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GLOBALISATION AND THE MEDITERRANEAN MONK SEAL (*MONACHUS MONACHUS)* ON KARABURUN PENINSULA

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ABSTRACT

Industrialisation, urbanisation, population increase and mass tourism disrupt natural balances. The effects of "globalisation" on biodiversity of coastal ecosystems and local values of inhabitants may be better understood when using our monk seal research on the Karaburun Peninsula as a model. This model may also be useful to conservationists working on other threatened species in the Mediterranean.

1. INTRODUCTION

The environment has always changed and species have evolved or gone extinct. Humans are now an additional force of such change on a global scale. Ever since we mastered tools such as fire, axes, and boats we have significantly altered environments and impoverished natural communities (Habeck, 2002). Air, water and soil pollution has expanded from local to global scales.

The need for food, fuel, shelter cannot be ignored, but beyond these basic "needs" we now manufacture, use, and discard non-essential products on a global scale such as electronic equipments, packed foods, plastic bags, bottles, batteries, many other plastic articles without the capability of recycling. Products are often designed with a limited life and planned obsolescence. Globalisation is obviously the modern driving force of consumer-based social and economic systems.

We should consider that, from the political aspect, it might be argued by some that globalisation plays a stabilising role, encouraging nations to engage in international trade rather than indulge in political intrigues. Of course, it might also be argued that globalisation also plays a role in purposely destabilising certain developing countries and regions in order to gain access to and exploit valuable natural resources.

We propose that globalisation significantly shifts values and behaviours. For many people, both rural and urban, international and national corporations, international advertising agencies, investment banks, pension funds, construction companies etc. increase the desire for more money to consume more. In these pursuits, people may no longer be as sensitive to how their actions affect the delicate balance of nature.

We assert that globalisation poses serious problems so clear solutions must be addressed for the health and peace of individuals, nations, and wild life. Mediterranean Action Plan emphasises the meaning of sustainable development as a "basic principle of environment" giving explanations for the relevant necessary actions which have to be taken (Grenon, Batisse, 1989). In awareness of sharing the responsibility, research and action programmes are most effective when they are designed to be international and multicultural.

The effects of "globalisation" on the biodiversity of coastal ecosystems and local values of inhabitants may be better understood when our monk seal research on the Karaburun Peninsula is used as a model. This model may also be useful to conservationists working on other threatened species in the Mediterranean.

2. RESEARCH AREA

The Karaburun Peninsula (436km²) is in the north of the Urla Peninsula (1246km²) within the province of Izmir on the Aegean coast of Turkey.The research area is 100km away from the central district of Izmir. There are two municipalities and 13 villages in the area. It covers the borders of Karaburun Town and Balikliova village of Urla Town. The coastal length of the research area is around 120 km.

The Karaburun Peninsula was one of the most important Aegean areas in production of grapes, olives, artichoke, narcissus and other local agricultural products up to 1980s. Flower plantation is a recent activity which is an alternative income source for the inhabitants owning rather small pieces of land for agriculture. Olive oil processed in small scale local olive oil factories is still a major income for the local people of the peninsula (Erdem *et al.*, 2001). General emigration trends out of Karaburun are as follows:

- 1920's: Greek relocation after Turkey's War of Independence;
- 1930-40's: poor adaptation of relocated Turks;
- 1950-60's: fatal earthquakes (Soykan *et al.*, 1989);
- 1970's: non-competitive products due to rough winding roads and steep valleys which make mechanized agriculture relatively difficult;
- 1980-present: relocation to Izmir and other metropolitan areas seeking better education and employment opportunities (Sivrikaya, 2002) .

The rocky, mountainous peninsula is rimmed by steep cliffs, pebble beaches, islets and islands. The highest peak, Akdag, reaches 1218 m. The land supports 384 species of flora from 255 genera and 70 families (Bekat and Secmen, 1981). The dominant vegetative forms are sclerophyllous shrubs, pines, olives, grapes, and grazing land as is common throughout the Mediterranean. Bird life is also diverse with 204 terrestrial and marine species, including many endemic, internationally recognized as endangered species (Audouin's Gull-*Larus audouinii,* Yellow-legged Gull-*L. cachinnans)* (Eken, 1997). The Karaburun Peninsula is also home to some rare, endangered mammals including the Eurasian Otter, *Lutra lutra,* and, of course, the Mediterranean monk seal, *Monachus monachus* (SAD/AFAG, 2001).

Research studies in Foca since June 1993 and Karaburun since September 2000 have indicated that at least 15 seals have been using the area. Researchers have found 2 breeding caves and more than 15 usable caverns. At least 3 monk seal pups have been born on the Karaburun Peninsula since 2000 (Figure 1).

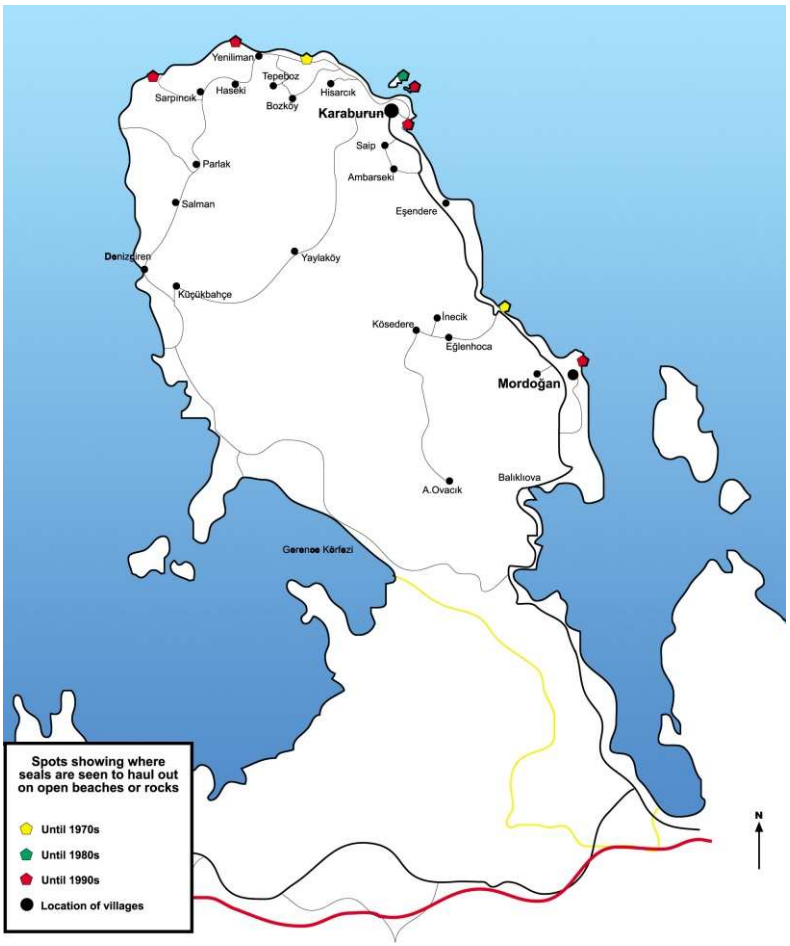

Fig. 1. Map showing spots where seals were seen to haul out on open beaches or rocks until 1970s, 1980s, and 1990s.

3. MEDITERRANEAN MONK SEAL

The Mediterranean monk seal, *Monachus monachus* (Herman 1779) is a member of pinniped family (Ozturk, 1992). Like all mammals, monk seals must breathe air. Compared to other pinniped species they hunt and dive in rather shallow waters, staying underwater for only 5-10 minutes. The maximum-recorded depth is not more than 100 m. (Orkun *et al.* 1998). The nutritional sources of the monk seals are varied and include green algae, (Schnapps et.al. 1962), eels, caro, whiting, sardines, bonito, octopus (Ronald, 1973), lobsters, (Bertram, 1943), herring (Bacescu, 1937), *Dentex*, *Labra* (Boettger, 1951) and other fish species. Monk seals can be a nuisance to fishermen as they take fish from nets and cause damage. They seem to take fewer fish when the nets are set at a depth of 30m (Ronald and Healey, 1974).

The seals mate at sea after reaching maturity at 4-5 years of age. They can live as long as 40 years. Females have one or two pups annually or biennially, usually in September or October. Gestation is 10-11 months and pups are usually born on beaches within caves. They can swim and dive after two weeks and are weaned at about 17 weeks (IUCN, 1996; Johnson, 2001). Mating is observed on Turkish coastlines at the end of summer or in autumn (Mursaloglu, 1986).

Referring to ancient works such as Homer's “Odyssey” and Aristotle's “Historia Animalium” it is estimated that there were herds of monk seals living along the Mediterranean Coastline. Since 19th century this population was known to utilize the whole Mediterranean coastline and the East Atlantic from Portugal down to Senegal in West Africa. The number of Monk seals has decreased rapidly starting by mid 20th century following the industrial and recreational pressure along Mediterranean coastlines. Today their distribution is limited to some eastern Mediterranean coastlines and northwest Africa. According to the International Union for Conservation of Nature the total remaining population is estimated to be about 500 individuals (MOM, 2001). Researchers in Turkey have identified 31-44 individuals and estimated that at least 50 Monk seals presently live on the shores of Turkey (Orkun *et al.* 2002).

The Mediterranean monk seal is Europe's most endangered marine mammal. Threats to its survival were clearly identified at the First International Conference on the Mediterranean Monk Seal convened in Rhodes, Greece in 1978. They include:

1. Increased adult and juvenile mortality because of deliberate killing,
2. Increased adult and juvenile mortality caused by incidental entanglement in fishing gear,
3. Increased adult and juvenile mortality due to human disturbance (activities such as tourism, fisheries and shipping),
4. Increased pup mortality caused by pupping in unsuitable conditions, due to loss of preferred habitat,
5. Poor conditions due to lack of food as a result of overfishing,
6. Reduced fecundity (breeding success) and pup survival (possibly) caused by inbreeding depression (Johnson and Lavigne, 1995).

We believe that land-based and shipping-related marine pollution in Izmir Bay, as well as domestic waste, also threaten the survival of monk seals in our research area.

Currently, monk seals use natural coastlines preferably having caves or caverns convenient for breeding and/or sheltering, free of human constructions, inaccessible for the human and influences of human activities. They also use the rocky coastlines, shores, bays and river mouths for hunting. Thus, the Mediterranean monk seal needs long distances of natural coastlines unfragmented by human activities and constructions in order to survive and breed” (Orkun *et al.* 1998).

We can only determine monk seal distributions through direct observation (i.e. they are not observable via remote sensing nor radio tracking). Therefore, our observation data is biased-if there are more people in an area, there is more potential for seal observations even if they do not prefer the populated areas. Thus it is very difficult to ascertain to a certain degree how monk seals have adapted to using areas inhabited by humans. We do know, however, the regional distribution patterns indicate that Mediterranean Monk Seals only exist in areas which are still relatively pristine (Orkun *et al.* 1998).

4. GLOBALISATION AND MEDITERRANEAN MONK SEALS ON THE KARABURUN PENINSULA

The factors threaten the survival of the Mediterranean monk seal also threaten the overall health of the Mediterranean ecosystems and human cultures. Monk seals have the priority of being the sensitive indicator species of the ecosystem's health. Monk seal researchers in Turkey believe that “Conserving the Mediterranean Monk Seal means conserving the Mediterranean” (SAD/AFAG, 2001).

4.1. Material and method

4.1.1. Seal sightings, observations and habitat

The shy behaviour of monk seals combined with the scarcity of the species makes behavioural observations difficult, especially in the eastern Mediterranean where monk seals have been observed for a short period of time (Orkun *et al.*, 2002). Since September 2000, researchers working in Underwater Research Society/Mediterranean Monk Seal Research Group (SAD/AFAG) have been conducting a research on Karaburun. Methods include;

Seal sighting data mainly from local small scale fishermen, amateur fishermen, local people active near the coastline, second house dwellers and other groups are recorded on a standardized form.

Observations on seals by researchers and volunteers from:

- stationary points of coastline on route of seals or nearby their caves using binoculars and/or telephoto lensed cameras;
- using a small boat and patrolling along the coastline;
- in-cave checks (using diving equipment).

Habitat for seals is observed by car or boat and caves are explored using lighted diving equipment.

4.1.2. Construction, population, and pollution

The study area is observed by car and boat. Visits and field surveys with relevant official governors, managers, local people are conducted. Official documentations and scientific literature are searched.

4.1.3. Fishermen activities

Members and non-members of “fisherman cooperatives” are visited regularly. Dialogs are initiated in the harbours, coffee shops, private homes and in the project office at Karaburun.

Photo and video cameras used in all activities for visual documentation. Official maps for public use are referred for localizing relevant data.

Human populations, land use activities, and wastes (some indicators of globalisation) are related to behaviour and populations of seals surviving in our research area using graphs, maps and numerical computation.

4.2. Relationship between dwellings and monk seal habitat

“*They will be astonished to know that a seal lives beneath their house***” -** A remark by a construction worker about a second house cooperative settled above and nearby a seal cave at Esendere / Karaburun.

A major incentive for much of the urbanization along the Mediterranean coastline is mass tourism. This lucrative industry has been the driving force of economic development in the Mediterranean since 1960s and, in many areas, it is also the engine that spurs demand in other relevant sectors of the economy such as the construction and fishing industries. Tourism has also been cited as the cause of a dramatic increase in human pressure on the Mediterranean monk seal since the 1950s (Johnson and Lavigne, 1999).

We believe that some major factors, relevant to globalisation, that have supported coastal construction and second houses in Turkey are:

1. Modern agricultural methods and marketing make the land more valuable for construction than for continued agriculture.
2. “Human resources have the tendency to accumulate where wealth for work is higher” (Yasamis, 2001). Rural peoples' migration to megapoles, selling their rural lands to citizens.
3. Progress in technology, communication, transportation, media, (television was introduced to our culture in the 1960's) and market advantages for purchasing domestic products drove many people to accept a utilitarian approach for social status. Regardless of the economic status people are motivated to have a second house for property investment, for social status, and for economic advantages of spending summer holidays in their own house (Dogan and Erginoz, 1997).
4. National politics encouraging civil engineering, mass tourism, substantial markets in local, national and global trade (Doganlar et al, 2001).

Besides the above mentioned major factors, complexities in coastline management have resulted in insufficient share of responsibilities among governmental departments and local municipalities. This let the people who are after easy-money create an artificial increase of land prices around coastal towns. Uncontrolled development of Turkish coastlines was realized in 1980's (Dogan and Erginoz, 1997).

Second houses are used for only 2 months per year, on average, during the north Aegean summer season. We have documented around 10.000 second houses (10 % under construction) within our research area. Even on the Karaburun Peninsula, where we do not see a massive construction and tourism activity profile, insufficient drinkable and irrigation water, insufficient baseground facilities, land fill waste sites, misuse of agricultural lands, pollution, toxic run-off are in the literature of local stakeholders (Figure 2).

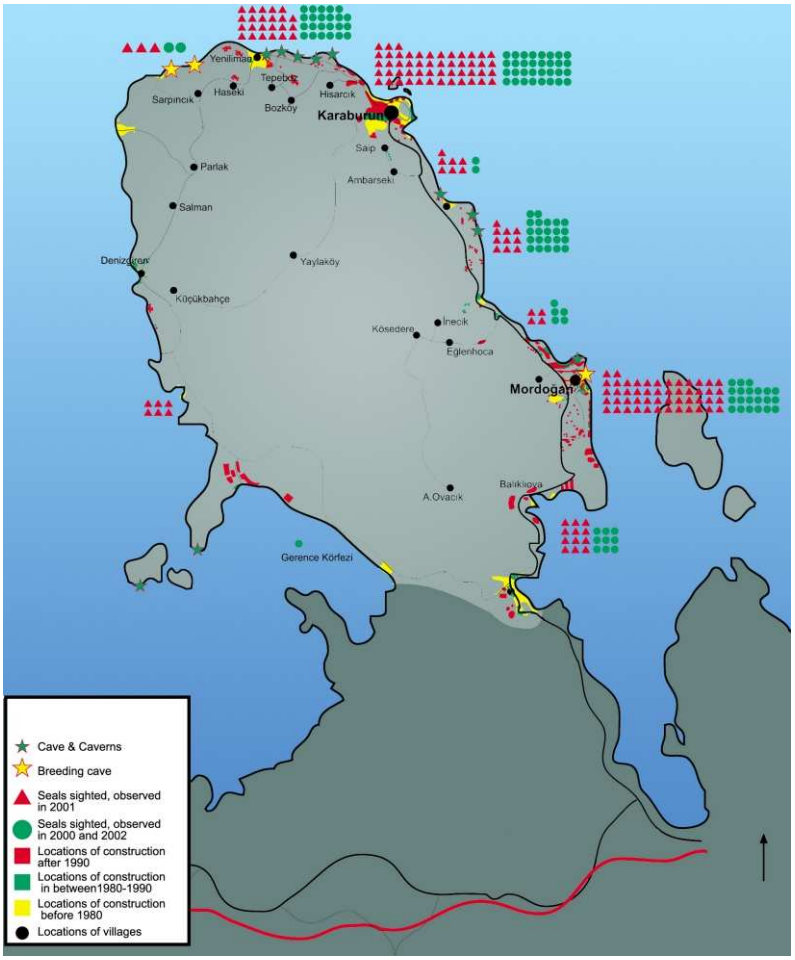

Fig. 2. Map showing construction on coastlines (before 1980, between 1980 and 90, and after 1990) and monk seal activity and breeding caves.

4.3. Correlation of human population and number of seals sighted in 2001

"We like more to be at Karaburun now that we have learned seals are here" - remark by a second house owner at Karaburun.

Due to tourism and second house dwellers' activities we see a drastic change in the population of human in the research area. We wanted to correlate the time- population data of human with the number of seals seen at the same time of year. We only referred to seal sightings from the north and east side coastlines of the peninsula where we see dominant local population settlements and second house constructions (Figure 3 and 4).

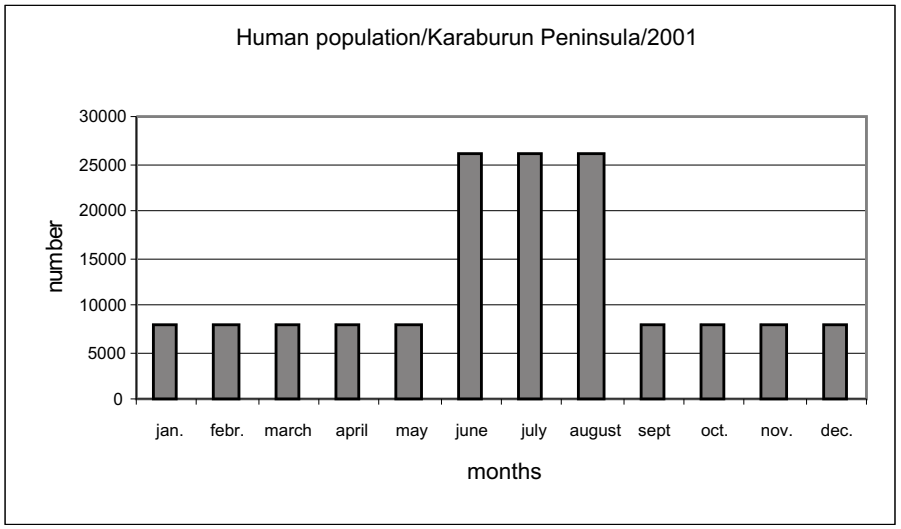

Fig. 3. Human population in research area per month in year 2001.

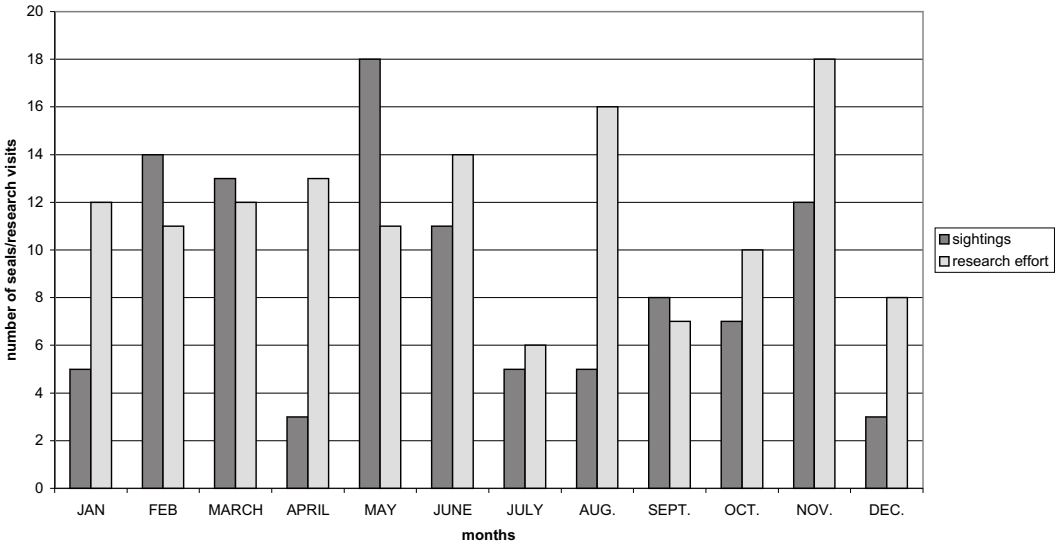

Fig. 4. Number of sighted monk seals (research team observations excluded) and the effort for interaction with informants in research area per month in 2001.

We exclude the behaviour of biology aspects of the monk seal. The fishermen are the main source of data except in summer time. The fishermen are relatively passive in December and January due to strong north and north east winds.

4.4. Wastes and monk seals

Toxic Chemicals; Izmir is the third most populated and economically developed city in Turkey located at the eastern end of an intrusion (and old Gediz River Delta) by the Aegean Sea. Izmir city is obviously large with its 12.825km² lands and approximately 3 million population. Izmir Bay surroundings are filled not only with the settlements but also by irrigable agricultural land (Menemen Plateau) the return waters of which find the sea either directly or indirectly through Gediz River. Water catchments area of Izmir Bay is approximately 20.000km². Industrial and domestic pollution of Gediz River and Aliaga factory wastes carried by strong north and northwest winds to southward in upper level waters, do reach the outer gate of Izmir Bay where Foca and Karaburun border. Chemical pollution dominant in crom has the potential of threatening the healthy being of the whole marine bio-life in a wide range (Sunlu *et al.*, 2001).

Plastic Wastes; Since September 2000, throughout the research studies and cave checks researchers have always found bags, bottles, ropes and undefined pieces of plastic on the shores, in water pools of caverns, and on shores of caves. Apart from local sources, the brand names, the language used on them and the types of the encountered particular wastes also indicate the possibility of over national borders sourced pollution.

By January 2002, during a regular check in a breeding cave nearby Mordogan where a pup was born in October 2001, the researcher encountered a massive accumulation of plastic waste on the shore of the cave. Over and nearby these wastes on the pepple shore there was observed clear tracks of a young and an adult monk seal indicating that the cave is in use. A nylon bag of around 40 litres capacity also found in the cave was full of collected wastes after the cleaning up process.

All kinds of domestic and industrial wastes are thrown into more than five stations of garbage area on the peninsula. Villages far from main districts have produced their primary garbage areas. There is no precaution at these stations for preventing physical or chemical dispersal to base ground (soil and underground waters) or the surroundings.

To better understand the scale of wastes stored in open garbage areas we can refer to below Table 1 showing data on the most densly populated and second house constructed districts (Sivrikaya, 2002, per comm.).

Table 1. Waste stored in Open Garbage Areas in the Karaburun Peninsula.

Garbage area of districts	Approx. min-cover area in km²	Approx. min. distance to sea coastline in km
Karaburun (pre-used)	1	2
Karaburun (in use)	5	4
Mordo an (pre-used)	4	3
Mordo an (in use)	5	6
Kucukbahce (pre-used)	0.5	1.5
Kucukbahce (in use)	3	3

A plastic waste that a young seal could be trapped into would drive her to an inevitable end as her body dimensions increase in time and the waste article soffocates her body to death. Referring to research data obtained in monk seal projects in Turkey and Greece we still find that there are monk seals observed to have plastic materials or ropes around the body which caused direct or indirect death (Zavras, Guclusoy, 2001).

4.5. Professional fishing activities and mortality of seal pups

Monk seals are known to take fish from set nets or lines of fishermen. Damage on the equipment, loss of fish, time and expenses needed to repair the equipment sometimes drive fishermen to deliberately kill the monk seal. Small fishermen are in competition with seals. Besides the seals, dolphins and sea turtles are the other primary actors of this competition as the top species of marine food web.

Local fishing activities on the peninsula are mainly of small scale fishermen. 150 artisanal fishermen are members of one of 5 fishermen cooperatives in the research area. Boats of big scale fishermen, except 2, are not resident and also hunt in zones other than the peninsula coastlines. Around 200 big scale fishing boats are observed to use the parts of Karaburun at particular times in 2001. Trawlers hunt beyond a one N.mile range from the coastline. Girgiri boats depending on the facilities of the boat are free to fish in a range of 9 metres and deeper in all zones except the inner and outer Gulf of Izmir. Unselective and very defective techniques on fishing grounds used by coastal seines and small trawler boats have been forbidden since 1st of April, 2001 by the Ministry of Agriculture and Rural Affairs.

Recent changes in Aqua Products Circular, concerning big scale fishing activities, make it harder to evaluate the current relative potential of productivity of small scale fishing around the peninsula. Unfortunately there is no reliable data on the fish caught in the last years along the coastlines of the Karaburun Peninsula (Anonymous, 2000).

What is for sure is that recent official precautions to prevent illegal, harmful fishing techniques are appreciated by local small scale fishermen. Referring to dialogs with local fishermen, it has been indicated that in a very short period of time, less than a year, fishermen have begun to catch fish species that couldn't be caught in the last decade and there is a relative increase in the abundance of fish caught due to above mentioned preventive measures taken against illegal fishing activities

Current legal status for fishing determined in the official Aqua Products Circular looks as if it is giving more credit to small scale fishermen than in the past decades. But as part of the consumer of globalising values fishermen and members of their families are also motivated to consume more and change their standard of living. Referring to research studies on the techniques and quantities of equipment used for fishing over the last decades we learn that there is a great deal of change in the material of fishing equipment and in fishing techniques .

We learn that up to 1950's fishermen had to produce hand made set nets and lines mainly of organic material. Since 1960's organic tread used in nets and lines changed their place with inorganic materials produced from petroleum. As outcomes of “globalisation”, durable equipment exported and then produced in Turkey, used by fishermen for less maintenance and cost efficiency, creates threats to marine life. There is a great deal of change in the quantity and type of equipment used among artisanal fishermen. Bu what is for sure is the fishermen do or plan to have as much equipment as they can to catch more fish. Competition among fishermen, risk of damage to equipment due to sea conditions, damage caused by dolphins, seals and sea turtles drive them to have and use more equipment to compensate the inevitable risks of an insufficient catch.

Drastic seasonal increase in the local population due to tourist and second house dwellers in May, June, July is a major factor in the increase in equipment and activity of fishermen.

The rate of value of the same fish species at this time of year (summer season of maximum 60 days) increases up to 2-5 times higher than the value in other seasons of year.

4.5.1. Set Nets and Pup Mortality:

Young monk seals between 2-4 months get entangled in set nets and die by drowning. Leftover set nets, long lines due to net entanglement to sea ground, nylon bags, ropes are still passive potential traps for seals, dolphins and turtles. In years 2000,2001 and 2002 the total number of monk seals born in a cave near by Mordogan/Karaburun was only three. Two pups, born in 2000 and 2001, were found dead by drowning due to entanglement in set nets. A total of 2 pups were born in Foca Town 9 N.miles away from the Karaburun Peninsula in years 1995 and 1996. Both pups were entangled in set nets and only one could be rescued by a fisherman and the research team. We still get recordings from local fishermen of drowned or rescued young seals from set nets of their own from 1970's and 1980's. Thus four in five pups known to be born in the Karaburun and Foca regions have been entangled in set nets and 3/4 have died” information correlates the high threat of set nets on survival of monk seals.

5. CONCLUSION

We believe that it is not possible to maintain adult or young generations unless adequate attention is paid to conservation measures and they are basically satisfied with the life they live in Karaburun. Health, education and social facilities improved by globalised technologies seem to be the necessary projections for the rights of people living in rural areas. In decision making, management plans should be handled thinking about local cultural and ecological values. We should certainly guide natural and cultural protection, for economic improvement gained by tourism, agriculture and fisheries. If the sea, soil and air are spoiled by pollution and coastlines abandoned by unplanned settlements there will be no chance for sustainable life.

Implementation of conservation measures to be of any value must be based on a firm knowledge of the life cycle and habits of animals (Winn and Olla, 1979). We believe that every species has a role in the ecosystem. Considering still on going research projects to explore the complexities of marine life, a species known to have survived for millions of years to become extinct would create a gap in the ecosystem.

Species have an aesthetic value of perception for humans. Like seals, they are unique in their form

and members of the harmonious beauty of nature. Their forms have been used to express human culture since ancient times. We believe humans should be very careful not to cause defective effects on natural beauties that they cannot ever replace.

Ethically, the human is expected to behave aware of responsibilities to his environment. In our research area, there seems to be the tendency in the present and younger generations to perceive their surrounding in terms of economic projections and definition of needs motivated by references to the globalising world. Defining the carrying capacity of natural sources would be a good start to an approach in order to reach solutions. Trying to find paths to inform the members and reorganize the capacities of local stakeholders would result positively in long term.

We believe all individuals, specialists, institutions and their mutual efforts on education, research and conservation will be usefull for a sustainable life in the Mediterranean.

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