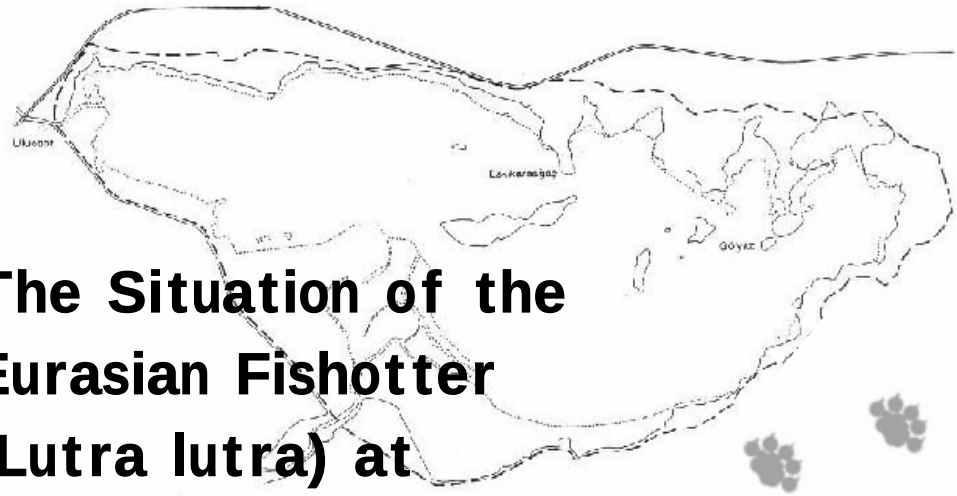
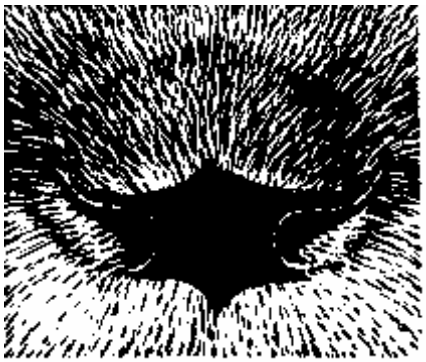


The Situation of the Eurasian Fishotter (Lutra lutra) at Lake Uluabat

Abundance
Breeding Grounds
Feeding Habits
Threats



Heike Thol-Schmitz
Thomas Schmitz
Wildlife Consultants

"First Survey of Breeding and Feeding Areas of the Eurasian Fishotter at Lake Uluabat", a Subproject of the "Lake Uluabat Conservation Project" coordinated by 'The Society for the Protection of Wildlife/ WWF Turkey' (DHKD).

This project is supported by Unilever.

The Situation of the Eurasian Fishotter (Lutra lutra) at Lake Uluabat
Bahar Suseven (Heike Thol- Schmitz)

ISBN: 975- 98483-2-5

Gökova- Akyaka'yı Sevenler Derneği (G.A.S.-Der)
Bilim Serisi 1, 2005

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Yayıma hazırlayanlar : Bahar Suseven, Thomas Schmitz
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Tasarım ve Uygulama: Bahar Suseven
Baskı : Gökova- Akyaka'yı Sevenler Derneği (G.A.S.-Der)

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*all photographs: Thol-Schmitz/ Schmitz

PREFACE:

Extract from the Ramsar Convention for the Protection of Wetlands:

III. Wetlands of International Importance and the Ramsar principle of Wise Use

22. Under the Ramsar Convention on Wetlands the two concepts of wise use and site designation are fully compatible and mutually reinforcing. Contracting Parties are expected to designate sites for the List of Wetlands of International Importance "*on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology"* (Article 2.2), AND to *"formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory"* (Article 3.1).

23. Ramsar COP3 (1987) defined wise use of wetlands as "*their sustainable utilisation for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem*." The Strategic Plan adopted at COP6 (1996) equates "wise use" with sustainable use. Contracting Parties to the Convention also recognize that wetlands, through their ecological and hydrological functions, provide invaluable services, products and benefits enjoyed by, and sustaining, human populations. Therefore, the Convention promotes practices that will ensure that all wetlands, and especially those designated for the Ramsar List, will continue to provide these functions and values for future generations as well as for the conservation of biological diversity.

(RAMSAR CONVENTION: Annexes to Recommendation 4.2, Montreux, Switzerland, 1990, and Resolution VI.2, Brisbane, Australia, 1996)

versus:

"Who cares for water? - We want fish!"

(Member of the Fishing Cooperative in Gölyazı/ Lake Uluabat)

Acknowledgements:

We would like to thank everybody who helped and supported us during the survey and the completion of this report:

* The DHKD for their interest in our work, for inviting us to participate in the "Lake Uluabat Conservation and Environmental Masterplan Project" and the members of both offices, who never cease to answer our needs,

* A special "Thank you" to Ms Eren Atak (DHKD Project Coordinator) for her assistance and her friendship,

* As always to Grace and Paul Yoxon (IOSF) for their advice,

* All the members of UluKuş for their valuable assistance and the good time we had! Big "Thanks" especially to Mrs. Franziska Arıcı, who never left our sides, and to her husband Mr. Ismet Arıcı, who gracefully suffered the negligence,

* To the Mayor of Gölyazı, Mr. Cavit Uysal and the employees of the Gölyazı Municipality, Ms Saliha Yayan and Mr. Recep Yünkuş, for their logistic support and for making sure, that we were always comfortable,

* To the Fishing Cooperative administration for their support, especially to their vice president Mr. Ömer Aslanlar for his patience with us,

* To Mr. Cavit Suyabatmaz from Gölyazı, who let us stay in his house; to the Kırcal family, who fed us with lovely food and valuable information, to Ali İhsan (Coşkun) and Serkan from the tea house for their never-ending supply of much needed tea and coffee, and last but not least: to all the people in Gölyazı and all around the lake, who made us welcome and supplied us with the necessary background for this survey.

Thank you all for a great time!

Introduction

The objective of the first ever Fishotter (Lutra lutra) survey in the Uluabat area has been a determination of the population, its breeding areas, feeding habits and imminent threats. Important for the "National Fish Otter Data Bank Project" we started recently, building capacity for further monitoring had been in our interest as well as the future of DHKD's "Lake Uluabat Conservation and Environmental Masterplan Project". So, beside the field work, we prepared and held an introduction workshop and a course of fieldwork training for members of the local bird group "UluKuş" as part of the survey project, providing us with the necessary assistant workforce and ensuring further survey possibilities (see: ANNEX/ A.2, Personnel and Itinerary).

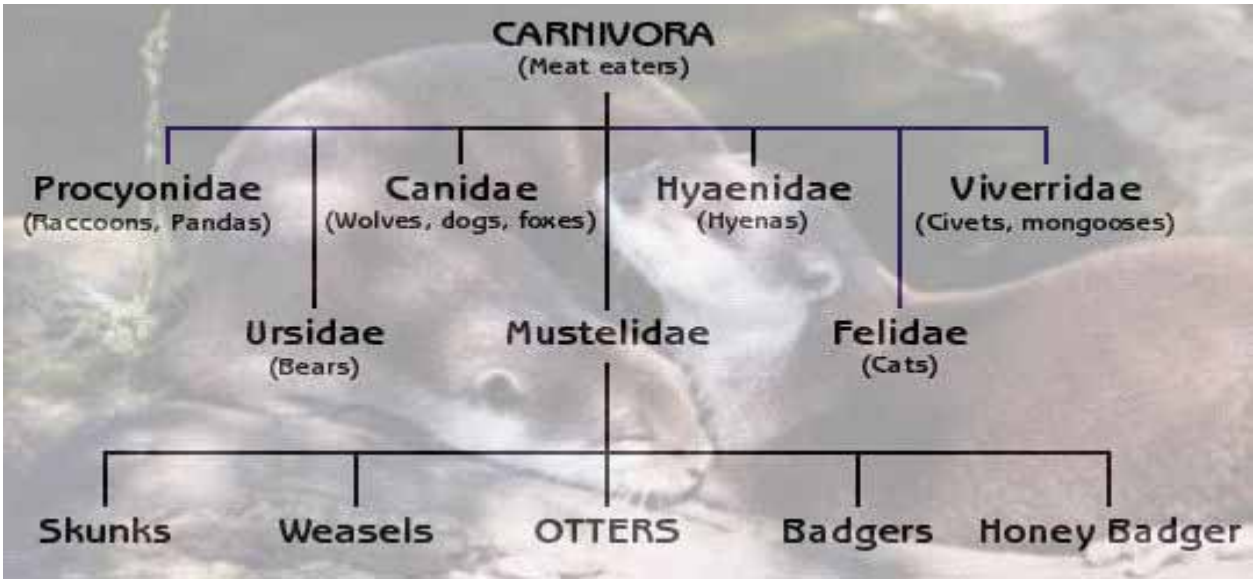
We investigated the area of Lake Uluabat in autumn 2002 for 16 days, keeping mainly to the vicinity of the Ramsar site with a few exceptions where we had to explore deep into the canals of the Mustafakemalpaşa Delta, south west of the lake.

Despite the semi- aquatic Eurasian Fishotter (Lutra lutra) as a species being still quite unknown because of its elusive nocturnal behaviour (with the only exception: Shetland (Kruuk, 1994)), its importance, especially as a Ramsar species increased over the last years parallel to its decreasing global population. The general status of lutra in Turkey is widely unknown (Foster- Turley/ Macdonald/ Mason, 1990; Macdonald/ Mason, 1992) or rather not well researched (Eroğlu, 1994; Öztürk, 1998), with only a few people working on the subject and a great lack of team effort or mutually used or shared information. Surveys are generally conducted differently to normal mammal surveys, tracking is difficult and the acknowledged method of otter assessments is by spraint surveys. The general Fishotter survey bases mainly on the accumulation of spraint samples, individual sprainting behaviour and such; rather than counting individuals like in other surveys (e.g. birds), here numbers are not the relevant criteria. The usual objective is an overall assessment of the status quo of lutra in accordance to its habitat or ecosystem, not a count.

1. The Eurasian Fishotter (Lutra lutra)

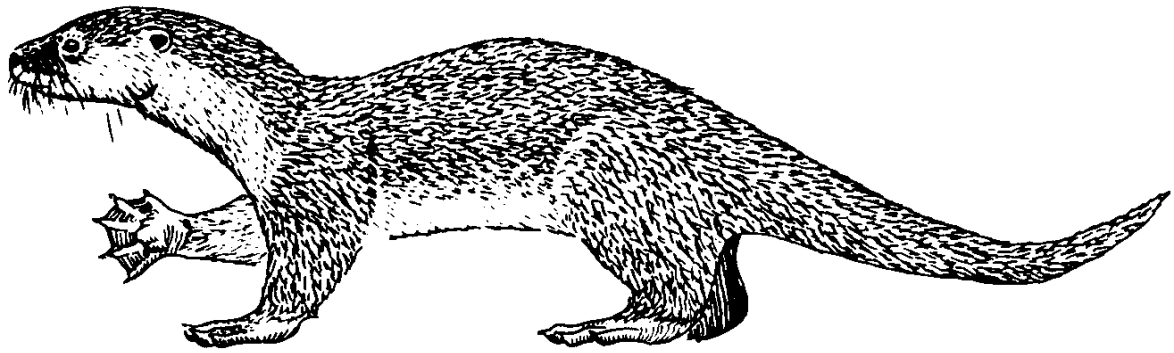
1.1 Species Description

Otters are carnivorous, semi- aquatic mammals, belonging to the Mustelidae family.



Graphic 1: Lutra species, Family Tree

The Eurasian Fishotter becomes up to 130cm long and can reach a weight up to 14 kg. The species is very well equipped for their semi- aquatic life. Their webbed feet, thick waterproof fur, conical tail and cylindrical, streamline bodies, enable them to dive and hunt very speedily. On land they are rather clumsy, a fact that does not keep them from travelling long distances, even over land, for mating reasons, or in case their habitat becomes inhabitable.



Graphic 2: Eurasian Fishotter

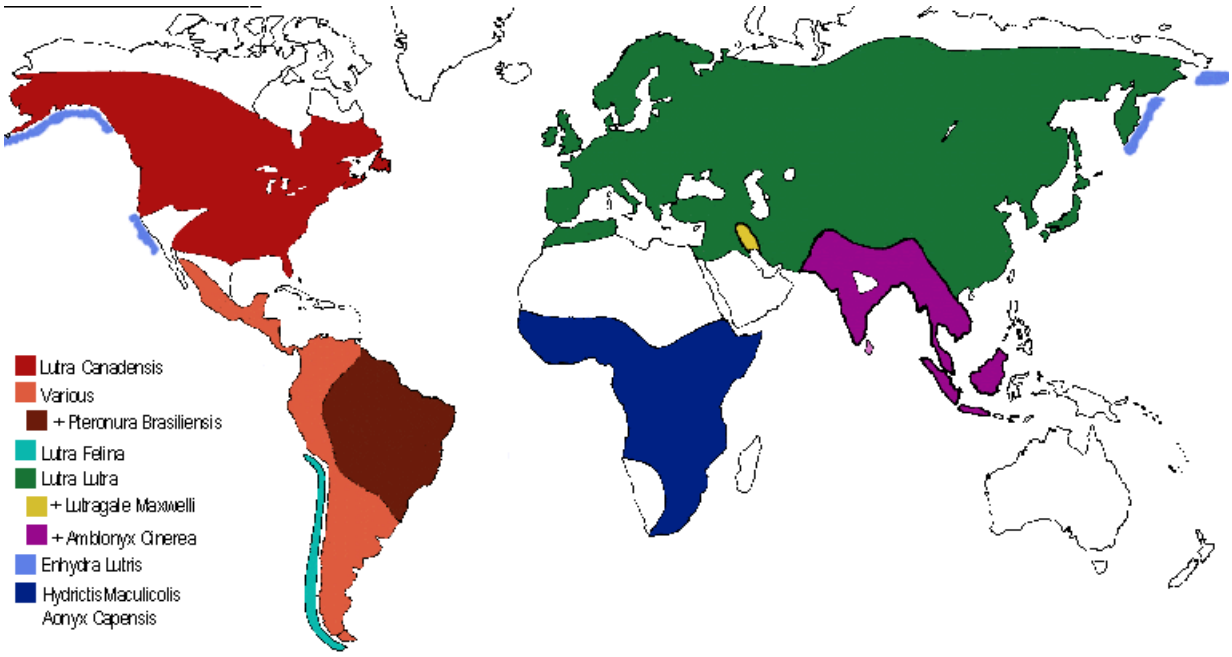
Their lifespan (under surveillance) is allegedly ~12 years. The concerned literature does not provide any definite numbers for a lifespan under natural circumstances (Chanin, 1985). We know that the subject of our long term studies had been at least 14 years old, when she died. (Thol-Schmitz, 2000; Thol- Schmitz, 2002)

They live of fish (preferably eel), small birds, crustaceans and snails. Their prey differs with their ability to hunt, an able bodied adult otter will prefer fish, where young or very old otters live of slower moving prey.

Otters are nocturnal, secretive and very sensitive mammals. Especially the females are solitaire and quite territorial, with the exception of the mating season, when males and females are visiting each other. Their ranges can be as small as 2 km and as extensive as 80 km river or lake side. Overlapping territories are quite usual, with central rather small and private home ranges not inhabited or even frequented by other individuals (Chanin, 1985). Under normal healthy conditions, they are able to reproduce every 2-3 years. Their cubs (usually 2-5) are allowed to stay with their mother for up to two years, after that time they leave their mother's territory.

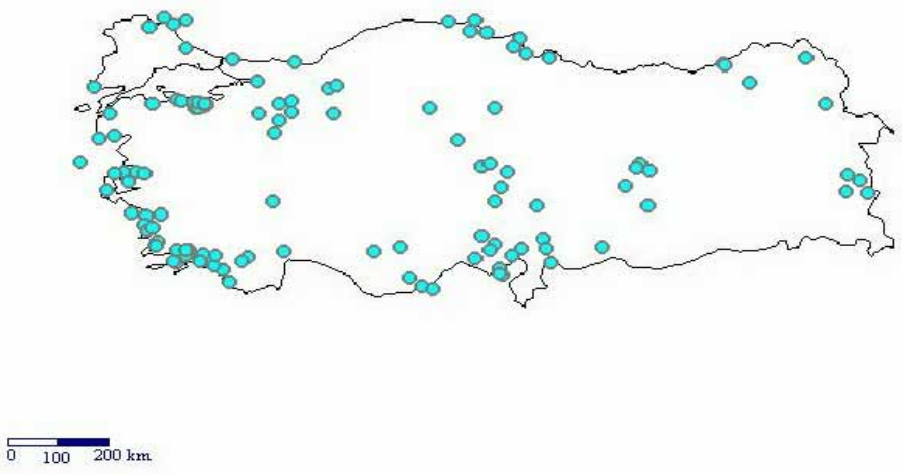
1.2 Distribution

Worldwide we know 13 species of otters. Since the North and West distribution of two oriental species, the Smooth Otter (L. perspicillata) and the Hairy- Nosed Otter (L. sumatrana) is not yet cleared and subspecies research in Turkey is still ongoing, the lutra situation in Turkey is not yet satisfyingly determined (Güven, 1999). Up to date there is no sign of any species or subspecies throughout the country, so with a high percentage of reliability we can assume that in Turkey we solely deal with Lutra lutra, the Eurasian Fishotter.



Map 1: Eurasian Fishotter, Global Distribution

Working on the National Fishotter Data Bank Project, we now know quite a few Fishotter habitats in Turkey:



Map 2: Eurasian Fishotter, Distribution Turkey (updated: May, 2003)

1.3 International Protection Status

The Eurasian Fishotter is worldwide protected as a "vulnerable" species (IUCN, Red Data Book); its international protection status is due to several global treaties:

* CİTES (Washington Convention of International Trade in Endangered Species of Wild Flora and Fauna)
* CMS (Bonn Convention on the Conservation of Migratory Species of Wild Animals)
* Bern (Bern Convention of the Conservation of European Wildlife and Natural Habitats)
* Ramsar (Ramsar Convention for the Protection of Wetlands)

1.4 General Threats to the Species

For many years Fishotters have been regarded as indicators for habitable habitats. An inhabited habitat qualified as clean and toxic free (Ramsar Handbook, 1996). Nowadays Fishotters still serve as a bioindicator species but for pollution rather than for quality wetlands: population numbers being on the decline, where habitats are polluted (Ruiz-Olmo et al., 2000; Sidorovich, 2001). On the one hand Fishotters are much more resistant than has been assumed, on the other hand the mortality rate through toxic matters like PCB is immensely high (Ruiz-Olmo, 2001). Obviously the species is not able any longer to discern a clean habitat from a lethally polluted one. Modern chemicals seem to be more subtle killers than traditional ones. Survey and review results are devastating; examined Fishotters show high concentration level of toxic matters like organochlorine (insecticide) residues like DDT and nowadays the much more toxic Dieldrin and Aldrin, heavy metals (Cadmium, Mercury etc), chemicals like Polychlorinated Biphenyls (PCB), Aluminium, and the like causing heart diseases, liver and kidney failures, sterility and many more symptoms leading to long suffering and premature death (Strachnan/ Jefferies, 1996; Ruiz-Olmo et al., 2000; Sidorovich, 2000; Jefferies/ Hansen, 2001; Gutleb, 2001). The life expectancy and quality of Fishotters is globally on the decline.

Nevertheless even hunting is still allowed in many countries (especially the Balkans). Although widely distributed in Turkey, the Lutra population is declining and otters count as endangered species (Güven, 1999; Thol-Schmitz; 2000; Demirsoy, 2002; Kayaöz, 2002). Despite otter hunting being strictly forbidden throughout the year, we lose a great number of otters through destruction of habitats, poaching, dangerous fishing methods, direct and indirect persecution.

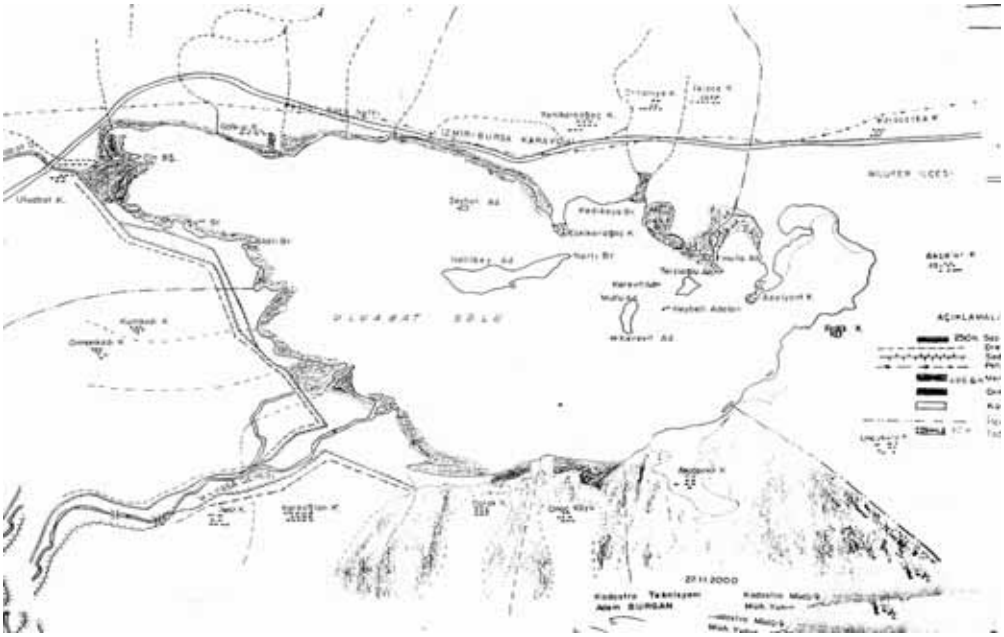
2. Survey Area

2.1 Geology

The survey area is situated in north-western Turkey (geographic coordinates: 40°10'N 28°35'E), bordering the coastal zone of the Marmara Sea and the Kocaçay Delta basin in the north and the Emet and Orhaneli River basin in the south. Bursa, main city of the province is approximately 30 km to the east of Lake Uluabat. The lake basin belongs partly to 4 different provinces: Bursa, Kütahya, Balıkesir and Bilecik.

The Uluabat basin covers an area of approximately 10.500 km2. The lake is 22km long (W/E) and about 10.5km wide (N/S). The water coverage of the lake (app. 135 km2) depends on the high seasonal fluctuation of the water level (0.8m minimum- 3.5m maximum). (DHKD/ Ministry of Environment, Turkey, 2002).

Eight islands of different size, some inhabited and/or used for animal husbandry or farming, are situated mainly in the north and north-west of the lake.



Map 3: Lake Uluabat, Base Map

2.2 Topography, Habitats, Vegetation

Lake Uluabat is a characteristically eutrophic shallow freshwater lake, fed mainly by the Mustafakemalpaşa (abbr.: MKP) River (SW). Silt deposition through the MKP river and various drainage canals formed a vast delta around the river mouth, whose hinterland (the former floodplain) is mainly used for agriculture and grazing. Large embankments secure the cultivated areas against flooding in winter. With its vast and nearly impregnable reed beds (Scirpus sp., Typha sp., Phragmytes sp.), water- lily ponds (Nymphea alba), waterlogged meadows, tamarisk thickets (Tamarix smyrnensis) and willow trees (Salix salix) on the embankments the delta still owns most of it' s characteristics. The large amount of silt, carried towards the river mouth during the years formed some small reedy islands in front (E) of the delta, partly covered with old willows. The south- west corner of the lake being extremely shallow, because of high sedimentation is nearly impenetrable during most of the year, giving wildlife a real chance to thrive. Still, since the main industry (tanneries, canneries etc) has developed around the city of Mustafakemalpasa, the river is highly polluted and carries its poisonous load into the lake. (Aksoy/ Demir/ Torunoğlu, 1998)

Freshwater exits through the Uluabat River in the north-west corner of the lake. The river banks form vast pastures, which are used for grazing cattle, sheep and water buffalos during the flood free periods. The Uluabat River has been dammed for fishery reasons for a while, but the old dam has been opened some time ago by the farming community, who complained about flooding during the last rainy years. Uluabat village is situated some km further inland on the shore of the river.

The northern shore is restricted by the Izmir- Bursa road, with vast reed beds (Scirpus sp., Typha sp., Phragmytes sp.) on the lake side and bordering seasonal waterlogged meadows surrounded by typical marsh plants like Juncus maritimus and Juncus minutus. Tamarisk (Tamarix smyrnensis) and willow (Salix salix) form dense jungles, ideal for water bound wildlife.

The northern bank becomes rockier towards the north- east corner of the lake, with the village of Eskikaraağaç on a peninsula and Gölyazı village on an island, tight to the mainland by a bridge (the only villages inside the Ramsar boundary). The shore is partly covered by vast reed beds, the bays holding white water- lily fields (Nymphea alba). The rocky hills, formerly covered by

mulberry trees for silk production, are nowadays mainly cultivated with olive, fig and other fruit bearing trees; some parts are fields with corn, beans and such.

The west holds some small, but nevertheless environmentally problematic industrial plants (Şöllmer, Kerevitaş, chicken farm, slaughterhouse complex etc.) around the small town of Akçalar. (Aksoy/ Demir/ Torunoğlu, 1998; Özesmi, 2001)
Seasonal waterlogged meadows, reed beds (Scirpus sp., Typha sp., Phragmytes sp.) and groves form lovely pastures; some places are used for recreation (picnic places) near the village of Fadıllı.

The southern shore becomes more waterlogged during the flood season than other parts of the lake. Watermarks on trees have shown high flood marks and waterlogged forests, meadows and seasonally wet riverbeds are the main features of the south. Here Lake Uluabat's most prominent attribute, the winter flooding, formed different and very clearly defined zones: reed beds, waterlogged meadows, and waterlogged forests (Salix, Fraxinus, Platanus) going over into cultivated rocky slopes on the mountain side. Some villages (Dorak, Onaç, Akçapınar etc.) are found more or less high above the water level and the village of Dorak is the place, one should go for a first orientation.

Map 4: Lake Uluabat, Topographical Map (3D)

There are eight islands in the lake, four with their original wild vegetation of reeds and shrubs, the four bigger ones having been partly inhabited and cultivated in the past. At the time of the survey only Halilbey and Terzioğlu showed signs of cultivation and some live stock has been kept there for free grazing.

As mentioned before the main feature of this vast eutrophic and highly polluted (Aksoy/ Demir/ Torunoğlu, 1998; Özesmi, 2001) lake is its seasonal flooding leading to remarkable water level differences between summer and winter (DHKD/ Ministry of Environment, Turkey, 2002).

Some habitats have been formed by and live of the temporal flooding, such as the waterlogged forests and meadows, mainly found in the south. These habitats are very suitable living and breeding spaces for an array of wild species and a save haven during the wet. The mudflats formed after the first rains at the time of the survey offer a nice potential for track reading and moulding. We think the wet and the flooding it provides is the only chance for survival of the eutrophic lake and the mentioned habitats, since it provides an amount of freshwater that literally clears the polluted waters at least for a while. A water level regulation, as is discussed in the moment could prove lethal for the whole ecosystem.

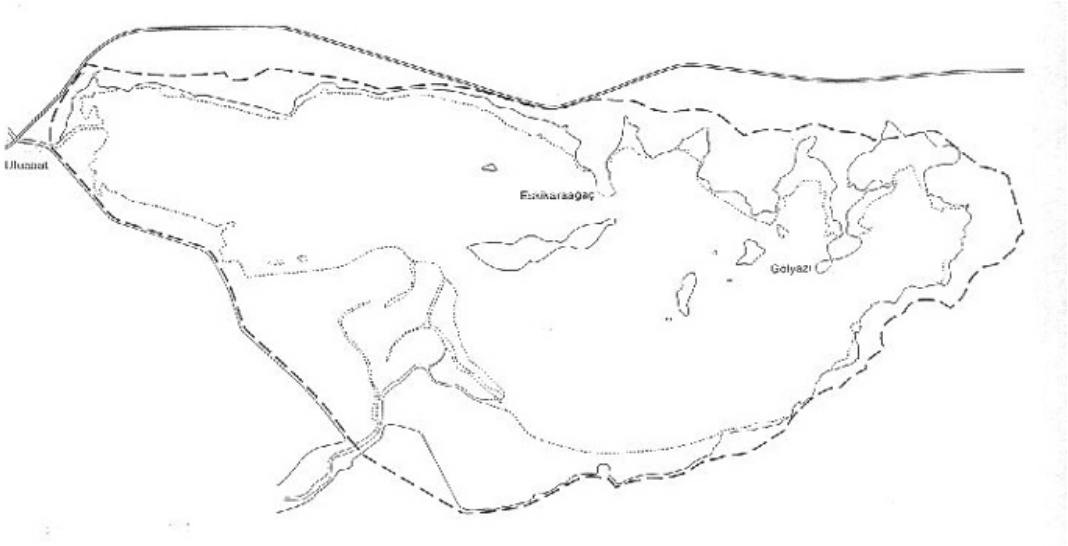
Photograph 1: Lake Uluabat, Floodmarks on the vegetation in the South

At the time of the survey the lake has been considerably low according to the statements of the local population.

2.3 Protection Status, Importance

The lake is an important Ramsar site, one of the first declared in Turkey. The Ramsar boundary follows the main body of the lake and includes the villages of Eskikaraağaç and Gölyazı. Among other Ramsar criteria relevant species are birds like Pigmy Cormorant, Ferruginous Duck, Dalmatian Pelican and several rare plants and insects (IUCN, Red Data Book). Despite its importance as an ecosystem and variety of globally threatened species the lake did not have any protection status at all at the time of the survey, except of some archaeologically important and thus protected sites.

Since the DHKD and the concerned Ministries are working on the Environmental Master Plan and the implementation of the relevant protection zones, a better protection of the rich biodiversity of Lake Uluabat should be expected in the near future. (see: 6. Recommendations)



Map 5: Lake Uluabat, Ramsar Boundaries

2.4 Socio- Ecological Structure of the Local Population

The rural population around the lake lives mainly of fishing (fish and crayfish) and agriculture (farming, animal husbandry). Other commercial activities are bee keeping, reed cutting, and the collection of snails, frogs, medicinal leeches and plants. Handicrafts like knitting are popular especially in the village of Yenikaraağaç (Özesmi, 2001) and an important economical factor. Tourism is yet developing.

Industrial settlements (canneries, tanneries, slaughterhouses etc) in the catchment area of the east and west shores require workforce, and attract quite a number of women and young men to work there rather than earn their living with agricultural activities.

Some statements of people we talked to during our survey:

* "Everybody got easily rich while the crayfish trade lasted; nobody wants to make an effort now to earn some money." (Inhabitant of Gölyazı)

* "During the crayfish years people earned as much money in a day as a state employee earned in a month." (Fisherman in Eskikaraağaç)

* "The fish population has been bigger and healthier in the old times." (Man in Fadıllı)

* "We lived of this lake and we loved it, its waters have been clear and drinkable, we could see down to the ground and there was no mud. Since the industrial development started, the lake got polluted and the lake's produce got less, drinking water is coming from far away and nobody even goes swimming any longer. You'll get ill if you do." (Family in Gölyazı)

* "We lived of silk production for a long time and sold our raw silk to Bursa. Then different agricultural ideas started and with the use of insecticides our silkworms died and the mulberry trees were cut. Now our women have to work in the factories, which are killing our lake as well." (Family in Gölyazı)

* "We are living on an island; we do not like interference from outside." (Man in Gölyazı)

* "Our houses are falling to pieces, because we are not allowed to repair them as we want because of the Protection Site Management (SIT/ 'Türkiye Tabiat ve Kültür Varlıkları Koruma Kurulu')." (Man in Gölyazı)

Photograph 2: Talking to people in Eskikaraağaç

Since the living standard is quite low, hunting and poaching are rather common, as is usual in similar communities. During and even out of the hunting season organising hunting parties and carrying hunters via boat to normally unreachable places is a welcome, illegal, unsustainable but widely tolerated (even by the involved authorities) source of income for boat owners. The loan of plastic or even living decoys, which are kept throughout the year on the shore in cages, is another wide spread, profitable yet forbidden ('MAK' = circular directive/ Anonymous, yearly) means of the local revenue.

So it is not really astounding, that killing or injuring animals "for fun" is a favourite and loathsome pastime even for smaller children. Killing birds with slings or shooting out the eyes of village cats with air rifles (rarely you find a cat in Gölyazı with both of its eyes in healthy condition) is a "tradition" passed on from bigger children to the small and the task is fulfilled with considerable skill.

Photograph 3: One eyed cat in Gölyazı

3. Methods and Material

3.1 Survey Techniques

80% of the 16 days on the lake consisted of field work and/or various surveys (like visiting the daily fish auction for potential prey assessment and a boat trip to the sites, we could not reach by car), made possible by being accommodated directly on the lake in the small town of Gölyazı, situated on an island in the north east of Lake Uluabat. The evenings were spent with fly proof wrapping collected spraints and other samples, cleaning plaster track moulds (see: ANNEX/P.5, "Plaster moulding tracks"), uploading the daily amount of digital pictures into the laptops and evaluating daily records. Since the weather stayed good enough for most of the time, we did not have to use the planned "Joker Day" for field work. Rather than spending it in Bursa, we decided to take a trip to the Kocaçay Delta. A day well spent! The rest of the time has been spent with organisational work, which we mostly conducted in the teahouse or on the 'meydan' (central village place) to give the local population the opportunity for a chat with the project team, or on the other hand providing us with the possibility to pose questions to the inhabitants of the town. (see: ANNEX/ A.2, Personnel and Itinerary)

Photograph 4: Working on the "Meydan"

The close- knit local population of Lake Uluabat is rather not in favour of intervention by 'outsiders' (Bursa is regarded as 'outside', being 20 minutes away!). The level of 'environmental awareness' and knowledge of wildlife is normal for Turkey: everybody has an opinion about pollution; everybody knows what a Fishotter is, despite the species being wrongly called 'beaver' ("kundus"), quite commonly used in many regions of Turkey. And every man being either fisherman and/ or hunter claims either to have shot an otter out of various reasons or knows someone who has. Please note: our contacts have been mainly with the male population since we did not see many women during the survey.

We had planned to use a prepared questionnaire for questioning the local population but decided against it, after making first personal contacts. We did not want to add an over official image to our investigation, thus turning the rather suspicious community against the project and the project team. Being around and part of the village, even for such a short time, enabled us to make friends, chat and gathering necessary information much more casual than we had originally planned.

We generally use the internationally acknowledged 'Mc Donald Survey Method' (Mc Donald, 1983) for overall Fishotter assessments and up to date it provides us with good results. The general idea is that if a randomly chosen stretch of 600m river or lake side in a 10 km area turns out to be negative, you have a zero population. A slightly different technique has been used during the English Fishotter surveys 1991-1994, using a length of 600m per 6-8km of survey site (Chanin, 1993 and Strachnan/Jefferies, 1996). Based on the 'Mc Donald Survey Method' and our longstanding survey experience, we developed a special method of systematically "fine combing" the area, according to its habitat characteristics.

3.2 Survey Phases and Pilot Sites

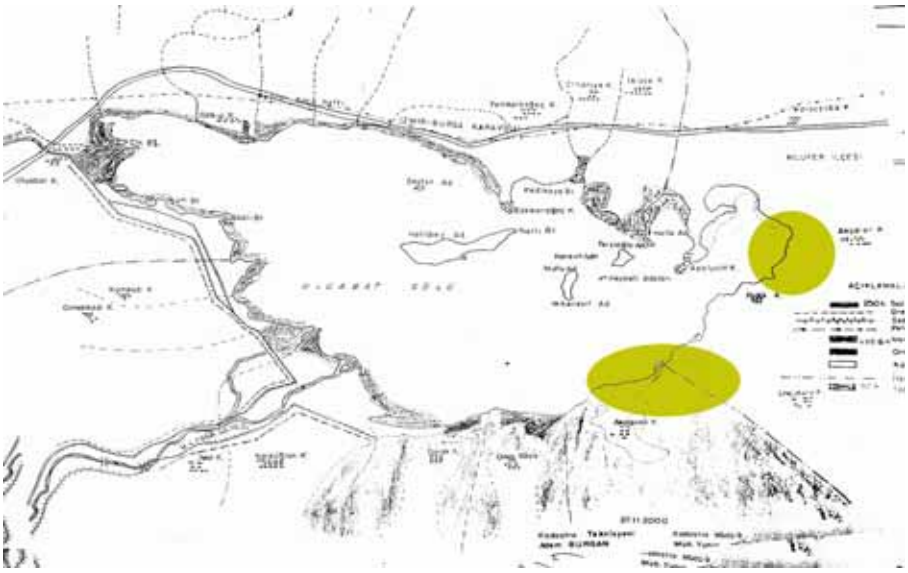
The survey has been performed in three phases:

1- Orientation and Assessment,
2- Pilot Site Surveys,
3- General Site Control.

During the first, the 'Orientation and Assessment Phase' we collected, mapped and recorded spraints, plaster-sampled tracks, kept photographical records and field notes on findings, habitats

and conclusions. For a better orientation we went on a boat trip around the lake to investigate the irreproachable bays and reed beds and to evaluate the islands (see: 4.4.3, Boat trip to islands and unreachable coves).

Since the area is very large and finding spraints at most of the selected survey points, evaluating the first week's results, we had to choose two pilot areas for specific surveillance, one for night surveys (Pilot Site 1) and one for refined investigation (Pilot Site 2). Among other criteria for the selection of these pilot areas has been the freshness of recorded spraints, the frequency of otter visits to the sites (spraints and tracks), the assumed number of visiting individuals, infrastructure advantages (very suitable mudflats for tracks, good sprainting sites, comfortably to reach, not too much human traffic, site easy to memorise even at night etc). Due to the number of tracks and differences in the spraints and sprainting sites, we concluded that more than one individual had been visiting both of the pilot areas. Since photographical records never have been an objective of the survey, we only performed two night watches with 4/5 people waiting in different areas of the sites. We heard several individuals (typical "whistling" sound of a female with cubs) during the first night survey and have been tricked by one Fishotter during the second, who left its spraints just between the two groups of surveyors.



Map 6: Pilot Sites

During the third phase all sites have been controlled again for fresh signs of Fishotter traffic and differences. All survey points have been visited at least twice, always using the car as base and carrying on on foot. (see: ANNEX/ A.1, Project Landmark Key)

3.3 Complementary Surveys

* 2 Night Surveys
* 1 Pollution Survey
* 1 Boat trip to Islands and unreachable Coves
* 2 Visits to the daily Fish Auctions (Potential Prey Assessment)
* Flora and Fauna
* Socio- Cultural Survey

A proposed high water level survey to assess potential breeding sites during the wet has been denied, because of a lack in funding. We suggested, that the narrower the dry habitats get, the easier it would be to verify the assumed breeding sites of the first survey.

3.4 Complementary Activities (Sustainability of Project and Monitoring):

* Workshop for Ulukuş Members
* Field training for Ulukuş Members

3.5 Equipment

We have been well equipped with binoculars, telescopes, GPS, halogen torches, walky- talkies, cameras (one digital, one analogue + zoom), the necessary field equipment for the collection of spraints, plaster for track moulds etc. We used two laptops, charts and maps for recording and brought a borrowed beamer for the workshop presentation. Most of the equipments have been our own, but parts of the equipment including the maps and several reports on the area have been provided by DHKD. Using our own car for the survey made spontaneous actions possible and logistics easier.

3.6 Mapping and Recording

The main 1:25.000 maps we used as base and field maps have been provided by the DHKD and have been used for surveys before (Welch/ Welch, 1998). Complementary to the base map we used some newer maps provided by some enthusiastic UluKuş members, which showed some landmarks like pump stations etc that did not exist at the time of production of the base map. We used a hand held GPS in the field and adequate software for proper results of post mapping.

We used already existing survey field forms of SAD- DEMAG/ Nuray GÜVEN VERYERI to record spraints and other samples, and a listing and recording system we developed specially for our National Fishotter Data Bank Project.

4. Results

Even if we rate the whole lacustrine eco system and its various wetland habitats as very suitable for Lutra on the whole, the number of spraints and accordingly inhabited sites is amazing, especially in regard to the appallingly high level of water pollution and numerous other threats to the Fishotter population. A survey with more than 50 landmarks and 27 survey points resulting in only three points of the whole area (1xN, 1xNW, 1xSO of the lake) being fully negative (= devoid even of old spraints), prove the Uluabat area to be a very valuable Fishotter site. Since we assessed a great abundance of lutra, the negative points are irrelevant.

Therefore two weeks of intensive field work provided us with 80 spraint samples and numerous track moulds- a very good result for a relatively short survey. As experienced Fishotter surveyors and lacking the necessary equipment anyway we never aimed at photographing individual Fishotters and- out of ethical reasons- refrained from penetrating reed beds to discover potential holts or resting sites.

4.1 Distribution and abundance

Since an ordinary short term Fishotter survey is based on recording spraints and tracks, the only conclusions concerning the size of the population are the number and freshness of spraints, tracks and differences in defecation habits. Concerned literature is split into two fractions: one that sees spraints as a guide to otter's distribution, but as no reliable factor for their abundance (Chanin, 1993 and Kruuk et al, 1987); the other fraction sees a tight relation between the density

of spraints and otter's abundance (Mc Donalds/ Mason 1986) or is even very positive about the existence of this relation (Strachan/ Jefferies, 1996).

We tend to the latter opinion. To our knowledge we are the only team in Turkey with an experience of long term Fishotter studies, which enabled us to study the behaviour and sprainting habits of one main individual and her cubs over an era of 14 years (Thol-Schmitz, 2000). During this time we conducted other surveys as well and comparative studies (unpublished observations) led to the conclusion, that there is indeed a positive relation between the density of spraints, sprainting behaviour and abundance of Fishotters.

On Lake Uluabat we collected and recorded 80 spraint samples of 28 different checkpoints. Collecting spraints, especially when fresh is essential, since territorial habits of Fishotters increase the possibility of marking a site again, when the old mark is collected. We suggest, that the higher the frequency of remarking, the closer to the otter's most frequented places, or even the holts, the spraint site is situated. (see: ANNEX/ P.3, "Typical signs of Fishotters")

Some examples:

If after one night we find 5 different sized fresh otter scats on one spraint site the possibility of more than one individual is very high (Pilot Site 1). If not only the sprainting behaviour, but recording different sized tracks and roll marks support this conclusion (Pilot Site 2), we can deduct, that two different families (females with cubs) inhabit these sites. The frequency of fresh spraints supports this theory, since females with cubs tend not to wander too far from their holts.

Finding a "playground" (scratches and roll marks), on one of the reed islands (N 17) in front of the MKP delta, led to the same conclusion.

In the south of the lake, on the edges of the waterlogged forests on points N 3 and N 4 we dealt with one (adult) individual, that distinctively chose high tree branches for defecation, where in and around the villages of Eskikaraağaç in the north, we collected spraints exclusively from big rocks. Both otters show individual preferences although on both sites boulders as well as trees are found.
Since we found scats the same size and condition on exactly the same locations around Eskikaraağaç in February 2000, we possibly even deal with the same individual.

Since numbers in Fishotter surveys are neither the survey's objective nor are they relevant, estimated abundance numbers can never be reliable. The only method to discern individuals is by DNA typing of spraints (Jansman/ Chanin/ Dallas, 2001), a very elaborate and cost intensive procedure, which as far as we know is not carried out in Turkey yet.

It is not in the nature of the Fishotter to occur in big numbers as described above (see: 1.1, Species Description). So, general survey results usually do not satisfy the layman community. Still, analysing our findings we come to the careful conclusion of not less than 8, and not more than 12 adult individuals, together with their cubs we come to a total number of approximately 20 Fishotters inhabiting Lake Uluabat. Despite their different defecation habits and signs of individual behaviour leading to these estimations, the lower number of 8 adults should be regarded as more relevant, because of overlapping home ranges.

4.2 Breeding Locations

At the time of the survey the lake's water level has been very low. Therefore the terrestrial habitats have been much bigger and wider. They had not been reduced to the dimensions they would have during the breeding period, making a location of potential breeding sites nearly

impossible. For that reason we had planned to come back for a survey in the wet when habitats would have been really flooded. Potential breeding sites would have been reduced to minimum dimensions and assessments would have led to more exact results than the ones we are able to give now. Regrettably these plans have been denied for lack of funds.

We located four potential breeding sites:

1- The area between the Gölyazı peninsula and the Fadıllı reeds
2- The waterlogged forests in front of (N) of Dorak
3- The banks of the MKP river, river mouth and delta
4- The area south east of Uluabat (Kaplı Burun and Kum Burnu)

4.2.1 The area between the Gölyazı peninsula and the Fadıllı reeds:

Habitat: From rocky hill slopes with small reedy inlets on the Gölyazı peninsula to dense reed beds and pond like water-lily fields between Gölyazı and Akçalar, to waterlogged meadows and forests near Fadıllı

Cause: a) One presighting of female and cubs (1+3) by members of UluKuş North of Gölyazı, February 2002

b) Signs of high activity throughout the area:

* Different sized fresh scats, close to each other
* Different sized tracks
* "Roll marks" and various passages in and around reed beds

Photograph 5: Potential breeding habitat: Between Gölyazı and Fadıllı

4.2.2 The waterlogged forests in front (N) of Dorak ("Kocakamış")

Habitats: Waterlogged meadows, waterlogged willow, ash and plane tree forest with shrubs like Monkpepper (Vitex agnus castus), dense reed beds on the waterfront with scattered beach like inlets, reedy sedimentary islands

Cause: a) "Sign heaps" (Chanin, 1993) and spraint spreads (latrines), that could well be the entrance to an undiscovered holt (Kruuk, 1994)

b) Very good breeding habitat, nearly impenetrable by human and animal foes (dense undergrowth)

c) Ash and plane tree stand in direct relation to otter breeding locations, since they preferably use their root system as holts (Chanin, 1985)

Photograph 6: Potential breeding habitat: Below Dorak

4.2.3 The banks of the MKP river, river mouth and delta

Habitats: Vast reed beds, scattered reedy sedimentary islands in front of river mouth; water channels and pools throughout the delta; shrubby riverbanks, sandy beach like stretches and mud flats on the river banks

Cause: a) Signs of high activity throughout the area:

* Different sized fresh scats, close to each other
* Various passages in and around reed beds and river banks

b) Very good breeding habitat, nearly unreachable by human and animal foes (very shallow water)

Photograph 7: Potential breeding habitat: Mustafakemalpaşa Delta

4.2.4 The area south east of Uluabat (Kaplı Burun and Kum Burnu)

Habitats: Vast reed beds, scattered reedy and/or willow stocked sedimentary islands with dense shrubby undergrowth, very shallow water

Cause: a) Signs of high activity throughout the area:

* Different sized fresh scats, close to each other
* "Roll marks" and various passages in and around reed beds
* Different sized tracks

b) Very good breeding habitat, nearly unreachable by human and animal foes (very shallow water)

Photograph 8: Potential breeding habitat: South- East of Uluabat

All presumed breeding sites offer stabile inner habitats and home ranges during the flood season and are nearly impenetrable by human force most of the year, either because of their dense undergrowth, vast reed beds or disagreeable water levels.

4.3 Spraint Analyses: Feeding Habits and Prey Assessment

4.3.1 Basics of Spraint Analysis

Collecting spraints and recording the sites lead to valuable conclusions about individual behaviour, feeding habits and give some means to estimate population numbers. (see: 4.1, Distribution and Abundance) Deductions of feeding habits and prey preferences are generally concluded from spraint analyses. It is quite easy to distinguish food remains in Fishotter spraints and the spectrum of discernable solid remains is usually quite wide. Of course remains of soft bodied or very large prey can not be assessed through spraint analyses and seasonal feeding habits should be taken into account (Conroy et al., 1993).

Photograph 9: Collecting and Recording Spraints

Lutra lutra in general is a fish eater, but does not refrain from other prey, if needed. Most adult Fishotters prefer Freshwater Eels (Anguilla anguilla) if available, but may well refrain from the laborious act to catch them, if easier, slow moving prey is available. In freshwater ecosystems shallow water leads to a higher hunting efficiency, since the success is much higher and prey is usually landed for consummation. The prey preferences fluctuate with the seasons and the availability of species and the situation and status of the individual otter; young otters predate on low value prey like crabs, frogs and toads (toads are always skinned before consumed), mothers might predate on smaller prey, while her cubs are still small.

The conservative estimate of an adult Fishotters daily consumption is 10-15% of the individual's body weight, according to season and reason. A lactating female's consumption can reach up to 30% of her body weight p.d. (Kruuk, 1995).

4.3.2 Technique

Survey conditions did not allow separating and storing vertebral columns of potential prey like fish or Rana species, we at least took scale samples of every fish species we found from the fish auctions to compare with scale remains in the investigated spraint samples.

Photograph 10: Collecting and Recording Potential Prey Samples on the Fish Auction

We collected and recorded 80 spraint samples, 12 additional samples, 8 scale samples and plaster moulded 2 whole tracks (10 paw marks). Because we could not deep freeze samples, we dried them under fly proof conditions. Each sample has been recorded and marked. Since the general sample amount for a main prey assessment is 10- 15 spraints per investigated freshwater habitat (Conroy et al., 1993), we randomly chose 20 samples for analysis. Being no biologists and having had not enough samples for comparison, we are only able to make a general prey assessment as to whether their diet consists mainly of fish, frogs, birds etc. We were generally not able to discern predated species. (see: ANNEX/ P.4, "Visits to the fish auction")

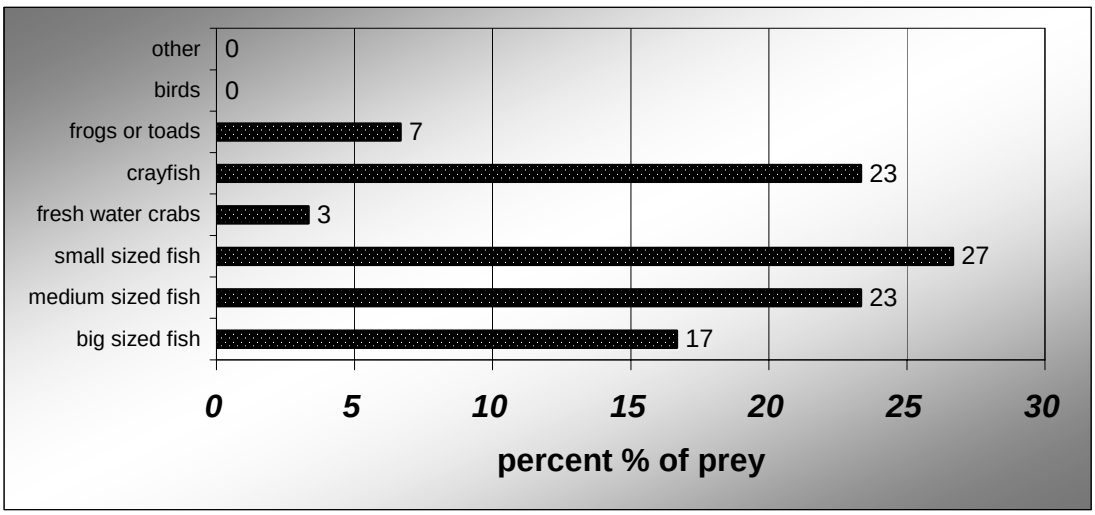
As is usual (Conroy et al., 1993; Albayrak, 2002) we soaked the samples overnight and washed them carefully wrapped in fly mesh, the remains then being thoroughly investigated with magnifying glasses and microscope.

4.3.3 Results

From 20 randomly chosen and investigated samples out of 80 (some samples contained more than one kind of prey remains):

Remains of:	Samples (out of 20):	Remarks:
remains and scales of big sized fish (app. > 30 cm)	5	some scull and gill cover parts scales = Carp sp. (one Pike ?)
remains and scales of medium sized fish (app. 15-30 cm)	7	some scull parts, some vertebral bones scales = Carp sp.
remains and scales of small sized fish (app. < 15 cm)	8	1 vertebral bone (Eel?)
remains of freshwater crabs	1	carapace
remains of crayfish	7	carapace
remains of frogs or toads	2	vertebral and other bones
remains of birds	0	
other (terrapins, snakes etc)	0	
total findings	**30**	

Parts in percentage:



Graphic 3 : Percentage of Prey Remains in Investigated Spraints

We did not find as many vertebral bones as is usual in Fishotter spraints. During the field survey we only saw one skinned toad. It seems that the diet of Uluabat Fishotters consists mainly of small and very small fish.

We would have preferred a total spraint/ prey analysis by a local biological faculty, since our knowledge of available prey is not sufficient.

4.4 Complementary Surveys

4.4.1 2 (+1) Night Surveys

4.4.1.1 Night Survey I

Location: Pilot Site (PS) 1
Date: 16./17.10.2002
Time: 22.00- 01.00h
Weather: cold and open
Personnel: 5 people

Result: heard Fishotters calling twice from the lake (22.45hs and 23.55hs), typical "whistling" sound of female with cubs.

Disturbances: Two, by cars during the watch.

4.4.1.2 Night Survey II

Location: Pilot Site (PS) 1
Date: 21.10.2002
Time: 04.40- 07.35h
Weather: very cold and open
Personnel: 4 people

Result: Otter has visited site before and during our arrival and did not come back. All night sewage has been let untreated into the lake through big pipes coming from the reed beds.

4.4.1.3 Night Survey III (evening walk)

Location: Lake side road outside of Gölyazı
Date: 26.10.2002
Time: 20.30-22.00h
Weather: open and cold
Personnel: 3 people

Result: Hear one Fishotter moving in the water, splashing and calling.

4.4.2 Pollution Survey

Location: Pilot Site (PS) 1
Date: 23.10.2002
Time: 17.00- 19.30h
Personnel: 2 people

Result:

The mentioned pipes are leading from the reed beds to unused sewage treatment ponds (biological clearance) behind the reeds. Behind that the sewage comes openly through canals from the direction of the Akçalar Bridge and surrounding the reed beds from the direction of the industrial site. We investigated the vicinity of the bridge/ canal and found a chicken farm. No sewage in sight there. Inquiring the situation back in Gölyazı by asking our acquaintances, they assume the sewage comes from the Şöllmer/ Kerevitaş factories and the slaughterhouse complex. Obviously it is only let in massively at night, during our day surveys it has not been that noticeable, at night it had horrid dimensions (see: ANNEX/ P.2, Pollution Survey).

4.4.3 Boat Trip to Islands and Unreachable Coves

Location: Most of the islands, MKP Delta, Coves in the South
Date: 19.10.2002
Time: 11.30- 18.00h
Weather: increasingly stormy, cold and slightly rainy
Personnel: 4 people+1 "captain"

Results:

The unreachable coves in the south and the MKP Delta and its sedimentary islands offer very good breeding conditions and are quite frequented by otters. We found potential holt sites, an otter playground and more signs of Fishotter activities. To our amazement the islands have not been as frequented as we assumed, but obviously hunters use them regularly for breaks and to sort out their prey. We found many fresh coot skins on one of the islands. There have been illegal hides and fake decoys in quite a few reedy coves. Among other shot birds like yellow-legged gulls, we saw 3 dead Dalmatian Pelicans that had died very recently of unspecified reasons. We could not find any shot wounds. Someone had cunningly cut the old willow trees out of the middle of one the bigger sedimentary islands.

We had to go more slowly than we had planned, because of increasingly bad weather conditions and could not even visit all of the islands. We never found the opportunity for another boat trip. (see: ANNEX/ P.1, Photographs of Boat Trip)

4.4.4 Visits to the daily Fish Auctions for Assessment of Potential Fishotter Prey

We visited the daily fish auction twice (17. +19.10.2002) with various objectives:

4.4.4.1 Assessment of potential Fishotter prey
4.4.4.2 Estimation of ecological and economical values and problems
4.4.4.3 Information about the legal situation of the local fishing industry
4.4.4.4 Evaluation of fishing practices in relation to Fishotter mortality

4.4.4.1 Assessment of potential Fishotter Prey

With further spraint analyses in mind we took scale samples and photographs of all the fish species being caught at the time. Taking scale samples has been an unheard and unseen practice up to date in the village of Gölyazı and has been performed to the great amusement of local fishermen and auctioneers with tweezers and pocket knifes.

Results:

Carp	(Cyprinus carpius)
Crucian carp	(Carassius carassius)
Rudd	(Scardinius erythrophtalmus)
Pike	(Esox lucius)
Catfish	(Silurus glanis)

+ some small fish without value, all called "feki" by the locals

+ crayfish (Astacus leptodactylus)

Since we did come rather late in the year some seasonal fish like eel (Anguilla anguilla) and other species have not been caught regularly at the time.

Photograph 11: Daily Fish Auction

4.4.4.2 Estimation of ecological and economical Values and Problems

The two villages inside the Ramsar boundaries, Gölyazı and Eskikaraağaç live almost completely of fishing and commercial side activities like net knitting and the production of fishing baskets and fyke nets. The fishing population grew rich through the crayfish trade during the eighties. After the crayfish population declined almost totally because of a fungal infection (Özesmi, 2001), the fishing cooperative had to find ways to sustain their members. They regularly stock the lake with introduced species like Crucian carp, which disturbs the natural balance between carnivorous and herbivorous species considerably. The formerly clear water of the lake with its underwater gardens of submerged plants (Welch/ Welch, 1998) having turned highly turbid nowadays might not only be caused by pollution but by sediment disturbance through mud inhabiting fish like the carps.

Nevertheless fishing has ceased to be a good source of income. In Gölyazı up-to-date approximately 100 boats (kayık) are left of the 500 boats of former years. Still according to the fishing cooperative on good days 200-300 kg of crayfish and 2-3 t of various fish are caught and sold by auctions per diem. Since the lakes ecology is no longer healthy, water and fish contaminated (Özesmi, 2001) and one big bowl of fish (app. 10-12 kg) is sold for a price as low as 5 USD, the future of the local fishing industry seems uncertain.

Photograph 12 : Bringing in Fish to the Auction

4.4.4.3 Information about the legal Situation of the local Fishing Industry

According to statements of its members the lake is rented off the National Estate Directorate ('Milli Emlak Müdürlüğü') by the Gölyazı Fishing Cooperative ('Gölyazı Su Ürünleri Kooperatifi'). The cooperative has been founded in 1966 to regulate the crayfish trade and reached a number of 1145 members during the 1970s. Their number dropped to mere 608 members nowadays, caused by the increasingly difficult fishing situation (Özesmi, 2001), pollution and relentless over fishing taking their toll. Despite fishing being strictly regulated by law and the yearly circular, fishing is uncontrolled and performed regardless of temporarily closed seasons, certain fish measurements, restricted species etc. Without the artificial input of the Crucian Carp (~ 1.000.000 fish/ p.a.) by the cooperative, which turns the lake literally into a Fishfarm, fishing would long have ceased to exist on Lake Uluabat.

4.4.4.4 Evaluation of Fishing Practices in Accordance to Fishotter Mortality

Despite many of the fishermen claiming the contrary, others admit that Fishotters are caught and drown in their nets and fyke nets. The concerned literature (Strachnan/ Jefferies, 1996; Chanin, 1985) describes especially fyke nets as the most effective means to kill otters. We do share this opinion, because our experiences show the same results (unpublished observations). We know many cases were Fishotters drowned in fyke nets and nets laid out illegally in and across river mouths.

The amount of fishing nets in Lake Uluabat is enormous. Numbers of up to 10.000 nets are known (Lake Uluabat Master Plan Draft/ DHKD + Turkey Ministry of Environment, 2002). We could not believe our eyes during the survey by boat: the lake is a mere criss cross of nets, fyke nets and crayfish traps! We are sure, that the mortality rate through drowning is quite high, but that the deaths of Fishotters are not important enough to be mentioned by the local fishing population.

Photograph 13: Fyke Nets in Gölyazı

4.4.5 Flora and Fauna (Additional Species)

For Flora please see: 2.2, Topography, Habitats and Vegetation and for additional species see Annex, A.3, Additional Species and P.6, Additional Species and Samples.

4.4.6 Socio- Cultural Survey concerning Fishotters:

Some answers to the question: **"Do you have seen Fishotters ("Beavers") here?"**
We do not wish to add any comments, since the answers stand for themselves:

* **There are many Fishotters, but on the other side (S)".**
  (Men in teahouse in Gölyazı)

* **"I have seen 3 in February (2002, com. of author), one has been shot by hunters, I wounded one, because it eats my fish."**
  (Fishfarm Owner in the north)

* **"I have seen 7-8 Fishotters in my life and I shot one because I have been afraid."**
  (Old man in Eskikaraağaç)

* **"There are no otters around here, but I know of some in Eskikaraağaç"**
  (Fisherman in Fadıllı)

* **"No longer here."**
  (Shepherd in the south)

* **"In former times hunters came from Bursa to shoot them."**
  (Man in Gölyazi)

* **"I have shot one last year in the reeds; I thought it was a duck."**
  (Hunter near Fadıllı)

* **"I saw one at night in the light of my projector, while I was fishing.**
  (Amateur Fisher in Gölyazı)

* **"They destroy our fishing nets and eat the fish out of them, but they do not get caught and drown."**
  (Fisherman in Gölyazı)

* **"They drown in our nets and fyke nets."**
  (Fisherman in Gölyazı)

* **"Why? Are they important?"**
  (Old man in Eskikaraağaç)

* **"Ask X, he shot some."**
  (Old man in Eskikaraağaç)

Another (rather provocative) question during a discussion ("Wildlife is stealing our produce…") on the 'meydan' in Gölyazı: **"Are you so poor, that you cannot share some fish with wild animals like Pelicans, Fishotters or Cormorants?"**

The answer was: **"Yes."**

Photograph 14: Discussions on the Meydan

4.5 Complimentary Activities:

4.5.1 Workshop for UluKuş Members

To support the sustainability of the subproject we had to make sure we leave trained personnel to monitor the site in the future. So we held a workshop for all interested members of the local bird watching group "UluKuş" in the beginning of the survey period and trained 2 different people p.d. for the first ten days parallel to the survey, supplying us with assistant workforce and building up our assistants' necessary field capacity. Since Fishotter survey and monitoring techniques are rather specific, we tried to adept and teach according to international standard methods (Kendelevu Tool-Kit, 2000; Ando, 2001; Kanchanasaka, 2001; Han, 2001).

A) Workshop Objectives:

A.1- Short Term Objectives:
A.1.1- Species description

A.1.2- Field methods
A.1.3- Conservation necessities

A.2- Medium Term Objective:
Monitoring capacity

A.3- Long Term Objective:
Supporting the National Fishotter Data Base

Photograph 15: Workshop

4.5.2 Field Training for UluKuş Members

A) Field Training Objectives:

A.1- Practice of general field methods
A.2- GPS reading
A.3- Spraint locating, recording, sampling
A.4- Mapping
A.5- Monitoring
A.6- Recording and sharing results

Generally seen the workshop and the field training have been very successful. The participants have been very helpful and it was big fun to work together. They learned to find signs of Fishotter activities and how to record them. News of the Uluabat Fishotters reaches us quite regularly, but out of various reasons (lack of personnel, vehicles, funds etc) a full monitoring of the lake is not performed. (see: 6.7, Monitoring)

5. Threat Analysis

The semi aquatic fish otter being top of the food chain has near to none natural enemies. Individuals chose their habitats with great care, avoiding possible risks that would endanger their well being. Up to date our surveys only showed some rare behavioural exceptions, and these always had good cause (Thol- Schmitz, 2002). As a wetland eco system Lake Uluabat offers quite a broad spectrum of valuable and tempting habitats to the Fishotter, some of which prove lethal or at least very unhealthy on long terms (Strachnan/ Jefferies, 1996). Other threats such as

net fishing or fish trapping are globally known dangers to otter populations (Strachnan/ Jefferies, 1996; Chanin, 1985).

All threats endangering the Fishotter population in the vicinity of Lake Uluabat are manmade or at least of human cause.

Photograph 16: Dead Male Fishotter (found shortly after we left)

5.1 Water Pollution

The water pollution level is immensely high and a well known fact even with the local population. Some research reports are shocking and water pollution will lead to great problems in the near future. With some areas being worse than others (Mustafakemalpaşa River and Delta, Akçalar vicinity), the lake seems to be one poisonous body from sediment to produce, affecting wildlife as much as human wellbeing. According to reports we have read (Aksoy/ Demir/ Torunoğlu, 1998), we estimate the marine produce of the lake being heavily loaded with heavy metals and various poisons. Still some municipalities seem to encourage industry to settle in their areas, disregarding water purification and other environmental laws for the sake of employment possibilities and even close their eyes to seemingly pure sewage pouring into the lake through big pipes. Everybody moans about water pollution and the loss of life quality over the last two decades, but nobody is willing to forsake development or put local industry at stake. Seeing so well established a Fishotter population in such highly polluted and unhealthy environment would be more than unusual without the everlasting 'fish miracle' of Lake Uluabat. (see: 1.4, General Threats to the Species; and: 4.4.4.2, Estimation of ecological and economical values and problems; and: ANNEX/ P.2, Pollution Survey)

5.2 Human Attitudes

Since nearly 30 years and even more so after the decline of the crayfish population in the 1980s, the lake is used as a huge 'fish farm'. Every spring the fish cooperative in Gölyazi, who rent the whole of the lake for commercial fishing of the state, spike the lake with one million young herbivorous Crucian Carp (Ref. Chairman of Cooperative), being fished once grown. As by-produce indigenous carnivorous fish species like pike are caught, disregarding of size, season or protective laws and resulting in a totally imbalanced biological system, being nevertheless a very tempting source of easily acquired nutrients for some wild species.

Another symptom of the artificial usage of the lake is the ownership orientated attitude of the fishing local population. The cooperative taking care of the never ending fish supply (2-3 tons overall catch per day in average), and the lake being rented for their use; the price for this lesser

quality fish is so low (= 0.35 $/ kg), the fishermen hardly have a mentionable income despite all their efforts. Conditionally they watch jealously over their property, not willing to share with wildlife - e.g. pelicans, cormorants and Fishotters: they eat their fish, harm their equipment and disturb their lifestyle; killing these 'pests' is only reasonable, like happened last winter with a group of pelicans and most probably the dead ones we saw during our stay.

Moving around the small island town of Gölyazi the amount of cats in general and among them the number of one eyed or blind cats is amazing and remained mysterious until we saw older children teaching small ones to shoot cat's eyes out. Reaching their late teens air guns serve the same purpose much more effectively.

We noticed a certain "self service attitude" all over the lake; people take remorselessly what suits them: trees, shrubs, greeneries, water, animals. People are aware of their activities being illegal, since they show some very cunning attitudes, like cutting only the inner trees of groves or felling trees only in the middle of a forest.

We only mention these incidents as examples of a general attitude towards wildlife and even domestic animals.

5.3 Fishing Methods

A water body full of slow moving herbivorous fish is very tempting for a Fishotter. But the lake being crisscrossed by fishing nets and fyke nets (tr: pinter/ loc: sakı) is an immense death trap. Drowning in fishing equipment is a common death cause all over the world and lutra morbidity is high wherever fyke nets are used (Chanin, 1985; Strachnan/ Jefferies, 1996). Mortal incidents with fishing equipment do occur on Lake Uluabat, the rate is very hard to estimate, statements of the local fishermen vary a lot.

5.4 Hunting and Poaching

Despite the lake's rating as "Living Lake", Ramsar Site and IBA it has no protection status. Hunting is allowed and hunting restrictions are not implemented, as nearly everywhere else in Turkey. Poaching and deceitful hunting is widespread, posing a threat to all wildlife in the region, including the Fishotter. People keep false (plastic) and live decoys to use for luring ducks, they build hides, hunt from boats- whatever is forbidden by hunting laws ('MAK' = circular directive, Anonymous, yearly) you see on Lake Uluabat!

Photograph 17: Dead Pelican on Lake Uluabat

5.5 Fish Farming

Fish farm owners are globally known and accused as Fishotter killers (Chanin, 1985; Güven, 1999; Pattnaik/ Dash, 2001; Uysal, 2002). They are usually unyielding, adverse to take any protective measures and stubbornly defending their produce. Lutra feeding from fish farms is undoubtedly true- which predator can resist so easily caught prey- and getting into conflicts with fish farm owners is predetermined. The fish farm owner we talked to on Lake Uluabat admittedly killed Fishotters because "they were stealing" his fish. We anyway doubt the legal situation of the fish farm in the north of Lake Uluabat.

5.6 Wrong Planning

Besides these problems we heard of some major plans which will change big parts of the landscape and endanger the complete eco system. One is the Izmir- Bursa highway planned to cut through big parts of the lake's hinterland (east/ south east), putting the rich wildlife in these still very untouched and yet unreachable sites at risk.

The second are several barrages planned south of the lake in the Mustafakemalpaşa vicinity. Besides irrigation, they aim at water level regulation, by barring some of the inflows of the lake thus regulating the normally highly fluctuating water level, which is one of the main features of Lake Uluabat and main cause of its rich wildlife and varying habitats. Some of the water input is even regulated now.

6. Recommendations:

Necessary Measures for Wildlife, Habitat and Fishotter Protection

6.1 Water Pollution

One of the main attractions for industrial investors in some regions of Turkey is the laxness with which conservation laws are implemented. The promise of employment is enough for local administrations to sell their environmental values, sometimes even the health of their communities and causes them to close their eyes to major wrongs executed in the name of regional development. We have no proof of this being the case at Lake Uluabat, but we tried to investigate the "sewage swamp" on the lake front at Akçalar's industrial site and it very much resembled a case of "closed eyes". It is not possible to ignore a rather big area of seemingly pure black sewage, flowing through the reed beds and entering the canal, which leads to the lake through quite big pipes. Besides that we gathered information from several research reports about the highly polluted Mustafakemalpaşa canal, the main input of the lake.
Since the environmental laws in Turkey are rather good but rarely implemented to the full, the only possibility for a change to the better is going public and thus putting pressure on the concerned parties. Media campaigns or campaigning in general involving as many interested participants as possible (local population, universities, NGO's etc) might lead to good results. Support from the communities and the people can be taken for granted in this case since a lot of people accuse the regional industry of polluting the lake, destroying their income and decrease the quality of their life. An argument for the concerned authorities might be that it is much costlier to resurrect a high grade eutrophic lake than to save it while it is still alive!

6.2 Human Attitudes

To change personal attitudes, or rather a part of a cultural heritage is not an easy task and might take longer than the bleak situation of the lake and its wildlife allows. Environmental education alone will not convince without the help of state executive organs like Gendarmes, National Park Wardens to implement concerned laws and fines as an additional first means of pressure. To focus on schoolchildren is easier and should never be forsaken, but this is not enough, since children alone have neither the strength nor the power to overcome tradition. Talking to grown ups, holding meetings and capacity building of key persons should be a task tackled by involved NGOs. We have made the experience that once the meaning of sustainability is made clear; the first steps to sustainable use are not very far away. In the case of Lake Uluabat it will be necessary to find a real alternative to the rather artificial fishing industry of the last three decades. Telling the fishing population that their catch is not healthy any longer, but presumably heavily polluted, might be a first step.

6.3 Fishing Methods

Fishing methods will have to change if a sustainable use of the water body should be effective. The use of fyke nets and nets in shallow lakes always implies the unintentional trapping of wildlife and is a globally known problem (Chanin, 1985; Thol-Schmitz, 1999; Pattnaik/ Dash, 2001). In many European states the funnel entrances of fyke nets are secured by a cross of wire or strong fishing line, allowing only fish, but no waterfowl, amphibians or aquatic mammals to enter (Madsen/ Sogaard, 2001). If nets are fine, they are usually ripped by trapped wildlife, which causes the anger of the fishermen, but does not harm wild animals. Of course this is no acceptable solution. One should learn about existing alternative fishing methods and promote these in seminars with fishermen. Seminars can be held in cooperation with the fish cooperative and should allow the possibility for dialogues between the concerned parties.

6.4 Hunting and Poaching

After seeing the records of the midwinter counts dropping from the original 400.000 to 27.000 birds this year (DHKD Midwinter Count Results/ 'toygar' email chain*)*, locals telling us about shooting Fishotters and seeing photographs of strangled pelicans in Gölyazı, where one man purposefully killed them, after the villagers had fed them through the harsh winter and seeing history repeated with our own eyes during our stay, hunting should be strictly forbidden in the area in the long term. Doing so, at least men with guns would be banned from the vicinity and poachers would be more obvious. Although Fishotters are not hunted in particular, they are still shot when convenient, being regarded as a pest. As a short term objective the proper and strict implementing of existing restrictions ('MAK' = circular directive, Anonymous, yearly) should be promoted. Education seminars should be held for the whole community as well as for certain stakeholder groups. A great number of NGOs are dealing with the same problem globally and it might be useful to contact experienced groups especially from the Balkan states, who held education seminars concerning Fishotter protection (Roche/ Kucerova, 2001; Ozolins, 2001).

6.5 Fish Farming

To our amazement, the fish farm owner on the lake showed a good incline to listen and some openness towards preventive measures. Since he obviously has no financial means to build fences or other devices to keep otters out of his farm, co funding of such measures could save Fishotters' lives. Including him into seminars might change his general attitude, since he showed interest and some understanding, when we visited him. Special seminar courses for the fish farm complex do exist in Otter protection circles and exchanging material and experiences could be helpful (Roche/ Kucerova, 2001, Özdemir, 2002).

6.6 Wrong Planning

It needs a lot of promoting, campaigning and public awareness to change big plans like the Izmir- Bursa highway and the barrages, but if the aim is to safe Lake Uluabat the concerned NGOs should be thinking about a national campaign against these absurd plans. The only chance this lake had until now to survive the amount of polluted water poured into it has been its regular and immense flooding. Flooding makes most of the habitats possible, like the wonderful waterlogged meadows and forests in the east and south of the lake. And it dilutes the poisonous brew it usually consists of. Regulating Lake Uluabat is not sustainable. Regulating Lake Uluabat means death.

6.7 Monitoring

The most important means to reach conservational objectives around Lake Uluabat is a good monitoring team. Two trained (and integer!) wardens would be ideal to do a good and steady job, since it is not practicable for volunteers to perform a rather time and fund consuming task like this. The wardens should be of medium age and be provided with the necessary authority to prevent further destruction of the ecosystem. We have seen trees being cut illegally very cunningly on the inside of sedimentary islands (NW) and in the waterlogged forests (S). News reached us recently about the willows that provided a roosting site for Pygmy Cormorants have been cut down and the whole colony had to move! Reeds are cut uncontrolled, regardless of breeding times for wildlife. There are many examples like this, making a good monitoring force indispensable. Already existing workshop and education material for Fishotter monitoring and field ranger training (e.g. Ando, 2001; Noveriawan, 2001) should be taken into account

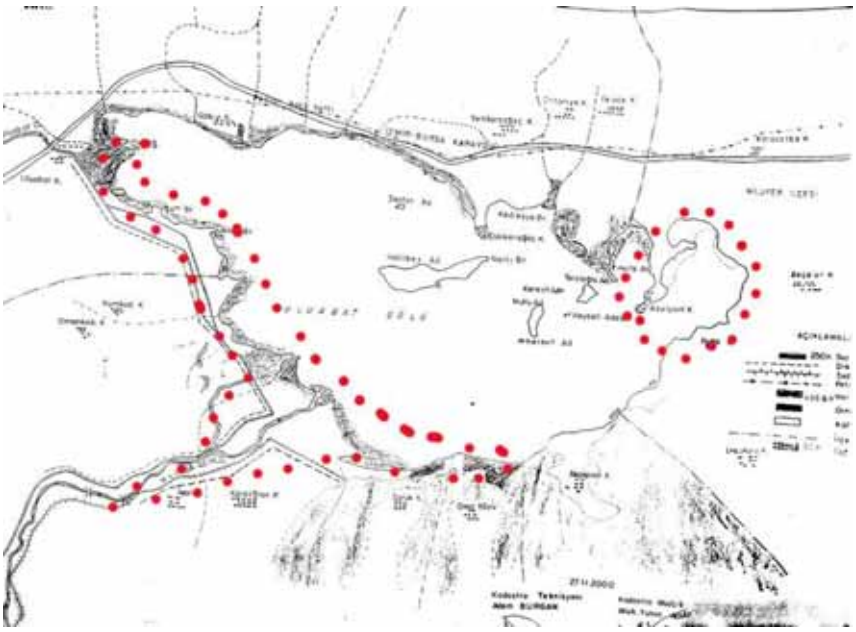
7. Discussion

7.1 Ramsar directives for Fishotters?

(Protection Zones, Indicator/ Flagship/Keystone Species etc.)

7.1.1 Zoning/ Protection Zones:

Since Fishotters are very active and claim wide ranges as their territories, we can not agree with the idea of protective zones for Fishotters in the sense of the Ramsar directive (Ramsar Handbook, 1977/ 2000) or Eurosite criteria (Eurosite Guide for Management Plans, 1996). A partly protected ecosystem like at Lake Manyas, where a small part of the lake is announced a "Bird Paradise" and the rest of the lake is not protected at all, is not practicable for lutra. (Fact is: it is not practicable for any species, since they all move over the borders of their advised living zones.) To protect Fishotters properly, ideally the whole lake should be undisturbed, cleared of any disturbances and sources of danger and cleaned of toxic matters. Since this is not possible, the only advice we can give towards protective zones is to install at least two core zones around the suggested breeding locations (see: 4.2 Breeding Locations), to prevent disturbances during breeding and rearing cubs.



Map 7: Recommended Core Zones for Fishotter Protection

7.1.2 Species Definition:

As we mentioned before (see: 1.1, Species Description) Fishotters have been described for many years as an "Indicator Species" (Ramsar Handbook, 1977/ 2000) for quality wetlands. To use this term for the lutra population of Lake Uluabat is ridiculous, with pollution reaching unsustainable proportions for wildlife. Surely the term and the criteria have to be discussed and newly defined on a global level in the near future. For a "Flagship Species" the Fishotter is too evasive and can not be watched as easily as some bird species, like the Pygmy Cormorants or the Pelicans. In an intact habitat Fishotters perform a key role as top predators. Since the ecological balance of the lake is heavily disturbed by the artificial fish situation, the species still do their predatory duty, but carry it out on easily caught prey like the Crucian Carp. "Keystone" species play vital ecological roles. The recognition of the important ecological role of keystone species, which are often abundant and widespread, and the need for their conservation, is perhaps foreign to the traditional conservation ethic, but deserve serious consideration. Quoting the Ramsar directive, a "Keystone Species" is a species that "carries an important symbolic character and plays an important role in the ecology" of a wetland. "Most of them (are species) with a great abundance and "their protection should be seriously considered, even if "their protection should be incongruous to traditional protection ethics" (Ramsar Handbook, 1977/2000). So, defining Lutra lutra as a "Keystone Species" is definitely the most rightful definition in the Ramsar sense.

7.2 Fishotter Abundance- Why?:

Lake Uluabat and its environment are righteous beautiful and we have rarely seen a semi aquatic eco system with such a variety of habitats. But the obvious convenience it offers to wildlife is not enough any longer to cover for the immense environmental problems this lake has to cope with. Habitats are being destroyed, the water is polluted, the bird population is noticeably declining; if help is not coming soon, it might as well be too late!
Still, the Fishotter population thrives and the results of this first survey are remarkable. We did ask ourselves, why an animal like the Fishotter, which we always introduced as an indicator for clean and sustainable habitats, copes with such an unhealthy environment. We did reach several conclusions, which may open fields for new discussions and surveys:

*Otters are capable to travel wide distances, maybe their former habitats far in the Bursa region or the Emetçay and Orhaneli basins are no longer inhabitable and they had to move on. We do

not know the surrounding and the hinterland of Uluabat enough to know the attraction it could generally offer to a semi aquatic mammal like the lutra. Lake Uluabat and its perfect habitats could offer the only alternative to settle in the region.

*The 'fish miracle' of Lake Uluabat might be attractive enough for them to settle.

*Neither do we know the state of the otter population's health nor their life expectancy, they could be all ill. This does require at least good monitoring, well performed necropsies on all found dead bodies and recording.

A longer survey would be needed to investigate their breeding and survival rates, morbidity rates and its causes in general. Bursa University Veterinarian Faculty has started to research death causes in wildlife on the lake, we would be glad to be in contact and to receive the results of research on dead otters found in the vicinity.

8. Conclusion

To generally protect a vulnerable species like the Eurasian Fishotter on Lake Uluabat, much more is needed than local or regional approaches and awareness programs, as good as they may be. A solid and integer state policy concerning wetlands and species protection is urgently required. Long known facts about otters and development (like the fish farm complex or hazards in accordance with agriculture) are regrettably completely disregarded in Turkey. Conservation advices are not taken and most issues of the long signed global treaties are not implemented.

Lake Uluabat urgently needs a protection status, preferably a ban on hunting as well; meanwhile completely implementing hunting restrictions in a teamwork effort together with the concerned executive organs will help a lot. But preserving a valuable Ramsar site like Uluabat without any kind of official environmental protection is neither sustainable nor can it prove successful. We reject partially protected sites like in Manyas for birds for Fishotters, since roaming wide spaces is characteristic for this particular species. Zoning is not enough to protect Fishotters.

We have great misgivings about the general idea of zoning. We would prefer strict "off limit protection zones" to preserve original species' gene pools. The idea of zoning in the Ramsar directive is in accordance to the idea of 'sustainable use and development' of the Rio directives. Experience showed, especially in underdeveloped countries with weak economies that 'sustainable development' still often means full scale development under false pretences. To effectively protect rare, endangered, vulnerable species and their habitats or whole ecosystems, it is to be considered to leave areas fully natural without any development whatsoever, following the idea of reserves rather than expecting wildlife to "thrive" in restricted and polluted spaces. In these countries, Turkey regrettably is no exception, protection zones are usually not kept anyway. In already developed and highly polluted areas such as Lake Uluabat a strict restoration project (and of course a sustainable master plan) is rather more needed than conservation and protection programs. We had the chance to discuss the area's problems with a representative of the IFC/ World Bank (International Finance Cooperation) and tried to put him into contact with DHKD project coordinators to discuss funding of water restoration projects.

Our small capacity building program has been partly successful. Members of UluKuş send us some records and photographs of tracks and spraints after we left, but there is no regular and effective monitoring program.

The dead otter that has been found 3 hours after we had left the vicinity has been collected by the head of the veterinary faculty in Bursa for a necropsy. Despite us asking several times the necropsy report regrettably never reached us.

The fact of Lake Uluabat having such a high water level fluctuation (up to 3.50m difference in some places!) opened some questions regarding holts and breeding sites. We would have needed to investigate for some days at a time of highest water level to possibly find more answers.

We learned to love Lake Uluabat very quickly and in only two visits made the problems and sufferings of this wonderful ecosystem our own. We made good friends and we loved being literally in the middle, part of the daily life of Gölyazı, if even for a short time.

We would like to close this report with a word of U Thant (1909- 1974), former Secretary-General of the United Nations:

One can easily imagine how much money and effort we would be willing to devote to preserve an animal species on the moon if the astronauts had found one. No species on earth is less precious. No effort should be spared to save unique and irreplaceable products of millions of years of evolution with which our small planet has been endowed.

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Akyaka/ Muğla
2002/ 2003

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Index of Maps, Photographs and Graphics used in the text:

Maps: **Source:**

Map 1	Eurasian Fishotter, Global Distribution	Internet
Map 2	Eurasian Fishotter, Distribution in Turkey	NFDB*/ Thol-Schmitz/ Schmitz
Map 3	Lake Uluabat, Basemap	DHKD
Map 4	Lake Uluabat, Topographical Map (3D)	DHKD
Map 5	Lake Uluabat, Ramsar Boundaries	DHKD
Map 6	Pilot Sites	DHKD/ Thol-Schmitz/ Schmitz
Map 7	Recommended Core Zones (Ramsar Directive)	DHKD/ Thol-Schmitz/ Schmitz

*National Fishotter Data Base

Photographs:

Photograph 1 Lake Uluabat, Floodmarks on Vegetation
Photograph 2 Talking to People in Eskikaraağaç
Photograph 3 Injured Cat in Gölyazı
Photograph 4 Working on the "Meydan"
Photograph 5 Potential Breeding Habitat: Between Gölyazı and Fadıllı
Photograph 6 Potential Breeding Habitat: Below Dorak
Photograph 7 Potential Breeding Habitat: Mustafakemalpaşa Delta
Photograph 8 Potential Breeding Habitat: South- East of Uluabat
Photograph 9 Collecting and Recording Spraints
Photograph 10 Collecting and Recording Potential Prey Samples on the Fish Auction
Photograph 11 Daily Fish Auction
Photograph 12 Bringing in Fish to the Auction
Photograph 13 Fyke Nets
Photograph 14 Discussions on the "Meydan"
Photograph 15 Workshop
Photograph 16 Dead Fishotter**
Photograph 17 Dead Pelican

**all photographs except Photograph No.16 (DHKD): Thol-Schmitz/ Schmitz

Graphics:

Graphic 1	Lutra Species, Family Tree	Internet
Graphic 2	Eurasian Fishotter	Internet
Graphic 3	Percentage of Prey Remains in Investigated Spraints	Thol-Schmitz/ Schmitz

ANNEX A.1: "Project Landmark Key"

Land mark	Contr. Points	GPS Coordinates, used map datum WSG 84		Project Number	Location	Habitat	Remarks	Controls	Results
N1	2	35T	643141 4448756	14 N 1	North of Gölyazi	Vast reeds, small water-lily beds, rocky hill slopes	One presighting: group of four fishotters (Ulukus, winter 2002)	1+1	Positive : 2 Negative : 2
N2	2	35T	643812 4445191	14 N 7	Close to "Gölyazi Fish Restaurant"	Dense reeds, waterlogged meadows, vast water-lily beds, shrubs and trees	add.sample: Emys carapax	1+2	Positive : 2 Negative : 1
N3 (PS1)	4+	35T	643023 4447571	14 N 2	Akcalar Picnic place	Very plain, seasonal waterlogged meadows, small reedbed (+ bullrushes), canal, trees and shrubs	Great abundance of very small Rana sp.	Pilot Site	Positive : 11 Negative : 2
N4	2	35T	646139 4447538	14 N 3	Fadilli waterlogged meadows	Very plain waterlogged meadows, small boulders, few trees and shrubs		1+2	Positive : 5 Negative : 1
N5 (PS2)	3+	35T	644823 4446543	14 N 4	Beneath Ayvali cave, creek bed	Small creek bed and estuary, shingles, sand and mud flats, willow forest, shrubs	High floodmarks, creek bed and mud flats perfect for tracks (Fishotter, Badger, martens, hedgehock etc.), rollmarks	Pilot Site	Positive : 12 Negative : 1
N6	2	35T	643756 4444923	14 N 6	Waterlogged forest, west of Fadilli	Waterlogged forest and meadows, vast reed beds	Dead pelican, hidden in a sack	1+2	Positive : 3 Negative :1
N7	1	35T	641338 4443110	14 N 5	Waterlogged forest beneath Akcapinar	Very vast reed beds, waterlogged meadow and forest	Forest = willows, monkpepper, ash, high floodmarks on vegetation	1	Negative : 1
N8 (Boat)	1	35T	643315 4444706	19 N 1	Beneath Ayva (Yeni Baglar)	Dense waterlogged forest (willow), lake side waterlogged meadow, vast reed beds	Very suitable breeding site, spraint heap (entrance to holt?)	1	Positive : 1

N9 (Boat)	1	35T	641949 4443320	19 N 2	Beneath Akcapinar (Kocakamis)	Shingled beach, waterlogged forest (ash and shrubs) behind, mountains slopes with olive trees, vast reed beds on both sides	Great abundance of spraints, one fresh with "jelly", the older ones all found on high boulders (flood season?)	1	Positive : 1
N10	2	35T	639768 4442113	18 N 1	Beneath Akcapinar (Handpump)	Vast reed beds in front, followed by dense waterlogged forest, some stagnant water pools, few big boulders, mountain slopes cultivated	Snakeskin, parts of birds (Grey heron, coot, spur raptor)	1	Negative : 2
N11	1	35T	633206 4440922	16 N 1	Karaoglan Pumpstation	Canal, plain meadows, few trees and shrubs, in the back pastures and reed bed, course ways and canals	Habitat carries delta character, great abundance of very small Rana sp., coluber	1+2	Positive : 3
N12	1	35T	630431 4442583	15 N 7	Mustafakemalpasa River/Ayaz bridge	Sandy, partly shingled river sides with boulders and shrubs, bridge	Good sand beds for tracks	1+2	Positive : 2 Negative : 1
N13	1	35T	626083 4439982	15 N 8	Mustafakemalpasa River , big rocks north- east of Ayaz bridge	Sandy, partly shingled riversides with boulders and shrubs		1+3	Positive : 2 Negative : 2
N14	1	35T	628303 4444939	15 N 6	Atabey Pumpstation	Shingled canal sides, few reeds, rocks and shrubs	Add. species: Emys orbiculata, second control impossible because of heavy rainfalls	1	Negative : 1
N15	1	35T	625534 4448853	20 N 1 (ex)	Beneath main course way, north-west of Atabey Pumpstation	Vast reed and water-lily beds, few willows	Add. samples: freshwater snails, hip bone (bird), fungi	1	Negative : 1
N16 (Boat)	1	35T	629257 4447872	19 N 3	Small island near Cakal Burnu	Small, reedy sedimentary island with one single willow tree		1	Positive : 1

N17 (Boat)	1	35T	628061 4448391	19 N 4	Big island in the vicinity of Demirkapilar	Reedy, sedimentary, rather big island, willow groves (partly felled), beach like sandpatch south- west of island	Many different tracks on sandpatch, scratchmarks, abundance of spraints	1	Positive : 1
N18 (Boat)	1	35T	623784 4451828	20 N 2	Uluabat River, broken dam	River, plain pastures, few trees, shrubs and reeds, canals and course ways, big rocks from broken dam	Habitat carries delta character, add. species: coluber	1+1	Positive : 2
N19	1	35T	621994 4451734	15 N 4	Uluabat River bridge	Partly sandy, partly shingled river sides, muddy waterlogged meadow, few reeds and shrubs	Presighting: spraint heap (Heike, Febr. 2000)	1	Negative : 1
N20	2	35T	631541 4452573	15 N 3	South- west of Gölkiyi graveyard	Wide strip of waterlogged meadows, partly juncus, stones and boulders, lake front vast reedbeds	Add. species: coluber, only few appropriate sprainting sites, further controls not possible beause of heavy rainfalls	1	Positive : 1 Negative : 1
N21	1	35T	631720 4452651	15 N 2	South of Izmir-Bursa road, 6.4 km northwest of Eski Karaagac	Very vast reed beds, plain waterlogged meadows, partly juncus, waterlogged forest, soft loamy ground	Great abundance of very small Rana sp., one further control not possible beause of heavy rainfalls	1+1	Positive : 2
N22 (Boat)	1	35T	634295 4450552	19 N 5	Seytan Island	Island, rocky coast, small reedbeds, hills cultivated with olive trees		1	Negative : 1
N23	2	35T	637009 4449762	15 N 1	Two open beach-like places north-west and north-east of Eskikaraagac	Shingled beach with big boulders, partly sandy, northern edge of village	Presighting: spraint, exactly same location (Heike, Febr. 2000)	1+2	Positive : 7
N24 (Boat)	1	35T	637455 4449091	19 N 6	Halilbey Island, Narli Burun	Island, gravelled beach, few reed, hills cultivated with olive trees, small settlement, animal husbandry (goats and cows)	Add. species: freshwater snails and clams	1	Negative : 1

N25 (Boat)	1	35T	640024 4447920	19 N 7	South coast of Kerevit Island	Reeds, monkpepper shrubs, waterlogged meadow, few small rocks	One dead yellow legged gull (old), great amount of coot skins (fresh)	1	Positive : 1
N26 (Boat)	1	35T	640600 4447633	19 N 8	Terzioglu Island	Shingled, rocky coast, few monkpepper shrubs hills, cultivated with olive trees, old and abundant settlement		1	Positive : 1
N27 (Boat)	1	35T	642914 4448599	19 N 9*	Kiz Island	Reedy island, antique square boulder wall in front of vast reed beds	Antique settlement, finding of rock marten scats	1	Positive : 1
* further investigation by boat has been made impossible because of increasingly bad weather conditions									

ANNEX A.2: "Personnel and Itinerary

Day/ Date	Consultants/ Sub-Project Coordinators	Project Coordinator	Assistants	Logistic Support	Itinerary
12.10.2002	Heike Thol- Schmitz Thomas Schmitz	Eren Atak		Saliha Yayan Recep Yünkuş Fevzi Kırcal Cavit Suyabatmaz	Travel to Gölyazı, settling in, Planning project and logistics
13.10.2002	Heike Thol- Schmitz Thomas Schmitz	Eren Atak	Franziska Arıcı Sevgi Mutlu Saliha Yayan Tansu Tuncalı Rapani Şahin Ömer Döndüren Asuman Aydın Mehmet Celbiş		Workshop, Field work planning
14.10.2002	Heike Thol- Schmitz Thomas Schmitz		Franziska Arıcı Sevgi Mutlu		Field Survey
15.10.2002	Heike Thol- Schmitz Thomas Schmitz		Franziska Arıcı Tansu Tuncalı		Field Survey Mapping
16.10.2002	Heike Thol- Schmitz Thomas Schmitz		Franziska Arıcı Tansu Tuncalı		Field Survey Compl. Survey (Night survey)
17.10.2002	Heike Thol- Schmitz Thomas Schmitz		Franziska Arıcı Mehmet Celbiş		Compl. Survey (Fish auction), Field Survey Organisational work, PA work
18.10.2002	Heike Thol- Schmitz Thomas Schmitz		Rapani Şahin		Planning boat trip and logistics (petrol), Field Survey

19.10.2002	Heike Thol- Schmitz Thomas Schmitz		Arca Atar Saliha Yayan Yusuf Gemici	Ömer Aslanlar	Compl. Survey (Boat trip)
20.10.2002	Heike Thol- Schmitz Thomas Schmitz		Asuman Aydın Ömer Döndüren		Field Survey: Control
21.10.2002	Heike Thol- Schmitz Thomas Schmitz		Franziska Arıcı Sevgi Mutlu		Compl. Survey (Night survey)
22.10.2002	Heike Thol- Schmitz Thomas Schmitz		Franziska Arıcı		Day off: Kocaçay Delta !!!
23.10.2002	Heike Thol- Schmitz Thomas Schmitz		Franziska Arıcı		Field Survey Compl. Survey (Pollution)
24.10.2002	Heike Thol- Schmitz Thomas Schmitz		Franziska Arıcı Arca Atar Tansu Tuncalı		Field Survey: Control
25.10.2002	Heike Thol- Schmitz Thomas Schmitz		Franziska Arıcı		Mapping, Field Survey
26.10.2002	Heike Thol- Schmitz Thomas Schmitz		Franziska Arıcı		Pre Wrap-up, Logistics (Bursa: Photographs etc) Compl. Survey (Early Night Survey)
27.10.2002	Heike Thol- Schmitz Thomas Schmitz		Franziska Arıcı		Mapping and orientation, Field Survey Intern Wrap-up
28.10.2002	Heike Thol- Schmitz Thomas Schmitz	Eren Atak			Project Wrap-up, travel

ANNEX A.3: "Additional Species"

Aviae / Birds				
Code	**latin**		**english**	**remarks**
00070	Tachybaptus	ruficollis	Little Grebe	seen or heard
00090	Podiceps	cristatus	Great Crested Grebe	seen or heard
00720	Phalacrocorax	carbo	Cormorant	seen or heard
00820	Phalacrocorax	pygmeus	Pygmy Cormorant	seen or heard
00880	Pelecanus	onocrotalus	White Pelican	seen or heard
00890	Pelecanus	crispus	Dalmatian Pelican	seen or heard
00970	Ixobrychus	minutus	Little Bittern	seen or heard
01080	Ardeola	ralloides	Squacco Heron	seen or heard
01190	Egretta	garzetta	Little Egret	seen or heard
01210	Egretta	alba	Great White Egret	seen or heard
01220	Ardea	cinerea	Grey Heron	seen or heard
01860	Anas	platyrhynchos	Mallard	seen or heard
01980	Aythya	ferina	Pochard	seen or heard
02020	Aythya	nyroca	Ferruginous Duck	seen or heard
02030	Aythya	fuligula	Tufted Duck	seen or heard
02600	Circus	aeruginosus	Marsh Harrier	seen or heard
02870	Buteo	buteo	Buzzard	seen or heard
03040	Falco	tinnunculus	Kestrel	seen or heard
04240	Gallinula	chloropus	Moorhen	seen or heard
05820	Larus	ridibundus	Black-headed Gull	seen or heard
05925	Larus	cachinnans	Yellow-legged Gull	seen or heard
08310	Alcedo	atthis	Kingfisher	seen or heard
10170	Motacilla	flava	Yellow Wagtail	seen or heard
10190	Motacilla	cinerea	Grey Wagtail	seen or heard
10200	Motacilla	alba	Pied Wagtail	seen or heard
10990	Erithacus	rubecula	Robin	seen or heard
11870	Turdus	merula	Blackbird	seen or heard
12000	Turdus	philomelos	Song Thrush	seen or heard
12360	Locustella	naevia	Grasshopper Warbler	seen or heard
13110	Phylloscopus	collybita	Chiffchaff	seen or heard
14620	Parus	caeruleus	Blue Tit	seen or heard
14640	Parus	major	Great Tit	seen or heard
15490	Pica	pica	Magpie	seen or heard
15600	Corvus	monedula	Jackdaw	seen or heard
15630	Corvus	frugilegus	Rook	seen or heard
15670	Corvus	corone	Hooded Crow	seen or heard
15720	Corvus	corax	Raven	seen or heard
15820	Sturnus	vulgaris	Starling	seen or heard
15910	Passer	domesticus	House Sparrow	seen or heard
18810	Emberiza	melanocephala	Black-headed Bunting	seen or heard
Mammaliae / Mammals				
	Meles	Meles	Badger	tracks, scats
	Erinaceus	europaeus	Hedgehog	tracks, scats
	Canus	aureus	Jackal	tracks
	Martes	martes	Pine Marten	tracks, scats
	Martes	foina	Rock Marten	tracks, scats
	Sus	scrofa	Wild Boar	tracks
	Mustela	nirvalis	Weasel	tracks, scats

	Rattus	rattus	Common Rat	seen
	Lutra	lutra	Eurasian Fishotter	heard,tracks,scats
	Mus	musculus	House Mouse	scats
	Crocidura	russula	Shrew	seen (dead)
Amphibiae+ Reptiliae / Amphibians and Reptiles				
	Coluber	ravergirii		seen*
	Natrix	tesselata	Dice Snake	seen**
	Rana sp.	arvalis	Freshwater Frog species	seen
		ridibunda	" " "	seen
	Hyla	arborea	Tree Frog	seen, heard
	Bufo	bufo	Common Toad	skin
	Lacerta	viridis	Green Lizzard	seen (dead/ prey)
	Mauremys	caspica rivulata	Striped-necked Terrapin	seen
	Emys	orbiculata	Spotted Terrapin	seen
	Testudo	hermanii	Common Tortoise	seen
	Potamus	edulis	Freshwater Crab	seen
	Amphipoda sp.		Freshwater Crayfish species	seen
	Mollusca sp.		Freshwater Snail species	seen
	Astacus	leptodactylus	Edible Crayfish	seen, fish auction
				*one unidentified snake
				**found skin
Ichthyes / Fish				
	Cyprinus	carpius	Carp	seen, fish auction
	Carassius	carassius	Crucian carp	seen, fish auction
	Scardinius	erythrophtalmus	Rudd	seen, fish auction
	Esox	lucius	Pike	seen, fish auction
	Silurius	glanis	Catfish	seen, fish auction
	Anguilla	anguilla	Freshwater Eel	seen, fish auction

PHOTO ANNEX/ P.1: "Boat Trip"

coot skins on one of the islands

shot Yellow-Legged Gull on another island

Captain and vessel

Otter scratchmarks on the "playground"

Bathing cows

gulls in the boat's wake

PHOTO ANNEX 2: "Pollution Survey"

sewage exit into the canal

polluted reed bed

sewage pipes, yet unused

sewage leaking through the fields

sewage exit into the lake

in the back of the polluted reeds the industrial plants

PHOTO ANNEX 3: "Typical Fishotter Signs"

typical spraint on tree on pilot site 1

typical spraint on boulder on pilot site 2

typical sprainting location (Eskikaraağaç, E)

otter track on pilot site 2

otter path in the reeds on pilot site 2

rollmarks on pilot site 2

PHOTO ANNEX 4: "Fish Auction- Potential Prey Assessment"

Crucian Carp

Rudd

Pike

Crayfish

fish without value ("feki")

PHOTO ANNEX 5: "Plaster Moulding Tracks"

plaster moulding tracks on pilot site 2

moulded tracks in river bed on pilot site 2

moulded tracks on mudflat on pilot site 2

plaster track

plaster track detail

PHOTO ANNEX 6: "Additional Species and Samples"

freshwater snails and clams

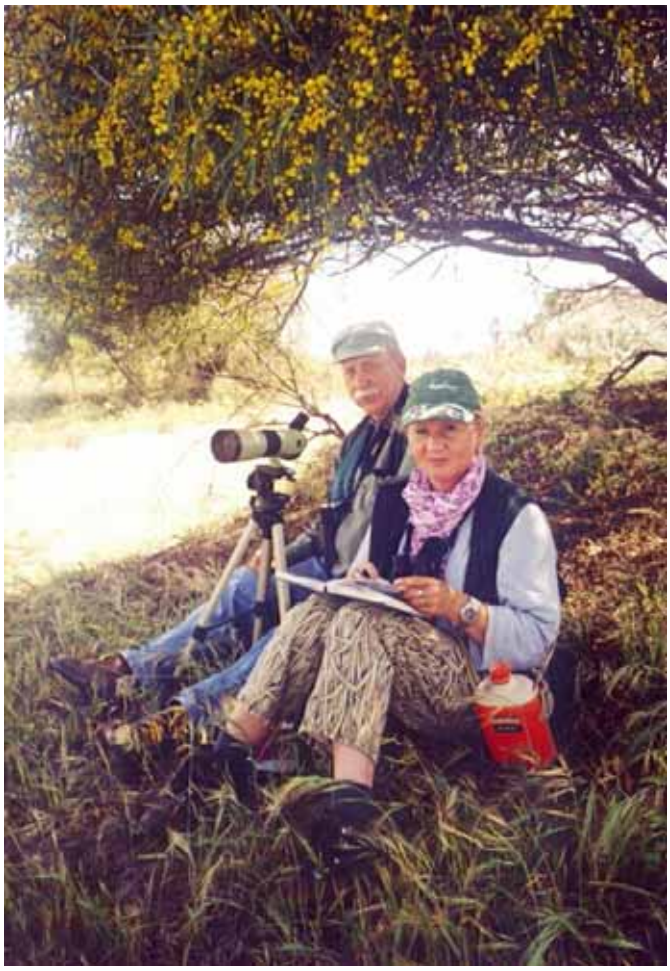
Mauremys caspica rivulata (carapace)

snake remains and skin

Emys orbiculata

Rana sp.

Coluber sp.



This project has been funded by the Turkish Society for the Protection of Nature (DHKD) and has been supported by Unilever.

Heike Thol-Schmitz (Bahar Suseven) was born in Cologne/ Germany. She studied Archaeology, Geology and Geography at the University of Heidelberg. Her interest to work with animals and nature has been aroused in her early childhood. She is an Absolvent of the WWF/ Wetschool and a certified Wildlife Rehabilitator. Being chairwoman of the local NGO 'Friends of Gökova-Akyaka', she coordinates "Bio-Gökova", a UNDP GEF/SGP project that tries to find local solutions to environmental problems in her home region. Her expertises are wildlife studies and biodiversity in freshwater wetlands. She has published several papers about Fishotters.

Thomas Schmitz was born in Karlsruhe/ Germany and studied Sociology in Heidelberg and Medicine at the University of Würzburg. He too is a certified Wildlife Rehabilitator and is also involved in local environmental work and coordinates the "National Fishotter Data Base". He excels in field work and manages diverse websites as webmaster.

Together they conduct the only long term Fishotter study of Turkey in their "home wetland" Gökova. Their fieldwork includes wetland and biodiversity studies and research about Fishotters, birds and environmental issues.

ISBN: 975- 98483-2-5