the skin of the head of a seal and the facial parts of two seal skulls.

The seal material was sent to the Zoological Museum in Berlin, where the renowned mammal taxonomist Dr. Paul Matschie worked. In a detailed article published in 1905 he described the seal material under the title "Eine Robbe von Laysan" (a Seal from Laysan). He compared, in a very meticulous way, the seal remains he received from Schauinsland with pinniped material in his museum. He came to the conclusion that the animal was a true seal and belonged to the genus *Monachus* Fleming, 1822. He then compared his Pacific material with Mediterranean monk seal material (*Monachus monachus* Hermann, 1779) already in the Berlin collection and with the excellent photographs of the Caribbean monk seal, *Monachus tropicalis* (Gray 1850) published by D.G. Elliot in 1904. The result was that he had in his hands an undescribed species, which he named after its collector, *Monachus schauinslandi*.

In his article Matschie designated no holotype, so all the remains are syntypes. The complete skin was sent back to the museum at Bremen where it was mounted and exhibited, and is still on display. It received the registration number RK 502 (see G. von Wahlert, 1956). The other material stayed in Berlin. In 1956 Judith E. King, in her monograph on the genus *Monachus*, published photographs of the complete skull in the Berlin collection, with the legend "skull of the type specimen ZMB 32795". Thereby she designated that skull as the lectotype of the species.

The stuffed complete skin at Bremen is a paralectotype. The two facial skull parts and the skin of a head of *Monachus schauinslandi*, which are also paralectotypes, stayed in the Berlin museum but cannot be found at present. Whether these objects were destroyed or donated to another museum is not known. It may even be possible that they are among unregistered material in the museum.

Acknowledgements

The author is grateful for the help he received from Dr. P.F. Becker of the Uebersee-Museum in Bremen and from Dr. M. Ade of the Zoological Museum in Berlin, now named Museum für Naturkunde.

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Monachus Science

Vol. 5 (1): May 2002

OBSERVATIONS ON DIVING BEHAVIOUR OF FREE RANGING MEDITERRANEAN MONK SEALS *MONACHUS MONACHUS* ON TURKISH COASTS

Cem Orkun Kiraç, Yalçın Savas, Harun Güçlüsoy, N. Ozan Ververi

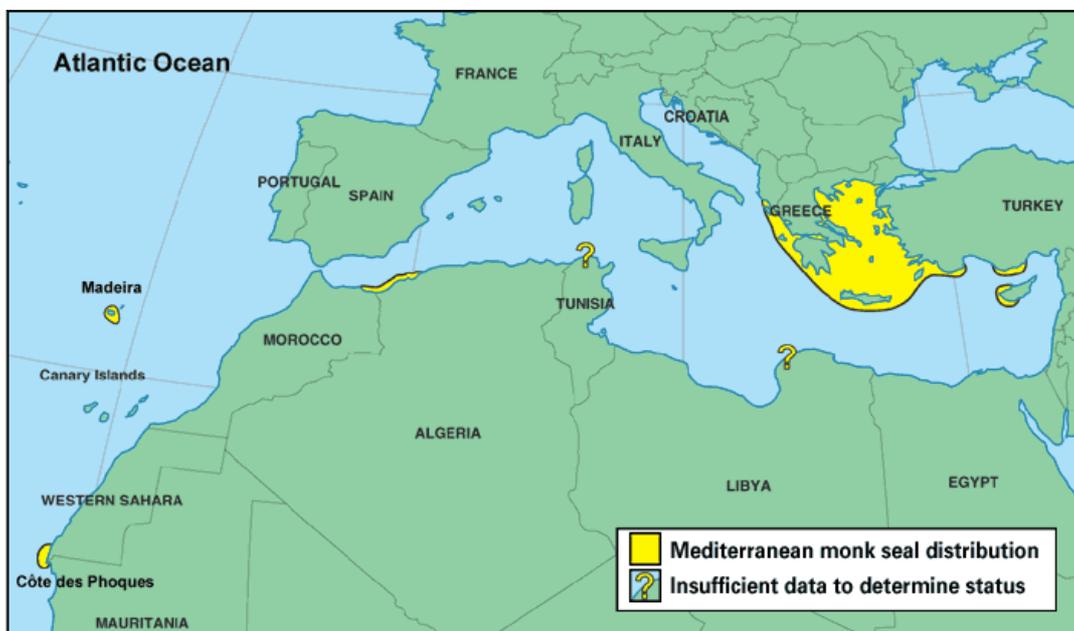
[Underwater Research Society – Mediterranean Seal Research Group \(SAD-AFAG\)](#)

Abstract

Diving behaviour of Mediterranean monk seals in Turkish waters was observed opportunistically from 1993 to 1998. Twenty separate diving episodes, each comprising many individual dives, were recorded. Eighteen of these events involved adults; the remaining two involved juveniles. Among the 18 observations of adults, 15 produced complete data for 3 previously identified (1 male and 2 females) and 4 unidentified animals. A total of 220 dives and 223 surface intervals were recorded. Mean dive duration and mean surface interval for adult animals were 384.9 seconds (6.4 min) and 48.9 seconds (0.81 min), respectively. The two observations of a juvenile monk seal recorded 32 dives and 35 surface interval measurements. Mean dive duration of juveniles was 407.9 seconds (6.8 min) with a mean surface interval of 32.6 seconds (0.54 min).

Introduction

Little is known about the diving patterns and feeding behaviour of the Mediterranean monk seal (*Monachus monachus*), which survives mainly on the coasts of Greece and Turkey in the Eastern Mediterranean, and on the coasts of Western Sahara and Madeira in the Northeast Atlantic Ocean [[Distribution map](#)].



Along the Atlantic coast of the Western Sahara, Gazo (1996) used time depth recorders (TDRs) to study the diving behaviour of nursing and recently weaned Mediterranean monk seal pups. One nursing pup had mean and maximum dive durations of 51.6 and 320 seconds, respectively. Two recently weaned pups had mean diving durations of 112.9 and 91.1 seconds, and maximum dive durations of 330 and 590 seconds, respectively. In a subsequent study Gazo (1997) used a TDR to study diving behaviour of an adult male monk seal. The animal dove to a maximum depth of 58 m; maximum dive duration was 8 minutes. Most dives were shallow (less than 8 m), with only 5% exceeding 50 m.

On the Desertas Islands, Madeira, Costa Neves (1998) provided preliminary observations on the diving patterns and feeding behaviour of monk seals observed from selected lookout points. He observed two distinctive diving patterns in foraging monk seals: "spot feeding," where seals dove continuously in the same location close to shore for up to several hours, spending up to 12 minutes underwater, and about one minute on the surface before initiating the next dive; and

“transit feeding,” where seals covered considerable distances along the shoreline, with dive durations up to seven minutes, before resurfacing. Spot feeding was usually observed in solitary adults in relatively shallow water not exceeding 6 m. Immature seals were only observed “transit feeding.”

Until now, no information on the dive pattern and feeding activity of the Mediterranean monk seal in the Mediterranean basin has been available. Here we report observations of dive durations and surface intervals of Mediterranean monk seals observed opportunistically along the coast of Turkey.

Methods

Observations of free ranging adult and juvenile monk seals were made from selected lookout points on remote islands and the mainland of the Turkish Aegean between May 1993 and September 1998. Observation points included: the western cliffs of Büyük Kiremit Island off Yalıkavak, Çavus Island off Gümüslük, Bodrum, SW Turkey, and the Siren Rocks of Orak Island off Foça, W. Turkey (Figure 1). Observations from the mainland were obtained along the coast of Kanlıkaya cliffs, 4 km north of Karaburun town (D1), the Ayani coast, 4 km north of Foça (D17 and D18) and Kizilkuyruk Cape at the Western tip of Fethiye bay (DX). Observations were made in regions where repeated monk seal sightings had occurred, and when animals were encountered during scheduled surveys or routine fieldwork.

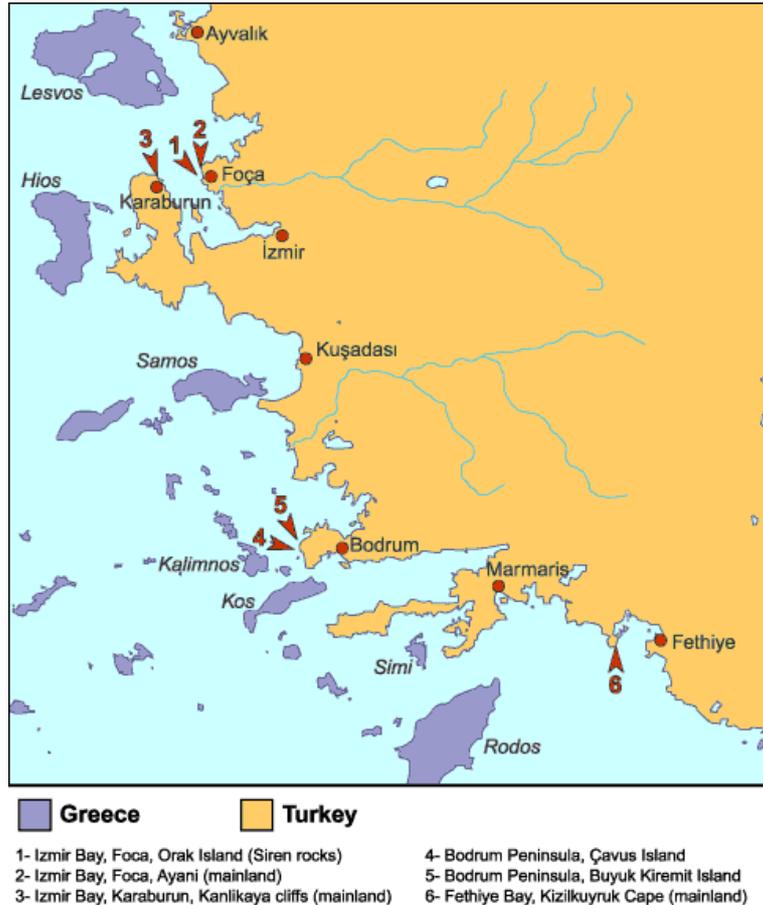


Figure 1. Observation sites

Researchers selected locations on cliffs with the widest angle of view to facilitate observations of monk seal diving behaviour (Figure 2). A total of 17 observers recorded diving behaviour, with 2 to 6 observers participating on each occasion. The observers attempted to hide themselves among rocks or vegetation, where available, in order not to be seen by the seals. During observations of diving activity, times of every dive and surfacing event were recorded. Binoculars (8x to 12x), cameras with zoom lenses (24-50 mm and 75-300 mm), and a telephoto lens (600 mm) were used to identify individual seals and to make the observations. Sex of individual seals was identified on the basis of previous field experience, with conclusions being verified against information on morphological differences provided by Samaranch and Gonzales (1998). Dives were characterised as “spot feeding” dives or “transit” dives following Costa Neves (1998).

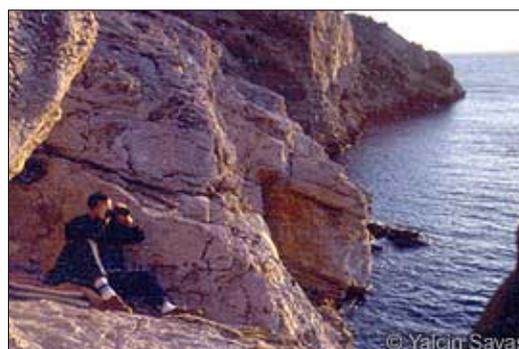


Figure 2. A researcher at a cliff top observation post on Karaada Island, Bodrum.

In three cases, researchers intruded upon diving seals. One observer made scuba dives to observe the behaviour of the adult seal “Susa?” (observation D10b) and the juvenile seal “Fatma” (D17) on the north coast of Çavus Island, and on the Ayani coast near Foça, respectively. In the case of observation D13a, researchers took photos from an inflatable boat for a short period of time, while remaining at least 50 m from the seal, “Disi Korsan,” at the Siren Rocks of Orak Island (Figure 4). In all three cases, the seals continued their diving activity, regardless of the presence of human observers.



Figure 3. Susa at Büyük Kiremit Island



Figure 4. Disi Korsan at the Siren Rocks

For each individual dive observed, dive duration and surface intervals between dives were recorded and mean, median and maximum dive duration, and mean and median surface intervals were calculated. In addition, the data were pooled for all animals observed, in order to calculate mean, median, and maximum dive duration, and mean and median surface intervals for all dives combined.

Results

A total of 20 diving episodes, each comprising a series of individual dives, were observed (Table 1). Three of these had incomplete data and were not used in any calculations (DX, DY, DZ). The remaining 17 diving episodes with complete data involved 15 adult monk seals (Table 2) and 2 juveniles (Table 3), and spanned 3319 minutes (55.3 hours) of observations. All the observations were made between dawn and dusk and in the majority of the spot dive observations (D4, D5, D9, D10b, D13a, D15, D16, D17 and D18) seals left the dive area near or at dusk.

These seventeen diving episodes were used to estimate mean, median, and maximum dive durations, and mean and median surface intervals for each of the animals. Dives less than or equal to 25 seconds were considered too brief to be classified as a dive and were not included in the estimation of dive duration. In addition, the mean and median dive duration and surface interval for all adults combined (15 seals, 223 surface intervals and 220 dives), and all juveniles combined (2 animals, 35 surface intervals, and 32 dives) were also calculated. The ratio of mean dive duration to mean surface interval (d/s) for each diving episode was also calculated, for both adult and juvenile seals combined.

Table 1. The location, dive type, name/field code of individual seals, sex and date of diving observations.

No.	Obs.	Location	Type	Seal	Sex	Date
1	D1	Kanlıkaya to Karaburun	Transit	F1	-	28.05.1993
2	D4	B. Kiremit Island	Spot	Susa	M	15.01.1994
3	D5	B. Kiremit Island	Spot	Susa	M	16.01.1994
4	D6	B. Kiremit Island	Spot	Susa	M	17.01.1994
5	D8	Orak Isl./Siren Rocks	Spot	F2	-	05.04.1994
6	D9	Çavus Isl.	Spot	Susa?	M	05.06.1994
7	D10a	Çavus Isl.	Spot	Susa?	M	06.06.1994
8	D10b	Çavus Isl.	Spot	Susa?	M	06.06.1994
9	D11	Orak to Kartdere	Transit	F3	-	13.08.1994
10	D12	Orak Isl./Siren Rocks	Spot	Sühendan	F	18.11.1994
11	D13a	Orak Isl./Siren Rocks	Spot	Disi Korsan	F	21.09.1995
12	D13b	Orak to Incir	Transit	Disi Korsan	F	21.09.1995
13	D14	Orak Isl./Siren Rocks	Spot	Sühendan	F	30.09.1995
14	D15	Orak Isl./Siren Rocks	Spot	F4	-	01.10.1995
15	D16	B. Kiremit Island	Spot	Susa	M	01.09.1996
16	D17	Ayani	Spot	Fatma (Juv)	-	31.07.1998
17	D18	Ayani	Spot	Fatma (Juv)	-	06.09.1998
18	DX	Kizilkuyruk Cape	Spot	Piyade	M	24.09.1994
19	DY	Orak Isl./Siren Rocks	Spot	F5	-	26.05.1995
20	DZ	Orak Isl./Siren Rocks	Spot	F6	-	05.10.1995

Table 2. Maximum, mean and median dive duration and mean and median surface interval and d/s ratio of all observations for adult seals. OP= Observation period of seals' dive; d/s= divemean/surfacemean factor.

No.	Obs.	Seal	Type	Ndive	divemax	divemean	+/- SD	dive median	Nsurf	surfmax	surf mean	+/- SD	surf median	d/s	OP (min)
1	D1	F1	Transit	4	335	248.5	95.5	272.0	3	120	56.7	55.8	35.0	-	42
2	D4	Susa	Spot	29	635	407.4	165.2	425.0	28	120	32.4	20.6	30.0	12.6	330
3	D5	Susa	Spot	32	840	342.6	208.1	330.0	34	43	23.2	10.7	24.5	14.8	319
4	D6	Susa	Spot	8	582	258.0	212.4	284.5	9	36	19.2	10.1	20.0	13.4	37
5	D8	F2	Spot	4	889	460.5	290.5	353.0	5	51	36.4	8.4	33.0	12.7	41
6	D9	Susa?	Spot	8	420	232.9	147.7	187.5	9	59	30.2	19.3	38.0	7.7	188
7	D10a	Susa?	Spot	3	340	285.0	74.7	315.0	4	90	52.5	35.7	52.5	-	367
8	D10b	Susa?	Spot	19	1080	288.8	236.2	213.0	20	75	32.1	20.0	37.5	9.0	102
9	D11	F3	Transit	7	395	273.3	98.1	302.0	6	64	39.2	21.8	42.0	7.0	64
10	D12	Sühendan	Spot	13	521	387.4	87.1	404.0	10	141	85.9	26.9	84.5	4.5	98
11	D13a	Disi Korsan	Spot	53	901	487.2	103.7	497.0	54	107	79.4	15.0	81.0	6.1	570
12	D13b	Disi Korsan	Transit	1	405	405.0	-	405.0	1	60	60.0	-	60.0	-	8
13	D14	Sühendan	Spot	13	470	396.8	53.8	407.0	13	87	72.2	9.0	71.0	5.5	151
14	D15	F4	Spot	7	475	223.3	164.1	205.0	9	105	50.6	37.9	51.0	4.4	75
15	D16	Susa	Spot	19	648	468.1	207.4	581.0	18	59	39.9	17.7	47.0	11.7	463
	Overall (sec)			220	1080	384.9	181.3	405.5	223	141	48.9	29.8	41.0	7.9	2855 min
	Overall (min)				18.00	6.41	3.02	6.76		2.35	0.81	0.50	0.68		47.58 hr

Table 3. Maximum, mean and median dive duration, mean and median surface interval and d/s ratio of observations for the juvenile seal "Fatma".

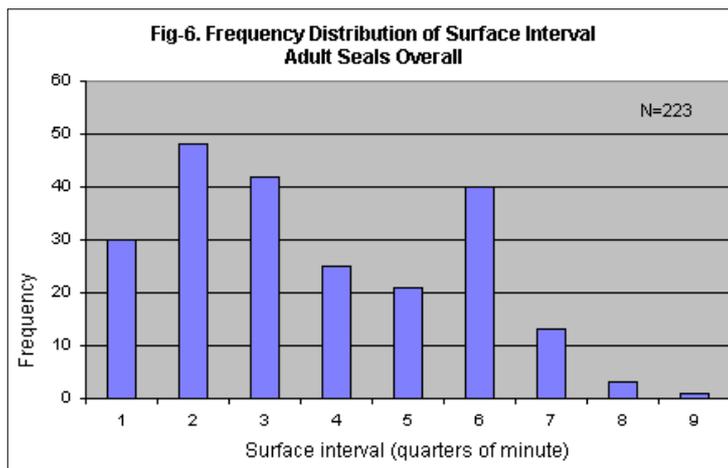
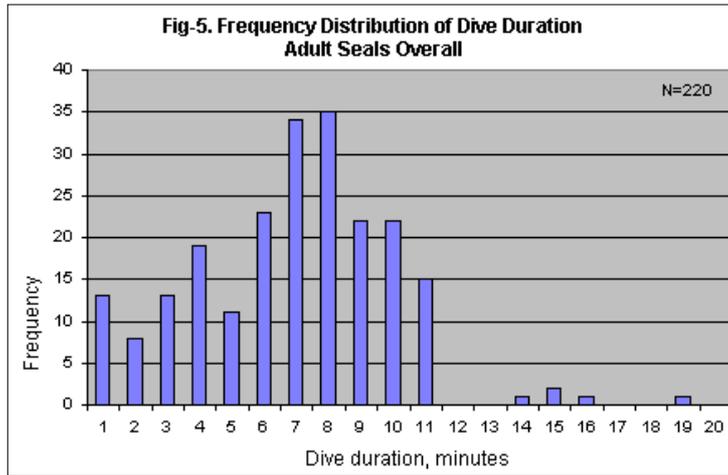
No.	Obs.	Seal	Type	Ndive	divemax	divemean	+/- SD	dive median	Nsurf	surfmax	surf mean	+/- SD	surf median	d/s	OP (min)
1	D17	Fatma	Spot	9	585	365.8	159.8	390.0	11	40	22.4	14.3	22.0	16.4	59
2	D18	Fatma	Spot	23	635	424.4	123.0	435.0	24	110	37.3	19.9	31.5	11.4	405
	Overall (sec)			32	635	407.9	134.4	434.5	35	110	32.6	19.4	30.0	12.5	464 min
	Overall (min)				10.58	6.80	2.24	7.24		1.83	0.54	0.32	0.50		7.73 hr

The majority (17 cases, 85%) of the diving episodes involved "spot dives" where the animals dived within a limited area, in relatively shallow waters between 2 to 15 m depths close to the coast (whereas, at B.Kiremit Island, depths reach around 50 m; this is adjacent to Susa's usual diving area where water depth is around 10 m). This pattern usually continued for hours. In the remaining 3 cases (15%), the seals exhibited transit dives in waters between 9.6 to 20 m deep. The juvenile seal "Fatma" dove around a reef at depths from 2 to 5 m although sea depth reaches 10 m in the reef's immediate surroundings.

Generally, the seals appeared to become aware of the presence of observers and, on occasion, looked in their direction. Nonetheless, the animals did not appear to be disturbed and continued their diving behaviour, often for hours. In three cases – D1 (transit), D11 (transit), and D12 (spot) – the seals were observed on the surface having caught fish once, twice and once respectively. In observation D1, the seal, probably a female, was observed catching a fish and tossing it away to about 3 m distance. This was followed every time by short dives to re-catch it and the behaviour was repeated 3-4 times before the seal finally swallowed the fish with an upward movement out of the water.

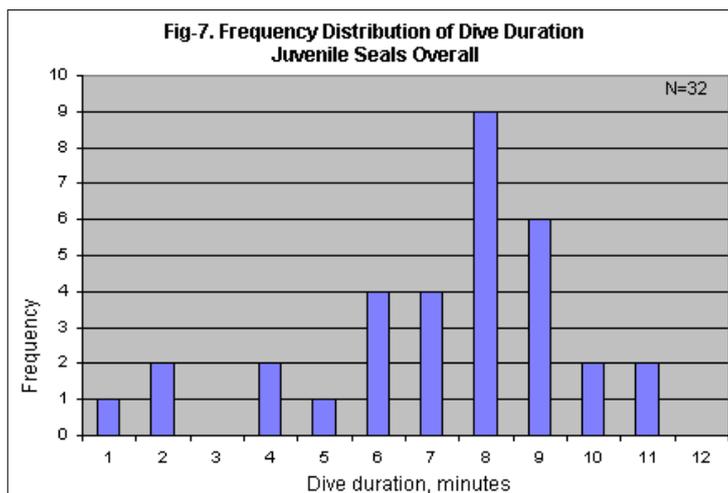
For adult seals, mean dive duration of all observations combined is 384.9 ± 181.3 seconds (6.4 ± 3.0 min.). Frequency distribution of dive duration combined for all dives is unimodal at 8 minute time segment (covering 7.00 to 7.99 minutes) revealing a normal distribution (Figure 5). Monk seals frequently dive for 9-11 minute segments (8.00 to 10.99 minutes). Longer dives are rare: dives of 14, 15 and 16 minute segments occurred once, twice and once respectively, while a single example of an 18 minutes dive – the longest ever recorded in a Mediterranean monk seal – was observed.

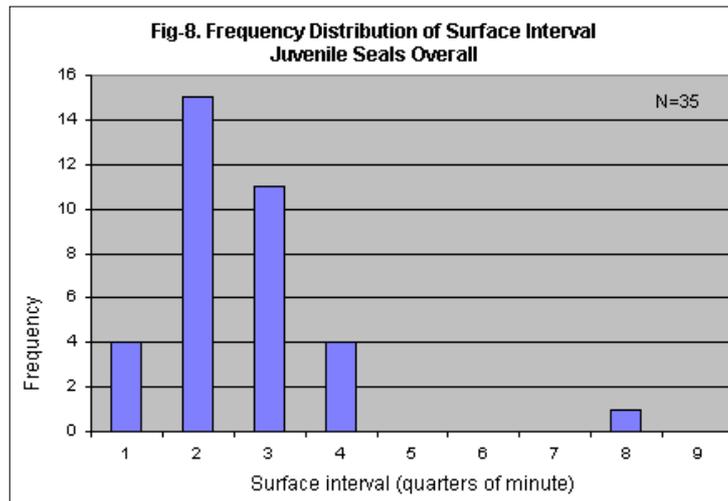
Mean surface interval of all adult observations combined is 48.9 ± 29.8 sec. (0.81 ± 0.50 min). Frequency distribution of surface interval combined for all dives is unimodal at 2nd quarter of minute (covering 16 to 30 seconds) (Figure 6).



For juvenile seals, mean dive duration of all observations combined is 407.9 ± 134.4 sec. (6.8 ± 2.24 min). Frequency distribution of dive duration combined for all dives is unimodal at 8 minute time segment (covering 7.00 to 7.99 minutes) revealing a normal distribution (Figure 7). Longer dives become rare: dives of 9 minute segments occurred 6 times while 10 and 11 minute segments occurred twice each.

Mean surface interval of all juvenile observations combined is 32.6 ± 19.4 sec. (0.54 ± 0.32 min.). Frequency distribution of surface interval combined for all dives is unimodal at 2nd quarter of minute (covering 16 to 30 seconds) (Figure 8).





In addition, a correlation between mean dive duration and mean surface interval is sought using the d/s factor, calculated as ratio of divemean to surfacemean for seals providing notably higher dive and surface samples. The d/s ratio for the adult male "Susa" is 11.7, 12.6, 13.4 and 14.8 respectively (all spot), for the adult female "Disi Korsan" 6.1 (spot); for the adult female "Sühendan" 4.5 and 5.5 (both spot); for "Susa?" 9.0 (spot). Surprisingly, the d/s ratio for the juvenile seal "Fatma" is higher than those indicated for the adults (above), 16.4 and 11.4 (both spot). However, this might be associated with diving on the reef, a shallow diving spot (approx. 3 m).

Discussion

Our observations are generally consistent with those of Gazo (1997) and Costa Neves (1998) in the Northeast Atlantic. This evidence suggests that monk seals in the Atlantic and in the Mediterranean generally exhibit similar diving patterns in coastal waters. Our observations are also consistent with the qualitative descriptions of diving and feeding behaviour provided to us over the years by artisanal fishermen along the coast of Turkey.

In all cases observed thus far, Mediterranean monk seals dive and feed in relatively shallow waters close to shore. Dive durations are generally short (by phocid seal standards), our observation of an 18.00 minutes dive being the longest recorded for this species.

In spite of the fact that we could not obtain a concrete result from d/s ratio, we believe that these ratios may be used to further understanding of metabolism of seals during dives.

Although visual observations are useful for documenting diving and feeding behaviour of Mediterranean monk seals during the day, other approaches, e.g. time depth recorders, would be required to study their diving behaviour at night.

Acknowledgements

We thank: Marianne Theunissen for her participation in the field research on Orak Island and Çavuş Island, Margriet Kreulen, Bas Beekmans, Metin Akçali from TTKD Bodrum for their participation in the field research on Kizilkuyruk Cape, and Kenan Yapici, Serdar Akinci and Yesim Öztürk, AFAG staff, for their participation in the field research on Ayani, Foça. We are also grateful to Sevki Avcı of Foça for his valuable logistic support, including photography, during observations on Orak Island and Büyük Kiremit Island.

We also thank William M. Johnson and Matthias Schnellmann for providing dive data for the adult seal "Sühendan" (observation D14) on Siren Rocks, which added important data to our study. Finally, we thank Dr. David M. Lavigne and Dr. Ali Cemal Gücü for their valuable comments on the draft manuscript. Partial funding for this research was provided by WWF International.

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GROWTH AND DEVELOPMENT OF MEDITERRANEAN MONK SEAL PUPS DURING REHABILITATION

E. Androukaki¹, E. Fatsea¹, L. 't Hart²,
A.D.M.E. Osterhaus², E. Tounta¹, S. Kotomatas¹

¹ [MOM/Hellenic Society for the Study and Protection of the Monk Seal](#)

² [Seal Rehabilitation and Research Centre](#)

Introduction

As part of an action plan for the conservation of the critically endangered Mediterranean monk seal *Monachus monachus*, a rehabilitation programme has been established in Greece since 1990, aiming at increasing the survival possibilities of animals needing aid and releasing them healthy into their natural environment. A standard practice during the rehabilitation period is the recording of various development parameters in order to:

- Contribute to the diagnosis of the condition of the animal and the evaluation of the progress of treatment.
- Create a database, that may be used for the further improvement of the rehabilitation programme, but also in cases of emergency (epidemics, catastrophes, breeding in captivity).
- Acquire data on the species difficult to collect from animals in the wild.

Here we present data on the growth, relative to the diet, and development of six Mediterranean monk seal pups rehabilitated in the Centre. All pups, four males and two females, were admitted at the age of 1 - 3 weeks old. Upon admission in the facilities, they were all orphans and exhibited symptoms of dehydration, starvation and in one case multiple infections. The rehabilitation lasted between 3-6 months, depending on their health status, growth and their capability to survive in the wild.

Methodology

Age determination

The age of the animals is estimated upon admission, (with an accuracy of ± 5 days) based on the following characteristics: the presence/absence of the umbilical cord or fresh umbilicus, the dental eruption and the state of the moulting process, as described in relevant studies for the species in the wild.

Growth:

→ **Daily measurement of food intake/ feeding methodology:** Feeding and caloric input influence development parameters. All meals are weighed with an accuracy of 10 gr. In liquid meals, water and fish are weighed separately. The feeding program of the pups starts with rehydration therapy and within 24-48 hours after admission the animal starts to take its first food: fish porridge, which is later replaced by whole fish. During the development of the animal the feeding program is adjusted in order for the animal to learn hunting and feeding by itself. The feeding methodology progresses **from tube feeding** of liquid food, to **force feeding** of solid fish, to **hand feeding** and last stage the **self-feeding in the pool**.

→ **Measurement of body weight:** Upon admission, and approximately once in two days thereafter the animals are weighed at set time on a scale of 0,5 kg accuracy. When the animals exceed the weight of 25 kg, they are weighed twice a week. After 35 kg., the animals are stressed during this procedure and thus measurements are conducted only once a week.

Moulting: From the first day of appearance of moulting, a daily record with detail description of the moulting pattern and extend is kept, including photographs of the animal.

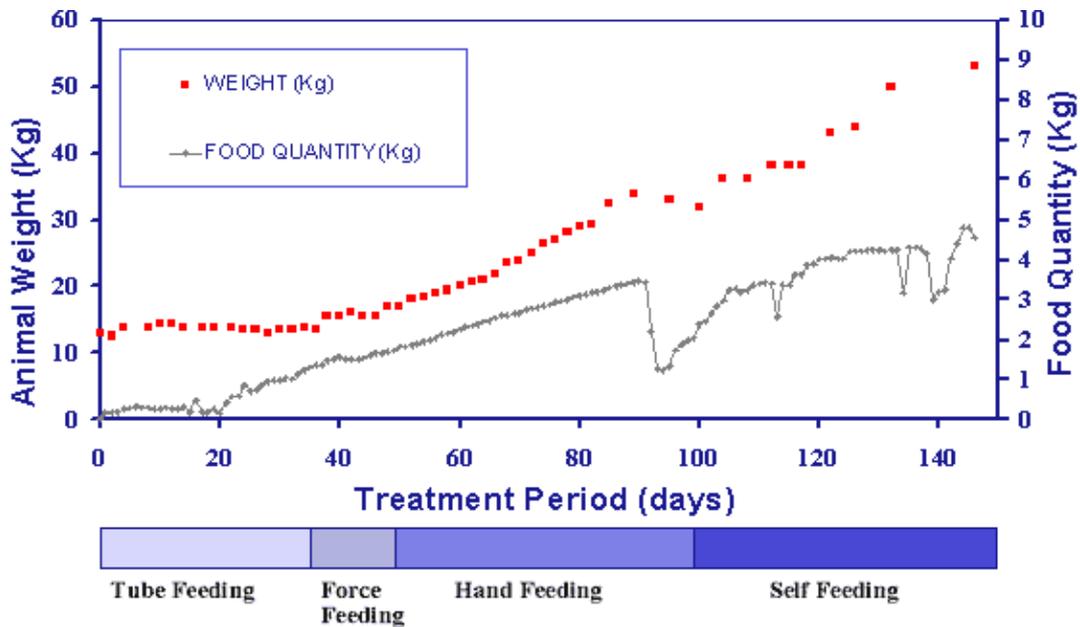
Dentition: Dentition is checked daily and the pattern of its development is recorded, until the animal is in full dentition (32 teeth with dental formula: incisors 2/2, canines 1/1 and post canine elements 5/5).

Results

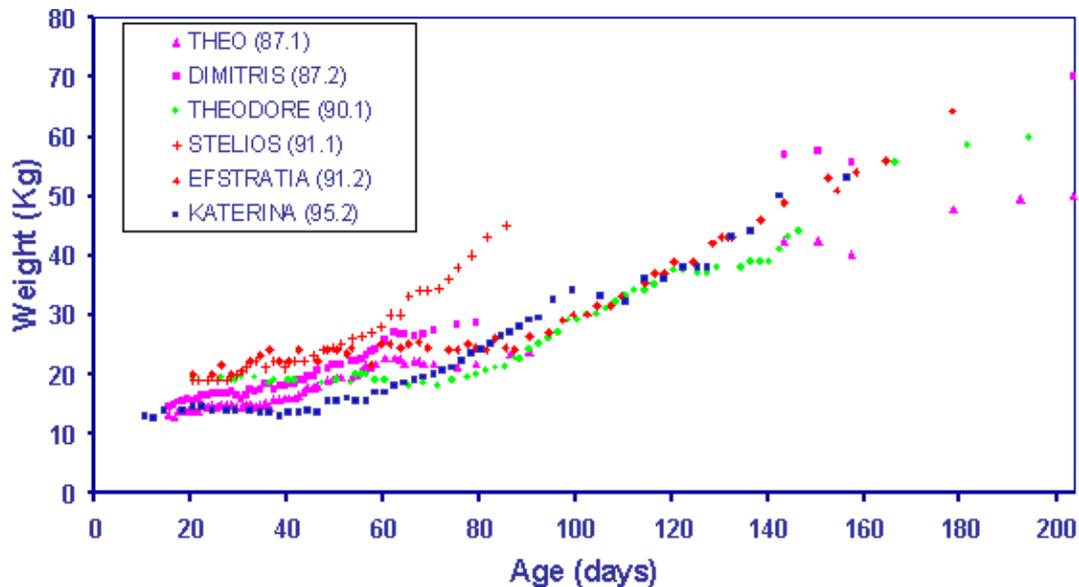
The growth of the animals is closely related to their food intake and method, as well as on their overall health status. The weight of the seal 95.2 (Katerina), while it was tube fed, mainly on fish porridge, and force fed on solid fish remained stable at the level of about 13 kg, where it was found, although the feeding quantity was gradually increased. When it started to be

hand fed, its weight increased in parallel with the increase in food quantity. On day 91, the seal exhibited gastrointestinal problems and it was put on a diet. During this period, the animal's weight decreased, but being hungry the animal started to eat on its own from the fish thrown in the pool, in order to develop its ability to hunt. From this point onward the food quantity provided was rather stabilised, while the seal was left to eat the amount it needed. It gained weight gradually until it reached 53 kg on the day of its release.

Growth curve of seal 95.2 (Katerina)



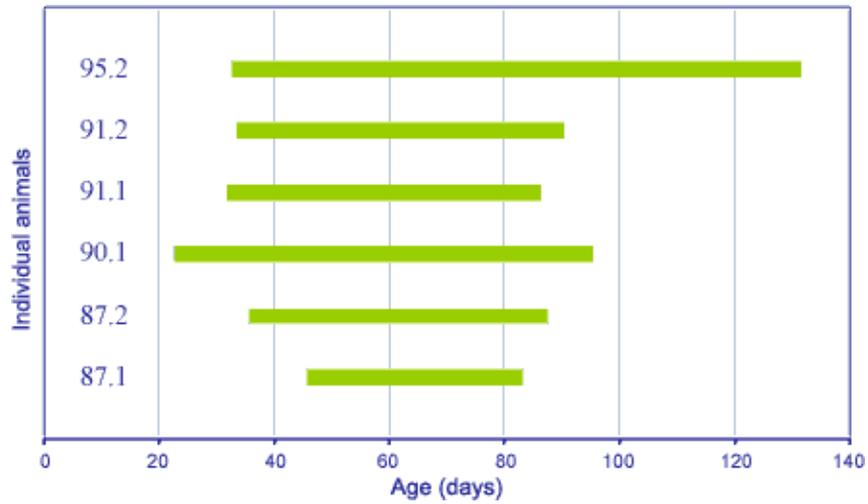
Weight curve of pups



The weight of the pups on admission ranged from 12.8 - 20 kg and increased gradually to reach 50 - 70 kg., at release. The animals at the same age have similar weight, with the exception of 91.1. (Stelios), which exhibited a very fast improvement and in three months period it was released. The rest of the animals were released after an average of 6 months treatment.

Development of moulting

The duration of moulting of the pup lanugo was found to be quite variable and it was observed to last from 35-96 days, starting at the age of 4-5 weeks old. This variability may be related to the health status and the growth of the animals, something also observed in the Hawaiian monk seal. Animals with consistent health problems such as 90.1 (Theodore) and 95.2 (Katerina), being occasionally on a diet, exhibited prolonged moulting. In general, the moulting period in the rehabilitation facilities is protracted, in comparison with the pups in the wild, where it may start at about the same age but it seems to be completed in 2-3 weeks' time based on the studies of the population of the N.Sporades. However, it has to be noted, that in the rehabilitation setting moulting is recorded in detail from its first till its last day. It is possible that the last period, while the animals are almost completely moulted (with the exception of limited areas on the face and flippers), cannot be distinguished in the wild, unless the animals are disturbed.



Moulting pattern



Phase 1

Characteristics:

- Moulting starts first on the back of head
- Moulting proceeds at the back



Phase 2

Characteristics:

- The animal quickly loses hair on the anterior upper body
- On the upper body moulting is almost completed, lanugo still remains on flippers, part of the head and the ventral.
- Moulting rate decreases



Phase 3

Characteristics:

- Moulting rate increases
- Moulting starts above the eyes and around the snout
- Moulting around the head is almost completed, lanugo still on pelvis and flippers



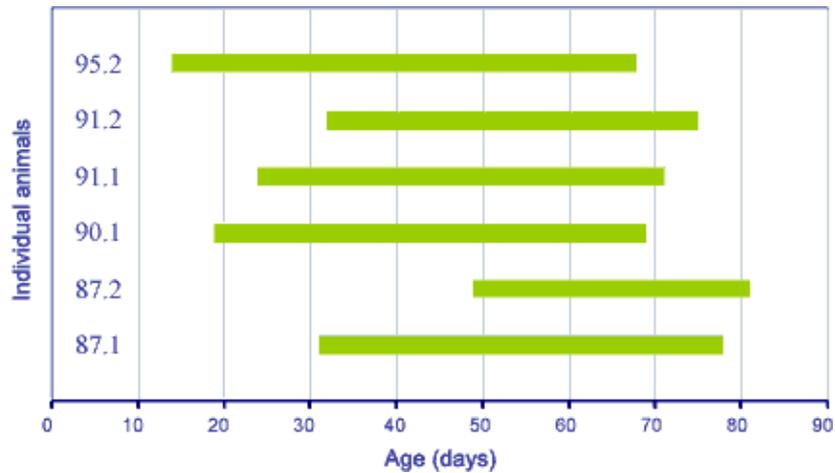
Phase 4

Characteristics:

- Moulting starts on the back flippers
- Moulting completed

Development of dentition

None of the 6 animals studied had any teeth on admission. Dental eruption started at the age of 2-3 weeks old. Full dental development was measured to last from 40-51 days. Dental development did not exhibit a consistent pattern in the sequence of teeth eruption, however, in general, incisors erupt first, then canines, while molars appear last. Overall, dental development appears to be delayed in this species, in comparison with the Hawaiian monk seal pups, where it starts at 4 weeks old and it is complete in about 20 days.



Conclusions

The above results form a previously unavailable basis for developmental parameters for the Mediterranean monk seal in captivity. Comparing our observations with the ones measured in the wild, it is evident that animals under rehabilitation exhibit delayed development.

- ✓ Several aspects of the development of the animals under treatment are largely depended on the food they receive and their health status.
- ✓ Their growth during the first months after admission, while they get only liquid food, is delayed in comparison with the one in the wild. However, when their food starts to be whole fish, they gain weight quickly and they grow fast to acquire the weight that their conspecifics have of the same age.
- ✓ The moulting period was found to be prolonged, depended on the health status of the animals. A common distinct pattern in the moulting process was evident.
- ✓ Dental development does not seem related to the health and the nutritional status of the animal or to have a distinct pattern. Comparison with the wild is difficult since the study of dentition in the wild involves disturbance of the pups and mothers.

Acknowledgements



We would like to thank, MOM and SRRC staff and volunteers who assisted us in this work.



This poster was presented at the 16th ECS (European Cetacean Society) Conference, "Marine Mammal Health: from Individuals to Populations", 7-11 April 2002, Liege, Belgium.

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Monachus Science Posters

Vol. 5 (1): May 2002

ANALYSIS OF HEAVY METALS IN BLUBBER AND SKIN OF MEDITERRANEAN MONK SEALS

A. Dosi, S. Adamantopoulou, P. Dendrinou,
S. Kotomatas, E. Tounta & E. Androukaki

[MOM/Hellenic Society for the Study and Protection of the Monk Seal](#)

Introduction

During the last few decades, seals and other fish-consuming marine mammals have received attention as indicators of environmental pollution (Holden, 1970; 1975; 1978; Olsson et al., 1992) as they can reflect contaminant concentrations in their prey species as well (Law et al., 1992; Marcovecchio, 1994).

Mediterranean monk seals, *Monachus monachus*, occupy a high trophic level in the food web. Therefore they may be considered useful as an indicator species for investigating the biomagnification of heavy metals in the Greek waters and in the East Mediterranean in general. The IUCN/UNEP (1988) Action Plan for the Mediterranean monk seal has considered that pollution from chemical compounds may be an important limiting factor for the species' welfare but its potential impact has not been assessed up until now. Studies on the incidence of metals on the Eastern Mediterranean subpopulations of the species, as well as from the whole Mediterranean region in general, are confined to one study of mercury concentrations in body hair of *Monachus monachus* (Yediler et al., 1993).

Objectives of the study

Given the endangered status of Monk seals and the potential for heavy metals to have detrimental effects upon marine vertebrates (Rawson et al., 1993), there is a clear need to augment the almost inexistent amount of data regarding heavy metal burdens in marine mammals from the Mediterranean Sea. This study is an initial investigation of heavy metal concentrations in this species and its aim is to form a baseline reference for future work.

Materials and Methods

Tissues used in this study were derived from 17 different Mediterranean Monk Seal individuals. Samples were obtained from seals either found dead or that died during their treatment in the Seal Treatment and Rehabilitation Centre, Alonnisos. Information on the animals and the samples is provided in Table 1 locations of collection in Map 1. Localities were divided into six main geographic divisions (Table 1). Samples were analysed in the School of Ocean Sciences, Bangor, North Wales. Porcelain crucibles, previously washed with 10 % hydrochloric acid, were weighed and adequately labelled. Crucibles plus thawed sample tissues were weighed and placed in the oven at 60°C to desiccate. Samples were afterwards placed in a muffle furnace at a temperature of 540°C for five hours, until all the organic content was removed. Crucibles with samples were weighed again in order for ash weight to be calculated. 1% nitric acid was used to dissolve the ash and each sample was made up to 25ml solution in acid washed 25ml glass bottles sealed with polythene caps. Solutions were stored in acid washed plastic bottles until their analysis by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES).



MAP 1: Locations from where samples were collected

Map 1. Locations from where samples were collected

Table 1. Information of the Monk Seals' samples used

Sample Code	Date of Collection	Area of Collection	Geographic Division	Stage of Development	Sex	State of Decomposition	Tissue Type
T 94.1	29/10/1994	Skopelos	SPORADES	Pup	M	Medium	Blubber+Skin
T 95.1	5/1/1995	Naxos	CYCLADES	Juvenile	F	Fresh	Blubber
T 95.2	3/12/1995	N. Evia	SPORADES	Pup	F	Fresh	Blubber
T 96.1	28/1/1996	Psara	EAST AEGEAN	Adult	F	Fresh	Blubber
T 96.2	14/3/1996	Milos	CYCLADES	Juvenile	M	Medium	Blubber+Skin
T 96.3	15/10/1996	Piperi	SPORADES	Pup	F	Medium	Blubber+Skin
T 96.4	13/11/1996	Piperi	SPORADES	Pup	F	Fresh	Blubber+Skin
T 96.5	12/12/1996	Fourni	EAST AEGEAN	Adult	M	Advanced	Blubber+Skin
T 97.1	20/6/1997	Megara	SARONIKOS	Adult	F	Fresh	Blubber
T 97.2	24/9/1997	Karpathos	SOUTHEAST AEGEAN	Adult	M	Fresh	Blubber
T 97.3	26/12/1997	Ikaria	EAST AEGEAN	Pup	F	Fresh	Blubber+Skin
T 98.1	28/11/1998	Nissyros	SOUTHEAST AEGEAN	Pup	M	Medium	Blubber+Skin
T 98.2	9/12/1998	NE Evia	SPORADES	Pup	M	Advanced	Blubber+Skin
T 99.1	15/4/1999	Chios	EAST AEGEAN	Adult	F	Medium	Blubber
T 99.2	2/6/1999	Potidaea	NORTH AEGEAN	Adult	F	Medium	Blubber
T 99.3	20/6/1999	Pteleos	SPORADES	Juvenile	M	Medium	Blubber
T 99.4	22/8/1999	Milos	CYCLADES	Adult	F	Initial	Blubber

F = female M = male

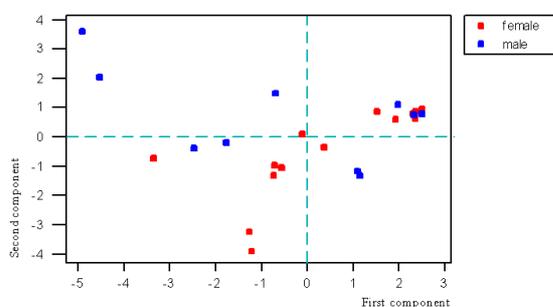
All ICP-AES analyses were performed in the Institute of Environmental Science, Chemistry Tower, Bangor. Simultaneous semi-quantitative analysis of the 14 metals (Al, As, Cd, Co, Cr, Cu, Fe, Mg, Mn, Pb, Pt, Se, Si and Zn) was performed using an inductively coupled plasma-atomic emission spectrometer, ICP-AES (Jobin Yvon 138 ULTRACE). Copper and zinc were afterwards determined more accurately using a set of standard solutions in order to create calibration lines. 0, 2, 4, 6, 8 and 10 ppm Zn and 0, 0.05, 0.1, 0.2, 0.4, 0.6 ppm Cu were made up in 50 ml solutions with 1% nitric acid. The standard solutions produced values against which the concentrations of the two metals in the samples were determined quantitatively. The whole procedure was again performed in the ICP-AES.

Results

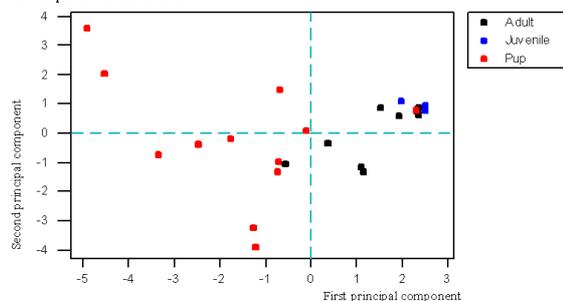
Parameters' Influence on Metal Concentrations

Concentrations of metals in marine mammals are known to be affected by a number of parameters such as sex, age, location, tissue type, prey type as well as yearly changes in the environment. All the parameters, for which sufficient data were available, were taken into consideration in order to determine their influence in the concentrations of metals in the animals' tissues. Principal Component Analysis (PCA) was carried out for the 12 of the examined metals in order to determine which of the above-mentioned parameters poses greater influences in the concentrations of the metals. The analysis resulted in 64% of the variability accounted to the first two components. Therefore plotting the scores for the values in the first component against those in the second component we could represent 64% of the available information (Figure 1). The plots of the first two components in relation to the different parameters indicate that tissue type and stage of development of the seals are responsible for the variability in the concentration values of the metals. The majority of the skin samples exhibited negative scores for the first principal component and most of them also have negative scores for the second. It could be implied therefore that skin samples are responsible for the highest concentrations in all metals. From the stage of development related plot it is clearly evident that samples derived from pups are those with the highest concentrations of all metals.

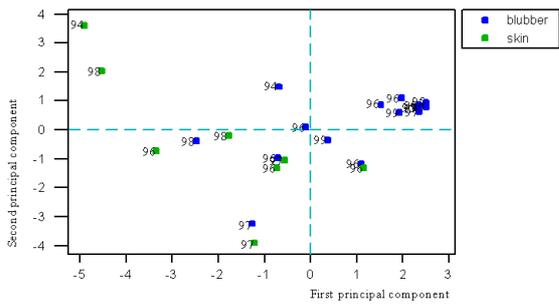
Plot of the first two components resulted from PCA analysis in relation to sex



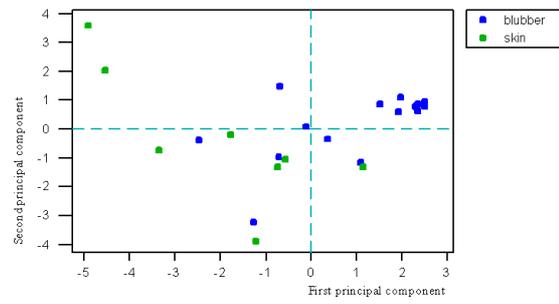
Plot of the first two components resulted from PCA in relation to stage of development of the animals



Plot of the first two components resulted from PCA in relation to tissue type and year of collection



Plot of the first two components resulted from PCA in relation to tissue type



Plot of the first two components resulted from PCA in relation to geographic location

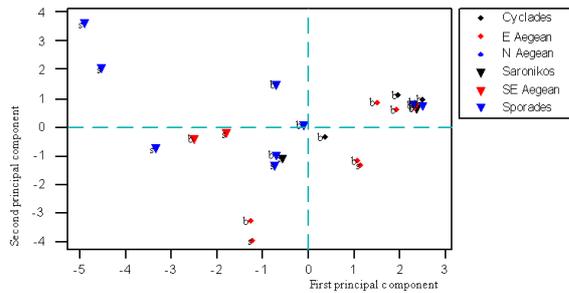


Figure 1. Plots of the scores of the first two principal components of PCA analysis of the 12 metals concentrations in relation to the different examined parameters

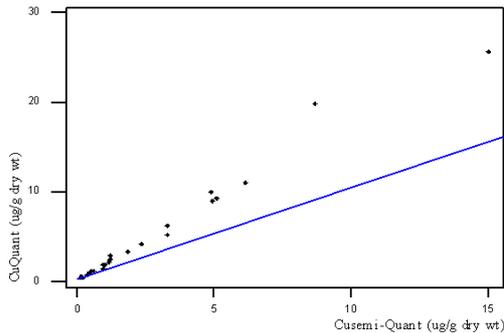
Copper and Zinc

The two methods of ICP-AES used for the determination of copper and zinc were investigated in terms of their resulted values in order to study the degree of difference, if any, between them. The semi-quantitative values were plotted against the quantitative ones for both copper and zinc and the equations of the fitted lines were calculated (Figure 2). Quantitative copper values were found to be greater than the values obtained from the semi-quantitative method by almost a factor of 2. Zinc values on the other hand did not differ between the two methods. It may be concluded therefore that the method of analysis could be important for some metals while it does not have any effect on others. The relationship between the quantitative values of the two metals was also investigated. The Pearson's correlation coefficient was calculated to be 0.686 with a p-value of <0.001. Both variables though, were dependent and did not fit assumptions for single linear regression. Consequently copper and zinc concentrations were transformed to the logarithmic scale and the Geographic Mean Regression was utilized. Graphical presentation of the Log values for the two metals is presented in Figure 3 with a Pearson's correlation coefficient of 0.815 (p-value <0.001) and the resulted equation for the geographic mean regression line:

$$\text{LogCu (ug/g dry wt)} = -0.736 + 0.882 \times \text{LogZn (ug/g dry wt)}$$

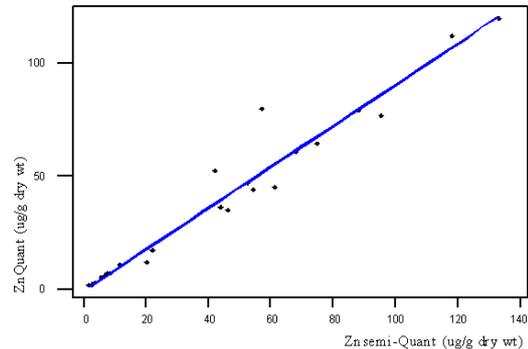
$$\text{CuQuant (ug/g dry wt)} = 1.836 \text{ Cu (ug/g dry wt)}$$

R-Sq = 97,8 %



$$\text{ZnQuant} = 0,912 \text{ Zn (ug/g dry wt)}$$

R-Sq = 95,5 %



Logarithmic plot of quantitative copper against quantitative zinc concentrations (ug/g dry wt)

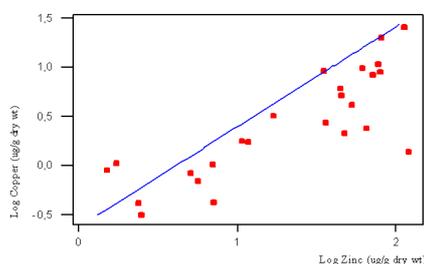


Figure 2. Relationship of the semi-quantitative and quantitative results for copper and zinc (blue lines indicate the 100% precision between the two methods) and logarithmic plot of the relationship between quantitative copper and zinc concentrations

Discussion

For the first time the concentrations of metals in the blubber and skin of Monk Seals from the Eastern Mediterranean subpopulation and the Aegean in particular, were studied and analysed. Total heavy metal concentrations are by themselves insufficient to assess either the health status of the animals or the effective toxicity of the toxicant in question. Yet, they are important and necessary as they can provide a benchmark for what is to be regarded as a 'normal' or 'abnormal' heavy metal burden for animals (Wagemann & Muir, 1984). Extremely limited data regarding metal concentrations in monk seals are available (Borrell et al., 1997; Menchero et al., 1994). The former render this study very difficult to comment and evaluate and very important in terms of baseline information about the species and the area. Larger sample sizes and comparative data from polluted and unpolluted regions are required to help assess the possible contribution of pollution to the viability of Mediterranean Monk Seals.

Influence of Different Parameters on Monk Seal Metal Concentrations

- ✓ Sex was not observed to account for any differences in the concentrations
- ✓ Tissue type and stage of development accounted for differences in the concentrations for all metals studied with the highest concentrations observed in the skin of monk seal pups
- ✓ No evident differences were found in the metals' concentrations during the different years of collection. However, the differences in sample sizes and the very small number of samples obtained for some years, renders the comparisons difficult
- ✓ The different locations of sample collection did not account for differences in the concentrations of metals

Copper and Zinc

- ✓ The mean copper concentration obtained from our study was 5.173 ug/g dry weight which is towards the lower end of the ranges tentatively assigned (Law et al., 1991; Law, 1996)
- ✓ Significant differences were observed between concentrations in blubber and skin with the greatest in the latter
- ✓ Previous studies have reported a negative correlation between age and copper concentrations in *Phoca hispida*, *Odobenus rosmarus rosmarus* and *Monodon monoceros* (Wagemann, 1989; Wagemann & Stewart, 1994; Wagemann et al., 1983). The same was observed in our study as well, with pups having significantly higher concentrations than adult monk seals
- ✓ Zinc exhibited higher concentrations in the skin, which is similar to what have been found in *Phoca vitulina* (Roberts et al., 1976), *Phoca sibirica* (Watanabe et al., 1996), *Leptonychotes weddellii* (Yamamoto et al., 1987) and *Stenella coeruleoalba* (Honda et al., 1982)
- ✓ Zinc concentrations were significantly higher in pups compared to adult and juvenile monk seals
- ✓ Copper and zinc exhibited a significant correlation. The same was the case in livers of *Leptonychotes weddellii* (Szefer et al., 1994). The mechanisms underlying the association of copper and zinc are largely unknown but it is speculated that this association is probably mediated by metallothionein, as these metals are inductors and constituents of this metalloprotein (Wagemann & Stewart, 1994)

Acknowledgements

Part of this study was submitted by A. Dosi for the fulfilment of the requirements of the M.Sc. Degree in Marine Biology at the University of Bangor, N. Wales. We would like to express our gratitude to Dr. Andy B. Yule for his advice and guidance throughout the completion of this thesis. We would also like to thank all authorities and individuals that contributed to this study, by reporting the strandings from where the samples were collected.



This work has been partially funded by the European Commission, D.G. Environment, through the contracts, Life-Nature, B4-3200/96/500 and LIFE00NAT/GR/7248



This poster was presented at the 16th ECS (European Cetacean Society) Conference, "Marine Mammal Health: from Individuals to Populations", 7-11 April 2002, Liege, Belgium.

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Letters to the Editor

Vol. 5 (1): May 2002

Killing sharks at French Frigate Shoals is unacceptable

I recently returned from a sabbatical in the Northwestern Hawaiian Islands where I was pursuing my research program in evolutionary ecology and demography of long-lived marine animals in relation to large scale environmental change. My graduate students and I are employing capture-mark-recapture techniques and modelling to understand population dynamic processes in relation to ENSO-like oceanographic phenomena.

I'm writing to object in the most strenuous terms to the killing of sharks by NMFS employees at French Frigate Shoals (FFS). The proposed killing is a seriously misguided 'management' activity that is unlikely to benefit the endangered Hawaiian Monk Seal population at FFS. There is no well-supported scientific evidence that the seal population will benefit from the removal of individual sharks from the atoll. Furthermore, killing of predators at FFS atoll may well have negative effects on the marine ecosystem and is certainly incompatible with the aims of the Hawaiian Islands NWR and the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve of which FFS is a component. The shark killing is the most outrageously inappropriate management activity I have ever had close knowledge of.

Having looked at the shark study SUP #12521-01007 carefully, I note the following specific concerns:

It is inferred without any evidence that sharks have had a "large impact on the seal population" – this would be a very difficult hypothesis to confirm, yet I am aware of no peer-reviewed scientific publications in independent journals that support this idea with any quantitative evidence. It seems that the current approach to seal management begins on a false or at most unsubstantiated premise – that sharks are having a large impact. Overwhelming evidence indicates the population decline and failure of recruitment of juvenile seals at FFS has been due to malnutrition, not shark predation.

There is no quantitative evidence to support the idea that "only a few individual sharks" are responsible for attacks on seal pups. What little data there is tends to support the opposite, and in any case, much more intensive tagging and capture-mark-resighting data would be required to confirm this hypothesis. Furthermore, even if there were such evidence, the possibility that new individuals would appear to replace the removed individuals has not been tested. Even the methods used to capture sharks for marking and killing are questionable – e.g., 297 hours of fishing near East and Trig Islands (in 2000 and 2001) using hooks baited with bird and fish tissue. Because sharks are attracted from long distances by the smell of carrion, this suggests that the shark capture protocol itself is likely to attract sharks near to these sites, with unknown effects on other marine wildlife.



Sharks patrolling the shoreline along Trig Island, a Hawaiian monk seal pupping beach at French Frigate Shoals

The data on Galapagos Sharks presented in SUP #12521-01007 is noteworthy because it tends to undermine the idea that only a few individuals are killing seal pups. For example, over 20 Galapagos Sharks have been marked at Trig Island, but the evidence shows these individuals occur there only occasionally and that they are part of (quote) "a much larger population than previously thought". The emerging picture seems to be of an irregular visitation of islands in FFS by individuals from a large and highly mobile predator population that roam mainly outside the atoll.

Let us suppose for a minute that, contrary to all indications, the killing of sharks at Trig Island FFS could in fact prolong the lives of very young Monk Seals by temporarily deterring shark predation. If this was the case, the management scheme would be effectively increasing the number of juvenile seals entering into a system which obviously (and according to NMFS research) cannot support them because the current number of seals at FFS is beyond carrying capacity. This would quite likely lead to increased starvation and mortality of juveniles above what we are currently seeing – a net negative impact on the endangered Hawaiian Monk Seal.

Thus the only quantitative evidence, together with basic ecological principles, points to killing of individual Galapagos Sharks as a scientifically unsupportable and entirely useless activity as far as management of seals is concerned. The NMFS killing also follows a NMFS-permitted non-sustainable fishery for sharks in which I understand that hundreds of sharks, including Galapagos Sharks, were killed for their fins within a few miles of FFS during the 1990s.

A major argument for establishing the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (of which FFS is a part) was the need to conserve the uniquely high numbers of apex predators (especially sharks) within this area. The unjustifiable killing of sharks by NMFS within this no-take reserve is nothing less than the most appalling case of environmental mismanagement I have come across.

I would make the following recommendations:

- No permits should be issued for shark killing until the population biology, movements, and foraging behaviour

of Galapagos, Gray Reef and Tiger Sharks at FFS is thoroughly studied and reported in the peer-review independent scientific literature and that this scientific evidence unequivocally shows that removal of sharks is necessary for the continued existence of a Hawaiian Monk Seal population at FFS.

- Proposals to kill sharks should be reviewed by a committee of independent (of NMFS) marine ecologists before any kill permits are issued. I can make a list of qualified individuals who would be able to do this.
- No permits for shark capture within three miles of any island in FFS when using animal tissue as bait.
- The refuge should support efforts to understand shark species' population size, movements and foraging behaviour at FFS by tagging.
- The refuge should support efforts by NMFS to create an ecosystem-based population model of the endangered Hawaiian Monk Seal at FFS.

Ian L. Jones, Associate Chair, Atlantic Cooperative Wildlife Ecology Research Network, Department of Biology, Memorial University of Newfoundland, St. John's, Newfoundland, Canada A1B 3X9.
Web: <http://www.mun.ca/acwern>

✓ **Editor's note:** Similar letters of protest have also been addressed to the U.S. National Oceanographic and Atmospheric Administration (NOAA), the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service.

Keep on publishing

Please, do not close such wonderful and useful web site. It's of primary importance for monk seal conservation! Thanks for all you did and will do for the monk seals.

Claudio Groff, Italy.

We at SAD-AFAG have been shocked by the bad news concerning the possible closure of The Monachus Guardian.

We hope, however, that our collective efforts will assist the survival of the journal, a highly effective publication that fills an enormous information gap between the relevant NGOs, scientists, conservationists and governments in the conservation of *Monachus monachus* and its coastal habitats. It is beyond dispute that we need such a publication – it allows NGOs a platform for information exchange, publishes valuable scientific data on the biology and history of species, practical conservation know-how drawn from field experience, and popular articles and news about monk seals for the general public.



After many years of generally depressing news about the conservation of Mediterranean monk seals, major advances are at last being made in Turkey, Greece, Madeira, Mauritania. We believe that it is time to increase funding to save this critically-endangered species, not cut it back or eliminate it. We will do whatever we can to support the continued publication of the Guardian.

Cem O. Kiraç, Underwater Research Society – Mediterranean Seal Research Group, Ankara, Turkey.

I would like the IFAW to rethink its withdrawal of support for monk seals. Obviously monk seals are an ancient and threatened major marine life-form, hanging on by a thread. The Monachus Guardian has kept all of us informed about monk seal issues and helped us contribute in our ways to its conservation. Without a focus like the Guardian, energy we need to help the monk seals will be diffused and lost.

I have studied seals for thirty years and have recently done some pilot work on monk seals on Kaua'i. We are dealing with only scores of animals on the main Hawai'iian Islands, while numbers on the northwest chain are dropping. These animals need our help.

Joseph Mortenson, Ph.D., USA.

I guess that all conservation activities face funding priorities, and I do not have time to investigate fully the pros and cons of IFAW's decision. However, I am acutely aware of just how tiny is the population of Mediterranean Monk Seals, and how severely it has declined. Your newsletter has played a prominent part in highlighting its fragile state. I can't help thinking that action to save the Monk Seal is a far more deserving conservation priority than some of the more media-grabbing but actually less serious issues (like seal harvesting in the arctic) that IFAW has successfully publicised. I wish you well in your campaign for Monk Seals, and that particularly includes getting funds to publicise their plight.

Dr D.W. Yalden, Editor, Mammal Review, Biological Sciences, University of Manchester, U.K.

It is an ironic situation that The Monachus Guardian has become as endangered as the monk seals it is working to protect. I really appreciate all the assistance that TMG has given me and the Seal Conservation Society over the last few years, including helping out with the Society's Mediterranean monk seal species account on our web site. I sincerely hope that funding is forthcoming and that the Monachus Guardian will survive.

Peter Haddow, Seal Conservation Society, U.K.

The Guardian is the only "journal" that has carried the full conservation story about this most highly endangered marine mammal.

Prof. Keith Ronald, Guelph, Canada.

I would like to speak on behalf of the Italian Gruppo Foca Monaca: we do really hope alternative sources of funds for your meritorious activities may soon be found... Your valuable work of coordination among the diverse players in monk seal conservation cannot be lost or made to be in vain. We do need The Monachus Guardian as the only common reference point to exchange views, to inform, to know what other parties are doing, in a field where communication is sometimes difficult (and not only for "logistical" reasons)...

Luigi Guarrera, Gruppo Foca Monaca, Roma, Italy.

I have read with surprise the news regarding the possible disappearance of The Monachus Guardian due to lack of funds. I want to express my strong support for the maintenance of this communication medium, and the key role it plays between all the organisations working with monk seals in different parts of the world. I really hope that this problem will be solved, since the Monachus Guardian is and will remain necessary as long as these species remain endangered.

Pablo Fernández de Larrinoa, Fundación CBD-Habitat, Madrid, Spain.

Please do your best to ensure that the journal continues. I believe that the monk seals need this web site.

Evelyne Benhenda, La Chaux-de-Fonds, Switzerland.

I hope your publications and on line web site can be kept alive, because I think you are doing very necessary work for the conservation of *Monachus*.

Vanessa Labrada Martagón, CICIMAR, Lab. Mamíferos Marinos, La Paz, Baja California Sur, México.

✓ **Editor's note:** Frontline conservation organisations, university professors, staff members of government institutions, NGO campaign managers, journalists, students, school pupils and monk seal aficionados – we take this opportunity of thanking the hundreds of people from all over the world who have written in to voice their support for the continued publication of TMG. Your letters, emails and [petition](#) signatures are already proving indispensable in the effort to attract alternative institutional funding to The Monachus Guardian. Our deepening ties with frontline monk seal conservation groups, coupled with a much-needed pledge of emergency aid from the Bellerive Foundation in Geneva [see [Prince issues appeal](#), International News, this issue], is making it look increasingly hopeful that the November 2002 issue will appear as originally scheduled.

Sighting in Tilos...

Regarding Keith Ronald's comments about Tilos [[Back to the future](#), Letters to the Editor, TMG 4(2): November 2001] I'm writing to let you know about a monk seal presence in St. Charles Bay, on the southwest coast of Tilos during May 2001. This information is reliable.

Professor Enrico Cavina, Head Dept. Surgery, University Hospital S. Chiara, Pisa, Italy.

Pay the penalty

I was doing a report on Hawaiian monk seals. I think that it is important that if someone hurts them or kills them that THEY SHOULD PAY A \$20,000 FINE AND STAY IN JAIL FOR A YEAR. I think Hawaiian monk seals are COOL. And MY NAME IS Amanda and I'm 10 YEARS OLD. I'm IN FIFTH GRADE.

Amanda, USA.

Beach visitor

I live in Oahu [one of the Main Hawaiian Islands] on Ewa beach, and there is a monk seal that hangs out right in front of our deck. Here are some pictures...



One photo was taken back in May 2001, but we are not sure if he is the same seal that appears in our later pictures. The remaining photographs were all taken earlier this year (with a digital camera), and are all of the same seal. Details of his appearance:

- Thursday, Jan 24, 2002 – 7 am to 11:30 am

- Wednesday, Jan 30, 2002 – 5 am to 4:30 pm
- Friday, Feb 1, 2002 – 10 am to 3:30 pm
- Sunday, Feb 3, 2002 – 7 am to 3:30 pm.

These are **known** times the seal remained continuously on the beach. I don't know how often he's been out there without our knowledge – we could have sworn we heard a barking sound (not like a dog, but like a seal) on Jan 23 during dinner and also on the night of Jan 29. He normally appears within 100 ft to the left or right of our beach deck.

We live in Navy housing on Oahu. I immediately recognized the animal as a Hawaiian monk seal and notified the police out here as soon as I saw any beachcombers come near him. The police **have** been roping off the area and guarding the little guy as best they can. I am also watching for them and shoo away any people who try to cross the police tape or disturb the seal. At first, the residents out here mostly did not seem to realize what the creature was (I had one who had heard he was a turtle and one woman asked me if he was a walrus), but word has spread and most people out here know that he is a Hawaiian monk seal, that he is endangered, and that the police will get you if you disturb him or cross the police tape.

I have also been in contact with the National Marine Fisheries Service here on Oahu – I send them pictures and any news of sightings. I also have their hotline number in case I see that he is injured or sick. They have confirmed that he is an adult male Hawaiian monk seal. He is untagged. He does have some scars, but no open wounds or any signs of illness. They have also sent the police special signs to use when roping off the area, posters to put up in common areas to educate people about the monk seal, and they have given info to the police to educate their ranks about the animal and the laws regarding the conservation of the species. I also contacted the Navy Housing office, and they instructed the base police to call the NMFS for more info on the seals and laws concerning them – they are very concerned that the Navy be a "good citizen" regarding our furry little friends.

The police out here seem to be very conscious of the need to protect the seal, especially after I contacted both the Navy Housing Office and the NMFS. And they know I am watching every move they make regarding the seal.

According to what I hear from the base police here, there have been other sightings of seals up and down the coast here, although none as frequent as this little guy. He just seems to like our beach. The beach out here is relatively deserted during weekdays and at night – we don't get much activity except on weekends during the "sunning" hours. The police know that and basically sat out here all day Sunday, while the seal was here, to protect him.

April Moseley, Oahu, Hawaii

✓ **Editor's note:** Little is known about the occurrence or population trends of monk seals inhabiting the Main Hawaiian Islands [see [Sightings on the Main Hawaiian Islands](#), TMG 3(1): May 2000] but NMFS hopes to publish results of its survey in the archipelago later this year, according to Jason Baker of the Service's Hawaiian Monk Seal Population Assessment Program.

Onsite improvements

As a new visitor to your web site after reading a recent article in BBC Wildlife magazine, I was impressed by the site's informative content and layout. I think it could be slightly improved with the inclusion of a monk seal photo gallery and video clips.

Zahra Thompson, U.K.

✓ **Editor's note:** Thanks for the suggestion. Given the time and resources, we are hoping to add a video library and photo gallery to the site. Readers may also be interested to know that the BBC Wildlife article referred to above, [Hanging by a thread](#), was reprinted in TMG 4(2): November 2001.

Management issues in the NMPANS

Having just visited the Northern Sporades, I read your articles with profound interest [[The Islands at the End of the Line](#) and [All at sea – Adrift in the Northern Sporades Marine Park](#), TMG 4(2): November 2001]. Your analysis of the situation seems very sound.

Dr Chris Smeenk, Curator of Mammals, National Museum of Natural History, Leiden, the Netherlands.

✓ **Editor's note:** The years of campaigning by the NGO community may finally be paying off. Please see this issue's news from [Greece](#) for an important update on the management of the Northern Sporades Marine Park.

Monk seal genetic studies

As a Portuguese student of marine biology at the University of Lisbon (Faculty of Sciences), I have to prepare a report about the differences between monk seal populations, including the possibility of endogamy in the Desertas Islands of Madeira, using genetic data (such as primers). I would like to know if such data already exists and, if so, where they may be found.

Sofia Mendonça, Lisbon, Portugal.

✓ **Editor's reply:** As far as we are aware, comparative genetic studies relating to possible differences between Mediterranean and Atlantic populations of *Monachus monachus* have been limited in scope and number. However, you might wish to obtain:

Stanley, H.F. 1995. Molecular studies of the genetic relationships between monk seals in the North Atlantic, Western Mediterranean and Eastern Mediterranean. Final report to the EC, DGXT Contract No. B4-3040/92/016705. The Zoological Society of London, London/U.K.: 1-14 + tbl. I-III.

Global warming and habitat deterioration

I am a student of Natural Sciences in Bologna (Italy), and I would like to ask you if there could be any relationship between rising sea levels and the lack of suitable caves for the birth of monk seal pups.

Is there any possibility that monk seals are diminishing in part because they cannot find caves with suitable beaches inside, thereby putting their pups at risk from storm waves?

Angela Corbari, Bologna, Italy

✓ **Editor's reply:** As far as we know, there is no evidence to suggest that rising sea levels are leading to further deterioration of monk seal cave habitat in the Mediterranean. Historically, Mediterranean monk seals were known to inhabit open, sandy beaches or great "arching caverns" whose characteristics favoured social interaction, breeding success and the relative safety of unweaned pups from storm surges. Human persecution and harassment, however, and tourism's relentless expansion into some of the last isolated and undisturbed reaches of the Mediterranean, have driven surviving monk seals to retreat into increasingly marginal habitat – often rocky caves and crevices that are incapable of meeting the biological needs of the species.

You may find the following references of relevance:

Anderson, S. 1979. Cave breeding in another phocid seal, *Halichoerus Grypus*. In: K. Ronald & R. Duguay, eds. First International Conference on the Mediterranean Monk Seal, Rhodes, Greece, 2-5 May 1978. Pergamon Press, Oxford, UK: 151-155.

Johnson, W. M., & D. M. Lavigne. 1999. Monk seals in antiquity. The Mediterranean monk seal (*Monachus monachus*) in ancient history and literature. Mededelingen 35: 1-101. The Netherlands Commission for International Nature Protection. [[Online abstract](#)]

Johnson, W.M., & D.M. Lavigne. 1999. [Mass tourism and the Mediterranean monk seal](#). The role of mass tourism in the decline and possible future extinction of Europe's most endangered marine mammal, *Monachus monachus*. The Monachus Guardian 2(2): 62-81.

The editor reserves the right to edit letters for the sake of clarity and space

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