The Monachus Guardian
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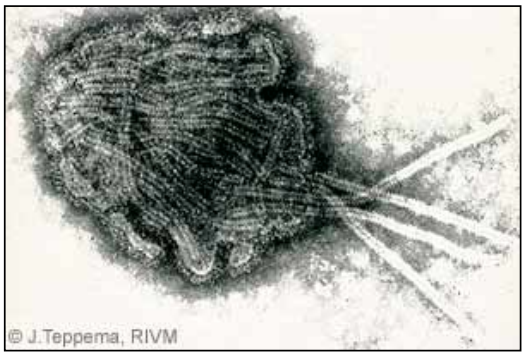
Vol. 5 / No. 2 | Published by Friends of the Monk Seal | November 2002



Cover Story: Morbillivirus, seen through an electron microscope

In Focus: Conservation and community aid comes to Mauritania

Perspectives: The fisherman's tale: filtering scientific evidence from groundless myth

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Guest Editorial

Vol. 5 (2): November 2002

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MONK SEAL APOCALYPSE

Giuseppe Notarbartolo di Sciara

I'm reading a book, rocked gently on a small boat, moored in a few meters of water off the south coast of Patmos, a Greek island in the Eastern Aegean Sea. It is late afternoon on the first of August 2002. My wife and daughter chat, my son dives from the top of the wheelhouse with great splashes. All of a sudden I hear my wife's hushed voice: "Look, a seal!" We all freeze. And a seal, indeed, it is – a huge seal. The animal swims calmly at the surface, in a meandering way, towards our boat. About 30m away from us the seal lifts its whiskered head out of the water, takes a long, hard look straight into my eyes, then dives. It surfaces again minutes later on the other side of the boat, farther along the coast, seemingly inspecting from above a trammel net which had been set by a local fisherman no earlier than an hour before. We follow the seal in its early evening patrol along that stretch of coast, and watch it as it alternates 3 minute-long dives with short periods at the surface. We keep track of the seal's movements, first with our naked eyes, then with the binoculars, until finally it disappears into the distance, 40 minutes after we first spotted it. Forty minutes that changed my attitude to these Aegean shores, 32 years after I first began frequenting them.

As a marine mammalogist by profession, I have come into contact with many different cetacean and pinniped species in their habitats – including Hawaiian monk seals – and remember every sighting as being a memorable event. This time, however, it was particularly special, perhaps the most special event of all. I have been coming to Patmos to spend my summer vacations ever since 1971. I always longed to set my eyes on a Mediterranean monk seal, and often found myself looking at the beautiful yet empty cliffs and beaches, trying to imagine them teeming with seals. With the passing of time I had even begun to wonder if such a treat would ever be bestowed upon me or upon my children. But now, after so much waiting, I had finally managed to put myself in a place where a Mediterranean monk seal would appear. It was truly a revelation – or 'apocalypse' – to evoke the well-known scripture written on Patmos two millennia ago that made the island famous.

Five days later a seal revealed itself again. I have no idea whether this second one was a different seal, but I suspect it was the same as before since it had a very similar appearance. This time the animal hauled out on a small beach in front of my eyes, and I was able to take a few snapshots from a distance with my small digital camera. Worried that I might scare the seal away, I remained at a safe distance, and so the quality of the photographs is rather modest.

What I found most striking was how this seal (or these seals?) appeared to be confident of humans, and consequently quite vulnerable. The beginning of August is peak tourist season on Patmos, and during both sightings motorboats of all sorts were passing by every few minutes further offshore. The people aboard these boats gave the impression of being totally oblivious to the presence of a seal near them. The seal also had an air of confidence about it, cautious and aware as it might have been. I found it a good sign that the seal chose to be in a populated area in a season in which the strong *meltemi* winds offer long stretches of windward coasts that are empty of people.

However, I also realised that I could easily have killed that seal with a rifle, had I had the intention, for some reason, of carrying out such a criminal act. I understand that direct mortality inflicted by fishermen is still the greatest conservation threat that monk seals face in the Mediterranean. The impression I got on Patmos strongly supports this. Fishermen still declare that they hate seals, although there is some hope that such animosity will eventually melt away as decreasingly remunerative fishing activities are progressively abandoned in favour of the more lucrative catering for tourists. On Patmos there are just over a dozen fishermen left. One of these, interviewed after our sighting, said that he knew very well that there are still seals around the island. However, I also noted the continued existence of serious misconceptions. Fishermen are earnestly convinced that there are still numerous

seals about, and all this talk about seals disappearing is nonsense circulated by environmentalists. They also say that seals and dolphins are a great problem for them because they tear their nets, and will try to kill them if they only get the chance, or chase them away at best.

But I also had the clear impression that at this particular moment in history there may be a chance that the tide could finally be turned in favour of the seals, if only we were to accelerate the solution of problems affecting the fishermen. If this is true, I see three strategic management actions as having a high priority. First, address and solve problems locally: work with the locals, island by island, rather than on a grander scale. If we manage to make a good home for the seals on an island, they'll stay there; and if we manage to construct a mosaic of "good" islands for the seals, we may be able to reconstruct a population. Second, ensure that the locals, and particularly the fishermen, are made aware of the real condition of the monk seal through sources of information that they trust. Fishermen should be convinced that, rather than being plentiful, monk seals have indeed disappeared from most of their former range, and that they only remain in perilously small numbers in scattered archipelagos like these in the Aegean. Efforts must also be made to impress upon the locals the ecological and symbolic importance of saving the monk seal. Third, and most important, a concrete programme of incentives for the locals, to convert the presence of seals from nuisance to advantage, must be devised. This is not an easy task. However, the potential benefits are enormous and so an effort should be undertaken. In Sweden, for example, Lapp reindeer herders are compensated for the numbers of predators – notably wolverines – inhabiting their grazing lands, regardless of stock losses and other forms of damage. Even if it were impossible to convince the local or national authorities in Greece to adopt such an approach, this could be accomplished through NGO initiatives. The affluent international community that converges on Patmos every summer may be particularly sensitive to the problem and be willing to contribute.

Giuseppe Notarbartolo di Sciara, Patmos, Greece, August 2002.

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International News

Vol. 5 (2): November 2002

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WWF backs The Monachus Guardian…

The World Wide Fund for Nature (WWF), reacting positively to an appeal earlier this year by Prince Sadruddin Aga Khan of the Bellerive Foundation, has agreed to become a 2002 sponsor of The Monachus Guardian [see Prince issues appeal, TMG 5 (1): May 2002].

That very welcome news was conveyed to the Prince by WWF International Director-General, Dr. Claude Martin, in June 2002.

The journal's survival had previously been placed in serious jeopardy by the unexpected withdrawal of its former publisher and financial supporter, the International Fund for Animal Welfare [see IFAW bows out, TMG 5 (1): May 2002].

WWF, through its Mediterranean Programme Office based in Rome, now joins Bellerive as the second sponsor of TMG for 2002. WWF MedPO is already engaged in monk seal conservation initiatives elsewhere in the Mediterranean, most notably in Turkey through an EU-funded coastal habitat protection and management initiative spearheaded by Turkish NGO, SAD-AFAG [see Coastal zone management project commences, TMG 5 (1): May 2002].

With Bellerive's active encouragement and support, efforts are currently underway to secure much-needed funds for the continued publication of TMG in 2003 and beyond.

Bellerive Foundation

In challenging other organisations to match his funding commitment, Prince Sadruddin has expressed the hope that The Monachus Guardian 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."

Organisations or individuals wishing to support the Prince's appeal on behalf of The Monachus Guardian are kindly invited to contact the editor by email or the secretariat of the Bellerive Foundation.

For voluntary subscriptions to the journal or straightforward donations, please turn to our new Seal Appeal page.

Seal rehab proceedings in press

The proceedings of a workshop on seal rehabilitation, held in Liege, Belgium in April 2002, are soon to be released on CD, according to its organisers, Jeny Adroukaki of the Hellenic Society for the Study & Protection of the Monk Seal (MOm) and Yvan Larondelle of the Université Catholique de Louvain. The Workshop, held as an adjunct to the 16th Annual Conference of the European Cetacean Society, and entitled *Rehabilitation in theory and practice: protocols, techniques, cases*, attracted some 40 participants from 12 countries [see Rehab workshop convenes in Liege, TMG 5 (1): May 2002].

Further details of the CD's release and availability are expected to be made available in due course.

RAC/SPA confronts Action Plan failures in Syria

Rather than convene another of its unwieldy conferences (normally held every four years) to assess the (highly questionable) progress of Barcelona Convention signatories meeting their monk seal conservation targets [see **UNEP/MAP**. 1987. Action plan for the management of the Mediterranean monk seal, available in the Monachus Library], the UNEP/MAP coordinating body RAC/SPA decided instead to hold a far more discrete technical meeting in Syria on 29-30 September 2002.

The two-day conclave, held in the coastal town of Latakia brought together monk seal specialists from Greece, Italy, Morocco and Turkey to define a series of conservation (education, research, legislative and public awareness) initiatives to be proposed to the Contracting Parties of the Barcelona Convention.

The rationale, according to one participant, is that "not enough is being done to halt the decline of the species."

The report generated by the meeting, although still in the process of being finalised, is soon expected to embark on the next leg of its long procedural journey: it must first be endorsed by the Mediterranean Action Plan's National Focal Points before being delivered to the Contracting Parties for approval – whose next meeting is scheduled for autumn 2003.

Based on past experience, those who are waiting for the Mediterranean governments to meet their legal, financial and moral obligations in protecting monk seals would be ill-advised to hold their breath.

Mediterranean Recognition for Calypso

In June, Calypso, Environmental Research Bureau, received the 2002 International Mediterranean Recognition award. The Bureau, which maintains offices in Spain and Greece, received the prize in recognition of its 10-year research and conservation efforts on behalf of the endangered Mediterranean monk seal.

The board of adjudicators included representatives from several Mediterranean Basin countries, including Spain, Italy, Greece, Egypt and Morocco, as well as the Mediterranean Information Office, which acts as a focal point for the region's NGOs. The prize was awarded by the Mediterranean Foundation at the Queen Fortress, Tarragona, Spain, to the Bureau's president and founder, Dr. Daniel Cebrian.

The 2002 International Mediterranean Recognition Awards ceremony in Tarragona, Spain

Calypso-ERB has implemented monk seal research and conservation projects in Croatia and Greece, including Zakynthos in the Ionian and Milos-Kimolos-Polyegos in the Aegean, the latter an important monk seal breeding area that is now the site of a prospective marine park.

A relevant bibliography has been added to the Monachus Library: **Cebrian, D.** 2002. Bibliography. Calypso-ERB.

EndQuote

"The monk seal is the symbol of our work – and saving the monk seal means saving the Mediterranean coasts."

– Cem Orkun Kiraç, on the 15th anniversary of Turkey's Mediterranean Seal Research Group (AFAG).

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Hawaiian News

Vol. 5 (2): November 2002

Scientists continue to target shark cull

Scientists opposed to the projected cull of Galapagos sharks at the Hawaiian monk seal breeding site at French Frigate Shoals have continued to broadcast their objections to the scheme, amid signs that NMFS may be willing to address at least some of their concerns [see Killing sharks at French Frigate Shoals is unacceptable, 5 (1): May 2002].

In a second open letter summarizing perceived deficiencies in the NMFS proposal, Ian L. Jones – Associate Chair of the Atlantic Cooperative Wildlife Ecology Research Network and a faculty member of the Memorial University of Newfoundland – has informed NMFS that, in his view, the cull is "scientifically unsupportable and outrageous".

Detailing his objections, Jones challenges the basis upon which NMFS has portrayed the cull in its public notice as a research project, even though one of its stated aims is "to reduce monk seal pre-weaned pup mortality by Galapagos sharks..."

"If this is the primary goal of the project," Jones contends, "then it is not a research project – it is a management action. The goal of research is to gather scientific data regarding a question… The goal of endangered species management is to take action once the action has been scientifically justified."

If NMFS were purely interested in research, he continues, it "could conduct research on pup mortality and on the behaviour of Galapagos Sharks without killing any sharks." Jones is of the opinion that the cull is more likely to hamper rather than aid research efforts, in part because of the disturbance it would generate.

Jones also takes issue with the public notice's contention that "Recent studies have shown that shark predation can be a significant contributing factor to early Hawaiian monk seal pup mortality at Trig Island, French Frigate Shoals."

In his letter to NMFS, he writes: "This vague statement is your only basis for conducting your proposed shark cull, but is [an] entirely inadequate scientific justification for such an activity. We all agree that Galapagos Sharks take a few pups; this is in no way a scientific justification for a cull. What quantitative evidence is there that such mortality is 'significant' to the Monk Seal population? The clear picture regarding the Hawaiian Monk Seal population at FFS, based on published science, is that the population decline is due to failure of juvenile recruitment due to malnutrition, resulting from a combination of poor oceanographic conditions and likely overfishing [see Judge issues ruling in "monk seal starvation" case, TMG 4(1): May 2001].

Jones also challenges the public notice's contention that "The initial removal of up to 15 sharks is estimated to represent about 2% of the total population size of Galapagos sharks at French Frigate Shoals and is not expected to compromise the viability of the shark population based on shark population models and the best available scientific information."

In his letter to NMFS, Jones argues that scientific knowledge of the Galapagos Shark population at FFS is so uncertain that it "makes this statement highly dubious."

He also questions whether NMFS models have adequately "accounted for the cumulative impact of a removal of 15 sharks, on top of the unquantified (but possibly very large) mortality of Galapagos Sharks in a recent fin fishery near FFS in which hundreds of sharks were removed."

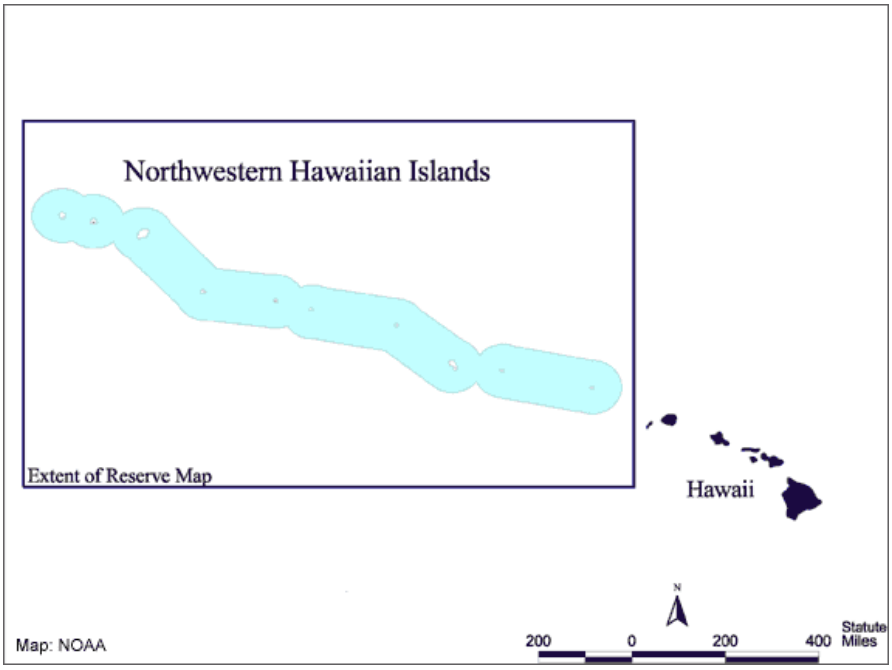
Suggesting a possible link between sharks, monk seals and dwindling food resources at FFS, he writes: "a number of lines of evidence point to a change in marine productivity that has reduced the number and density of reef fish around the atoll, and reduced recruitment of juvenile Monk Seals. These data suggest that the Galapagos Shark population, as a apex predator in this same system, would be under similar extreme food stress, which raises concern about the viability of the Galapagos Shark population even in the absence of your proposed cull."

An invitation to NMFS to comment on the Galapagos Shark issue unfortunately elicited no response.

‘Trojan Horse’ may threaten NWHI Reserve

Environmental campaigners in Hawaii and on the US mainland have continued to warn of government efforts to undermine the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, established by outgoing President Bill Clinton in December 2000 [see Bush accused of undermining Ecosystem Reserve, TMG 5(1): May 2002, Under review, TMG 4(2): November 2001, "Living rainbow" may benefit monk seals, TMG 4(1): May 2001].

Incorporating the reefs, atolls and islands of the Leeward Chain, the Reserve stretches over 1,930 km (1,200 miles) into the Pacific northwest, and is home to some 7000 species of coral, seabirds like the Laysan albatross, the threatened green turtle and the endangered leatherback and hawksbill turtles. It is also the principal habitat of the Hawaiian monk seal (*Monachus schauinslandi*), which is still thought to be declining by about 5% a year, despite conservation efforts.



click here for more detailed map

Native Hawaiians, who are among the Reserve's most ardent supporters, also believe that the islands are a link to their Polynesian ancestry and thus hold profound cultural and spiritual significance.

Earlier this year, abiding by the instructions of the U.S. Congress, the federal government proposed the creation of an NWHI Sanctuary whose purpose, as originally defined under the Executive Order, was to "complement or supplement" existing Reserve protections. In reality, say defenders of the Reserve, a barrage of powerful political and economic forces were attempting to undermine them.

"There appears to be a move to utilize the Sanctuary as a 'Trojan horse' which may act to undo NWHI Reserve protections," declared Dr. Stephanie Fried, Senior Scientist at Environment Defense, on 15 May 2002.

Appealing for a groundswell of public support to defend the Reserve, Environmental Defense warned that: "NWHI are threatened on several fronts. In Congress, the fishing industry, backed by fishery management councils, has introduced the Right to Fish Act, which would undermine protections in the NWHI and gut the Sanctuary Act. Other concerns include efforts to open commercial aquarium fish collection in the NWHI, access by mega-cruise ships, dubious 'research' activities, and attempts by the Western Pacific Regional Fishery Management Council to begin coral harvesting."

Sanctuary protections, according to Environment Defense, should incorporate not only those measures embodied in the NWHI Executive Orders, but also the following additional provisions:

- Research, educational, scientific, commercial and recreational activities should be allowed only if they do not harm the ecosystem, are independently monitored, and meet conservation goals as determined by a permit review committee consisting of ecologists who have worked in the NWHI, conservation representatives, and Native Hawaiian representatives.
- All State waters in the NWHI should be incorporated into the NWHI Sanctuary at strict levels of protection, mirroring protections in federal waters.

- A Kapu Zone should be established, running the length of the Sanctuary, closed to commercial activity with the exception of fishers grandfathered under the NWHI Executive Orders.
- Native Hawaiian cultural, religious and subsistence access must be guaranteed.
- Strong enforcement of Reserve and Sanctuary rules is needed. Without adequate enforcement, protection efforts will fail.
- Twenty-four hour automatic Vessel Monitoring Systems must be required on all boats accessing the NWHI Reserve/Sanctuary, independent dock-side inspection of returning vessels, and significant penalties for Sanctuary violations.
- Clear steps must be taken to ensure that the Sanctuary designation process itself, does not lead to increased human impact on fragile ecosystem as result of Reserve/Sanctuary designation.
- Military activities in the NWHI should be limited to the clean-up and clearing of military structures, dumpsites, toxins, and debris.
- "Eco-tourism" activities should be limited to Midway.
- Cruise ship access to the fragile NWHI Reserve and Sanctuary should be prohibited.

Environment Defense listed the following "substantial threats" that should be prohibited within the NWHI Reserve and the proposed NWHI Sanctuary:

- Lobster Fishing.
- Coral Harvesting.
- New fisheries and transfer of fishing permits.
- Aquarium fish collecting.
- Bio-prospecting.
- Dredging or construction.
- Dumping (vessel sewage, ballast water, CO2, etc.).
- Ocean mining or exploration.
- Research that does not follow the Executive Order mandate of conservation.

By September, Environment Defense and its partner in action, KAHEA, were reporting that the outpouring of public support for the Reserve was having a significant impact. Letters, faxes, emails and testimony at government hearings had, they said:

- "Helped convince the National Marine Fisheries Service (NMFS) to cancel two dangerous plans to open up 'precious coral' and 'coral reef ecosystem' fisheries in the NWHI.
- Forced the State of Hawai`i to withdraw its dangerous 'Fishery Management Area' plan for State waters in the NWHI and come up with a plan for a NWHI Refuge in State waters.
- Sent the National Ocean Service back to the drawing board with their weak and unacceptable NWHI Reserve Operations Plan."

In letters dispatched to Robert P. Smith, the NWHI Coral Reef Ecosystem Reserve Coordinator, the U.S. Marine Mammal Commission also voiced its objections to the draft Reserve Operations Plan [see Further Information, below]. Aside from challenging the draft's fatuous contention that the "size of the monk seal population has remained essentially unchanged since 1993", the Commission also called upon the National Ocean Service to honour the Executive Order's founding principles, notably its expressed aim of ensuring the long-term protection of the coral reef ecosystem, and of applying management techniques based on sound science and the 'precautionary principle' (i.e. giving nature the benefit of the doubt, rather than economic interests).

Meanwhile, public protests in Hawaii were also taking aim at draft regulations to be applied within state waters of the NWHI reserve.

Writing to The Monachus Guardian, KAHEA's Executive Director, Cha Smith, reported that "The first draft regulations were soundly rejected by record numbers of locals who consistently call for strong protections, especially in the most vulnerable NWHI waters, where the state has jurisdiction."

The State's second version, drawn up by the Department of Land and Natural Resources (Aquatics Division), appeared in August for public comment and review. According to KAHEA, the revised text represents a significant improvement over the much-maligned first draft, proposing regulations that "provide strong protection measures for the fragile coral reef ecosystem and reflect most of the concerns outlined in the large number of public comments."

The possible incorporation of state waters into the proposed federal NWHI Sanctuary is likely to take several years, according to KAHEA.

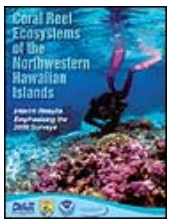
Smith also hailed a landmark fisheries decision in June 2002, when NMFS, citing a need to uphold the Executive Order, "stripped the NWHI out of Western Pacific Fishery Management Council's dubious Coral Reef Ecosystem Fishery Management Plan." Following WESPAC'S vigorous lobbying to re-open the NWHI lobster fishery, the decision, said Smith, was a "sound win for us and the seals."

Despite several crucial victories in the fight for the Reserve, both KAHEA and Environmental Defense warn that "the

NWHI are still under relentless attack" and public pressure is still urgently required to ensure that the Reserve is established as originally intended.

For further information:

In the Monachus Library:



Maragos, J. and D. Gulko (eds.). 2002. Coral Reef Ecosystems of the Northwestern Hawaiian Islands: Interim Results Emphasizing the 2000 Surveys. U.S. Fish and Wildlife Service and the Hawaii Department of Land and Natural Resources, Honolulu, Hawaii: 1-46.

KAHEA. 2002. Talking points. Help protect the NWHI: 1-3.

KAHEA. 2002b. Press Release. Board of Land and Natural Resources *Approves* Public Comment Period for Newly revised Regulations for State Waters in the Northwestern Hawaiian Islands. August 23, 2002.

NMFS. 2002. Fishery management plan for coral reef ecosystems of the western Pacific region. Record of Decision. 14 June 2002: 1-8.

Marine Mammal Commission. 2002b. Letter to Robert P. Smith, Reserve Coordinator, NWHI Coral Reef Ecosystem Reserve, 17 May 2002.

Marine Mammal Commission. 2002c. Letter to Robert P. Smith, Reserve Coordinator, NWHI Coral Reef Ecosystem Reserve, 23 May 2002.

On the web:

Environmental Defense: Protecting the Northwestern Hawaiian Islands.

KAHEA: Northwestern Hawaiian Islands in the News.

Official government website: NWHI Coral Reef Ecosystem Reserve.

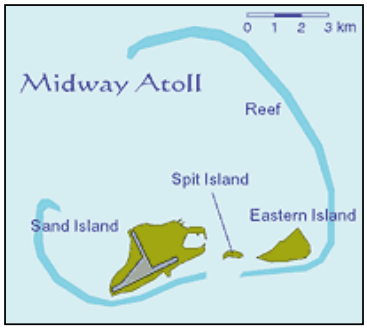
Midway births

In August, the website of the Midway Atoll National Wildlife Refuge reported the following monk seal pupping news of the season:

"The 2002 monk seal pupping season is nearly finished, and it has been another productive year. Through mid-July 2002, 13 pups were born on Spit and Eastern Islands, nearly equaling the record of 14 pups that were born in 2000. There are still a couple of adult females that have a small chance of having a pup before the end of the main breeding season.

Sharks continue to pose a threat to the population. National Marine Fisheries Service biologists studying the population at Midway have confirmed at least four seals with major shark bites in 2002, with one confirmed mortality. The monk seal population is estimated at 50-65 animals."

Mother and pup on Eastern Island



Earlier this year, the site also reported a parting of the ways between the U.S. Fish and Wildlife Service and Midway Phoenix Corporation, the commercial contractor responsible for keeping the Atoll's infrastructure running, including its airport and visitor programme.

"On March 6, the Fish and Wildlife Service and Midway Phoenix Corporation jointly agreed to terminate their cooperative agreement regarding Midway Atoll National Wildlife Refuge," read the announcement, adding that Midway's visitor programme had to be temporarily closed as a result.

While the site did not elaborate, it is known that tensions flared on a number of occasions as conservation and commercial interests clashed over their respective visions of the Atoll's future [see The Old Woman Who Swallowed the Fly, TMG 2 (1): May 1999; Midway's Monk Seals, TMG 1 (2): December 1998].

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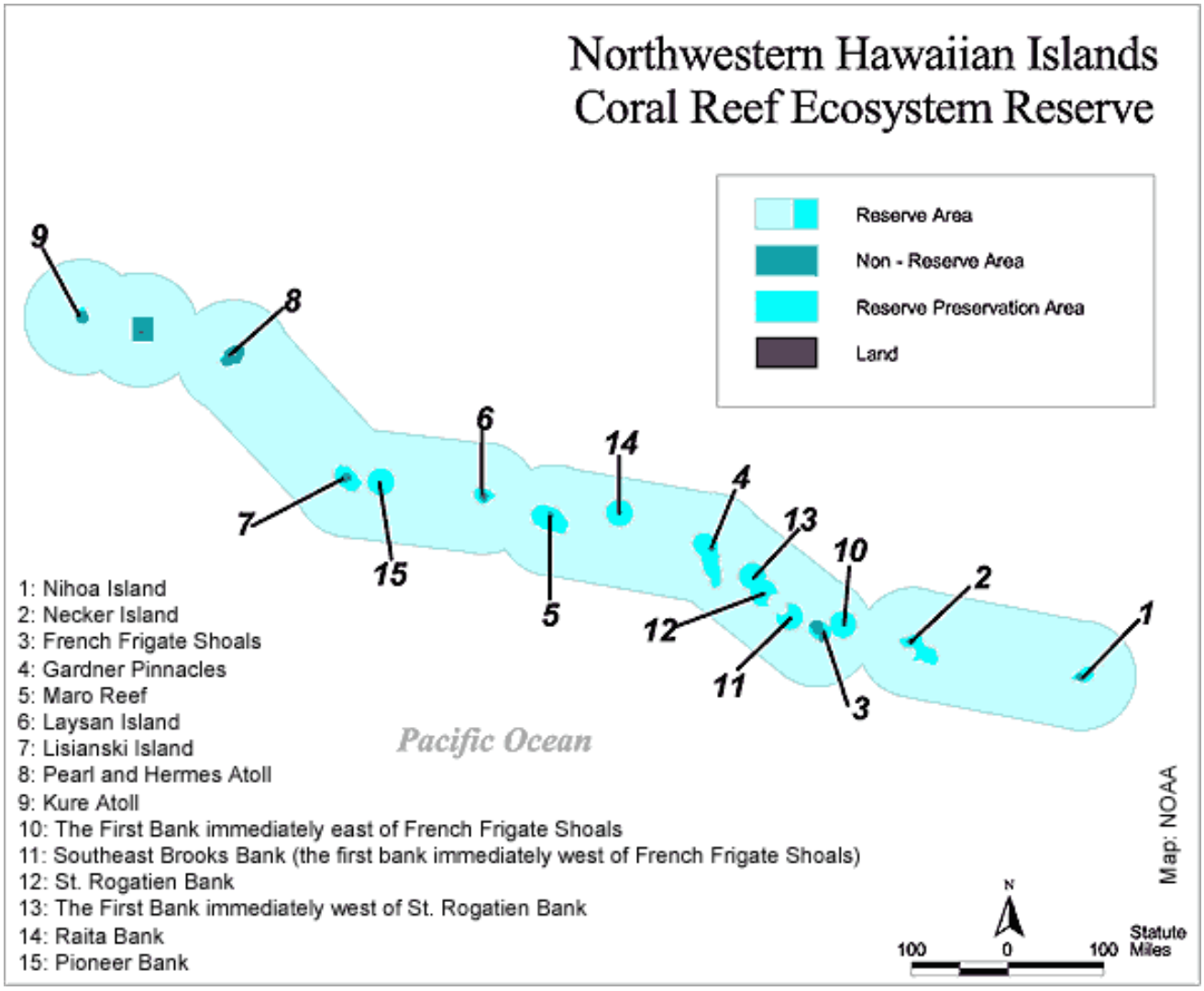
Northwestern Hawaiian Islands
Coral Reef Ecosystem Reserve
Reserve Area
Non - Reserve Area
Reserve Preservation Area
Land
9
8
6
14
4
13
10
2
1
7
15
5
12
11
3
Pacific Ocean
1: Nihoa Island
2: Necker Island
3: French Frigate Shoals
4: Gardner Pinnacles
5: Maro Reef
6: Laysan Island
7: Lisianski Island
8: Pearl and Hermes Atoll
9: Kure Atoll
10: The First Bank immediately east of French Frigate Shoals
11: Southeast Brooks Bank (the first bank immediately west of French Frigate Shoals)
12: St. Rogatien Bank
13: The First Bank immediately west of St. Rogatien Bank
14: Raita Bank
15: Pioneer Bank
Map: NOAA
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Mediterranean News

Vol. 5 (2): November 2002

Greece

Orphaned pup rescued on Evia

The chance discovery took place on 31 October near Pili in northern Evia. Two local men, who happened to be at their summer houses collecting olives at the time, spotted a monk seal pup lying on the sand and shingle beach below. The day was warm and sunny but followed a spell of stormy weather and high seas. After two hours keeping watch, but with no sign of the mother returning for her pup, the men called a Greek wildlife hospital which in turn alerted MOm.

MOm's Rescue Team, led by Jeny Androukaki, was quickly dispatched to Evia. Upon arrival, they discovered that the pup was approximately 1 week old, with fresh umbilicus and no marked dental eruption. In no small measure thanks to the swift action taken by the two locals, the pup was also more vigorous than foundlings discovered in recent years, and was not suffering from hypothermia.

Meanwhile, MOm's patrol boat *Alonissos* was speeding towards Evia from the Northern Sporades Marine Park, its mission to collect the pup and bring it as quickly as possible to the organisation's Seal Treatment and Rehabilitation Centre (STRC) at Steni Vala.

The *Alonissos* nudged into the sleepy fishing village's pitch black harbour at around 8 p.m. The pup, who had been fast asleep for most of the journey, awoke as the carrying basket was lifted onto the dock, offering several babyish barks – to the obvious delight of the few curious onlookers that had gathered to greet the new arrival.

Within a few minutes, the pup was safely ensconced under a warming infrared light in the STRC and being prepped to receive oral rehydration salts.

Chionati in intensive care at the STRC on Alonissos

MOm's consultant veterinarian from the Veterinary School of Thessaloniki, Dr. Anastasia Komnenou, and a nurse from the Seal Rehabilitation and Research Centre of Pieterburen, the Netherlands, arrived two days later.

The pup, christened "Chionati" (Snow White) by its discoverers on Evia – a somewhat curious choice given its chocolate-brown laguno – was quickly weaned onto fish porridge, with feedings taking place round the clock every three hours.

An umbilicus infection has required a course of antibiotics but, so far, the pup appears to be responding to treatment. MOm, however, remains cautious, pointing out that even with the best of treatment orphaned monk seal pups this young may only have a 50% chance of survival.

Stop press…Stop press…Stop press…

> Tragically, Chionati died on 8 November. Initial necropsy results, reports Jeny Androukaki, indicate that the seal pup died of starvation, despite adequate consumption of food in the five days prior to its death. In what appears to be a recurrent problem affecting Mediterranean monk seal pups in rehab – particularly animals only a few weeks old with low body weight – malabsorption (defective or inadequate absorption of nutrients from the intestinal tract) is being postulated as a possible cause of death. Further (microscopic) results are expected in due course. Dr. Thijs Kuiken of Erasmus University, Rotterdam, the Netherlands, performed the necropsy on Alonissos.

Government inaction jeopardises marine park

An apparent reluctance by the Greek Ministry of Environment and Public Works to honour its financial commitments to the flagship National Marine Park of Alonissos-Northern Sporades (NMPANS) is severely jeopardizing monk seal conservation efforts in the area, according to sources in Athens.

Deputy Minister Rodoula Zisi reaffirmed the government's commitment to the NMPANS during a high-profile visit to Alonissos on 15 March 2002 [see Sporades receives ministerial commitment, TMG 5 (1): May 2002]. Then, on 5 June, World Environment Day, the Minister of Environment, Vaso Papandreou, stated that "we are not celebrating the environment only to forget it for another year."

Although Ms. Zisi has successfully pursued the establishment of the Park's management body through the Greek Parliament – a significant milestone in the long-term conservation of the area – no government funding has been made available to vital conservation efforts in the Sporades since June 2001. With the funding crunch already at crisis point, guarding, monitoring, education and public awareness activities are facing serious disruption and even collapse, despite MOm's best efforts to cover the budget shortfall from other sources. Making matters even worse, the crisis in the NMPANS also coincided with the critical high summer tourist season, when threats to the Park and its vulnerable monk seals are most apparent.

A breaking news item carried on **www.monachus-guardian.org** and in other media in June resulted in several hundred protest letters being emailed to the Minister and Deputy Minister of Environment. So far, however, there is still no sign that the Ministry is making good on its promises.

Readers who have not yet registered their concerns with the Ministry are encouraged to do so by signing our automated online petition.

A question of management

After many years of much-criticized delay, the Greek government has finally passed necessary legislation to establish the NMPANS management authority, an essential step that will hopefully streamline the Park's day-to-day operation while also helping to nurture sustainable development patterns in the area [see All At Sea – Adrift in the Northern Sporades Marine Park, TMG 4 (2): November 2001].

A large question mark, however, continues to hang over the composition of the management body, and whether conservation interests will be adequately represented.

While primary stakeholders – such as the tourism and fishing industries – are likely to be key players in the management body, reflecting the importance accorded to their participation in the conservation process, conservationists believe that the interests of monk seals must also be heard loud and clear. The Greek Environment Ministry, however, continues to prevaricate – even though the choice of candidate seems logical enough to most outside observers.

Leading NGO MOm has been consistently applying management actions in the NMPANS for years – including guarding and monitoring, education and public awareness, rescue and rehabilitation – essentially fulfilling the government's own responsibilities.

Another step for Karpathos

Marking significant progress in MOm's EU-supported efforts to establish marine reserves elsewhere in the Aegean [see LIFE funding for Natura 2000 areas, TMG 4 (2): November 2001], the Greek government has recently completed legal procedures establishing the management authority for the Karpathos-Saria area. A Special Environmental Study, which proposes the creation an "Eco-development Area" within the administrative borders of

the Olympos area in Karpathos, is being forwarded to the Ministry for the Environment, Urban Planning and Public Works for approval. – MOm.

Uncertainty in Kimolos

Unspoilt Kimolos-Polyaigos: an enormous potential for local inhabitants – humans as well as seals

Meanwhile, uncertainty lingers in MOm's other Natura 2000 target area, the Kimolos-Polyaigos complex in the Cyclades, where the establishment of a National Marine Park has been proposed [see LIFE funding for Natura 2000 areas, TMG 4 (2): November 2001 and see Natura 2000 areas continue to attract support, TMG 3 (1): May 2000].

While the government has continued to voice its support for the project, which would protect one of the monk seal's most important breeding sites in the Aegean, local inhabitants, it seems, have yet to be fully convinced that the Park would benefit rather than harm their livelihoods. In an effort to address those concerns, the Environment Ministry convened a meeting in Athens on 12 September 2002 allowing local stakeholders, MOm staff members and government officials to participate in a broad exchange of views on the subject. Those in favour of the conservation plan – including the then mayor of the island – took pains to emphasise the potential economic benefits of establishing the National Marine Park of Kimolos, including ecotourism.

At present, Kimolos, an isolated, unspoilt island despite its presence in the tourism-intensive Cyclades, possesses few employment opportunities, particularly for the young. The largest single employer, a mining concern, provides jobs to a handful of locals. A properly designed and administered Marine Park, on the other hand, could be expected to employ many more, as well as bring economic benefits to other sectors in the local economy. Unfortunately, the government's failure to meet its financial obligations to the marine parks of Zakynthos and Alonissos-Northern Sporades – spawning serious management crises in both areas – has hardly proved the best of advertisements for a National Marine Park of Kimolos.

Lack of trust in government assurances may be at least partly to blame for the 13 October local election results, which saw Kimolos' park-supporting mayor voted out of office.

Undaunted by recent developments, MOm continues to pursue its conservation objectives in the area, convinced that local people will eventually recognise the economic and conservation logic of the Marine Park.

The Kimolos-Polyaigos area is believed to be home to one of Greece's most important monk seal colonies. Between 1997 and 2000, the population in the area was estimated at 30-45 individuals by MOm researchers, with nine pups being born during the 2001-2002 season [see Season's Recruits, TMG 5 (1): May 2002].

Kimolos pups

New research vessels for Kimolos and Karpathos

MOm research boats 'Kimolos' and 'Saria' ready for launch

The construction and registration of two new monitoring and research boats for the Kimolos and Karpathos Natura 2000 areas was completed during September. The vessels 'Kimolos', an 8.5 meter speedboat and 'Saria', a 9.5-metre speedboat of similar design, are equipped with radar and VHS transmitters.

Following their delivery to the project sites, and the selection and training of locally-recruited crew members by MOm's management team, the boats are now ready to undertake their assigned monitoring and research duties. As residents of the two islands, the new crew members are expected to bring a wealth of local knowledge and experience to the monitoring programme. – MOm.

Season’s recruits (2002-)

MOm researchers recorded the first monk seal births of the new 2002-2003 reproduction season during summer. So far, 9 newborn pups have been observed in the National Marine Park of Alonissos-Northern Sporades, 5 in the Kimolos-Polyaigos area and 5 in the N. Karpathos area. On-site surveys will continue for as long as weather conditions permit, with MOm's research and guarding vessels visiting breeding caves in order to gather new scientific data on the reproduction of the species.

Due to particularly severe and unpredictable weather conditions prevailing lately throughout Greece, it is likely that some newborn seals will lose their mothers and may be washed ashore. Anyone witnessing such an occurrence is kindly asked to contact MOm by phone without delay on 210-5222888. The organisation's Rescue Team will be on a 24-hour standby, ready to provide first aid to any seal in distress. – Panos Dendrinos & Jeny Androukaki, MOm.

Guarding award

On 2 July 2002, MOm received a prestigious award by the Union of Greek Shipowners and the George P. Livanos Foundation in recognition of its contribution to the protection of the marine environment. Special acknowledgement was given to the organisation's guarding activities in the National Marine Park of Alonissos-Northern Sporades, implemented systematically since 1991.

Aside from the moral encouragement offered by the award, the accompanying $20,000 prize also helped ease temporarily the organisation's severe financial hardship. Despite its status as the number one endangered marine mammal of Europe, monk seal conservation activities continue to be hampered by chronic lack of funding. – MOm.

Piraeus Bank offers support

Responding to the funding crisis affecting conservation activities in the National Marine Park of Alonissos-Northern Sporades, the Piraeus Bank Group has agreed to sponsor the continuing operation of the Biological Research Station at Gerakas, Alonissos, until the end of the year.

Under an agreement with the Greek Environment Ministry, MOm uses the Station as a base for its research and conservation activities in the Sporades, also operating an exhibition centre for visitors. Agreed funding support from the government to operate the Station, however, has yet to materialise. – MOm.

Monk seal greeting card issued by Piraeus Bank, marking its support of MOm's conservation activities in the NMPANS

Summer learning about seals

Again this summer, MOm's Public Awareness Campaign brought the monk seal conservation message to thousands of local residents and Greek and foreign visitors in key conservation areas in the Aegean. During the season, dozens of volunteers staffed MOm's Information Centres in Alonissos, Skopelos and N. Karpathos. For the first time this year, a centre also functioned on the island of Kimolos, the site of a prospective marine park.

The information centres and kiosks serving the Northern Sporades Marine Park received 11,587 visitors, of which 6,633 were Greek and 4,954 were visitors from abroad.

In the Cyclades, the newly-established Kimolos Information Centre received 1,245 visitors (964 Greek and 281 foreign), while in the eastern Aegean the N. Karpathos Centre hosted 1,315 visitors (537 Greek and 778 foreign). – Maria Dimitropoulou, MOm.

Junior environmental libraries in Kimolos and N. Karpathos

Two junior libraries with an environmental focus have been established by MOm in the prospective protected areas of Kimolos and N. Karpathos – an integral part of the organisation's educational outreach programme.

To date, each library features an on-line computer, 240 book titles, 67 videotapes, 52 issues of periodical publications, 24 CD-ROMs and 6 board games. The collection is divided into 34 themes with more than half focusing directly on the environment: Recycling, Endangered Species, Literature and Environment, General Environmental issues, Environment and Society, Environment and Culture, Environmental Protection, Nature-Science-History and

Natural Phenomena. The remaining 25 units cover a wider range of other subjects such as sports, archaeology, astronomy, biology, history, literature (classical and contemporary), mythology, fiction, art and technology. The libraries cover topics of interest for all ages between 2 and 18 years, without necessarily excluding older people.

The libraries opened their doors in January 2002. Since then, over a 100 books have been taken out on loan in Kimolos and 58 books and 22 CD-ROMS in N. Karpathos.

A reading contest for children aged 9-15, entitled "Reading Battles", was also held successfully in June 2002. – MOm.

Seal Foundation winds up, disburses funds

Following a lengthy legal procedure to wind-up its activities, the Save the Mediterranean Monk Seal Foundation [see Seal Foundation Still in Limbo, TMG 1 (1): May 1998] has donated all of its accrued assets to the leading *Monachus* conservation NGO in Greece. MOm received a total of $247,000 from the Foundation in spring this year, which the organisation immediately committed to marine park guarding activities, education and public awareness.

The funding allocation was made possible through the generosity of the Foundation's founding members, including Bellerive Foundation President Prince Sadruddin Aga Khan, ship-owners Andreas Potamianos and the late George P. Livanos, and brandy heir Spyros Metaxas.

Seal exhumed

MOm's Rehabilitation Team, in cooperation with its Kimolos Field Group, exhumed the skeleton of a dead seal in the Apollonia area of Milos in March this year. The seal, an adult female, died after being shot in the abdominal area and had been buried in the same spot following an necropsy in August 1999. Its skull will be used for a morphological study, while tooth analysis will be used to determine the age of the seal. – Jeny Androukaki, MOm.

IFAW donates to guarding effort

Stung by widespread criticism of its decision to withdraw from monk seal conservation [IFAW bows out, TMG 5 (1): May 2002], the International Fund for Animal Welfare reacted sympathetically to news this summer that a funding crisis was jeopardising conservation efforts in the Northern Sporades Marine Park [see Government inaction jeopardises marine park, this issue]. A long-time supporter of in situ monk seal conservation, the organisation extended an emergency grant to MOm, enabling it to continue its guarding patrols within the NMPANS.

Mediterranean News continues with Italy, Madeira, Mauritania & Western Sahara, and Turkey...

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Mediterranean News

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Italy

Monk seal returns

Hailed as "an exceptional event" by WWF Italy president Fulco Pratesi, a Mediterranean monk seal was sighted and caught on film on Saturday 25 May 2002, swimming off the WWF Reserve of Policoro along the Ionian coast of the Basilicata region.

The rare visitor to Policoro

The young seal was sighted initially by two fishermen, who quickly alerted experts at the WWF Wildlife Recovery Centre, a facility involved in the rescue of marine turtles. The fishermen's timely response was attributed to WWF's long-running public awareness efforts in the area.

The seal, nicknamed "Tony" by the fishermen, remained in the area long enough to be caught on film by WWF activists, thus providing the first photographic evidence of the species' possible return to the coasts of southern Italy. While there have been sporadic monk seal sightings in the region over recent years, most notably in Sardinia and Sicily, but also in Puglia and Tuscany [see Sporadic sightings continue in southern Italy, TMG 5 (1): May 2002], firm documentary evidence has remained elusive.

When WWF personnel first arrived on the scene, they reportedly found the seal floating languidly in the water, raising concerns that the animal might be dead or in difficulty. Such fears, however, were quickly dispelled as the animal resumed swimming along the shoreline. Indeed, Tony's physical appearance suggested that the animal was in good health and may only been resting or sleeping. Retreating to a safer distance, the WWF activists subsequently followed the animal for more than a hour, reporting that Tony showed no fear of human presence.

Acting swiftly to reinforce protection for the seal, the local harbour master delivered an alert to the surrounding area, reminding inhabitants that *Monachus monachus* is a strictly-protected species under Italian law.

According to experts of the Gruppo Foca Monaca and ICRAM, who monitor sightings of the species in Italy, "Tony" was probably a vagrant individual roaming outside its customary habitat – exploratory behaviour not uncommon for juvenile monk seals, particularly males. They speculated that the seal may have originated from a colony among the Ionian Islands of Greece, such as Cephalonia or Zakynthos.

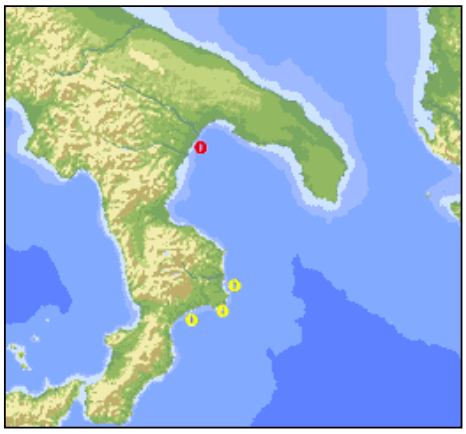
Underlining the extraordinary nature of the sighting, some reports suggest that the last monk seal observation to take place in the Basilicata region may have been a century ago.

"The presence of the monk seal is an exceptional event and is a result of the close collaboration between WWF and the local fishermen," said Fulco Pratesi in a WWF press release. "This first documented evidence of its presence will allow WWF to begin a more in-depth research programme on the monk seal in Italy."

Other monk seal sightings (making a total of 6 in all) [see Sporadic sightings continue in southern Italy, TMG 5 (1): May 2002] had previously been reported between the third week of March and the end of April 2002, between the Gulf of Squillace and the port of Crotone. In most of those cases, observers reported seeing a seal black in colour

and relatively small (70 – 1.30 cm in length). Since some of the sightings had occurred within the Marine Protected Area of Capo Rizzuto, a special monitoring programme and training workshop, aimed at ensuring a better coastal surveillance and protection scheme, was conducted by ICRAM with the MPA's staff and the marine corps operating along the coasts between Reggio Calabria and Crotone.

It is possible that the March-April sightings in the southwestern portion of Calabria may be of the same individual photographed farther north in the Policoro area, although the images suggest that the photographed individual is longer than the size reported in sightings information collected in Calabria. If, however, the sightings are attributable to the same individual, this seal would have travelled at least 200 km within a two month time frame. – Gruppo Foca Monaca.



Monk seal sightings occurring between March-May 2002 (yellow circles indicate non-photographed observations; red circle indicates the photographed sighting of Policoro)

Madeira

Sightings – and "accidents" – increase around Madeira

12 July 2002: A curious monk seal visits the fishing port of Caniçal

Researchers continue to monitor a marked increase in monk seal sightings around the main island of Madeira [see Madeira island observations, TMG 4 (2): November 2001 and Are monk seals recolonising Madeira island? TMG 4 (1): May 2001].

So far this year, over 30 observations have been reported from different locations around Madeira, but with a concentration near the village of Caniçal in the southeast and the Naval Club in Funchal, the island's capital.

These two places are highly frequented by people, with the result that many had the opportunity of observing these monk seals.

The reaction of the Madeiran community has generally been good but 4 "accidents" have already occurred involving monk seals. In these cases, it appears that the injuries were sustained when people tried to approach or play with the animals.

The Parque Natural da Madeira is therefore preparing a public awareness campaign, advising people about the monk seal's return to the island and how to behave when they encounter a seal.

It is also planning to survey the Madeiran coastline in an effort to identify the most suitable monk seal habitat available.

As recorded in previous issues of TMG, we believe that the monk seal may be in the process of recolonising the main island of Madeira as the recovering population in the Desertas Islands Nature Reserve begins to disperse in search of new habitat. – Rosa Pires, Parque Natural da Madeira.

Madeira names pups

A public competition was held on Madeira to find names for the three monk seal pups that were born last year. The winning entries were "Funchinha", which is related with the word "fennel" (from which the name of the Madeiran capital – Funchal – also originates), "Esponja" which means sponge, and "Adamastor".

Adamastor was the name given by Luís de Camões in his literary work "Lusiadas" to the monster that tormented Portuguese navigators at Boa Esperança Cape in South Africa.

The competition results are available in full on the following web site:
http://www.gov-madeira.pt/sra/geomedia/balcaoverde/Sondagens/Lobo_Marinho/index.htm
– Rosa Pires, Parque Natural da Madeira.

Desertas births

Two monk seal pups have been born in the Desertas Islands Nature Reserve so far this year, one in February and the other in July.

We also expect the females "Birisca" and "Desertinha" to give birth some time in October or November – as they have done every year since 1997. – Rosa Pires, Parque Natural da Madeira.

Mauritania & Western Sahara

Weam is one year old

Weam is now one year old. We all know her history from May's issue of The Monachus Guardian [see Rescue, release and post-release monitoring of Weam, TMG 5 (1): May 2002] and fortunately we can keep telling her story.

Following her release from the beach known as Barco de Azúcar, close to the breeding caves, Weam began using a couple of haul-outs around 3 km south of the release site and around 6 km from the colony caves. She spent most of the time resting on the beach and performing shy foraging trips at sea in the intertidal area.

She remained in this area for around 15 days, and no signs of weakness or weight loss were observed. Afterwards she began a period of wider dispersal until, a month later, she returned to the western coast of the Cabo Blanco peninsula.

Although venturing farther north than the breeding colony caves, Weam has since returned to the south and appears to have established herself on the two contiguous beaches of her release site (Campo de Tiro and Barco de Azúcar).

Seventy-five percent of our observations since May – when we last reported Weam's progress in TMG – have been on these two beaches.

Since her release on 27 February 2002, Weam has been intensively monitored from the distance by the CBD-Habitat team in order to eliminate any potential human disturbance. As a matter of fact, the site where Weam has now established herself is located within the marked protection area permanently monitored by wardens [see Conservation actions on the Cabo Blanco peninsula – a new approach, this issue].

So far, Weam is the only female monk seal known to haul-out on open beaches, the original habitat of the species from which they were displaced because of human persecution and disturbance.

Weam, monitored by guards

The provisional success of this reintroduction is, we believe, due to two remarkable facts. The first is that Weam accomplished a natural and spontaneous acclimatization during the 15 days she spent in the vicinity of the release area. That period allowed her to recognise open beaches as haul-out places, and to develop a homing instinct to this area. The second is that the permanent surveillance of the marked protection area has allowed her to find the kind of undisturbed habitat that her species requires to survive.

The conclusion we can draw from Weam's experience is that an acclimatization period increases the possibility of survival for rehabilitated pups, allowing them to familiarize themselves with open beaches close to the breeding colony and to recolonize this natural habitat historically used by the species.

If other individual seals were to follow Weam's lead, the consequences of such a change in habitat use might be significant, helping to reduce the very high pup mortality rate – the result of breeding in caves prone to storm surges. The recolonization of open beaches could also reduce the potentially catastrophic effects of a possible collapse of the current breeding caves.

In two years or so, we hope it will be possible to read in The Monachus Guardian news about the birth of Weam's pup on an open beach. – Miguel Angel Cedenilla, Ingrid Mozetich and Fernández de Larrinoa.

Development aid and conservation joins forces in Cabo Blanco

As related in this issue's In Focus article, Conservation actions on the Cabo Blanco peninsula – a new approach, targeted social and development aid can yield significant bonuses for the conservation of endangered species, particularly in countries struggling to escape the clutches of poverty.

In the article, authors Pablo Fernández de Larrinoa, Ingrid Mozetich and Miguel Angel Cedenilla explain how development assistance for Mauritania's impoverished artisanal fishermen – including a new fish market in Nouadhibou -– has resulted in meaningful protection for the "Coast of Seals". This includes the establishment of a guarded protection zone – incorporating the two main breeding caves at its core – covering around 6 km of coast.

Artisanal fishermen in Mauritania receiving safety equipment and conservation awareness material

International workshop report issued

The eagerly awaited report of the Population and Habitat Viability Assessment Workshop (PHVA), held in Valsaín, Spain, in November 2001 has now been published by the Conservation Breeding Specialist Group (CBSG) of IUCN.

As related in previous issues of TMG, the Workshop's principle aim was to consult the scientific community and the authorities of range states on wide ranging issues relating to the Monk Seal Recovery Plan in the Atlantic, and to further develop and refine its technical aspects [see International workshop wrestles with Atlantic issues, TMG 5 (1): May 2002, and Recovery Plan outlines objectives, TMG 4 (1): May 2001].

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.

Editor's note: An electronic (PDF) version of the report is now available for download in the Monachus Library:

> **González, L.M., B. Heredia, A. Araujo, I. Robinson, J. Worms, P.S. Miller, and U. Seal (eds.)**. 2002. Population and Habitat Viability Assessment for the Mediterranean Monk Seal (*Monachus monachus*) in the Eastern Atlantic. Workshop Report. Apple Valley, MN: IUCN/SSC Conservation Breeding Specialist Group: 1-126.

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Mediterranean News

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Turkey

“Dirty hands” still finger Datça

During a field expedition in July this year, AFAG researchers discovered an unauthorised road construction on the northern coasts of the Datça Peninsula, a Specially Protected Area (SPA).

Striking west from Kormen to Mersincik, the construction had already reached 7.2 km in length, penetrating the ecological heart of the Peninsula.

Based on similar incidents in the past, we suspected that the Datça directorate of the Ministry of Forests was most probably responsible, and this was confirmed by our investigations several days later.

It was on 19 July that we drove AFAG's research van to the small settlement of Kormen, and from there continued our expedition along the Peninsula's northern mountainous slopes.

Just on the outskirts of Kormen, workers at a small charcoal production facility tried to wave us down, but we continued on our way despite their insistent attempts to block our path.

It was then, in great distress, that we saw the unpaved road cutting into Datça's pristine northern coasts, destroying vegetation along the way. Seven kilometres later, at the end of the road, we discovered two heavy construction machines standing unattended.

We shot still photos and video footage to document the construction, whose legality seemed highly suspect.

Just before returning to Kormen 3 hours later, a tractor carrying 3 workers appeared behind our van -– obviously sent to question our reasons for being on this road.

After a brief exchange – in which it was claimed that the Datça Chief of the Ministry of Forests had opened the road as a fire prevention measure – we left the area.

Bulldozers wreak their destruction upon the Datça SPA

In the days following our departure from Datça, we issued strong letters of appeal to all relevant governmental departments, including the Ministries of Environment, Forests and Culture, the Authority for SPAs, the Provincial Governors of Mugla and Datça, and also Datça Municipality. A selection of photos was included to support our written evidence.

In a swift response, and echoing SAD-AFAG's own concerns, the Ministry of Culture and Ministry of Forests ordered the Datça Chief to halt the road construction and also directed their inspectors to investigate.

Our contacts with the Authority for SPAs revealed that ASPA inspectors had also visited Datça's northern coasts and had issued a report advising that the construction be stopped and public access to the site be prevented.

In our opinion, the fire-prevention justification for the road seems dubious – possibly a fake explanation to deceive the public and government officials. In fact, experience shows that human penetration into such forested areas increases, rather than diminishes, the risks of fire. A more plausible explanation is that the road was opened to provide raw material for the charcoal production facilities near Kormen.

Meanwhile, SAD-AFAG is still trying to ascertain why the ASPA provided permission for these facilities to operate, presumably in the knowledge that they would have to depend on local raw material.

It is also possible that a secondary housing cooperative, which owns land on Mersincik bay, might benefit from the road building scheme. Although construction of summer houses has so far been prevented along this coast, the road would provide a strategic short-cut to Kormen, where ferries make regular scheduled runs to the tourism centre of Bodrum – a major and lucrative incentive for development activity.

AFAG has been monitoring the ecologically important Datça Peninsula since 1994. Besides providing a last refuge for endangered monk seal populations along Turkey's southwestern coasts, the Peninsula is also home to other threatened and endangered species, such as the brown bear and ibex, Bonelli's eagle, Eagle owl and Eleonora's falcon.

According to our latest reports from Datça, heavy construction equipment has now been withdrawn from the site, although rumours persist that the road building will recommence next year when public attention has died down. Committed to preserving Datça's unique ecological legacy, SAD-AFAG is now seeking court action against those responsible for the road construction and the damage it has caused. Successful prosecution of the case would not only punish the guilty parties involved, but would also act as a deterrent to other potential offenders. – Cem Orkun Kiraç, SAD-AFAG.

Dilek survey searches for seals

In July 2002, SAD-AFAG carried out a preliminary survey along the coasts of the Dilek Peninsula National Park in an effort to identify suitable seal caves. Dilek, Turkey's first coastal national park, was established in 1966 and was also the site of SAD-AFAG's very first expedition in 1988.

During that survey we also observed our first monk seals – two individuals swimming together towards the adjacent Greek island of Samos.

During this year's expedition, our team checked and drew plans of the 3 caves previously identified in 1988. Unfortunately, we could detect no evidence of seal use.

Despite those disappointing results, a local fisherman reported seeing a seal hauling out onto a rocky platform on the southern coasts of the Park in spring 2002. Historical evidence also suggests that monk seals might be visiting Dilek on a seasonal basis, possibly from Samos.

Our research team also filmed the underwater life of the NP, which will be used for a documentary on Dilek prepared for the Ministry of Forestry (National Parks, Game and Wildlife General Directorate). – Harun Güçlüsoy & Yalçin Savas, SAD-AFAG.

Marine turtle and monk seal action plan for Izmir coasts

Last May, at the official invitation of the Ministry of Environment's Izmir Directorate, SAD-AFAG participated in a meeting to design an action plan for the protection of marine turtles and monk seals along the Province's coasts.

SAD-AFAG recommended the adoption of the "Conservation Guidelines" compiled by Johnson & Lavigne [Monachus Library: **Johnson, William M., and David M. Lavigne**. 1998.] for the protection of these species in the area.

The meeting's primary focus, however, was on the rescue and rehabilitation of stranded animals and necropsy procedures for individuals found dead. At the end of the meeting, SAD-AFAG was nominated to draw up an action plan for the rescue and the rehabilitation of monk seals and other marine mammals. – Harun Güçlüsoy, SAD-AFAG.

“Adopt a Seal”

SAD-AFAG's monk seal adoption campaign, which began in 1998 in co-operation with DHKD, was re-launched in April by the Mediterranean Seal Research Group (AFAG).

The previous campaign ran only for one year but its potential convinced AFAG to re-launch the programme. At first, the re-launch drew little public or media attention, with the result that only one supporter signed up to become a seal 'mother'.

Fortunes changed dramatically, however, when we issued another press release in September, explicitly drawing attention to the poor showing of public support. Five newspapers responded, carrying dramatic headlines such as

"Monk Seals Left Orphans". In the week that followed, we received 131 phone calls enquiring about the adoption campaign.

Three types of monk seal adoption are offered:

- Mother/Father, with a donation of 250 €
- Sister/Brother, 60 €
- Friend, 15 €

Each comes complete with an adoption certificate and an informative welcoming letter, along with recent news updates about the monk seals under AFAG's protection. Those signing up to mother/father adoptions also receive an appealing framed photograph of a monk seal. Donations received will be applied directly to AFAG'S monk seal conservation efforts.

Adoption certificate

For more information on the adoption campaign, please contact AFAG'S Coordination Office in Ankara. – Yesim Öztürk, SAD-AFAG.

Second film festival draws crowds at Foça

"Rastgele", the Fishermen's and Marine Documentaries Film Festival, was held for the second consecutive year on 14-18 August 2002 in Foça. Organised by the Association of Documentary Filmmakers in Turkey (BSB), Foça Local Agenda 21, SAD-AFAG, Foça Municipality and the Fishermen of Foça, the festival featured documentary film shows, conferences and fora on fisheries and fisheries policy, competitions and concerts.

During the fora, fishermen shared their experiences, trying to pinpoint possible solutions for the significant problems facing coastal fisheries today.

"Local people and the fishermen of Foça have been the backbone of our monk seal conservation activities for almost a decade now," said Yalçin Savas, Head of Conservation for SAD-AFAG and member of the festival organisation committee. "Their participation in our efforts and in this festival is an important element of coastal and marine conservation in Turkey."

Parallel discussion groups were convened on "Safety for Tour and Fishing Boats – International Regulations", "Social Security Rights of Fishermen", and "European Union and Fisheries Policies".

Every evening, film documentaries were screened in Beskapilar, the medieval fortress of Foça, including entries from Turkey, Belgium, Cyprus, France, Germany, Ghana, Israel, Italy, Portugal, Scotland, Spain, and USA.

As in last year's festival, some of the most popular activities involved good-natured competitions between fishermen, including hook binding, net repairing, fishing and boat races.

The festival is supported by IULA – EMME (the International Union of Local Authorities), UNDP (United Nations Development Programme), WWF (World Wide Fund for Nature), Foça Local Governorship, Foça Municipality and Foça Fisheries Cooperative.

Cem Kiraç, Coordinator of SAD-AFAG said: "We are currently involved in an EU-funded project, in partnership with WWF (World Wide Fund for Nature), and are working to find solutions for people who depend on the sea for their livelihoods. The Rastgele festival is a significant step towards the solution." – SAD-AFAG.

Bozyazi Nature Festival

The Bozyazi Nature Festival, organized by SAD-AFAG in cooperation with the Documentary Film Makers Association and Içel Amateur Photographers Society, took place between 29 June - 1 July 2002 and received substantial support from Bozyazi Municipality. Like its counterpart in Foça, the festival featured documentaries on marine and fisheries issues, but also an exhibition of drawings and paintings from the contest held every year among the schools of Bozyazi. – Yesim Öztürk, SAD-AFAG.

Losses in Court

The court case that commenced on 21 April 1999 challenging the "Annual Aqua Products Circular 33/1" issued on 21 February 1999 has been concluded, with judgement being awarded against the plaintiffs.

The legal action was taken by the Yeni Foça and Urla Fishing Co-operatives, the Turkish Association for the Protection of Nature and Natural Resources and SAD-AFAG, and was later supported by the Mordogan, Bogazici, Dikili, Balikliova, Çesmealti, Foça and Karaburun Fishing Co-operatives. The clauses that the legal action requested the court to amend are listed in a previous TMG news item: Court action follows artisanal fisheries symposium, TMG 2 (2): November 1999.

The Public Court rejected the request to suspend enactment of the circular on the grounds that it had been prepared by taking into consideration the views of the entire sector, including scientific institutions. Although trawler nets drag along the seabed, this was not the case for purse-seine fishing and hence these two systems could not be compared, the Court found. The claims made by the plaintiffs, the Court concluded, were not based on verifiable scientific fact.

The Public Court, however, did not deem it necessary to consult an independent expert to examine these claims, and based its final decision entirely on the defence presented by the Ministry of Agriculture and Rural Affairs. In the final statement of the decision, the only clause that was directly addressed concerned the Lampara fishery (a form of night purse-seine fishing – *girgir* in Turkish, *grigri* in Greek – utilising powerful lights). During the case's 2-year duration, however, a circular was issued by the Ministry of Agriculture and Rural Affairs addressing two more clauses that the plaintiffs requested be amended. The 34/1 circular, issued on 31 July 2000, prohibited the use of coastal seines on Aegean and Mediterranean coasts (except for Ayvalik) and the live catching of small fish (mainly to stock fish farms). In light of firm scientific data, SAD-AFAG will continue its efforts to change the depth limit of the Lampara fishery to "deeper than 50 meters and at least 1.5 miles away from the coast". – Yalçin Savas and Harun Güçlüsoy, SAD-AFAG.

Pup found dead on Karaburun

On Sunday 7 July the phone rang at our home in Karaburun. It was Mr. Ayhan Akçura of the Karaburun Civil Defense Force.

"Ozan," he said, "we have, I think, found a monk seal pup, dead, lying underwater. Please do come here as soon as possible."

Thirty minutes later, we were already at the scene of the incident, at Aslan Burnu (Lion Cape). As soon as I had suited up in diving gear, I went into the water to investigate.

At about 4 meters' depth I spotted a furry body with white and black patches. It was a female newborn monk seal pup. From its appearance and state of decomposition, it looked as if the animal had died several days earlier.

The body was taken out of the water and put in a plastic container. We then returned to Karaburun, keeping the body in the freezer of a refrigerator overnight. The next morning, using an icebox, we took the dead seal to the Veterinary Research Institute of the Ministry of Agriculture and Rural Affairs in Izmir.

According to the necropsy, completed on 8 July by AFAG members and specialists, the estimated date of death was 5 July 2002. The animal was then thought to be 1-2 days old. The body weight was estimated at 5 kg, the animal's total length (nose to hind flippers), 75 cm. No sign of milk intake was found in the stomach. Based on these and other observations, it is suspected that the animal drowned during birth at sea or at an unsuitable location (by a possibly inexperienced mother). It was also considered possible that the birth may have taken place abruptly and unexpectedly in an inappropriate place.

Following our team's return to Karaburun, we began a detailed inquiry on possible monk seal sightings at Aslan Burnu. After a weeklong effort to reach secondary house owners and lift-net fishermen in the area, we eventually learned that an adult monk seal had been seen in the days prior to the pup's death. Although the exact times differed according individual informants, it seems that an adult seal had screamed for hours during the daylight hours of Thursday 4 July, at the exact location where the pup had subsequently been found dead.

It is a pity that no one alerted the SAD-AFAG team at the time. – N. Ozan Veryeri, SAD-AFAG.

“Sensible seal tourism” commences in Turkey

From 25 October to 3 November, a small party of dedicated "monk seal fans" – under the guidance of Luigi Guarrera, co-ordinator of the Italian monk seal group, Gruppo Foca Monaca – visited SAD-AFAG's Cilician Basin conservation project, led by Dr. Ali Gücü of Middle East Technical University. The project receives funding support from WWF MedPO.

Guarrera, a former co-ordinator of WWF's Mediterranean Programme and an initiator of the Cilician monk seal conservation project, considers this first ecological tour a pilot project that may warrant further development through

WWF Italy's Education Office. Starting as early as spring 2003, he believes, it is possible that small groups of nature lovers may be visiting the WWF-supported monk seal conservation projects in Cilicia and Foça 2-3 times a year.

While it is hoped that the "ecotourists" will observe monk seals, every effort is being made to eliminate potential disturbance, including careful guidance and instruction by experienced project leaders. The visitors are also likely to provide an important contribution to one of the principal aims of the project: to instil within local people, especially the fisherman, a sense of ownership for their Marine Protected Area and to convince them that sensible "seal tourism" is not only possible but will also benefit their livelihoods.

With this aim in mind, the October expedition to the Cilician project relies on local involvement wherever possible – for instance, by hiring the boats of artisanal fisherman for coastal trips.

The itinerary of the Cilician tour attempts to meld ecological, archaeological and cultural influences. Highlights include a boat trip to the Bozyazi-Kizilliman Marine Protected Area, seal-watching from cliff-top archaeological sites, visits to abandoned seal caves, swimming and snorkelling from isolated beaches, early morning fishing expeditions with local fishermen, and hikes through some of the Mediterranean's most unspoilt landscapes. Further information is available on the Gruppo Foca Monaca website, http://www.focamonaca.it.

Progress reported in coastal zones project

Effective management plans for protected areas, stakeholder participation in the conservation process and no-fishing zones to benefit seals, fishermen and the marine ecosystem at large, are among the principal objectives of AFAG's collaborative project with WWF MedPO [see Coastal zone management project commences, TMG 5 (1): May 2002].

In Turkey, the EU-funded initiative – "Conservation and Management of Biodiversity Hotspots: Developing a Mediterranean Network" – is focusing on the following conservation areas: Foça and the adjacent Karaburun Peninsula near Izmir; and Aydincik (near Bozyazi, where AFAG's Mediterranean Office is based).

So far, several important steps have been accomplished in meeting the project's targets, among them:

- Detailed coastal zone management (CZM) plans have been completed for Foça–Yeni Foça–Karaburun (1 of 5 "Important Monk Seal Sites" selected by the National Monk Seal Committee), incorporating such components as speed restrictions for boats, vessel routing regulations (away from reefs and islets, where navigation can be hazardous), additional SIT-status protection zones for critical habitats, and strict enforcement of regulations in the proximity of monk seal breeding caves. The CZM plans will be submitted to the National Monk Seal Committee for review and comment. Moreover, relevant ministries will be individually requested to tie the components of the plans to existing legislation, and to ensure their subsequent enforcement.
- Similar CZM plans have been drawn-up for Aydincik in the Cilician Basin (another of the "Important Monk Seal Sites" designated by the National Monk Seal Committee).
- Following SAD-AFAG's appeal to the Ministry of Agriculture and Rural Affairs, requesting stricter fishery regulations around a known monk seal breeding cave near Mordogan on the Karaburun Peninsula [see Newborn seal still survives, despite entanglement fears, TMG 5 (1): May 2002], a no-fishing zone was established in the area. The "Ayibaligi Cave" near Mordogan is one of only three known breeding caves within the Bay of Izmir. As related in previous issues of TMG, several monk seal pups have died in the area because of entanglement in fishing nets [see Snared and Drowned, TMG 4 (1): May 2001].
- SAD-AFAG aims to establish 5 no-fishing zones (NFZ) to form a network of small marine protected areas in the Cilician Basin rather than a single, larger NFZ. Establishment of the first one, called Kizilliman NFZ near Bozyazi, east of Aydincik, was successfully established in 1999. The second NFZ (selected by the project's scientific consultant, Dr. Ali Gücü, of Middle East Technical University-Institute of Marine Sciences) is at Melleç, west of Anamur Cape, where an important monk seal breeding cave exists. The size of the NFZ was designated so that it would incorporate coastline one nautical mile in length and waters extending 200 m. offshore. A third NFZ is being considered for Aydincik coasts, but is still subject to further research by Dr. Gücü and the full support of the Aydincik fishing cooperative. Both the Melleç and Ayibaligi NFZs were published in the official gazette on 2 August 2002.

Monk seal pups in the Cilician Basin

- In its ongoing efforts to offer support to underprivileged artisanal fishermen, the project provided various articles of equipment to the fishing cooperatives of Foça, Karaburun Mordogan, Yeni Liman, Balikliova and Aydincik, including fax machines and office furniture.
- A patrol boat to monitor critical seal habitat in the Aydincik area is nearing completion in Izmir, and its delivery and launch is expected this autumn.
- Feasibility studies to develop alternative development opportunities in the Foça, Karaburun and Aydincik areas are underway. – Harun Güçlüsoy, SAD-AFAG.

The head of the Yeniliman Fishing Cooperative, with office furniture donated through the AFAG-WWF SMAP project

MPA problem-solving

In a follow-up to the Marine Protected Area workshop held last January [see AFAG attends MPA workshop in Dalaman, TMG 5 (1): May 2002], a second meeting was held under the auspices of the Ministry of Environment on 20 May 2002 in Ankara. Relevant Ministries, Universities, Institutes and NGOs, including SAD-AFAG, participated in the meeting which, like its forerunner, sought to identify problems and solutions affecting the establishment and operation of marine protected areas in Turkey.

During both meetings, the main problem was found to be legislative. Even though MPAs have been established in Turkey, it is now evident that there are conflicts and fragmentation of responsibility between the ministries involved and between different articles of national legislation. In concluding, the meeting resolved to establish a technical committee formed by SAD-AFAG, WWF Turkey, METU-Institute of Marine Sciences, Turkish Marine Research Foundation (TUDAV) and the Turkish National Committee on Coastal Zone Management (KAY), to prepare a status report on the MPAs in Turkey, including their legislative aspects.

The technical committee convened to assess their available information on 14 June 2002 at the METU campus and members examined relevant Turkish legislation to ascertain its compatibility with IUCN Guidelines for MPAs. The resulting report was submitted to the Ministry of Environment on 20th of August 2002.

According to SAD-AFAG's research, more than 1200 km of Turkish coastline has varying degrees of protection status (accorded by different authorities). Many important coastal areas are designated as National Parks, Nature Parks, Nature Protection Areas or SPAs. Unfortunately, however, none of these areas has a management plan or specific guarding system.

According to AFAG's analysis of the MPA problem:

- A number of coastal areas are already subject to existing and varying degrees of "protection".
- There is no need for additional MPA legislative status – existing forms are sufficient.
- In practice, however, existing areas do not enjoy real or meaningful protection since the responsible authorities are not exercising their legislative or enforcement potential at those sites.
- Conflicting national legislation leading to fragmentation of responsibility between the different ministries should be amended.
- In the short term, a concerted effort must be made to design and implement management plans for those MPAs which currently only exist on paper.

Unfortunately, considering the amount of the work required and the financial implications, it is likely that preparation and implementation of management plans for Turkish MPAs – including effective guarding systems – will take a decade or more. – Yalçin Savas & Harun Güçlüsoy, SAD-AFAG.

Monk seal exchange

Members of Croatia's Mediterranean Monk Seal Group (Grupa Sredozemna Medvjedica) visited Foça and Karaburun between 13 and 24 October 2002, as part of an exchange programme promoted by the WWF MedPO Across the Waters initiative.

The Croatian visitors and their Turkish counterparts within SAD-AFAG participated in roundtable discussions, presentations and field excursions, sharing knowledge and experiences on broad-ranging issues, including scientific research, MPA management and guarding, seal-fisheries interactions, seal rehabilitation and necropsy procedures.

Further information on the exchange programme is available on the MedPO, Across the Waters web site.

Additional details of AFAG's participation in the exchange is available at: http://www.atw-wwf.org/portxchg/15.htm. – Harun Güçlüsoy, SAD-AFAG.

Seal Watch commences on Karaburun

SAD-AFAG has launched the fourth phase of its Project Seal Watch whose main aim is to monitor in-cave behavior of the monk seal – the most hidden part of the species' life cycle.

The first phase was implemented in 1997 in collaboration with the Gruppo Foca Monaca, Panda Film and the Italian electric utility ENEL, on Orak Island, Foça, using a video camera, two infrared illuminators and a microphone [see Private Lives under Investigation, TMG 1 (2): December 1998]. The subsequent study in 2000 focused on a cave close to the town of Bozyazi on the Turkish Mediterranean coast. In this second phase, accomplished with the financial support of WWF Belgium, three cameras and IR illuminators and a microphone were installed in the cave [see Monk seal behaviour under surveillance, 3 (1): May 2000]. The audio-visual data were transmitted via a broadcast link system about 2 km away from the cave to the monitoring centre. The third phase, also in 2000, was carried out in the Ayibaligi Cave near Mordogan, on the Karaburun Peninsula, using surplus equipment from phase two [see Video monitoring on Karaburun, 4 (1): May 2001].

By November 2002 the fourth phase of the project commenced at the same site, which research indicates is the most important breeding cave within the Gulf of Izmir.

The project receives funding support from the Scientific and Technical Research Council of Turkey and the Van Tienhoven Foundation of the Netherlands.

Although the cave is only about a kilometer away from Mordogan town centre, and is surrounded by numerous summer houses and a nearby café, when autumn arrives and the schools re-open after the long summer break, the area quickly becomes deserted. Seals have used the cave for giving birth for the last three consecutive years.

For the purposes of the Seal Watch project, the cave has now been equipped with four monochrome cameras and IR illuminators and two microphones. One of the units malfunctioned after installation, leaving three units operating normally. Audio-video signals are delivered through a 250 meter long cable to the observation unit, based in a small, two-room building adjoining the nearby café. The observation unit comprises a VHS recorder capable of 24-hour continuous recording, monitors for each camera unit, and a multiplexer with digital motion sensor.

A bank of monitors begins to receive the first images from the Mordogan cave

Although originally designed to gather data on little-understood aspects of monk seal breeding and mother-pup relations, it now appears that this year's breeding season may pass without a birth in the Mordogan cave. The discovery in July of an aborted foetus weighing 5 kg along the same stretch of coast (about 15 km from the cave) may mean that Ayibaligi cave will not see a newborn pup this season [see Pup found dead on Karaburun, above]. More human disturbance this year – with late summer weather enticing seasonal residents of summer houses to linger longer than normal – may also have had an impact, making pregnant mothers too uneasy to trust the cave.

Although we may have to wait for a monk seal birth until next year, the system has already delivered its first seal images. The first seal to be observed, in fact, was an old friend from Phase one, previously captured on video in 1997 on Orak Island. She stayed less than a day in the cave. AFAG's Karaburun team named her "Foça".

Recently, SAD-AFAG received political support for the Seal Watch project from the Mayor of Mordogan, Mr. Ferhan Eroglu, who has agreed to ban human activities in close proximity to the cave. Fishing has already been prohibited around the cave – up to a water depth of 20 meters – by the Ministry of Agriculture's last biannual Aqua Products Circular [see Progress reported in coastal zones project, above]. – Yalçin Savas, SAD-AFAG.

15th anniversary for AFAG

The Mediterranean Seal Research Group (AFAG) is celebrating its 15th anniversary.

Established in September 1987, "Akdeniz Foku Arastirma Grubu" – as it is known in Turkish – started out as an

amateur student group in the Middle East Technical University, and as an offshoot of the METU-Subaqua Society. A message of encouragement from Turkish-Canadian Professor Fikret Berkes in Ontario proved instrumental in founding the Group. Prof. Berkes, who had already conducted several monk seal surveys along Turkish coasts, emphasised the importance of further surveys and practical conservation measures if the species was to have any hope of survival in Turkey.

With only 3 or 4 active members and a paltry budget, our Group's scope for action remained severely limited until a fixed meeting place was established at my own home in Ankara in 1991. Sustained efforts in public awareness – particularly through seminars and the mass media – soon yielded important benefits to the campaign and to the strength of our Group.

AFAG's 15th anniversary celebrations on Karaburun

With more active members filling its ranks, AFAG was soon conducting field research, public awareness and environmental education campaigns along Turkey's Black Sea, Aegean and Mediterranean coasts. In terms of lobbying and expertise, the Group also made a significant contribution towards the establishment of Turkey's National Monk Seal Committee in 1991. Meanwhile, we were also in frequent contact with Professor Bahtiye Mursaloglu, benefiting from her profound knowledge and experience on monk seals and marine research methodologies.

Turkey's first applied conservation and coastal zone management project, "Conservation of the Mediterranean monk seal in Turkey – Foça Pilot Project", was awarded to AFAG in 1993 and has been successfully implemented by Yalçin Savas and Harun Güçlüsoy ever since. The project received the prestigious Henry Ford European Conservation Award Grand Prix in 1998.

SAD-AFAG's Yalçin Savas in the Foça SPA patrol boat, *Cevre*

AFAG's strength took another leap when, in 1994, we joined forces with the Underwater Research Society (SAD) and merged with a group of scientists and monk seal conservationists in METU-IMS (Middle East Technical University-Institute of Marine Sciences) in 1998 to form a more organized structure throughout Turkey.

Building on a growing public support base, AFAG now has a sizeable volunteer and member network. Even today, 15 years after its founding, AFAG remains the first and only NGO in Turkey working for the conservation of the Mediterranean monk seal.

AFAG now runs 3 field project offices – in Foça and Karaburun on the Aegean, and in Bozyazi on the Mediterranean. Liaison offices are run out of Datça and Adana, and a coordination office operates from Ankara. At present there are 14 full-time or volunteer core staff and around 400 members.

This year in March, AFAG commenced an EU-funded project in partnership with WWF, aimed at creating marine conservation areas with no-fishing-zones along Turkish coasts, in partnership with local fishermen.

The last 15 years have seen some notable achievements for AFAG. We aimed our awareness campaigns at the general public, coastal inhabitants and, not least of all, government departments. Whereas 15 years ago the monk seal was hardly ever mentioned outside fishermen's villages, today the species appears frequently in the press and media. That, in turn, brings pressure to bear on government departments to fulfil the conservation obligations that are required of them.

During these last 15 years, we have also halted several unplanned and even illegal coastal developments in monk seal habitat, and have played a central role in establishing official protected zones along our coasts [see TMGs, *passim*].

Despite these accomplishments, I realize that there are many more things still left to do if we are to ensure the survival of this beautiful marine mammal and its "home" – our diminishing pristine coasts.

After our first 15 years, we have an enthusiastic, determined and hard-working staff backed by hundreds of sea-loving members. We also have the expertise and experience to deliver the conservation results expected of us.

What we require now is the financial backing – from both national and international conservation funding institutions

– to support and partner our efforts. – Cem Orkun Kiraç, SAD-AFAG.

NET WATCH

Mass tourism versus monk seals...

"As a major cause of the loss of natural habitat, tourism has a very direct negative impact on biodiversity, directly affecting rare and endangered species. Over 500 plant species in the Mediterranean are threatened with extinction and are under intense pressure from tourism development in some overbuilt destinations. In Zakynthos (Greece), sea turtles have had their coastal nesting grounds disturbed and destroyed by tourism development and tourist behaviour.

Tourism's impact on the critically endangered Mediterranean monk seal has been particularly devastating. The biggest impact has been from the loss of its habitat. The monk seal needs suitable cave and beach habitats in order to breed successfully – areas that are exploited by the tourism industry. Already the impact of tourism has played a major role in the decline and extinction of Mediterranean monk seal populations in several key areas including France and Corsica, Spain and the Balearic islands, Croatia, Italy and Sardinia, and Tunisia. Without dramatic changes, the current tourism pressure will likely drive the species to extinction."

Source:
WWF. 2001. Tourism threats in the Mediterranean. Background information: 1-4. Available in the Monachus Library.

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VIRUS THREATS TO MONK SEALS

An interview with Professor Ab Osterhaus, Erasmus Medical Centre, Rotterdam, the Netherlands

In 1997, a mysterious mass mortality event wiped out two thirds of the world's largest surviving colony of Mediterranean monk seals in Mauritania-western Sahara. Although the precise cause was never conclusively established, rival theories blamed both a toxic red tide event and a morbillivirus outbreak.

Now, in 2002, an ongoing virus epidemic in the North Sea has so far claimed the lives of some 20,000 common seals, threatening to overwhelm rescue centres. In the Dutch Wadden Sea alone, where the Seal Rehabilitation and Research Centre (SRRC) has registred more than 2,100 dead seals to date, it is suspected that half the population may have been eliminated.

But what of Europe's most endangered marine mammal? Already on the brink of extinction, how serious a threat are viruses to the survival of the Mediterranean monk seal, *Monachus monachus*? To learn more, we spoke to Professor Ab Osterhaus of Erasmus Medical Centre's Institute of Virology in Rotterdam, and Chair of the Scientific Advisory Board of the SRRC in Pieterburen.

Ab Osterhaus at Pieterburen

Q. When did you first become involved in monk seal conservation, and what inspired you to do so?

A. I've been working on seal viruses since 1984, and the first contact I had with monk seals was back in 1987, when two orphaned pups, Theo and Dimitri, were transferred from Greece to the SRRC in Pieterburen for rehabilitation. The Seal Centre was then at beginning of what was to become a long and fruitful collaboration with MOm, the leading monk seal NGO in the Aegean.

There were no suitable rehabilitation facilities in Greece at that time, and so the policy was still to bring monk seals to the Netherlands for treatment. That's basically against our rules today. The 1988 morbillivirus outbreak in the North Sea underlined the increased risks involved in moving animals in this way. As a result, it was decided that we should offer training and technical expertise, and also establish a mobile rehabilitation unit on Alonissos, in the Northern Sporades Marine Park, so that monk seals could be treated in situ.

Responding to the 1988 outbreak, we also created a multidisciplinary scientific advisory group, which I continue to chair on behalf of the SRRC. We established very stringent scientific and veterinary rules to guide the rescue and rehabilitation process.

Q. How great a threat is a virus epidemic to the survival of the Mediterranean monk seal as a species?

A. Well, I think there are two issues to consider here, dispersed as opposed to concentrated populations. The monk seal population in the Mediterranean is rather dispersed, which reduces the risk of a potential epidemic. A virus-infected animal, for example, might well die before having the opportunity to pass the infection on to other individuals. Even so, we always have to bear in mind that the animals do have contact with each other, have a wide interaction radius, and can travel quite considerable distances. With seals moving between colonies in the eastern Mediterranean, for example, there is also the possibility of cross-infection between monk seals in Greece and Turkey. As such, even in dispersed populations the threat of virus infections has to be taken seriously, especially that of morbillivirus infections.

Off the coast of Mauritania, on the other hand, there is a group of monk seals concentrated into a small geographical area where infectious disease could spell disaster. Potentially, disease could wipe out the entire population. Although outbreaks of this kind usually don't cause 100% mortality, with a species like the monk seal that is already on the brink of extinction, loss of 50% or more of the population – as happened in Mauritania in 1997 – could reduce genetic variability to a point where the colony can no longer sustain itself.

Q. What types of virus pose the greatest threat to monk seals?

A. Morbilliviruses, I think, constitute the major threat. Theoretically, this could be any morbillivirus: phocine distemper (PDV), canine distemper (CDV), rinderpest virus, even human measles virus – although this is unlikely to spread to seals because it is rarely seen in humans anymore in the industrialized world.

On another branch is the dolphin morbillivirus (DMV) and the porpoise morbillivirus (PMV). The interesting thing is that we originally thought that these two closely related viruses wouldn't spread to pinnipeds because they are essentially cetacean viruses, but we have seen at least two examples where cross-infection to monk seals did occur, in Mauritania and Greece respectively.

Of all these morbillivirus strains, however, I would say that the greatest threat to monk seals probably comes from CDV and its variant, PDV – the virus we're facing today that's killing many thousands of seals in the North Sea.

Victims of the 2002 PDV epidemic, 300 dead seals await necropsy in the Netherlands

Q. Could other viruses also pose dangers to monk seals?

A. No one has investigated it, but monk seals could also be susceptible to the herpes virus. We have identified a couple of seal herpes viruses which are mainly a threat to pups. Usually, what we see in harbour seals and grey seals is that although adults survive after suffering a respiratory infection, the pups can die.

Influenza viruses from birds should also be taken into serious consideration. There were massive outbreaks of influenza virus disease in seals in the 1980s, killing substantial portions of the population, and those were transmitted by birds. Again, these have not as yet been detected in monk seals but they do present a threat. These animals inhabit areas where migratory birds basically fly over their heads, and these birds do carry a plethora of different influenza viruses, some of which are undoubtedly dangerous for monk seals.

Q. How many of these potentially-lethal viruses have been detected in monk seals?

A. The only viruses that has been detected in monk seals so far are the morbilliviruses. In January 1996, a sick adult monk seal was discovered on the Aegean island of Psara. The animal, which subsequently died, was found to be infected with PMV, the porpoise morbillivirus. Then, during the 1997 mass mortality in Mauritania we isolated DVM, the dolphin morbillivirus.

January 1996: an adult monk seal on Psara was found to be infected with PMV, the porpoise morbillivirus

Q. How difficult is a virus to detect and confirm as cause of death, even in a mass mortality situation? During the 1997 mass mortality in Mauritania, for example, there was controversy and uncertainty over whether the cause could be attributed to a virus or a toxic red tide phenomenon.

A. That controversy is still there, although we are in the camp that maintains that the virus infection was the most probable cause. But we couldn't prove it. In the 1988 North Sea outbreak we could prove that the PDV was responsible for the epidemic by doing an infection experiment. I developed a vaccine in 1989, took a group of naïve seals, vaccinated four, sham vaccinated two, and then challenged them with the virus. The two sham vaccinated animals contracted the disease and died. And that's how I proved the virus was responsible. I was heavily criticized as a result.

During the 1997 mass mortality in Mauritania, I also isolated the virus. We demonstrated the presence of DMV and showed that a majority of animals had developed antibodies against it, and so there was definitely a spillover of the dolphin morbillivirus to the monk seals. You can always argue that that wasn't the primary cause, but that virus would definitely have debilitated the immune system of the animals. Whether or not it was the final cause of death, we will never know. However, we had one pup that was brought in for rehabilitation that died about 10 days later with a virus infection – that animal could not have died as a result of the algae bloom.

We also had blood and tissue samples analysed here in the Netherlands by the WHO reference lab and they couldn't find any evidence of an algae bloom – the toxins were just not there. The Spanish team then produced a report with contradictory findings, and so opinion remains divided.

1997: A mass mortality event strikes the monk seal colony in Mauritania / western Sahara, wiping out two thirds of the surviving population. Divided opinion blames both a morbillivirus epidemic and a toxic algae bloom or 'red tide'.

Q. What kinds of symptoms do morbilliviruses produce in monk seals? Do symptoms vary between adults, juveniles and pups?

A. Where morbilliviruses are concerned, if there is a naïve population – we can assume the monk seal population in the Mediterranean is naïve to morbilliviruses since we have not detected antibodies during periodic checks – then you would see all three categories, adults, juveniles and pups, being affected. If however, the virus has already been in the population, it is the pups that are most vulnerable because adults that have survived the infection are probably immune for life.

In contrast to the Mediterranean, a substantial proportion of the monk seal population in Mauritania carries antibodies to the dolphin morbillivirus. DMV specific immunity in the animals that survived the 1997 epidemic will most probably protect against other morbilliviruses as well.

In the acute phase, the virus mainly causes respiratory symptoms, including severe pneumonia from which the animals may die. If they survive the first acute infection, many other symptoms may appear, including neurological symptoms – which are usually fatal – gastrointestinal symptoms and skin problems. The point is, this virus severely debilitates the immune system, which means the animals become vulnerable to a host of other viruses and agents. During the 1988 North Sea outbreak, for example, we were isolating herpes viruses, influenza viruses, pox viruses, bacteria, parasites – you name it. This so complicated the diagnosis that we didn't know what the primary cause was, initially.

Q. Given their differences in habitat and behaviour, how are such viruses practically transmitted between species – for example, between dolphins and monk seals?

A. It's true that these species don't normally interact. However, seals are quite curious, so if you have a lot of dead dolphins floating in the water that still harbour viruses, then there is a possibility of contagion. The potential infectiousness of the virus also depends on environmental conditions. In the Arctic, for example, a carcass could remain infectious for weeks or longer. If it's in the Mediterranean, in summertime, then it's only a matter of days.

Q. What kind of time frame is involved in the development of a virus infection?

A. The incubation period is 1-2 weeks. After about a week the animal will start excreting the virus. This is the period when the animal is highly infectious – and so in theory it could come into contact with a number of other animals.

The monk seal we found on Psara was severely debilitated – it didn't swim and soon died – but you could quite easily imagine a real life situation whereby canine distemper virus is spread from domestic dogs to monk seals in the Mediterranean. If that were to happen, it is possible that a CDV epidemic could develop of the kind previously seen in the Antarctic among crab-eating seals, in the Caspian Sea and Lake Baikal, that killed tens of thousands of animals.

Q. What is the potential risk of monk seals contracting CDV and other viruses through contact with other wild and domesticated species, such as beech martins, bats, goats?

A. In Greece, there are outbreaks of CDV amongst dogs from time to time, but it also affects other terrestrial carnivores, like martins and foxes.

Goats have another virus, *peste des petites ruminants* (PPRV), and also rinderpest which has appeared in Turkey in the past and is closely related to DMV. These could be a potential problem for monk seals – we just don't know. As yet, we've not found a morbillivirus in bats, but they do harbour other viruses and also share cave habitat with monk seals. So far, I've tried to confine my comments to known threats, but I could give you a list of 50 other viruses out there which could be a potential threat, and it's important to keep that in the back of your mind. Everyone, for example, now takes the threat of morbilliviruses seriously. But when we first identified the phocine morbillivirus we had a hard time convincing the scientific world. So one has to guard against preconceived ideas, to be vigilant, and keep an open mind.

Q. Must viruses be considered a new threat to monk seals, or is there historical evidence to suggest that marine mammal populations have always had to contend with such periodic outbreaks?

A. I think these viral epidemics are not really new – only the frequency and intensity has changed. The earliest mass mortality that we know of was in 1955 amongst crab-eating seals in Antarctica, when the Americans mounted an expedition to the South Pole using non-vaccinated dogs. The dogs were dying of CDV and they probably dumped them in the water, causing an enormous mortality among the seals.

Q. To what extent can susceptibility to viruses among marine mammals be linked to deteriorating environmental conditions, such as pollution and malnourishment due to overfishing pressures?

A. First of all, the chance of animals becoming infected is higher because of increased contacts, both with domesticated animals and free-ranging or migrating species. There is an increased incidence, for example, of species moving into non-native habitats due to overfishing, climate change and other anthropogenic factors.

That, in fact, was the case that was made for the 1988 North Sea outbreak – that European fishermen were depleting fish stocks around Greenland, driving harp seals towards Scandinavian waters in search of food, and bringing the virus with them.

As a small concentrated population, the monk seal colony in Madeira must also be considered at risk from this phenomenon. In the last two years, for example, many hooded seals have been found well outside their customary geographic limits, and have been sighted in the Caribbean, Spain, even the Mediterranean.

If any of these animals were to carry a morbilli- or other virus, and come into contact with the Madeiran monk seal population, the risk could be significant. There may, in fact, even be a case for vaccinating this population.

Pollution is another factor. We know from seals in northwestern Europe that their immune system has been impaired – before the outbreaks – due to a build up of chemical pollutants like PCBs and dioxins. There are also new substances like hallogenated compounds used in antifouling agents on ships and in flame retardants – substances whose effects have not been fully studied as yet but that are building up in the environment.

Q. Vaccination is now routinely administered to monk seals undergoing rehabilitation. But under what circumstances is vaccination feasible for wild populations?

A. It is only administered routinely where we are concerned. We do not provide the vaccine to others at this stage, or only on a very limited basis. That's just a practical problem.

There is also the question of which vaccine to use. I am currently in discussions with our Ministries of Environment and Agriculture on precisely this issue, given the severity of the outbreak in the North Sea. There is a vaccine that's used in the United States which is a GMO, a genetically modified organism. It's actually based on canary poxvirus and that's a virus that does not replicate in mammals. The virus has been modified in such a way that it expresses the glycoproteins of CDV and that protects mink and ferrets against the virus. We think it will also protect against phocine distemper and other morbillivirus infections in seals. I've been trying to use that vaccine in the Netherlands but, since it's a GMO, I can't get the required permission. As a result, some people have started vaccinating seals with live attenuated vaccine. These should never be used in wild animal populations because of the risk involved. There is the notorious case of the black-footed ferret which was almost wiped out by vaccination with an insufficiently attenuated vaccine. What we are using is an inactivated vaccine, which may not be as effective as the GMO vaccine. Unfortunately, in Europe there is a knee-jerk reaction against anything associated with GMOs and, while I share many of those misgivings, this should be an exception.

Monk seal blood test. Serum samples from stranded, sick or dead monk seals should be collected and analysed as a matter of routine.

Q. Should vaccination be considered as a prophylactic measure in the eastern North Atlantic monk seal population?

A. I think vaccination should be considered for concentrated populations of monk seals, for instance in Mauritania and Madeira. You just have to weigh the benefits against the drawbacks and the practical problems involved. If you start to vaccinate you probably have to administer the vaccine several times.

Q. That obviously poses a high risk of disturbance.

A. You always have to weigh the pros and cons. But I think the opportunity should be taken to vaccinate the animals during other hands-on research procedures, such as the collection of blood or tissue samples. I agree that we should take whatever measures are possible to guard against unnecessary disturbance, but experience has shown that once an outbreak is already raging the logistics become far more difficult, particularly when there are no properly agreed protocols and scientific lightweights are taking decisions. I think all rehabilitated animals should in principle be vaccinated, but this has not been followed elsewhere.

Q. Are sufficient safeguards currently in place to guard against a possible epidemic among monk seals? And are there any specific steps that governments and NGOs should be taking to reduce risks?

A. The most important step is to develop a coherent action plan to deal with such emergency situations, composed of multidisciplinary teams. While a start has been made and working groups formed, I don't think they're functioning to the standard required yet. In fact, I'm almost certain that if there were to be another outbreak, then we'd see the same problems that occurred in 1997 in Mauritania.

Of course, there are always tensions between rival groups or individuals, but these problems can only be dealt with effectively with the right leadership and the right coordinating skills.

So far, I don't think we have the right experts around the table. The inevitable result is that – at least where infectious diseases are concerned – certain individuals are expressing opinions that they're really not qualified to talk about, even if they are experts in other fields, like population biology.

A rejuvenation of the expert teams – bringing talented young scientists into the equation – would, I think, be another step in the right direction.

Q. What special measures should monk seal conservation organisations be taking to monitor and guard against possible outbreaks? If it is not the case already, should blood samples be routinely obtained from stranded animals for analysis?

A. We have been getting serum samples from Greece, but not regularly from Turkey or Madeira. But this should be done on a routine basis. We are, in fact, currently trying to set up a coordination system for necropsies in the Greek – Turkish area, in Madeira and Mauritania. Once all the necessary contacts have been established, we will offer to analyse the samples free of charge, as we are currently already doing.

Q. How complex a procedure is it to test for the presence of viral infection? How quickly can results be obtained from analysis of blood and tissue samples?

A. Usually transport takes more time than the analysis. Although the procedure is complex, we have streamlined it in such a way that within 48 hours we have the result.

Q. What special measures should be in place to prevent disease transmission between monk seals undergoing rehabilitation and the wild population?

A. This is a point I've raised repeatedly. We have to be very careful, but with the safeguards we have at Pieterburen it is virtually impossible for rehabilitated animals to pose a greater risk than wild animals. If you rehabilitate professionally, there is no increased risk. I'm convinced of that. But 'professionally' – that's the key word. If rehabilitation is being undertaken where there are other species, particularly exotic species, in the same location, or if dogs and cats are allowed to roam around the facility, or if there are migratory birds in the immediate area, then there are serious risks of disease transmission.

Q. In what ways do you imagine that advances in virology will eventually pay practical dividends in safeguarding threatened and endangered species from viral mass mortality events?

A. I think there are three main areas. First in diagnostics. Although we are already quite advanced in this field, we could improve matters by making diagnostic capabilities more widely available. The second area is vaccination: we need to develop vaccines that can be used safely, and perhaps without touching the animals, thereby reducing or even eliminating disturbance. The third area where I see progress being possible is in anti-viral therapy. A diseased animal, for example, in the early stages of infection, could be treated with a specific anti-viral to combat the full onset of the disease. This is still a long way off, but in humans anti-viral therapy is already being used routinely for several virus infections.

Further reading

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In Focus

Vol. 5 (2): November 2002

CONSERVATION ACTIONS ON THE CABO BLANCO PENINSULA – A NEW APPROACH

Pablo Fernández de Larrinoa, Ingrid Mozetich and Miguel Angel Cedenilla

Ever since the first Spanish monk seal conservationists and researchers arrived on the "Coast of Seals" of the Cabo Blanco peninsula in 1992, applied actions have undergone several different stages and permutations of approach.

The 1992 expedition to this remote and politically disputed area of Mauritania / western Sahara took place 4 years after the French researcher, Didier Marchessaux, met a tragic and untimely death in a landmine explosion.

Up until 1994, the expeditions that followed had as their main objective the reassessment of written knowledge left by Marchessaux, Morales-Agacino and other researchers who intermittently worked along this coast. Intensive field work focused on identifying caves, beaches and other landmarks described in this bibliographic record. Breeding caves were relocated, as were other sites formerly occupied by seals – including once-important, yet geologically unstable, breeding caves that subsequently collapsed. A basic monitoring of the colony also commenced at this time (see the results in González et al. 1997).

From 1995 until 1998, a project financed primarily through the European Union LIFE programme concentrated on further detailed scientific research in the Cabo Blanco colony. Many of the current publications available on the subject are products of those years of intensive research.

Throughout this extended period of time, however, few if any conservation actions were applied in the area, which was heavily exploited by shellfish fishermen, who would descend from the cliff-tops to the beaches, caves, and anywhere else that goose barnacles might be harvested. Numerous artisanal pirogues also fished along the Coast of Seals, often as close as 40 meters to the entrance of the breeding caves.

A time for change

Following the mass mortality that struck the seal colony in 1997, claiming two thirds of the population, some of the researchers and conservationists involved concluded that it was time for a change in approach, reasoning that conservation action and the recovery of the population should become the primary objective at Cabo Blanco.

Following that rationale, in 1999 an International Recovery Plan for the species in the Atlantic began to take shape under the auspices of the Convention of Migratory Species (Bonn Convention), with appointed representatives of Mauritania, Morocco, Portugal and Spain leading the drafting process.

More recently, in November 2001, a PHVA workshop hosted by the Conservation Breeding Specialist Group (CBSG) of IUCN and the Spanish Ministry of Environment brought experts of many different nations and disciplines together to develop and improve the draft Action Plan [see International workshop report issued, this issue, and International workshop wrestles with Atlantic issues, TMG 5 (1): May 2002].

Since then, the projects developed in Cabo Blanco by the Fundación CBD-Habitat have focused on the conservation of the colony, including actions contemplated in the Plan and recommendations drawn up by the experts of the PHVA. The project, whose first stage has now drawn to a close in Cabo Blanco, has achieved some notable results.

Officially commencing in 2000, the project consisted of two main, closely-related, branches. The first of these focused on actions directly relating to the conservation or monitoring of the seal population, while the second incorporated social development actions – aid, education and awareness – within those sectors of the local population having a connection with the species.

Because of this conjunction of fields – social development and nature conservation – the project was financed by

specialised funding sources. The Spanish Agency of International Co-operation provided support for social development actions, while the Spanish Ministry of Environment and the NGOs Euronature and Fundación Biodiversidad financed conservation actions at the Cabo Blanco monk seal colony.

Social help for the poor

The social development component was considered essential to the success of the project. Formerly, seal researchers were seen by Mauritanian locals as strangers with weird views of the world – people who were anxious about the fate and welfare of animals, while impoverished locals hardly had the means to ensure their own survival.

In this context, convincing Mauritanians of the need to preserve an endangered animal species or involving them in the conservation process was virtually impossible.

With local artisanal fishermen having the most frequent interactions with monk seals in the area, we decided to investigate their particular social problems as a means of soliciting their help in the conservation of the species.

Safety-at-sea courses for artisanal fishermen

Conservation education comes to Mauritanian schools

Highest on the list of reported concerns was safety at sea – accidents which annually claimed several dozen lives – and also potentially serious health hazards arising from poor conservation and hygiene conditions under which the fish is sold in the city.

Accidents at sea, we discovered, were often caused by lack of knowledge. Many of these fishermen, in fact, have no seafaring traditions but migrated to the coast from interior regions, escaping from drought and attracted by the development of the fishing industry. A lack of means also prevented them from investing in safety equipment for their boats.

The new artisanal fish market in Nouadhibou

As a result of our study, over the past two years 360 fishermen have been trained in safety at sea, enabling them to predict and avoid dangerous situations, and also to react correctly in emergencies. We also provided them with safety equipment, such lifejackets, flashing emergency lights, position lights for the pirogues, foul-weather gear, first aid kits, etc.

Also, in conjunction with the city Council of Nouadhibou, the first artisanal fish market has recently been built in the city, helping to solve hygiene and fish conservation problems that were adversely affecting the health of the local population.

At the same time, environmental education and awareness courses were organised in conjunction with the Mauritanian Institute for Fisheries and Oceanographic Research – INROP -– (formerly known as CNROP), with artisanal fishermen, 70 school teachers and 2000 pupils of primary and secondary schools participating.

Coast of Seals protection area

All of these combined activities have resulted in a better understanding of the need to protect the monk seals in the region, and have encouraged local participation in the conservation process.

Local artisanal fishermen, for example, have now agreed not to fish in a designated area along the "Coast of Seals", which contains the two main breeding caves at its core.

This area, covering around 6 km of coast, has been marked with red flags to designate its boundaries. Since artisanal gillnet fishing in the area takes place from 0 to 500 meters from the coast, the signals placed to mark the area are clearly visible to the fishermen.

At the same time, on land, the area has also been marked to deter fishermen and shellfish collectors. An intensive patrolling of the area has been necessary to discourage their presence in locations critical for the seals – such as caves and open beaches – and to persuade them to fish in alternative areas.

During this process, the surveillance team has had to take action on numerous occasions to prevent their presence in seal breeding areas. Today, however, human intrusions by land have been virtually eliminated. Observation posts established for our guards allow monitoring of the area without the risk of causing disturbance to the seals below.

The realisation of this controlled terrestrial and marine zone represents an important result for the project and an important step towards the conservation and recovery of the Cabo Blanco seal population. Combined with reinforcement by the National Park of the Banc D'Arguin authorities of the Satellite Reserve of Cap Blanc, these efforts are leading to a much improved protection for monk seals in the area.

The Coast of Seals protection zone, marked by red flags

Since the beginning of this project, the number of adult or juvenile animals found dead (i.e. not including pups), has decreased from 4 animals respectively in 2000 and 2001, to 1 this year.

Seven of those carcasses were found prior to reaching an effective agreement with artisanal fishermen in September 2001, while only 2 were discovered subsequently.

All of the social development actions were implemented by the Fundación CBD-Habitat, in conjunction with the company Tragsa and the NGO Ipade.

Seal monitoring and research

While these initiatives were underway, many other conservation priorities were also being pursued in the colony – as reported in previous issues of TMG.

Monitoring of breeding caves has been undertaken on a daily basis since the inception of the project, allowing the identification of each season's newborn pups and their mothers. This has enabled us to resume work on constructing a reproductive history of breeding females, an effort that was brought to an abrupt halt following the mass mortality of 1997.

The continuous monitoring of the pups until their first moult at two months old has allowed us to determine the annual pup survival rate and to compare the results with external factors such as sea and weather conditions. In conjunction with the Spanish Ministry of Environment and the Spanish Institute of Meteorology, we are also developing a model which would allow us to correlate weather conditions at the coast with the models of high sea conditions generally used by meteorological institutions. This model, we hope, will prove useful in predicting storm conditions potentially lethal for newborn pups. Maintaining the link between nature conservation and social issues, such information will also enable us to issue weather alerts to artisanal fishermen.

Identification of monk seal individuals from the Cabo Blanco cliff-tops

Individual identification of males and non-reproductive females is also performed via cameras installed in the caves, and from photographs taken from the cliff-tops.

While it is a key priority, the monitoring of the coast is not confined to the meridional points of the marked protection area. Periodically, monitoring also takes us as far south as the tip of the Cabo Blanco peninsula, in order to find monk seal carcasses for necropsy or to rescue pups that have been swept away from the breeding caves.

So far, one pup has been rescued in this way, and following rehabilitation by INROP, with the technical assistance of

the SRRC of Pieterburen, it was released with a satellite transmitter set-up by Fundación CBD-Habitat. The small size of the transmitter allowed us to track the movements of the animal until the end of its battery life, 45 days after release [see Rescue, release and post-release monitoring of Weam, TMG 5 (1): May 2002 and Weam is one year old, this issue]. The animal, known as "Weam", which means 'concord' in the Arabic dialect, was also monitored visually, with local artisanal fishermen also contributing sightings information. As related in the last issue of TMG, Weam continues to be observed regularly, the animal often hauling-out on an open beach near the seal colony.

Fundación CBD-Habitat technicians have also spent time onboard fishing pirogues, gathering information on fishing grounds, fishing gear, and interactions with seals. Numerous interviews have also been conducted to gain further information on sightings of seals, particularly in locations where our technicians cannot reach.

The success of this project can, we believe, be attributed to the combination of diverse actions applied, involving diverse fields of expertise and funding sources. This interdependence has tended to magnify positive results throughout the project, but particularly in encouraging the involvement of the local community in the conservation process.

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Perspectives

Vol. 5 (2): November 2002

MEDITERRANEAN MONK SEAL BEHAVIOUR

Can we afford to discard anecdotal accounts?

Harun Güçlüsoy, William M. Johnson, Alexandros A. Karamanlidis

For as long as people have walked the Earth, their lives have been touched by animals. They have dominated and feared them, hunted, fished and farmed them, conferred supernatural powers upon them, treated them cruelly, with compassion and even religious respect. The very survival of ancient people depended upon a keen knowledge of wild animals, their habitat and behaviour patterns. Even today, the study of animal behaviour continues to be an important human pursuit, fulfilling a yearning for knowledge, for improved quality of life, or simply for profit. Research into insect reproductive behaviour, for example, is geared towards prevention of insect-borne diseases such as malaria, and also maximising agricultural output through pest control. On the other end of the scale, advancing knowledge of animal migration is helping conservationists design networks of “staging post” reserves that may ultimately save some endangered species from extinction.

The study of animal behaviour is a relative newcomer to the biological sciences.

Even today, monk seal research continues to rely on anecdotal accounts of fishermen and seafarers

Charles Darwin’s pioneering book, *The Expression of the Emotions of Man and Animals*, published in 1872, mapped a strategy for behavioural research that is still in use today. Unprepared for Darwin’s insight and revolutionary thinking, however, it was to take another 100 years for science to acknowledge his contribution. In 1973, the Nobel Prize for Physiology or Medicine was awarded to three pioneering zoologists, Karl von Frisch, Konrad Lorenz and Niko Tinbergen. According to the Nobel citation, they were the principal architects of the new science of ethology, the scientific study of animal behaviour. It was the first time that any contributor to the behavioural sciences had been honoured in this way, and it meant that the discipline of animal behaviour, which had its modern roots in the work of Charles Darwin, had finally arrived. One of the most significant contributions of von Frisch, Lorenz and Tinbergen was to demonstrate that behavioural traits are measurable entities in much the same way as anatomical or physiological traits.

Behavioural observations of Mediterranean monk seals date back to Aristotle, the Father of Zoology who, in his groundbreaking work *Natural History*, described the herding and social behaviour of seals on the coasts of Lesbos in the fourth century B.C. (Johnson & Lavigne 1999a).

In 1741, the famous Russian explorer and naturalist Georg Wilhelm Steller, while marooned on Bering Island, made a remarkably concise behavioural description of the sea lions that crowded its rugged shores (Frost 1993). Since Steller’s time, literally hundreds of authors have published works on the behaviour of Pinnipeds.

Compared to its northern relatives, however, or even to its endangered cousin in Hawaii, *Monachus schauinslandi*, our understanding of the behaviour of the Mediterranean monk seal (*Monachus monachus*) is seriously limited – a fact already recognised in the 1970s when scientists first began piecing together fragments of knowledge in an effort to devise a coherent action plan to rescue the dwindling species.

The characteristic obstacles that researchers face in pinniped behavioural studies, such as monitoring the animals while they are at sea or utilising tracking devices, are compounded in the case of the monk seal by low population numbers, colony fragmentation, inaccessibility of habitat, and the generally shy and retiring nature of the species.

Even so, direct observational research carried out over the years has succeeded in shedding some light on various aspects of Mediterranean monk seal behaviour. The early efforts of Mursaloglu (1984), Marchessaux (1989) and Dendrinos et al. (1994) provided significant information on mother-pup relationships, adult territorial and neonatal behaviour. More recently, long-term projects in Cabo Blanco (Mauritania / western Sahara), Madeira and Turkey have yielded some valuable insights into breeding and feeding habits and the use of caves by the species (Gazo et al. 1999, Neves 1998, Güçlüsoy et al. 1999).

All in all, however, reliable behavioural data on the Mediterranean monk seal remains meagre in volume and exceedingly difficult to gather. That presents an enduring problem for conservationists, who are required to design rescue and management plans based on detailed and accurate scientific knowledge of a species' biology and behaviour (Reed & Blaustein 1999).

Where Mediterranean monk seals are concerned, pursuing the research-to-conservation objective has been something of a hit and miss affair ever since efforts first began in earnest in the 1970s. Even today, faced with the same practical difficulties that have hamstrung researchers from the outset, data gathering continues to rely on anecdotal accounts of fishermen and seafarers, on logical and not-so-logical deduction, on comparative analysis with other pinniped species, on observations in captivity, and finally, on results of empirical research not infrequently based on conflicting or incompatible methodologies. While reliance on anecdotal sources has tended to diminish as *in situ* research becomes more technically sophisticated, it is important to remember that the evidence of fishermen and other coastal inhabitants has played a key role in improving knowledge of an otherwise obscure species, providing information on population numbers and distribution, prey preferences and feeding habits, and even seasonal movements (Berkes 1978).

Yet while anecdotal accounts have demonstrated their value in some key areas of monk seal conservation, it remains to be seen whether their full potential has been exploited elsewhere, particularly in terms of little understood aspects of the species' behaviour.

To date, ethological fragments are scattered among literally thousands of scientific papers, many of them unpublished. There has been no serious attempt to collate and cross-reference them. Conceivably, such information – when subject to proper scrutiny and coupled with newly collected anecdotal evidence – might offer promising new lines of inquiry in the ethological research of *Monachus monachus*.

The tricky part of any such compilation process is to separate fact from myth.

Here are a number of examples:

The grape-eating seal

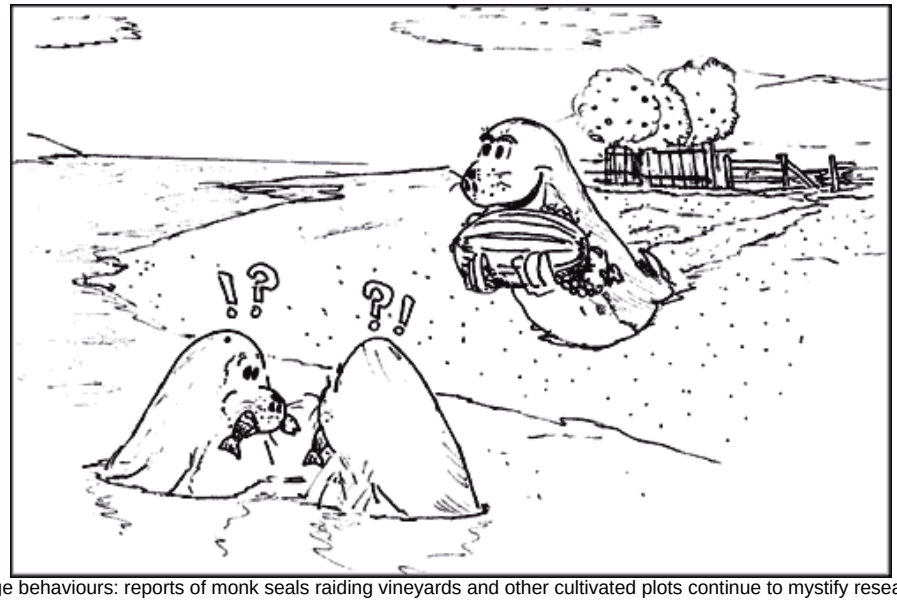
Reports originating from as far afield as Algeria, Corsica, Croatia and Turkey have accused the monk seal of sneaking into vineyards in the dead of night and feeding on succulent summer grapes (Anon. 1975, Brusina 1889, Hainard 1962, Jacob 1979, Ronald & Healey 1976). Indeed, the first reports of such behaviour appear in Renaissance times and were repeated, albeit with a dose of scepticism, in the first modern scientific description of the species authored by Johann Hermann (Hermann 1779). Brusina (1889) notes that "the inhabitants of the Dalmatian coast definitely assert that the seals come ashore during the night to suck the ripe grapes from the vines". The behaviour is also cited in the 1853 edition of the French Encyclopaedia of Natural History (Johnson & Lavigne, in prep.).

According to a more recent report, the monk seal was even risking extinction in Algeria with such mischievous behaviour, as irate farmers armed with shotguns took their revenge on the marauding animals (Anon. 1975).

In another description originating from the Cassis region of France around 1930, naturalist Gilles Cheylan reports that he originally attributed the repeated plundering of a seaside vineyard to wild boars. Hoping to catch the culprits, he and his companions set out for the vineyard at night, but instead of boars, found "four rather small seals diving into the sea which was about 20 meters away."

Coincidence? Cheylan concludes that because of the steep slope, the seals "must have used the goat path which leads from the beach to the vineyard" (Jacob 1979).

Recent reports of monk seals in Algeria feeding on potatoes, tomatoes and other crops cultivated near beaches only serves to deepen the mystery (Boutiba & Abdelghani 1997).



Strange behaviours: reports of monk seals raiding vineyards and other cultivated plots continue to mystify researchers (© Angelos Sanopoulos)

Boudouresque & Lefevre (1991) attributed the seal's grape and other vegetarian feeding habits to overfishing and consequent malnutrition – an unlikely hypothesis given the fact that the first reports are at least 500 years old.

Despite numerous anecdotal reports, the authenticity of the grape-eating phenomenon remains problematic, probably because no one in the scientific community can quite bring themselves to believe the monk seal capable of such an act. An earlier hypothesis, that seals may have inadvertently trampled the grapes as they sought shade in vineyards from the fierce midsummer sun, is also unsatisfactory since most "raids" appear to have been nocturnal. A casual foray into the vineyards with no particular objective other than curiosity can also be discounted, given the significant effort that monk seals – as ungainly as any Pinniped on land – must expend crawling ashore and then onto even higher land.

Such exertions, in fact, may well be indicative of pup or juvenile seals – as does the essentially inquisitive, adventurous nature of such behaviour. Indeed, Cheylan's description of "rather small seals" tends to confirm such a view. And what is to say that the monk seal, an opportunistic feeder at any time, is not even more adventurous in its tastes when young?

Migration

One of the first references to seal migration belongs to a Tunisian deckhand on a smuggler's boat in the early 19th century, who claimed to have seen herds of seals along the shores of southern Crete. Finding two pups in a cave one day, the crewmen decided to mark their identity, etching deep crosses between their eyes. Years later, on another smuggling expedition beyond the Straits of Gibraltar, the crew landed on an island and killed four large, beach-loafing seals. One of the dead, claimed the Tunisian, still bore a white scar between its eyes in the shape of a cross and can only have been "one of the two animals which were marked six or seven years before – or perhaps more – Allah knows." Seeking to explain the phenomenon, he added: "The seals always go towards the setting sun, contrary to the turtles which, like the Hajjis, always go towards the east" (Gavard 1927).

The smuggler's tale suggests that a grain of truth can be found in even the quaintest folklore. While monk seals do not habitually move in opposition to the Hajjis, they *can* sometimes travel significant distances – in search, perhaps, of bluer pastures, or better feeding grounds. Circumstantial evidence gathered during the 1970s suggested along-shore movements of between 50 – 600 km (Berkes 1976), findings generally supported by later observational deductions (Bayed 2001, Adamantopoulou et al. 1999).

Monk seals also commute between colonies, so-called seasonal movements that may take advantage of fish migrations, or breeding opportunities. Common sense now, you might think, but it was largely on the basis of anecdotal reports that researchers in the 1970s realised just how dynamic and how crucial interaction might be between fragmented colonies. That perceived importance was also reflected in the first conservation action plans for the dwindling species, envisaging networks of interconnecting reserves that would help nourish and sustain those movements. With governments and nature managers having other priorities in mind, however, precious little has been achieved towards that aim in the intervening quarter century.

Only relatively recently has field research and firsthand observation in Turkey (Veryeri 2001, Veryeri et al. 2001) and Mauritania (Cedenilla et al. 2002) confirmed previous assumptions on monk seal movements based on anecdotal evidence.

Breaking wind

A monk seal in Turkey, offering a noisy and forceful exhalation after diving

Already maligned as a stealer of fish and a wrecker of nets, monk seals have also gained a certain notoriety for their chronic flatulence.

Such antisocial behaviour even inspired a 16th century Benedictine hermit monk to write a poem denigrating the impudent seal who “lets off wind” so that even “the sea begins to hubble-bubble” (Johnson & Lavigne, in prep.).

Some fishermen in the Northern Sporades even claim that monk seals are able to use their powerful intestinal gases to hunt down prey hiding in rocky crevices underwater – a story also heard by researchers in Mauritania.

It is likely that misinterpretation and traditionally negative attitudes (Johnson & Lavigne 1999a) have given rise to such myths. Field experience has shown that what fishermen mistake for the sound of a seal breaking wind is, in fact, the animal forcefully exhaling, often after a long dive.

Character building

The Mediterranean monk seal has been variously described as mischievous, inquisitive, gregarious, solitary (hence the name, *Monachus*, according to some fanciful reports), docile, aggressive, easily adapting to captivity, shy and retiring, terrified of human disturbance.

Monk seals have died during blood and tissue collection procedures – possibly as a result of fright and panic. Monk seals have played and frolicked among human swimmers, even in areas where they had suffered serious persecution in the past. Human disturbance, on the other hand, has been known to make pups into orphans, and to provoke pregnant mothers to abort their foetuses.

Why the discrepancy?

> “It soon lost all fear of the numerous visitors around its enclosure. It entered and left the water under the curious eyes of the spectators and learned quickly to recognise me amongst them, turning towards me and crying when it demanded food – all of which didn’t prevent it from breaking the index finger of my right hand with a bite, one day when I tried to stroke it…” (Gavard 1927).

Historical and anecdotal accounts point to several, interrelating causes. First and foremost is habitat and how it shapes behaviour.

Comparative interpretation of ancient texts has revealed a fundamental deterioration of monk seal habitat since ancient times, driven by human disturbance and persecution. Over the centuries, monk seals have been displaced from open sandy beaches and great arching caverns that encouraged gregarious behaviour, to occupy increasingly marginal habitat, including caves that cannot even meet the essential biological needs of the species. Habitat deterioration has acted selectively against colony formation, in favour of individuals or mothers with pups. By severely limiting social interaction, mating and breeding success has been compromised, as has the animal’s gregarious behaviour for which it was so renowned in ancient times (Johnson & Lavigne 1999 a, b).

Then why are monk seals seen swimming into busy harbours, through the Corinth Canal, across Izmir and Thermaikos Bay – heavily polluted stretches of water in the Mediterranean? Why are they playing hide and seek with human swimmers?

The answer may lie in youthful curiosity and trust. Most, if not all, of the cases cited above involve juvenile animals. And like most juveniles, monk seal teenagers too, can be incautious, naive, even reckless. Most monk seals that end up entangled in fishermen’s nets, for example, are pups or juveniles – another behavioural phenomenon originally gleaned from anecdotal accounts and later verified by firsthand observations (Mursaloglu 1984, Jeny Androukaki, pers. comm. 2002. See also, When fishermen save seals, TMG 3(1): May 2000, and Snared and drowned, TMG 4 (1): May 2001).

In 1985 in Greece, researchers “confirmed that the young are not afraid of man and even let themselves be

petted…" (Ronald 1985). As history itself has shown, when cave intruders come in malice rather than misguided scientific curiosity, monk seals can pay a heavy price for their legendary trusting nature. In the 16th century, monk seal hunters were even taken aback by the docility and tameness of their prey (Johnson & Lavigne, in prep.).

Pioneering monk seal behaviourists like Bahtiye Mursaloglu knew that fishermen's reports could not always be taken at face value; that in village communities tales can quickly grow tall in the telling. Along the Aegean coast, for example, she came to realise "the unreliability of the numbers stated by fishermen and casual observers," largely because they were unable to clearly distinguish one seal individual from another (Mursaloglu 1991). Elsewhere, however, researchers have seen fishermen inflating seal numbers in the hope that it will improve their chances of compensation for damaged nets and reduced catches.

While anecdotal evidence cannot be equated with scientific fact, it can serve as a serious basis for further inquiry. Indeed, the use of anecdotal data is not simply a quirk of the monk seal conservation "scene", but a procedure gaining increasing acceptance in the understanding of poorly studied issues in diverse scientific disciplines. Such has been the case, for instance, in the management of the alligator snapping turtle (Berlin 1998) or even in the understanding of the effects of cannabis on the mood of psychologically disordered patients (Grinspoon & Bakalar 1998). Blehr (1997), pleads for a modification of ethological ground rules that will allow the presentation even of tentative hypotheses based on anecdotal data. The author argues that, especially in the study of free-ranging mammals – as is the case with the Mediterranean monk seal – "relevant behavioural observations lie outside the ethologist's control, and can only be replicated by further chance encounters. Observations in their anecdotal form should therefore be made available to other ethologists despite their lack of quantifiable data. This would allow for the creation of a pool of more or less unique observations helping to better understand behaviour."

> "A similar story was told in Kusadasi. A group of fishermen from Bodrum once witnessed a very ferocious battle between a seal and an unusually large octopus. The seal was unable to subdue the octopus and came very close to suffocation when the octopus blocked his nostrils. The seal swam over to the fishermen and 'asked for help'. The fishermen removed the octopus to save the seal's life and the seal followed the boat all the way to Bodrum harbour 'to show his gratitude'. Similar stories were told in two other communities..." (Berkes et al. 1979).

Logical deduction, comparative analysis (with other species and with the results of empirical research), preponderance of evidence (commonality of reports) – these are among the essential methods that researchers must apply in attempting to sift plausible ethological fact from myth and dubious folklore.

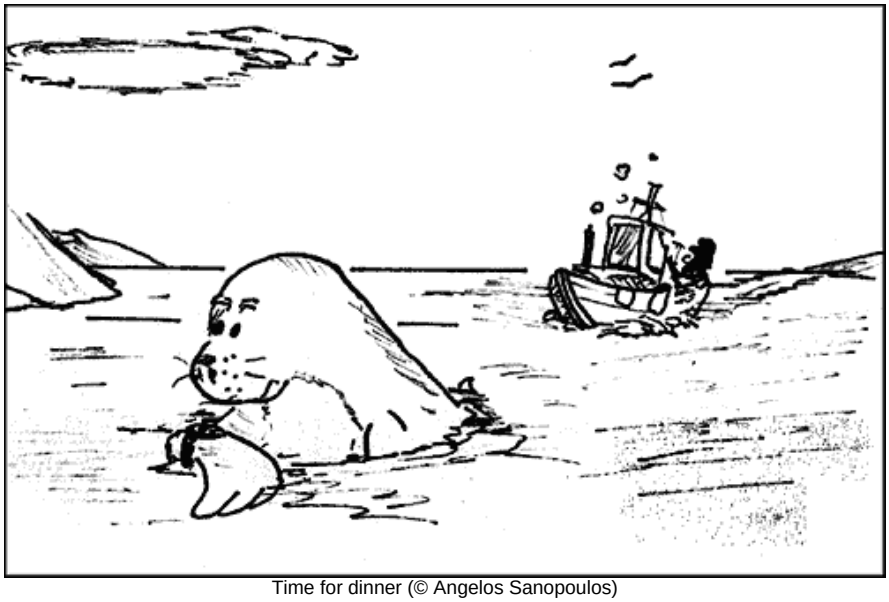
Such is the volume and diversity of anecdotal data focusing on the monk seal that a methodical approach is equally indispensable. Although the collation and comparison of such data has yet to be attempted in any comprehensive or systematic way, research should seek to:

- Identify, collate and analyse behavioural and biological facts buried in legends, folklore and anecdotal reports.
- Determine how anecdotal information has shaped human attitudes (often negatively) towards *Monachus monachus*.
- Ascertain how anecdotal evidence contradicts contemporary understanding of monk seal ethology, and how such data might fill missing gaps in scientific knowledge, and be usefully applied to the conservation of the species.

Monk seals appear in the local folklore of the Mediterranean region in numerous, often colourful, mutations.

Fishermen have regarded the monk seal as a cunning, voracious foe since ancient times, but to what extent do the following reports constitute observational fact, or prejudiced myth? Monk seals, according to Turkish and Greek fishermen:

- Keep a keen look out for fishing marker buoys that alert them when fishermen have laid out their nets and dinner is ready.
- Splash the surface of the water to drive fish into the nets.
- When feeding from the net, show a distinct preference for quality fish that command the highest prices in the marketplace.
- Rarely bother to retrieve fish that fall from the net onto the sea bed.
- Feed on the choicest fish cuts but leave the head in the nets.
- Attack the opposite end of the net as the fishermen haul in their catch.
- Wait for fishermen at strategic locations, and follow them out on their fishing trips.



Time for dinner (© Angelos Sanopoulos)

- Are capable of recognising individual fishing boats and fishermen and are thus able to identify which carry guns and which are more likely to harm them.
- Know, conversely, which fishermen are friendly, and visit them selectively in order to be fed. This habit has led to the popular saying in Turkey and Greece that “every fisherman has his own seal.”

Turkish fishermen have also reported observing monk seals mating in the water (an event rarely, if ever, observed by researchers) and territorial fights between males.

Given its past contribution and science’s current dearth of knowledge on the species, it is regrettable that so little effort is being made to collate and analyse the anecdotal evidence already at hand – evidence that could provide valuable insights into the behaviour of Europe’s most endangered marine mammal.

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ON A YOUNG MONK SEAL THAT LOST ITS WAY IN 1927

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On the 4th of August 1927 a young male monk seal (*Monachus monachus* Hermann, 1779) was found at Le Cormier, a small village on the Atlantic coast of France, about 13 km south of the mouth of the river Loire (Baudouin-Bodin 1964). Whether the animal was still alive or already dead is not known. The seal was mounted and brought to the Natural History Museum at Nantes in France (see figure). This museum, where the specimen is still present in the display collection, is worth visiting. As far as is known, the monk seal from Le Cormier is the second specimen to have been found on the French Atlantic coast.

The 1927 Le Cormier specimen, now on display in the Natural History Museum in Nantes.

The first, a young animal with a length of two meters, was discovered at the lower reaches of the river Gironde, northwest of the town of Bordeaux, in March 1817. The seal was mounted and exhibited in the Museum Rodrigues, but was subsequently lost when the museum closed down (Burguet 1843).

The discovery of these two monk seals poses an interesting question. Did they originate from the Mediterranean population or from the Atlantic? In her short article, Mrs J. Baudouin-Bodin, the former director of the Nantes Natural History Museum, expresses the belief that the Cormier specimen came from the Mediterranean one.

The present author, however, finds it more logical that the French Atlantic specimens originated from the Atlantic monk seal population. Despite the fact that no extralimital records of *Monachus monachus* are known from the Spanish Atlantic coasts and from Portugal (Teixeira 1979, Ibanez 1981, Reiner 1981), the discovery locations are closer to the Atlantic population than to the Mediterranean population. In the absence of firm evidence, however, the question of origin remains guesswork.

Another interesting aspect of the two records of monk seals on the French Atlantic coast is that so few extralimital records of *Monachus monachus* are known. Marine mammals which have no superable barriers can be found very far from their normal distribution range. Arctic species, for instance the hooded seal (*Cystophora cristata* Erxleben, 1777) can be found on the coast of Portugal and southern Spain, as well as in the Gulf of Mexico, the northern Caribbean Sea and on the coast of California. A southern elephant seal (*Mirounga leonina* Linnaeus, 1758), an Antarctic species, has been found on the coast of Oman on the Arabian Peninsula. Many more examples of extralimital records of seals and cetaceans can be cited, but would be beyond the scope of this short article.

Acknowledgements

The author is grateful for the help he received from the staff of the Natural History Museum at Nantes, where he could photograph the mounted Le Cormier monk seal.

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MONK SEALS IN THE INDIAN OCEAN?

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As discussed in some detail by Johnson and Lavigne (1999), the possible former presence of an unknown species of Pinniped in the Western Indian Ocean and Red Sea remains an open question.

While I have no definitive answer to offer, the aforementioned publication brought to mind documentation I collected some years ago during a two-year stay on Ile de la Réunion, a French island in the Mascarene archipelago. Due to the scarcity of information available on the subject, this historical evidence may prove useful to the discussion.

Historical reports of a seal species inhabiting the tropical waters of the Western Indian Ocean and Red Sea has raised the theoretical possibility of a former monk seal (*Monachus sp.*) presence, as they are the only seals known today to occur at such latitudes.

An alternative explanation is that observers confused seals with the dugong or sea cow (*Dugong dugon*, Sirenian) which are, or were, also present in the area. Dugongs continue to survive in the Red Sea and in the Persian Gulf, as well as along some East African shores, the Madagascar lagoon and around the Comoros islands. Older records of dugongs originate from around Mauritius and Rodriguez islands (Mascarene archipelago), from where they were extirpated during past centuries. The review of this topic by Stoddart (1972) is reasonably comprehensive.

Two fragments of historical information may now be added to the discussion.

On dugongs:

An authentic Holocene dugong butchery site was discovered some years ago in Umm al Qiwain, United Arab Emirates (Faure et al. 1993). The site is 4000 years old, and half of the mammal bones identified originate from dugongs. Another site is located on Akab island, adjacent to the city of Umm al Qiwain, dated between 4700 and 3000 BP. Nearly all the bones unearthed originate from dugongs (Faure et al. 1993). This might offer additional context to historical records of the "fish-eating tribes" discussed by Johnson and Lavigne (1999).

On seals:

A description of a visit to the Seychelles islands by a Marion-Dufresne expedition in 1768 appears to have been overlooked by some researchers (Lionet 1981). The expedition was mounted from Mauritius (then "île de France") and was composed of two ships, "La Digue" and "La Curieuse". In the logbook of "La Digue" it is recorded that on the morning of 4th of October 1768:

> "…about 20 'sea cows' were found, deeply asleep [on a beach on Mamelles islet]. They were killed. The largest was 7 feet 9 thumb long and up to 18 thumb in girth. The others were a third smaller. They were carried on board, and I boiled their fat, which gave me 38 pots of good oil to burn. This oil could have some other properties that I don't know of."

Conceivably, the larger specimen may have been a bull and the others its harem females. According to the logbook, this was the only location in the archipelago where these animals were found during the expedition and yet, apparently undeterred by that fact, the writer already speaks of the possibility of larger-scale exploitation.

That the animals were observed sleeping on a beach appears to indicate that they were Pinnipeds, not Sirenians. As with similar historical records from the region, this again raises the possibility that the sightings were of a now extinct Pinniped species, or of the southern elephant seal (*Mirounga leonina*). The latter hypothesis is bolstered by more

recent historical sightings of the species in the area, as well as the logbook's description of the marked size differences between males and females (if correctly interpreted).

What remains surprising is that this species is, at least today, normally linked to sub-Antarctic waters and weather. It is partly for this reason, in fact, that the *Monachus* hypothesis has been raised – even though it relies on no hard data. In analysing the historical records available, it appears far more plausible that a local (possibly breeding) population of southern elephant seals may have been present in the area, even if only vagrant animals are known today. Indeed, the 1768 sighting in the Seychelles took place in early October – precisely the season that adult southern elephant seals haul out for breeding (Le Boeuf and Laws 1994). Significantly, perhaps, Johnson (1990) also reports the sighting of a southern elephant seal as far north as Oman.

The depletion of the population through historical exploitation by sealers, coupled with massive overfishing pressures in modern times, makes it questionable whether we will ever see a recovery of the species at these tropical latitudes (Le Boeuf and Laws 1994).

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THE HABITAT OF THE ENDANGERED MEDITERRANEAN MONK SEAL (*MONACHUS MONACHUS*) IN THE ARCHIPELAGO OF MADEIRA

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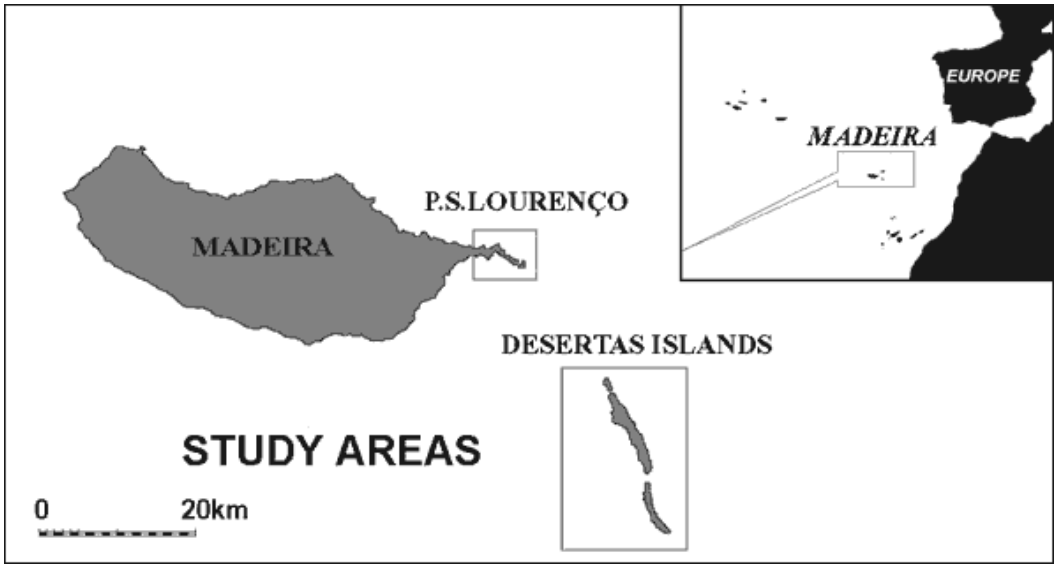
INTRODUCTION

The Mediterranean monk seal (*Monachus monachus*) is considered to be critically endangered and survives in small scattered and isolated subpopulations (Aguilar, 1999). When on land, Mediterranean monk seals frequent sea caves for resting and rearing of the pups. Circumstantial evidence indicates that monk seals use caves for resting that protect them from wind and wave action (Neves & Pires, 1999; Karamanlidis, 2000) as well as human disturbance (Panou et al., 1993). Successful breeding, in contrast, has been recorded mainly in well-protected, isolated caves (Mursaloglu, 1986; MOm, 2001).

A long-term project initiated by the Parque Natural da Madeira Service (PNMS) in 1989 aimed to: 1) describe the habitat of the species in the archipelago of Madeira, 2) identify the parameters determining the selection of caves as resting or breeding sites and 3) identify which caves could be used in the future by the recovering Madeira monk seal population.

METHODS



The coastlines of the Desertas Island Nature Reserve and Ponta de São Lourenço Protected Area were

circumnavigated and checked upon the presence of suitable monk seal shelters. Caves were entered by dinghy or by snorkelling during low tide and only after ascertaining that no animal was present. The features of the shelters were classified according to a number of variables that are considered to be influential in the selection of a cave as a resting or breeding site (Table 1). These variables enabled the swift collection of data and the performance of a cluster analysis.

Table 1 Variables used to classify Mediterranean monk seal habitat

North: Cave entrance oriented North (316º – 45º).
South: Cave entrance oriented South (136º-225º).
East: Cave entrance oriented East (46º - 135º).
West: Cave entrance oriented towards West (226º – 315º).
Small entrance: Surface of entrance visible above water at low tide < 5m2.
Big entrance: Surface of entrance visible above water at low tide > 5m2.
Short entrance corridor: Entrance corridor at low tide < 10m.
Long entrance corridor: Entrance corridor at low tide > 10m.
Small beach: Beach area inside the cave at low tide < 50m2.
Big beach: Beach area inside the cave at low tide > 50m2.
Beach underwater: Surface of the beach inside the cave is under water at high tide.
Beach above water: Surface of the beach inside the cave is above water at high tide.
Sand: Diameter of the predominant substrate of the beach inside the cave is 0,0625 – 4mm.
Pebbles: Diameter of the predominant substrate of the beach inside the cave is 4-256mm.
Boulders: Diameter of the predominant substrate of the beach in the interior of the cave > 256mm.

RESULTS

94 sea caves were identified, explored and charted. According to the cluster analysis, the habitat available to the Mediterranean monk seal in the archipelago of Madeira is made up of three distinctive groups of caves, which consist of eight different cave categories (Fig. 1). The features of the cave categories are presented in Table 2.

Table 2 Cave categories identified in the cluster analysis

Group I consists of four cave categories:

a) Caves with a beach underwater during high tide, big entrances and a short entrance corridor. These caves comprise 16% of the identified habitat.

b) Caves with a beach underwater during high tide, small entrances and a long entrance corridor. These caves comprise 3% of the identified habitat.

c) Caves with a beach underwater during high tide, small entrances and a short entrance corridor. These caves comprise 42% of the identified habitat.

d) Caves with a beach underwater during high tide, big entrances and a long entrance corridor. These caves comprise 12% of the identified habitat.

Group II has a single cave category:

e) Caves with a small sandy beach. These caves comprise 2% of the identified habitat.

Following cave categories belong to Group III:

f) Caves with a beach above water at high tide, which due to special features, such as double entrances, do not belong to categories g and h. These caves comprise 4% of the identified habitat.

g) Caves with a beach above water at high tide and a short entrance corridor. These caves comprise 15% of the identified habitat.

h) Caves with a beach above water at high tide and a long entrance corridor. These caves comprise 6% of the identified habitat.

Direct observations during the project have shown that monk seals utilise a wide range of the habitat and show no strict preference regarding the cave types when resting, as they have been found to rest in cave categories b, d, e, f and h.

Lobos cave (Group III, type g)

Cave belonging to group I, type a

Successful breeding, in contrast, has been recorded regularly only in cave categories e, f and h, which have a beach above water level during high tide and a long entrance corridor. Only in rare occasions did monk seals use caves with beaches below sea level for breeding.

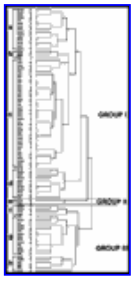

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Fig. 1 Classification of the habitat of *Monachus monachus* in the Archipelago of Madeira. Letters stand for cave categories (for a detailed description see Table 2), caves in Bold and Underlined represent the current breeding habitat, caves simply in Bold represent the potential breeding habitat.

(D2Wx, D2Ey: Deserta Grande west/east coast; D3Wa, D3Eb: Bugio west/east coast; PSLSi, PSLNj: Ponta São Lourenço south/north coast)

(Between Groups Linkage, Squared Euclidean Distance; SPSS 9.0 for Windows)

Considering these preferences, 16 caves were evaluated as being suitable for reproduction (Figure 1). Eight of them offer a good breeding environment under all weather conditions, whereas the remaining eight offer a good breeding environment only during calm weather. The potential breeding habitat makes up 17% of the habitat identified.

CONCLUSION

Monk seals in the archipelago of Madeira appear to be highly flexible in regard to the minimum requirements for resting; show, however, a preference for well-protected caves when breeding.

The results of the survey indicate the existence of suitable resting and breeding habitat in the study area, a positive factor in the potential recovery of the species in the archipelago of Madeira.

Acknowledgements

We would like to thank Parque Natural da Madeira for the funding and organisational support. We also would like to express our gratitude to the staff of PNM and particularly the Park Wardens for their enthusiastic collaboration during this project.

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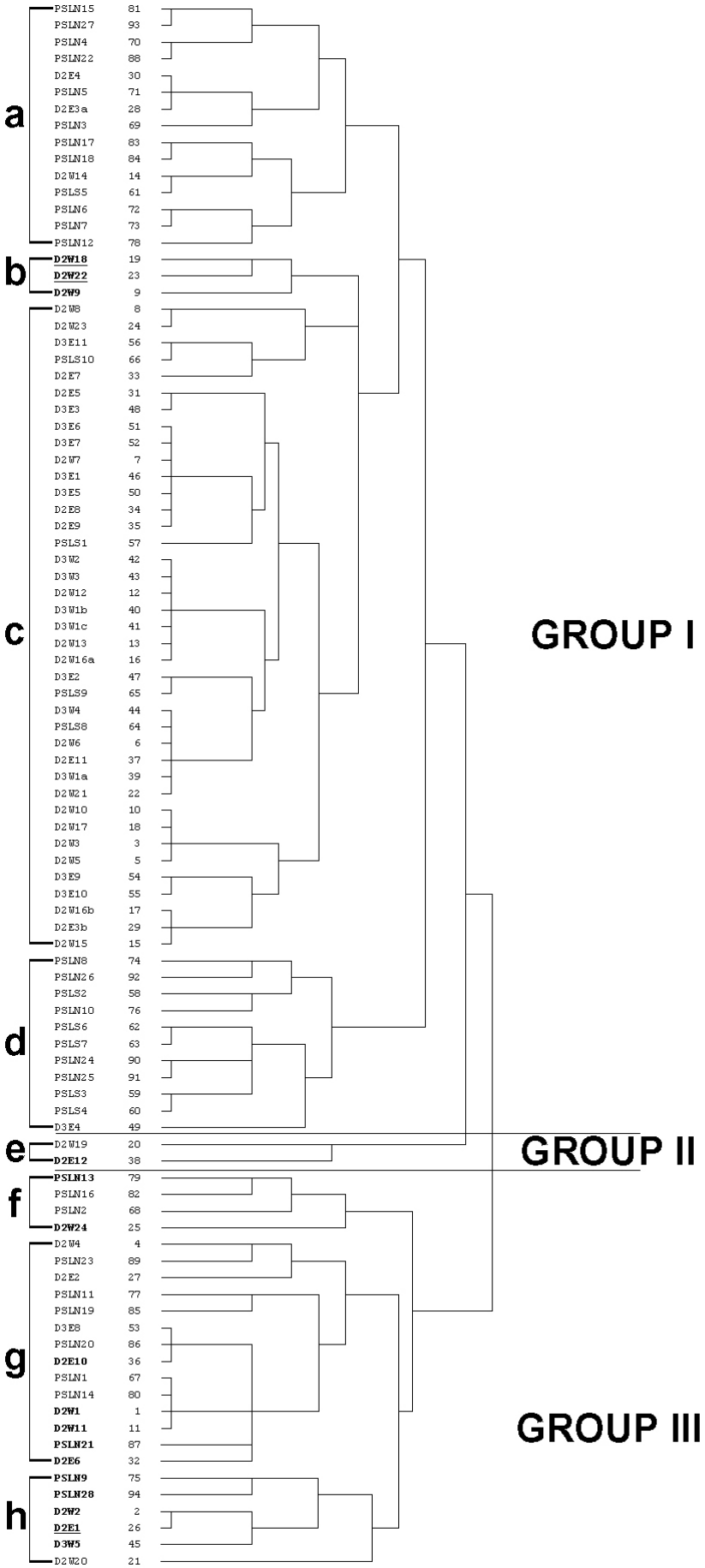
This poster was presented at the 16th ECS (European Cetacean Society) Conference, "Marine Mammal Health: from Individuals to Populations", 7-11 April 2002, Liege, Belgium.


a
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PSLN1 67
PSLN14 80
D2W1 1
D2W11 11
PSLN21 87
D2E6 32
PSLN9 75
PSLN28 94
D2W2 2
D2E1 26
D3W5 45
D2W20 21
GROUP I
GROUP II
GROUP III

The Monachus Guardian
monachus / schauinslandi / tropicalis

Letters to the Editor

Vol. 5 (2): November 2002

¿Which Park?

Before its creation in 1999, I did lobby for the inclusion of the monk seal cave areas within the National Marine Park of Zakynthos [See Challenge in the Ionian, 5 (1): May 2002].

Unfortunately, I only managed to get the monk seal included in the law as one of the target species for the Park's creation. It is ironic that the habitat of the most endangered living seal is not included in a new European Marine Park, created by law to preserve it.

Tourist trips to breeding caves have been organised since the late nineties and at least four individuals (one juvenile and three adults) were killed between June 2000 and February 2001, to the complete indifference of the Park's management body.

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

Sea turtles are chased intensely by tourist boats and pedaloes in the island bay, from their arrival until they leave. I am certain that severe stress inflicted during that crucial period is too grave to permit their long term survival in the area. Similar harassment has led to the disappearance of local bottlenose dolphins in the Canaries.

The best forests within the Park have been burned. Meanwhile, the wardens walk up and down the beaches. During the first year, when more money was available, 60 of them were hired to cover 8 km of beach. A similar number is enough to provide the best guarding in Spain for Doniana National Park (80,000 Ha), more than ten times bigger than the Zakynthos NMP, including the sea surface.

I am not surprised if funds have already been depleted.

I was named a 2001 official consultant to the Park and after one year of mismanagement (in my opinion), I sent a strong letter to the management body, making my continuation as a consultant conditional upon clear improvements. It was never answered. Tourist trips to caves continue and, I guess, killings too. I do not know if funds are still granted to the Park. ¿Which Park?

Dr. Daniel Cebrian, Calypso, Environmental Research Bureau, Milos, Greece

✓ **Editor's note:** Although little in the way of reliable information has been made available to the public, it appears that – like the National Marine Park of Alonissos, Northern Sporades – the Zakynthos NMP is facing a severe funding crisis, with planned conservation initiatives being deferred or cancelled and guards being laid off. The government's sudden reluctance to meet its financial obligations – possibly explained in part by the billions it is lavishing preparing for the 2004 Olympics – is likely to cause yet more sparks to fly in the European Union. The government's abysmal track record in protecting marine turtle nesting sites on Zakynthos has already led to

European Court judgements against the Greek state on several occasions.

Calypso, Environmental Research Bureau received the 2002 International Mediterranean Recognition award in June this year [see International News, this issue].

Bucharest Calling

My name is Toti Marinescu and I'm Editor-in-Chief of Radio Pro FM Bucharest, a national network which includes PRO TV Television, a news agency, one paper and 21 radio stations. My hobby is to save the monk seal and to write about this splendid animal. This mammal was seen even in Romania 30 years ago, on isolated beaches. But now, with tourism, the seal has disappeared. It lived on Cape Kaliacra too, in Bulgaria.

I would like to correspond with anybody who shares my interest in the monk seal.

Toti Marinescu, Bucharest, Romania. Email: toti@profm.ro

Helping the Hawaiian

Please let me know whether or not a credible organization exists in helping to preserve the Hawaiian Monk Seal. I was born and raised in Hawai'i and have always appreciated this species from afar. I would like to help as much as possible.

Dan Glober, USA.

✓ **Editor's note:** We suggest you contact the following organisation to learn more about its Hawaiian monk seal conservation programme:

KAHEA – The Hawaiian-Environmental Alliance
Honolulu, Oahu, Hawai'i

Monk Seal reintroduction in Israel

I am currently conducting a feasibility survey about the idea of reintroducing Mediterranean monk seals to Israel.

The idea is to construct a sheltered habituation enclosure, and to keep a breeding core until its population size will be large enough to support reintroduction.

I know that the Antibes Marineland project was rejected, but the Israeli concept is different.

Our purpose is currently to build a database for the authorities' "decision makers" about the feasibility of such a project.

I would like to get your professional opinion regarding this issue, or alternatively any organization or person whom I can contact, and that can give advice.

Amir Perelberg, Mammals Center, Society for Preservation of Nature in Israel.

✓ **Editor's reply:** Translocation and reintroduction of Mediterranean monk seals is a highly complex (and often contentious) issue since it necessarily involves the capture, removal and transport of individuals from existing populations elsewhere in the wild. Although an EU-funded, Spanish-led project was initiated several years ago to translocate monk seals from the Western Sahara to the Canary Islands, it never moved past the planning and research stage. Scientific opinion was divided on the wisdom and likely success of the initiative; it was hampered by lack of transparency, and the 1997 mass mortality event in the Western Sahara, which claimed two thirds of the surviving population, effectively ruled out the procurement of candidate animals. In the Mediterranean, where the surviving monk seal population is severely fragmented and composed of relatively small groups of animals, procurement of candidate animals for translocation purposes is unlikely to be approved by the relevant authorities. The **UNEP/MAP** (Barcelona Convention) Action Plan for conservation of Mediterranean monk seals [available for download in the Monachus Library] recommends that governments and NGOs take measures to encourage natural recolonisation of former habitat, by instituting a range of *in situ* conservation measures. Such efforts are being attempted, at least in part, in southern Italy. Indeed, *in situ* conservation of this critically endangered

species remains the overriding priority according to a consensus of scientific opinion [see **Johnson, William M., and David M. Lavigne**. 1998. The Mediterranean Monk Seal – Conservation Guidelines, available for download in the Monachus Library]. These efforts are mainly focused on the establishment of marine protected areas, rescue and rehabilitation, education and public awareness.

Although it is said that the Israeli concept differs from the rejected Antibes Marineland captive breeding scheme [see **Johnson, William M., and David M. Lavigne**. 1994.Captive Breeding and the Mediterranean Monk Seal – A Focus on Antibes Marineland, available in the Monachus Library], the nature of translocation dictates that there must be some shared similarities and problems, not least of all the procurement of candidate animals, the risks to the donor population, and risks to individuals in capture, transportation and captivity.

Life cycle

I came across your web site and was really moved by the articles. My 11 year old daughter is doing a report about the monk seal. And your site is very helpful for that and she has learned a great deal on the monk seal. We are looking for some real good photos of the seal through its stages of life. And, not having very good luck, we were wondering if you know where we could find such pictures. Any information would be helpful.

Melissa & Selissa French

✓ **Editor's note:** We are currently unaware of any photographic illustration of the monk seal life cycle that is easily accessible. However, we are hoping to add drawings depicting some of these stages to the Monachus Profiles section of the site in due course. In the meantime, one of our previously published articles may help: A field method for age estimation of Mediterranean monk seal pups, TMG 3 (2): November 2000].

Misleading monachus

Today, I tried searching for "monachus", and then for "monachus guardian", using Google. Both turned up monachus.org first. A chance visitor might actually think that the Guardian hasn't been updated since November 2001 (since the text reads "highlights of the current issue").

What should go there is a link to the new site, and the new issues: www.monachus-guardian.org.

Another solution would be to kill the old site, and keep the domain name. If IFAW can't afford to support The Monachus Guardian any longer, at least visitors shouldn't be misled into thinking it's in limbo, resting at November 2001 indefinitely.

Stefan Lang, Public Relations Dept., University of Bern, Switzerland.

Is IFAW still going to use monachus.org to keep the back issues of TMG online? If so, can't they at least put a notice somewhere that future issues will be published at the new site, www.monachus-guardian.org?

Harun Güçlüsoy, Underwater Research Society – Mediterranean Seal Research Group (SAD-AFAG), Foça, Turkey.

✓ **Editor's note:** IFAW has given us its assurance that monachus.org will link in to the new home of The Monachus Guardian, www.monachus-guardian.org. In the meantime, we apologise to readers for any inconvenience they may have encountered.

In terms of Internet search engines, it took the founders of TMG several years to achieve monachus.org's top rankings, making it all the more unfortunate that the URL was not transferred with the journal when IFAW withdrew its formerly generous funding support.

With new issues being published at regular intervals at the substitute URL, however, www.monachus-guardian.org continues its steady climb in the search rankings, and is already within striking distance of the number 1 slot on leading engines like Yahoo. Users entering "monk seal 2002" in search engines like Google – a recommendable tip for many Internet searches when the object is to find the latest updates – will already discover TMG's newest issues at the top of the listings.

Damaged issues

In your net site (a nice one!), it is unfortunately impossible to open the files in "current and back issues" section. The computer said that the files are damaged. Could you help me? Thanks for your help.

Marie-Odile Beudels, Institut royal des Sciences naturelles de Belgique, Brussels.

✓ **Editor's note:** The entire contents of our former site, monachus.org, was transferred to our current domain, www.monachus-guardian.org at the beginning of this year. According to several correspondents, it appears that some files in the old Monachus Library, including some back issues of The Monachus Guardian, may have been corrupted, either preventing download or subsequent file access. However, the Library is available in its entirety, and bug-free, at its new location, where many new titles have also been added since May, including PDF versions of the 2002 issues of TMG: www.monachus-guardian.org/library.htm.

Extinction scenarios

I am a freshman at the University of Puget Sound. I was wondering if there have been any hypotheses made about how the extinction of the Hawaiian monk seal would affect the Hawaiian Islands ecosystems? It is for my final project in my Diversity of Life class. Thanks so much!

Kate Pipal, University of Puget Sound, Washington, USA.

✓ **Editor's note:** Asked for his input on this topic, Dr. Jason Baker of the NMFS Hawaiian Monk Seal Population Assessment Program responded that: "This is a good question, but I don't think anyone has formally examined it with regard to monk seals. In general ecology texts, however, one can find discussion (with related references) of 'top-down' systems wherein top predators have a strong affect on other species. Whether this applies to the Hawaiian monk seal is unclear."

Keep on publishing (2)

Once again it was great to read the news and articles of "our" irreplaceable Monachus Guardian... Thank you once again for such a... creature!

Luigi Guarrera, Gruppo Foca Monaca, Roma, Italy.

So glad to see you have been resurrected! You provide an excellent service and I hope it continues.

Philip Miller, Ph.D., Program Officer, Conservation Breeding Specialist Group (SSC / IUCN), Apple Valley, USA.

✓ **Editor's note:** Reaching at least 10,000 people per issue, The Monachus Guardian is the world's only dedicated source of news and information on monk seals, their shrinking habitat, and the forces threatening their survival. We take this opportunity of thanking once again the hundreds of readers who have written in to support the continued publication of TMG and the maintenance of this website [see Keep on publishing, TMG 5 (1): May 2002]. It is in no small measure due to that demonstration of public, NGO, academic and media support that we have been able to continue publishing this year, aided by the generous sponsorship of the Bellerive Foundation and WWF [see International News, this issue].

With Bellerive's support, we are continuing our search for alternative funding sources that will hopefully put TMG on a more secure, longer-term financial footing. Anyone able to offer advice in this respect is kindly requested to write to us at: editor@monachus-guardian.org.

Spot the Error

"Jean Hermann's drawing of *Monachus monachus,* the Mediterranean monk seal, which he originally christened *Phoca monachus* in 1779, when he described it from a skeleton. The skeleton can still be seen in the Musée Zoologique de Strasbourg, which Hermann founded."

Stears, B.P. & Stearns S.C. 1999. *Monachus monachus,* in retreat. *In:* Watching, from the edge of extinction. Yale University Press, New Haven & London: 97-115.

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

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Recent Publications

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In Print

- **Baker, J.D. and T.C. Johanos**. 2002. Effects of research handling on the endangered Hawaiian monk seal. Marine Mammal Science 18 (2) April, 2002: 500-512.
- **González, L.M., B. Heredia, A. Araujo, I. Robinson, J. Worms, P.S. Miller, and U. Seal (eds.)**. 2002. Population and Habitat Viability Assessment for the Mediterranean Monk Seal (*Monachus monachus*) in the Eastern Atlantic. Workshop Report. Apple Valley, MN: IUCN/SSC Conservation Breeding Specialist Group: 1-126. Available in the Monachus Library.
- **Gonzalez, L.M., M.A. Cedenilla, P.F. Larrinoa, J.F. Layna and F. Aparicio**. 2002. Changes in the breeding variables of the Mediterranean monk seal (*Monachus monachus*) colony of Cabo Blanco Peninsula after a mass mortality episode. Mammalia 6 (2): 173-182. Available in the Monachus Library.
- **Maragos, J. and D. Gulko (eds.)**. 2002. Coral Reef Ecosystems of the Northwestern Hawaiian Islands: Interim Results Emphasizing the 2000 Surveys. U.S. Fish and Wildlife Service and the Hawaii Department of Land and Natural Resources, Honolulu, Hawaii: 1-46. Available in the Monachus Library.
- **Panou, A., A. Anestis, G.Ioannou, D.P. Karavellas, E. Liontou, A. Potamitis, E.H. Ries, N. Voutsinas and A. Vlachoutsikou**. 2002. Zakynthos Island, Ionian Sea, Greece: An important habitat for the Mediterranean monk seal, *Monachus monachus*. 9th International Congress on the zoogeography and ecology of Greece and adjacent regions, Thessaloniki 22-25 May 2002. Published by the Hellenic Zoological Society: 119.
- **Panou, A., P. Aravantinos, T. Kokkolis, S. Kourkoulakos, T. Lekatsa, L. Minetou, D. Panos, K. Pirounakis and E. Sclavos**. The Mediterranean monk seal, *Monachus monachus*, in the central Ionian Sea, Greece: Results of a long-term study. 9th International Congress on the zoogeography and ecology of Greece and adjacent regions, Thessaloniki 22-25 May 2002. Published by the Hellenic Zoological Society: 118.

Web publications, presentations & reports

- **Öztürk, B. and A. Dede**. 2002. Will Mediterranean monk seals survive in the Mediterranean Sea? Conserving Our Coastal Environment. Joint UNU-Iwate-UNESCO International Conference, 8-10 July 2002. [Abstract and Presentation].
- **Parrish, F.** 2002. National Undersea Research Center for Hawaii and Western Pacific – 2002 Milestone Report. Project: Evaluate the impact of harvesting precious corals on resident deepwater fish assemblages and the monk seal forage base. [Report].

In press

- **Güçlüsoy, H. H. Örek and N.O. Veryeri**. Is the Rehabilitation of the Mediterranean Monk Seal *Monachus monachus* (Hermann 1779) in Turkey necessary? II. Avrasya IWRC Yaban Hayati Rehabilitasyonu Sempozyumu ve Egitimi Kursu, 16-20 Mayis 2002, Ankara, Türkiye [in Turkish].

TMG thanks Alexandros Karamanlidis for his help in compiling this listing

The Monachus Guardian
monachus / schauinslandi / tropicalis

Vol. 5 (2): November 2002

Publishing Info

The Monachus Guardian
ISSN: 1480-9370

Editor: William M. Johnson
Production Editor: Matthias Schnellmann

Published by: Friends of the Monk Seal

c/o M. Schnellmann
Wernerstr. 26
CH-3006 Bern
Switzerland

All e-mail communications, including letters to the Editor, should be sent to:
editor@monachus-guardian.org

The views expressed in *The Monachus Guardian*
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The Monachus Guardian gratefully acknowledges the generous financial support of

Bellerive Foundation

World Wide Fund for Nature