Nature conservation field course: Protection of sea turtles (*Caretta caretta*) in Turkey 2010

Projektpraktikum: Schutz von Meeresschildkröten (*Caretta caretta*) in der Türkei 2010

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EXECUTIVE SUMMARY

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Fethiye is one of the most important *Caretta caretta* nesting beaches in Turkey. Since 1994 a research and conservation projecthas been conducted in the Specially Protected Area Fethiye. The "sea turtle project" is a long-term study in cooperation between university of Vienna and various Turkish Universities (this year the Hacettepe University, Ankara). The data were collected on three nesting beaches – Yaniklar, Akgöl and Çaliş – by Austrian and Turkish students, between 26 July and 11 September 2010. *Caretta caretta* is classified as endangered and is listed in the International Union for Conservation of Nature Red List of Threatened Species.

In the Mediterranean, two species are known to nest, *Caretta caretta* (loggerhead turtle) and *Chelonia mydas* (green turtle). Annually about 2000 to 3000 female loggerhead turtles nest, so it is the most abundant marine turtle species breeding in the Mediterranean. Nesting is restricted to the eastern Mediterranean; most clutches are found in Greece, Turkey, Cyprus, and Libya. Sea turtles are present in most major basins. In a complex life cycle, females come ashore to lay several clutches of eggs every two to three years. For this purpose they migrate from foraging areas to nesting sites.

The collected data encompass the number of encountered adult turtles, tracks, nests, hatchlings, temperature and anthropogenic disturbances. In daily morning and night shifts the positions of the nests were marked and tracks were measured. Both beaches are Special Protected Areas, but there is strong light pollution because of restaurants, bars and hotels for tourists and in Çaliş due to the promenade lighting.

Turtles found during night sifts were tagged and carapace sizes were measured after the turtle nested. This included straight carapace length (SCL), straight carapace width (SCW), curved carapace length (CCL) and curved carapace width (CCW).
Four different *Caretta caretta* individuals were observed in Yaniklar/Akgöl, whereby one of them (TR2141) was seen twice. In Yaniklar, three turtles (TRA0968, TRC2141, and TRC2137) were tagged. On Çaliş beach between 15 June and 12 July, also three turtles (TRC2145, TRA0988, and TRA0975) were tagged. No tagged turtle from the years before was sighted.

Tracks and hatchlings, (dead or alive) were counted and recorded. Five days after the last hatch, the nests were excavated. In Yaniklar/ Akgöl the maximum estimate of the number of hatchlings reaching the sea was 3884. Tracks were differentiated between those reaching the sea (1798), predated hatchlings (222) and those that died due to exposure to the heat (42).
100 adult tracks and 63 bodypits were found. This corresponds to 1.1 bodypits per track. In total, 72 nests were found, 48 in Yaniklar, 23 in Akgöl and 1 in Karatas. Compared to last year that is an increase of 6.5%. Over 72% of the found nests were so-called secret nests, which means that they were not discovered until the hatchlings emerged. Of particular interest is that one nest was laid by *Chelonia mydas*; this is the first one since 2002.
In Çaliş, a total of 21 nests and 17 tracks were found. Twelve of the nests were so-called secret nests. One nest could not be localised (no data available). In total, 1714 eggs were laid, of which 1417 hatched and a maximum 1279 hatchlings reached the sea.
The data collection, including the data from the years before, should provide information about the turtle population development and about the disturbance of nesting behaviour. Overall, a decreasing population trend has been recorded.
In summer 2010, two dead turtles were found on the beaches of Yaniklar and Çaliş. One individual was a *Caretta caretta,* the other one *Trionyx triunguis.* Both turtles were adult and showed injuries. The project team measured their body size and photographed them. An attempt was to determine the cause of death of the turtles based on their injuries. Most of them were assumed to have been hit by a boat propeller. Over the last decade, 25 dead turtles were documented on the beaches of Fethiye, although higher numbers can be assumed.

On the beach of Fethiye, there are many problems due to increasing tourism and barriers for *Caretta caretta*, which is the reason why the beach is becoming increasing unsuitable as a nesting place for the animals. We also documented changes at Yaniklar/Akgöl and Çaliş beach in 2010; photos and data were taken of sunbeds, umbrellas, lights and parked cars. The Ministry of Tourism and Culture in Ankara reported that tourist numbers have increased in Turkey in recent years. With the tourists, many problems arise. This includes driving on the beach, whereby the sand is compressed and deep vehicle tracks occur, which can destroy nests.
In the area between Karatas beach and Akgöl beach, the major disturbances are the enlargements of the hotels and their surroundings, namely Lykia Botanica Fun Club and Majesty Club Tuana, along with the camping sites between these two hotel resorts. The pier of Lykia Botanica has increased in size compared to the year 2009. After a reduction in the

number of sunbeds between 2008 and 2009, this year 21 new sunbeds were set up. Wooden pallet frames were arranged to form a walkway down to the beach from the bar at Akgöl beach. The numbers of volleyball fields also increased and at the end of Akgöl beach the old access roads were broadened and new ones were built. Many car and quad tracks were visible. To reduce these disturbances, we dug ditches at the entry sites onto the beach. Another negative factor is the planting of trees around the hotel and camping areas. One such area was in front of the camping sites at the Karatas beach bar. The pollution of the beaches, especially with trash, is a big problem.

In Çaliş, disturbances consist of party noise, many light sources and the many tourists who use the beach during the day and night for various activities. In 2010, light pollution continued to be a major problem for the loggerhead turtle. Light bulbs along with illuminated signs, chains of light, halogen lamps and also energy-saving lamps represent a huge disturbance for the turtles. The beach section of the promenade is cleaned up by the hotel staffs, but the beach section of Ciftlik is heavily polluted with trash. This year there was an increase in sunbeds (6.4%) and umbrellas (11.2%); especially in Ciftlik, beanbags and seat cushions are becoming increasingly popular. Furthermore, the bars in the section of Ciftlik have expanded from year to year, which was clearly evident based on aerial documentations from 2004 and 2010. The new constructions include a pier that was built in 2009 in front of the "Sunset beach Apartments", and a children's playground that was set up last year. Moreover, there are two new wooden stilt houses, one between Sunset Beach and another westward of the Sörf Café, which also have new plantings of acacia trees. In front of Sörf Cafe and the Sunset Beach Garden Club, green mats were laid out on the beach. They make the area unusable as a nesting area for *Caretta caretta*. This year, 2607 cars were parked on the picnic zone. Another change for the worse is that, since this year, no signs designating the beaches as sea turtle nesting sites are present.

Due to the very complex behaviour of the sea turtles, they occupy different habitats such as beaches, neritic zones and the open ocean. This entails an equally wide range of anthropogenic threats. Accordingly, conservation measures must be multidimensional and should involve all stakeholders. The sea turtle project has the objective to provide knowledge and to protect the endangered species. Furthermore, raising public awareness is an important aspect to help the sea turtles survive here.

This year, 5 Tiny Tags, which are small computer chips, were deployed to determine the temperatures inside the turtle nests. They were buried in 5 different nests at Yaniklar and

Akgöl. In order to acquire the needed data, the sensors were programmed to measure the temperature every 1 hour and 12 minutes.

At Yaniklar and Çalis the air temperature was measured daily at 6 am, 12 am and 22 pm and compared with the temperatures in the nests. The surrounding substrate, like sand or gravel, buffers the air temperature, but there is still a clear correlation between the temperatures outside and inside the nest.

The minimum air-temperature at Yaniklar was recorded on 4 September with 17.1°C. The maximum was reached on 22 July with 50.4°C. The nest-temperature, recorded with the Tiny Tags fluctuated by 0.5°C-1°C. The temperature median from the different nests ranged between 30.5°C-33.7°C and the incubation time from 47-52 days.

Nesting activity of the Loggerhead Sea Turtle, *Caretta caretta,* on the beaches Yaniklar and Akgöl at the Turkish Mediterranean coast, 2010

Evelyn Rameder & Isabella Gröger

KURZFASSUNG

Fethiye ist einer der bedeutendsten Nistplätze für die Meeresschildkröte *Caretta caretta*. Aus diesem Grund arbeiten seit 1994, im Zuge des "Seaturtle Projects, österreichische und türkische Studenten daran, Daten über deren Nistverhalten zu erheben. Dieses Jahr befanden sich von 26. Juni bis 11. September Studenten der Universität Wien in Fethiye. Es wurden Daten über die Anzahl der gesichteten adulten Schildkröten, der Tracks, der Nester, der Hatchlinge, der Temperatur, sowie der anthropogenen Störungsquellen gesammelt. Während der Nachtschichten wurden vier verschiedene Schildkröten am Strand beobachtet, wobei eine (TRC2141) doppelt gesichtet wurde. Alle vier wurden markiert.

Außerdem wurden über den gesamten Beobachtungszeitraum hinweg 100 Tracks und 63 Bodypits gezählt, was 1, 1 Bodypits pro Tracks entspricht.

Es wurden 72 Nester gefunden, davon 48 (66, 7%) in Yaniklar, 23 (31, 9%) in Akgöl und 1 Nest (1, 39%) in Karatas. Im Vergleich zum letzten Jahr ist dies eine Steigerung um 6,5%. Bei über 72,2% der Nester handelt es sich um sogenannte "Secret Nests".

Besonders erwähnt werden sollte, dass das erste mal seit 2002 wieder ein Nest von *Chelonia mydas* gefunden wurde.

ABSTRACT

Fethiye is one of the most important *Caretta caretta* nesting beaches in Turkey. For this reason, Austrian and Turkish students have been collecting data nesting habits there since 1994 in the framework of a "Sea turtle project".

This year students from the University of Vienna arrived on 26 June in Fethiye and stayed until 11 September.

The collected data include the number of encountered adult turtles, tracks, nests, hatchlings, temperature and anthropogenic disturbance. During night shifts, four different individuals of *Caretta caretta* were observed, one of them (TR2141) was seen twice. All four of them were newly tagged. Additionally, 100 tracks and 63 bodypits were found; this correspond to 1.1 bodypits per track. In total, 72 nests were found, 48 (66.7%) in Yaniklar, 23 (31.9%) in Akgöl und 1 (1.4%) in Karatas. Compared to the last year, that is an increase of 6.5%. Over 72.2% of the found nests were so-called secret nests. This year, a nest laid by *Chelonia mydas* was found. This is the first one since 2002.

INTRODUCTION

The sea turtle project takes place in Fethiye, Turkey, on two different beaches (Yaniklar and Akgöl) and has been conducted since 1994. During this period, many data have been collected, which provides an opportunity to monitor the development of the loggerhead population nesting in Fethiye. This year we stayed there for three months (first Austrian students arrived on 26 June and stayed until 11 September) and worked together with students from the Haceteppe University.

Although Fethiye is designated as a SPA (Special Protected Area), Yaniklar, Karatas and Akgöl beach are characterized by many anthropogenic disturbance factors such as bars, hotels, boat traffic and many bathers (Fig. 1), especially on the weekends.

The information signs about sea turtles and rules for beachgoers, which have been there in various states of repair in previous years, were removed and never replaced. This is one reason for the tourists' lack of information: most guests we talked to didn't know that they were spending their holidays on a turtle beach. During the night the hotel guests often made parties at the beach, left their garbage (mostly bottles and cans) and made bonfires. This not only distracts and scares the adult turtles away but also is dangerous for already laid nests.

Best on nest numbers and nest densities among the Turkish nesting beaches, Fethiye Beach represents one of the most important nesting sites of loggerhead turtles (Özdemir et al., 2007).The beaches offer well-suited conditions for *Caretta caretta*. They are mostly sandy with zones of cobbles and the gentle slope makes it easier for them to come up the beach.

MATERIAL AND METHODS

At the beaches of Akgöl and Yaniklar, beach surveys and data collection was done in collaboration between Austrian students (University of Vienna), their supervisors and Turkish students (Haceteppe University).The working time was divided into morning and night shifts. In two teams, each consisting of two to five persons, we monitored the beach sections. One team patrolled the so-called “Long Way” (Yaniklar), which extended from our camp to Karatas Beach, whilst the second team went in the other direction exploring the “Short Way” (Akgöl). In total, Yaniklar beach is 4.8 km long and Akgöl approximately 1.5 km. In the afternoon we transcribed the collected data from our notebook to the data sheets.

Night shifts

Yaniklar (Until the “Lonely Tree” (Fig.2), the whole way would be too long at night and we could have missed sea turtles emerging to the shore.) and Akgöl beach were monitored every night, until the first hatchlings left the nest on 10 July in Yaniklar. We stopped night shifts from that time on because in the dark the small hatchlings are easily overseen and might be stepped on. In Akgöl the first nest hatched on 17 July.

Night shifts took place between 10 pm and 2 in the morning. Overall, we observed the nesting of 4 turtles. The team patrolled parallel to the waterline, each person at a different height. This increased the chances of actually seeing a turtle and not walking by, which could easily happen as we tried to use a minimum of light. When we encountered a turtle on the beach, we observed it carefully but tried to stay out of its field of vision in order to not disturb it. As soon as the female finished nesting and camouflaging, we measured her straight carapace length and width (SCL/SCW) and her curved carapace length and width (CCL/CCW). The straight measurements were taken with a so called “Kumpas” (Turkish for calliper) (Fig. 3), the curved ones with an ordinary measuring tape. Afterwards we checked the turtle for epibionts, deformations (like cuts) and the front flipper for a tag. A tag is a small piece of metal in which the tag number (e.g. TRC2141) and the return address is engraved. If the turtle was not tagged yet, we tagged it.

Morning shift

The morning shift started at 5:30 or 6:00 am and took as long as we had worked to do. Normally we finished around 10 am. Like in the night shifts, we spread out in a line on the beach but this time we didn't look for female turtles but for the tracks they left at night and also for possible nests.

If a track was found, three measurements were taken: total track length, track width and distance to the sea (either from the nest, or from the farthest body pit from the sea, or from the farthest spot of the track to the sea). The measurements were taken with a 30 m or 50 m long measuring tape. The data were collected in a notebook and afterwards transcribed to the data sheets.

Each track was also examined for bodypits, which were checked for the presence of nests with a metal rod known as a Şiş in Turkish. We had to stick the Şiş carefully in the sand, if the resistance suddenly got fewer, there might be a nest. The sand was shoved away and we started to dig a howl, where we believed the egg-chamber to be situated. When the eggs came in sight, we labelled a ping pong ball with the new nest number and date, put it in the chamber and carefully refilled the chamber with sand. When all data was collected and the work was finished, we smoothed over the track lines and bodypits in order to avoid counting the same track twice.

Measuring and marking nests

Once a nest was detected and a ping pong ball was buried inside, we built a stone semicircle around it. On some of the stones we wrote the date and consecutive nest number (e.g. Y1 or A1, depending whether we found it in Yaniklar or Akgöl). At least one stone was left upside-down, because often the beach-visitors were attracted by the labelled stones and took them away. Additionally, we tied two labelled sticks together and buried them, the string always at an angle of 90 degrees to the sea, near the nest surface. If a nest was lost (e.g. all the marker stones were taken away), we dragged the Şiş through the sand, where the nest was expected to be and the string entangled itself on the Şiş. For further certainty we triangulated all the nests, taking measurements of beach features and also the nest's distance to the sea, including the differentiation of the wet, moist and dry zone.

Finally, the nest sites were cleaned of debris and other items if the hatchlings would have been in danger of getting stuck or trapped (Fig. 4).

Secret nests

There are two kinds of secret nests: the first are nests detected by our Turkish colleagues prior to the arrival of the first Austrian students and, the second are nests not found until they started to hatch. It is common that not all nests are found immediately when they were laid. This makes it important to watch out for hatchling tracks (Fig. 5) during morning shifts. If such tracks were found, they were traced back to their origin and the new nest was pinpointed.

Secret nests have their own consecutive numbering (e.g. AS1, the "S" marks it as "secret").

Hatcheries

This year no hatcheries had to be built. They are necessary when nests are laid on unsuitable sites, such as very near the waterline. If that had happened, the nest would have been opened and the eggs would have been excavated. They would then have been put into a bucket and transported to a newly determined nest site. A hatchery should be done within the first twelve hours after nesting, otherwise the embryos can be harmed. The eggs have to be placed in the hatchery in the exact same position and order in which they were removed. Also the hatchery must be dug the same depth and width as the original nest to provide more or less the same brooding conditions the eggs had in their natural egg-chamber. Again, the hatcheries get their own consecutive numbering.

RESULTS

Nests

In the nesting season 2010 we registered 72 nests on the three beaches Akgöl, Yaniklar and Karatas. 48 (66.7%) nests were found in Yaniklar, 23 (31.9%) in Akgöl and only 1 (1.4%) nest at Karatas beach (Fig. 5).

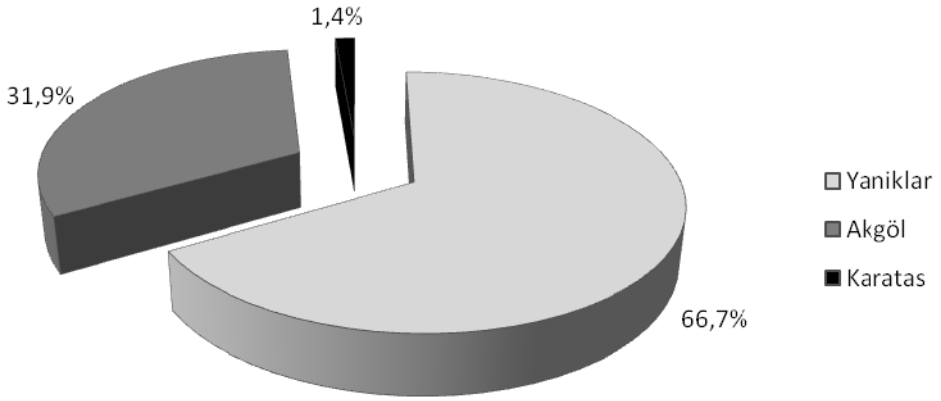

Fig. 5: Percentage distribution of the nests
Abb. 5: Prozentuelle Verteilung der Nester

An overview of the last 16 years of documented nesting activity in Yaniklar and Akgöl shows a steady decrease in the number of nests (Fig. 6). We had five nests less than 2009. This is a decrease of 6.5% in comparison to the last year.

Many nests were laid before our arrival on 26 June: We did not find most of our nests until the first hatch. We termed the nests that we did not find "secret nests". More than 72.2% of our nests were "secret nests" (Fig. 7). In Yaniklar we missed 52.8% of our nests and in Akgöl 23.6%.

Tab 1: Overview of nesting activity (1994-2010)
Tab 1: Überblick über Nestaktivität (1994-2010)

year	Yaniklar	Akgöl	**total**
1994	94	22	**116**
1995	133	36	**169**
1996	37	28	**65**
1997	57	28	**85**
1998	78	27	**105**
1999	65	8	**73**
2000	68	23	**91**
2001	79	24	**103**
2002	42	26	**68**
2003	78	17	**95**
2004	25	12	**37**
2005	57	13	**70**
2006	50	9	**59**
2007	55	31	**86**
2008	49	16	**65**
2009	43	34	**77**
2010	49	23	**72**

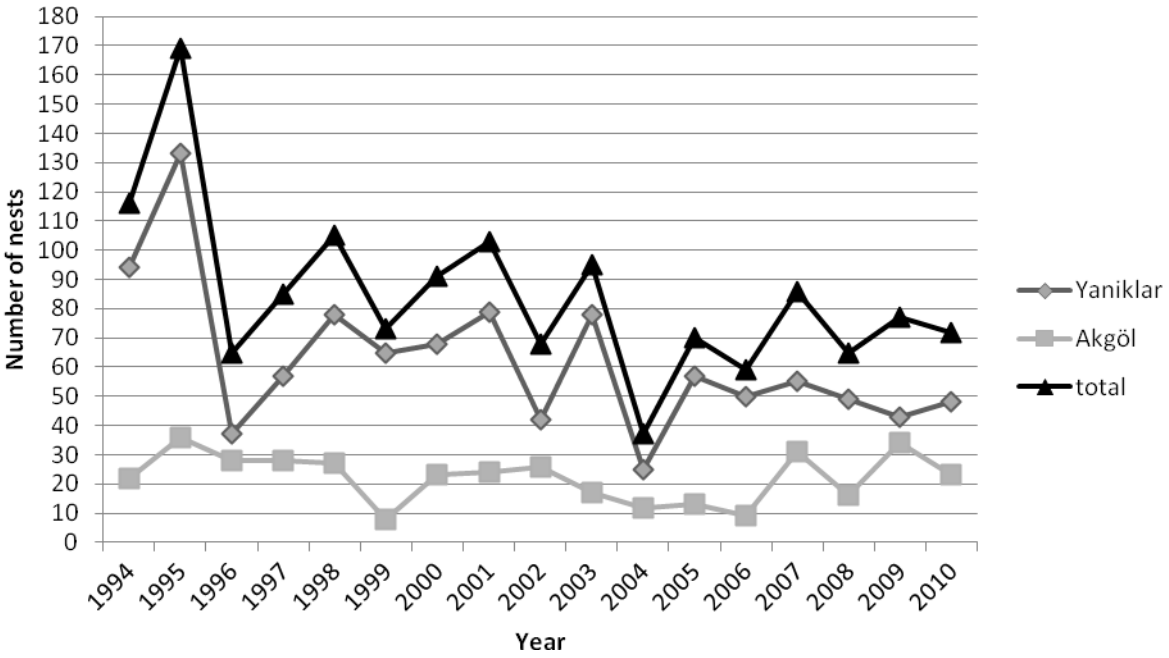

Fig. 6: Overview of the nesting activity from 1994-2010
Abb. 6: Überblick über die Nistaktivität von 1994-2010

The highest nesting activity of *Caretta caretta* took place before we arrived in Turkey.

A big problem in Akgöl was that tourists and local residents often moved our semicircle of marker stones. In some cases we lost nests (A5, A7). We decided to mark the nests with reeds and shields with the label: "sea turtle nest"- in English, German and Turkish (Fig. 8).

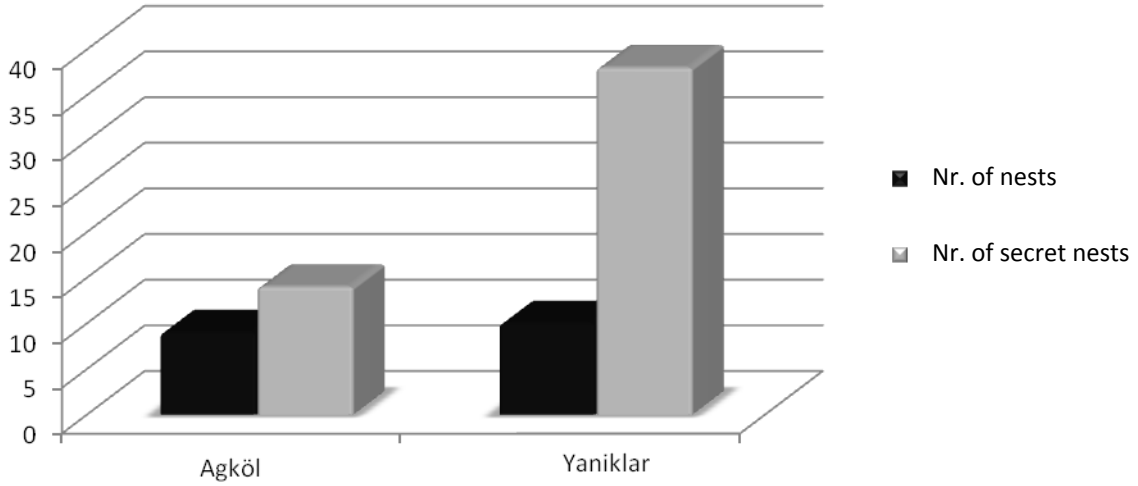

Fig. 7: Comparison of "secret nests" and nests
Abb. 7: Vergleich von "secret nests" und nests

The comparison between laid nests and the unsuccessful attempts (Fig. 9) showed that a female *Caretta caretta* has to come out in Yaniklar an average of 4.5 times and in Akgöl 4.4 times to successfully lay a nest.

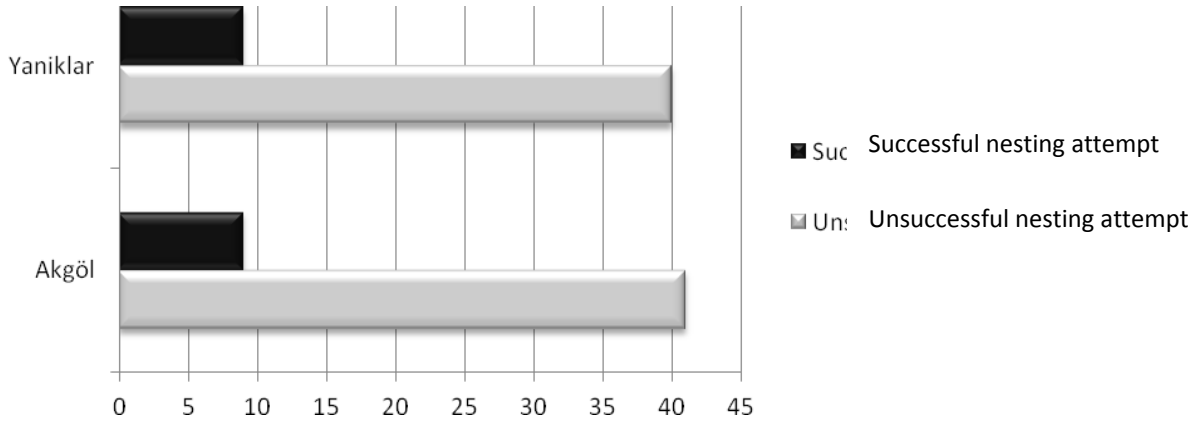

Fig. 9: Comparison between successful nesting and unsuccessful nesting attempts
Abb. 9: Vergleich zwischen erfolgreichen und erfolglosen Nistversuchen

The distance to the sea is an important parameter for the beach conditions and we therefore measured it. In Akgöl the average distance to the sea was 27.8 m, in Yaniklar 21.4 m. The shortest distances were 7.8 m (A5) in Akgöl and 7 m (YS9) in Yaniklar. Our longest measured distance in Akgöl was 60.3 m and in Yaniklar 48.2 m (Fig.10, 11, 12). It was not necessary to build a hatchery. In one case we discussed making a hatchery, but we decided against it. The nest A4 was flooded when the tide was high. The biggest problem to move a nest is that the eggs could be damaged. When the eggs are moved after a 48-hour timeframe the mortality of the turtle embryoes is very high (Miller et al. 2003), because development has fully started. On the other hand, when the nest is flooded the gas exchange is disturbed (CO_2 increases and O_2 decreases).

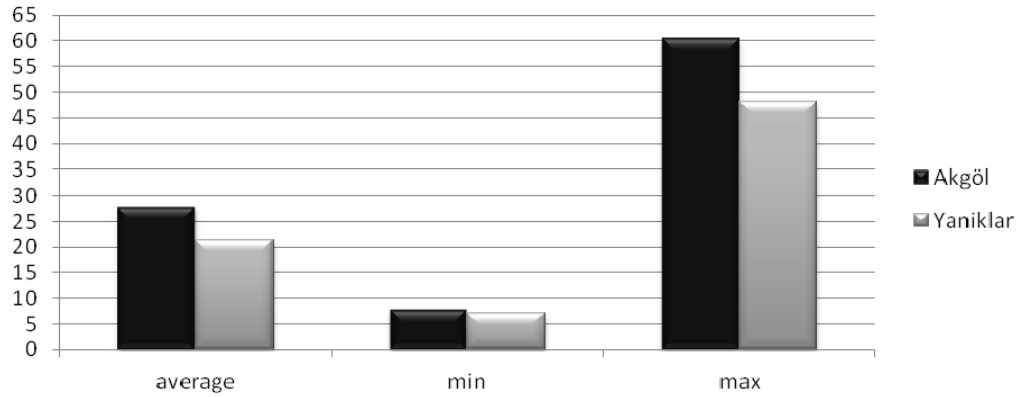

Fig. 10: Distance to the sea
Abb. 10: Nestentfernung zum Meer

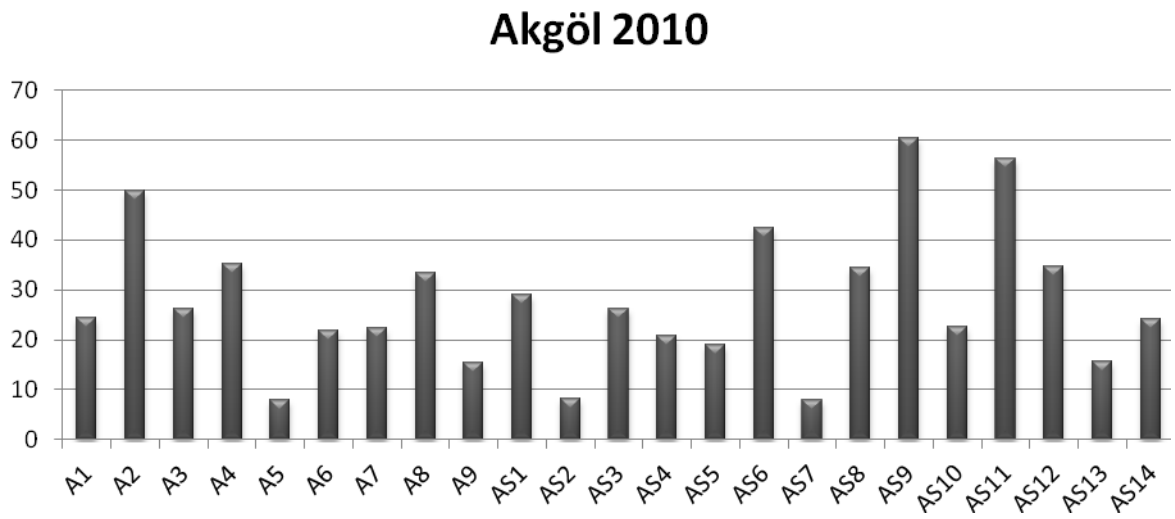

Fig. 11: Nest distance to the sea, Akgöl
Abb. 11: Nestentfernung zum Meer, Akgöl

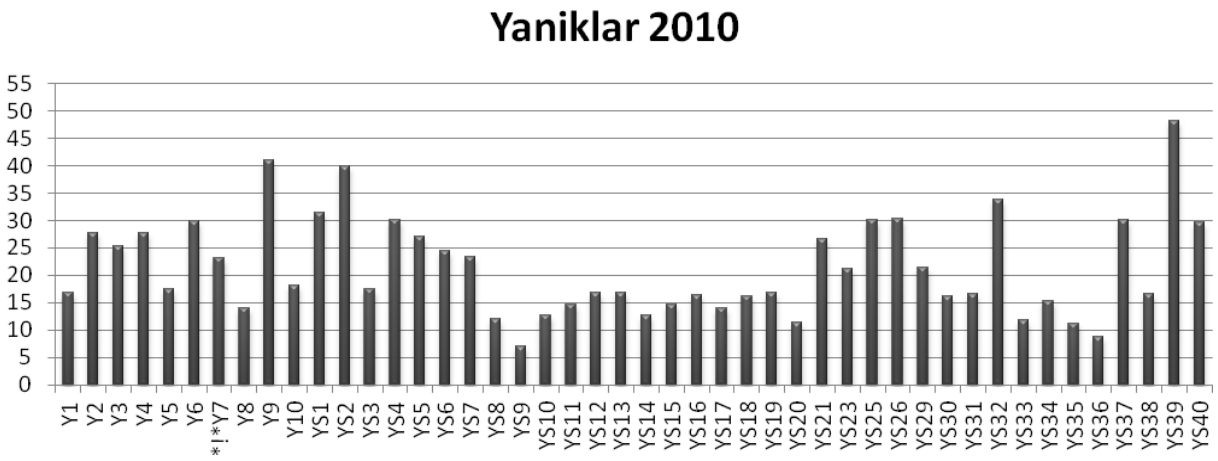

Fig. 12: Nest distance to the sea, Yaniklar
Abb. 12: Nestentfernung zum Meer, Yaniklar

! = *Chelonia mydas*

Tracks

In total we measured 100 tracks. One track was found on Karatas beach (23.8 m), in Akgöl 50 tracks, and in Yaniklar 48 tracks. The longest track in Yaniklar was 59.5 m and in Akgöl 160 m (A2). The average lengths were 34.8 m in Yaniklar and 52.4 m in Akgöl. The track widths ranged from 0.5 m to 0.8 m. The widest track was the *Chelonia mydas* with 1.1 m. The average *Caretta caretta* track was 0.7 m. In Yaniklar, Akgöl and Karatas we had 63 bodypits. The bodypits ranged from 1 to 4 per track. The mean of the body pits were 1.11 per track.

Adults

In total we observed and measured only four *Caretta caretta* adults. Three of them we tagged new, and the fourth individual we saw twice (TRC2141). The average CCL was 0.78 m and the average CCW 0.72 m. We also measured the SCL and the SCW. The average of these two parameters was 0.75 m and 0.55m, respectively (Tab. 2). We saw three of the four sea turtles in Akgöl.

Tab. 2: Measurements of the observed adults in cm
Tab. 2: Messungen der beobachteten Individuen in cm
SCL = Straight Carapace Length, SCW = Straight Carapace Width, CCL = Curved Carapace Length, CCW = Curved Carapace Width

Beach	Date	TagNr	SCL (cm)	SCW (cm)	CCL (cm)	CCW (cm)
Y	29.06.10	TRA0968 new	78,0	57,5	81,0	74,5
A	04.07.10	TRC2141 new	76,0	59,0	80,0	74,0
A	05.07.10	TRC2137 new	68,0	46,0	72,0	66,0
A	05.07.10	TRC2141	76,0	59,0	80,0	74,0

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DISCUSSION

The overall trend in the number of nests in Akgöl and Yaniklar is continuously decreasing. In 2010, we had 6.5% fewer nests than 2009. In the last 16 years the number of nesting females has dropped considerably – there could be many reasons for this development.

One explanation could be that disturbance on the beach is increasing. When the turtles come out from the sea to lay a nest, they are very sensitive to disturbances. The turtle emerges and "scans" the beach. In this very critical phase, any uncertainty will cause the sea turtle to go back. If this happens two or three times, the turtle releases the eggs into the sea and the whole clutch is lost. Artificial light for example, also reduces the number of nesting loggerheads (Miller et al. 2003). The two major hotels "Lykia Botanica" and "Tuana" are very present on the beach. The noise and light pollution continues until ca. 2 am. After the "Lykia Botanica", towards south (Fethiye), the beach forms an inlet and so the light and noise pollution is less evident.

The beach conditions are very important for the nest site selection. Characteristic loggerhead sea turtle beaches should be sandy, wide, open and with low dunes. A big problem in Akgöl and Yaniklar is "sand mining" (Miller et al. 2003). On many places sand is being removed (Fig. 13). In Yaniklar some sections of the beach show an up to 2-m-high sediment wall at the waterline (for example: after the "lonely tree" orientation point). The best conditions for successful nesting are low salinity, well-ventilated substrate, high humidity and no chance for the tide to flood the nest (Bolten 2003). Another problem on the beaches here is that there is so much gravel. The longest track we measured was 160 m. A potential explanation for this is the gravel. The females have to find the best place for the nest. On Akgöl beach there is so much cobble and gravel after the stream that it is very difficult or impossible to dig a nest.

Chelonia mydas

A pleasant surprise was the *Chelonia mydas* nest. It was the first nest since 2002. *Chelonia mydas* rarely nests in this region of the Mediterranean.

The Green turtle is the biggest sea turtle with a keratinized carapace and belongs to the family Cheloniidae. The name "Green turtle" refers to the green fat and muscles under the carapace (Spotila, 2004). It has a teardrop-shaped carapace, which can be 80 to 130 cm long. The carapace has five vertebral scutes, four costal scutes and only eleven marginal scutes. The supracaudal scute is divided. Another characteristic trait is that the nuchal scute does not reach the first costal scute. The carapace has various color patterns – they can change during a sea turtle's life. The plastron is light-colored with four pairs of inframarginal scutes. *Chelonia mydas* can reach a weight of 80 to 210 kg.

On both front flippers there is only a single claw (as opposed to *Caretta caretta*, which has two claws). The head is very small with a single pair of prefrontal scutes and four postoculars. Unlike *Caretta caretta*, the Green sea turtle has a smaller beak. The lower jaw is provided with teeth-like extensions; *Chelonia mydas* is mostly herbivorous. They prefer algae and seaweed, in many cases they also eat salps, sponges and jellyfishes (hatchlings are mostly carnivorous when they are in the pelagic phase).

Like other sea turtles, the Green sea turtles migrate long distances between foraging areas, courtship areas and nesting beaches (Miller et al. 2003). It ranges in all tropical and subtropical oceans. The major nesting beaches are in Tortuguero in Costa Rica, on islands in the Caribbean, South America, Australia, Indonesia, Thailand and Malaysia.

Chelonia mydas is, next to *Caretta caretta*, the second sea turtle species that breeds in the Mediterranean Sea. Most nests are laid in Turkey, Syria and Cyprus. Foraging areas of *Chelonia mydas* are found in the coastal waters of North Africa (Godley et al. 2002, Rees et al. 2008, www.seaturtle.org/tracking), in the bay of Marmaris, around the Island Kos and in the bay of Fethiye (Casale and Maragaritoulis et al. 2010).

Green sea turtles nest on 16 beaches at the eastern Mediterranean coast in Turkey. 78% of all nesting places in the Mediterranean basin are located on five beaches: three in Turkey (Akyatan, Kazanli and Samandag) and two in Cyprus (North Karpaz and Alagadi) (Casale and Maragaritoulis et al. 2010).

On 8 July 2010 in the morning shift, we found on Yaniklar beach a nest of *Chelonia mydas*. It was the first *Chelonia mydas* nest since 2002. It is an exception that *Chelonia mydas* nests in Fethiye: it normally prefers warmer regions. When we found the track and two body pits, it was very difficult to match the sea turtle species because of the size. The first body pit was 2 m wide and approximately 0.5 m deep (Fig. 14). The track was 1.1 m wide. As opposed to *Caretta caretta*, which makes asymmetrical tracks (they moving one front flipper, then the hind flipper and on the other side the same), *Chelonia mydas* produces symmetrical tracks (Fig. 15).

The egg chamber was 0.66 m deep and 0.28 m wide, with 98 eggs in it and 33 hatchlings reached the sea

Tab. 3: Nesting data, Akgöl (n.d. = no data available, ? = nest date unknown)
Tab. 3: Nestdaten Akgöl (n.d. = keine Daten verfügbar, ? = Nistdatum unbekannt

		Nesting	Distance to the sea (m)				Track length	
Nr.	Nest Nr.	Date	dry (1)	moist (2)	wet (3)	total	(visible)	Bodypits
1	A1	17.06.10	21.00	n.d.	3.50	24.50	n.d.	1
2	A2	26.06.10	46.30	2.30	1.30	49.80	160	1
3	A3	28.06.10	22.10	3.60	0.60	26.30	57.20	1
4	A4	29.06.10	24.70	3.30	5.20	35.30	88.20	0
5	A5	02.07.10	4.30	2.70	0.80	7.80	25.80	1
6	A6	05.07.10	21.30	0.50	0.10	21.90	53	1
7	A7	05.07.10	20.40	1.20	0.80	22.40	54	1
8	A8	10.07.10	29.30	2.70	0.60	33.40	84.40	0
9	A9	15.07.10	10.40	1.60	3.50	15.50	44.40	2
10	AS1	?	25.10	3.10	0.90	29.10	n.d.	0
11	AS2	?	6.10	0.40	1.80	8.30	n.d.	n.d.
12	AS3	?	20.90	3.80	1.40	26.10	n.d.	n.d.
13	AS4	?	17.75	2.30	0.80	20.85	n.d.	n.d.
14	AS5	?	16.10	n.d.	2.80	18.90	n.d.	n.d.
15	AS6	?	38.60	n.d.	3.70	42.30	n.d.	n.d.
16	AS7	?	n.d.	n.d.	n.d.	8.00	n.d.	n.d.

	Nest	Nesting	Distance to the sea					
Nr.	Nr.	date	dry (m)	moist(m)	wet (m)	total	visible	bodypits
17	AS8	?	30.90	3.40	0.20	34.50	n.d.	n.d.
18	AS9	?	57.60	2.10	0.60	60.30	n.d.	n.d.
19	AS10	?	n.d.	n.d.	n.d.	22.60	n.d.	n.d.
20	AS11	?	n.d.	n.d.	n.d.	56.40	n.d.	n.d.
21	AS12	?	n.d.	n.d.	n.d.	34.70	n.d.	n.d.
22	AS13	?	10.40	3.50	1.70	15.60	n.d.	n.d.
23	AS14	?	18.30	3.80	2.10	24.20	n.d.	n.d.

Tab. 4: Nesting data, Yaniklar (n.d. = no data available, ? = nest date unknown, Y7*!* = *Chelonia mydas*)
Tab. 4: Nestdaten Yaniklar (n.d. = keine Daten verfügbar, ? = Nistdatum unbekannt, Y*!* = *Chelonia mydas*)

		Nesting	Distance to the sea (m)	Tracklength				
Nr.	Nest Nr.	Date	dry (1)	moist (2)	wet (3)	total	(visible)	Bodypits
1	Y1	15.06.10	10.50	2.80	3.50	16.80	n.d.	1
2	Y2	15.06.10	24.00	2.70	1	27.70	n.d.	1
3	Y3	25.06.10	20.30	n.d.	4.90	25.20	n.d.	1
4	Y4	02.07.10	24.70	1.80	1.20	27.70	58.50	1
5	Y5	06.07.10	15.90	1	0.50	17.40	41.70	1
6	Y6	06.07.10	26.90	5.40	0.60	29.90	56.80	1
7	Y7*!*	08.07.10	20.60	1.40	1.20	23.20	n.d.	2
8	Y8	17.07.10	10.10	2.50	1.30	13.90	34.40	1
9	Y9	18.07.10	36	1.80	3.20	41	n.d.	1
10	Y10	29.06.10	16.10	1.60	0.40	18.10	n.d.	n.d.
11	YS1	?	28	n.d.	3.50	31.50	n.d.	n.d.
12	YS2	?	32.90	2.80	4.20	39.90	n.d.	n.d.
13	YS3	?	12.60	n.d.	4.90	17.50	n.d.	n.d.
14	YS4	?	28.30	0.90	0.80	30.00	n.d.	n.d.
15	YS5	?	23.60	2	1.40	27.00	n.d.	n.d.
16	YS6	?	20.30	n.d.	4.20	24.50	n.d.	n.d.
17	YS7	?	14.70	4.30	4.30	23.30	n.d.	n.d.
18	YS8	?	9.10	n.d.	2.80	11.90	n.d.	n.d.
19	YS9	?	5.60	n.d.	1.40	7	n.d.	n.d.
20	YS10	?	9.80	n.d.	2.80	12.60	n.d.	n.d.
21	YS11	?	11.20	n.d.	3.50	14.70	n.d.	n.d.
22	YS12	?	14.70	n.d.	2.10	16.80	n.d.	n.d.
23	YS13	?	14	n.d.	2.80	16.80	n.d.	n.d.
24	YS14	?	n.d.	9.10	3.50	12.60	n.d.	n.d.
25	YS15	?	11.90	n.d.	2.80	14.70	n.d.	n.d.
26	YS16	?	3.50	7.20	5.60	16.30	n.d.	n.d.
27	YS17	?	11.90	n.d.	2.10	14	n.d.	n.d.
28	YS18	?	n.d.	9.80	6.30	16.10	n.d.	n.d.
29	YS19	?	10.50	n.d.	630	16.80	n.d.	n.d.
30	YS20	?	8.57	2.03	0.70	11.30	n.d.	n.d.
31	YS21	?	24	1	0.60	26.60	69.50	1
32	YS22	?	/	/	/	/	n.d.	n.d.
33	YS23	?	17.50	3	0.70	21.20	n.d.	n.d.
34	YS24	?	/	/	/	/	n.d.	n.d.
35	YS25	?	25.50	3.30	1.30	30.10	n.d.	1
36	YS26	?	27.20	1.90	1.10	30.20	n.d.	1

		Nesting	Distance to sea (m)	Tracklength				
Nr.	Nest nr.	Date	dry (m)	moist(m)	wet (m)	total	visible	Bodypits
37	**YS27**	No nest	/	/	/	/	/	/
38	**YS28**	No nest	/	/	/	/	/	/
39	YS29	?	19.30	120	0.90	21.40	n.d.	n.d.
40	YS30	?	13	1.80	1.30	16.10	n.d.	1
41	YS31	?	14.90	0.60	1.10	16.60	n.d.	n.d.
42	YS32	?	32.30	n.d.	1.40	33.70	n.d.	n.d.
43	YS33	?	9.50	0.70	1.50	11.70	n.d.	n.d.
44	YS34	?	12.50	0.80	1.50	15.20	n.d.	n.d.
45	YS35	?	n.d.	n.d.	n.d.	11.10	n.d.	n.d.
46	YS36	?	3.10	2.20	3.40	8.70	n.d.	n.d.
47	YS37	?	27.20	1.70	1.10	30	n.d.	n.d.
48	YS38	?	12.10	3.20	1.20	16.50	n.d.	n.d.
49	YS39	?	44.90	2.10	1.20	48.20	n.d.	n.d.
50	YS40	?	24.50	3.30	1,90	29.70	n.d.	n.d.

Tab. 5: Emergences in Akgöl, Karatas and Yaniklar (n.d.: no data available, marked nr. = nests, Y7*!* = *Chelonia mydas*)
Tab. 5: Landgänge in Akgöl, Karatas und Yaniklar (n.d.: keine Daten verfügbar, Markierte Nr. = Nester, Y7*!* = *Chelonia mydas*)

				Distance to			
Nr.	Beach	Track Nr.	Date	the sea (m)	Length (m)	Width (m)	Bodypits
1	Y	1	15.06.10	8.40	n.d.	n.d.	n.d
2	**Y**	2	15.06.10	16.80	n.d.	n.d.	n.d
3	**Y**	3	15.06.10	27.70	n.d.	n.d.	1
4	Y	4	16.06.10	5.60	n.d.	n.d.	n.d
5	**A**	5	17.06.10	24.50	n.d.	n.d.	1
6	A	6	17.06.10	39.10	n.d.	n.d.	n.d
7	A	7	17.06.10	63.40	n.d.	n.d.	n.d
8	A	8	17.06.10	16.10	n.d.	n.d.	n.d
9	A	9	17.06.10	14	n.d.	n.d.	n.d
10	A	10	17.06.10	24.50	n.d.	n.d.	n.d
11	A	11	17.06.10	11.20	n.d.	n.d.	n.d
12	A	12	17.06.10	46.20	n.d.	n.d.	n.d
13	A	13	17.06.10	12.60	n.d.	n.d.	n.d
14	Y	14	18.06.10	7.70	n.d.	n.d.	n.d
15	Y	15	19.06.10	29.40	n.d.	n.d.	n.d
16	A	16	19.06.10	7	n.d.	n.d.	n.d
17	Y	17	19.06.10	31.30	n.d.	n.d.	n.d
18	A	18	19.06.10	11.90	n.d.	n.d.	n.d
19	Y	19	19.06.10	28	n.d.	n.d.	n.d
20	Y	20	20.06.10	4.20	n.d.	n.d.	n.d
21	Y	21	20.06.10	21.70	n.d.	n.d.	n.d
22	A	22	20.06.10	21.10	n.d.	n.d.	n.d
23	A	23	20.06.10	14.70	n.d.	n.d.	n.d
24	A	24	20.06.10	17.00	n.d.	n.d.	n.d
25	A	25	21.06.10	39.30	n.d.	n.d.	n.d
26	A	26	21.06.10	13.90	n.d.	n.d.	n.d

Nr.	Beach	Track Nr.	Date	Distance to the sea (m)	Length (m)	Width (m)	Bodypits
27	Y	27	22.06.10	27.80	n.d.	n.d.	n.d
28	A	28	22.06.10	25.70	n.d.	n.d.	n.d
29	Y	29	24.06.10	12.50	n.d.	n.d.	n.d
30	Y	30	24.06.10	10.30	n.d.	n.d.	n.d
31	**Y**	31	25.06.10	25.20	n.d.	n.d.	1
32	Y	32	25.06.10	42.80	n.d.	n.d.	n.d
33	A	33	25.06.10	48.30	n.d.	n.d.	n.d
34	A	34	25.06.10	17.50	n.d.	n.d.	n.d
35	Y	35	25.06.10	7.60	n.d.	n.d.	n.d
36	A	36	25.06.10	4.90	n.d.	n.d.	n.d
37	A	37	25.06.10	64.40	n.d.	n.d.	n.d
38	A	38	25.06.10	14.40	n.d.	n.d.	n.d
39	**A**	39	26.06.10	49.80	160	0.62	1
40	Y	40	26.06.10	6.70	12.70	0.60	0
41	A	41	26.06.10	11.10	24.10	n.d.	1
42	A	42	26.06.10	16	n.d.	0.76	0
43	A	43	26.06.10	40.80	100.50	0.63	0
44	A	44	26.06.10	18.50	36.20	n.d.	0
45	A	45	26.06.10	11.80	n.d.	n.d.	n.d
46	**A**	46	28.06.10	26.30	57.20	0.50	1
47	Y	47	28.06.10	28.20	57	0.70	1
48	Y	48	28.06.10	n.d.	n.d.	n.d.	n.d
49	**Y**	49	29.06.10	18.10	n.d.	n.d.	n.d
50	**A**	50	29.06.10	35.30	88.20	0.60	0
51	A	51	01.07.10	14.40	32.30	0.65	0
52	A	52	01.07.10	16.40	34.50	0.65	1
53	K	53	01.07.10	15.40	23.80	0.70	0
54	**Y**	54	02.07.10	27.70	58.50	0.65	1
55	**A**	55	02.07.10	7.80	25.80	0.69	1
56	A	56	02.07.10	10.70	20.60	0.67	1
57	Y	57	04.07.10	13.30	n.d.	n.d.	n.d
58	A	58	04.07.10	37.60	n.d.	n.d.	n.d
59	Y	59	04.07.10	10.60	21.20	0.69	2
60	A	60	04.07.10	30	38.50	0.65	1
61	A	61	04.07.10	37	n.d.	n.d.	3
62	**A**	62	05.07.10	21.90	53	0.62	1
63	**A**	63	05.07.10	22.40	54	0.68	1
64	Y	64	05.07.10	58.50	82.10	0.63	1
65	Y	65	05.07.10	8.20	16.40	0.65	0
66	Y	66	05.07.10	n.d.	n.d.	0.67	0
67	Y	67	05.07.10	8	n.d.	n.d.	n.d
68	Y	68	05.07.10	59.50	n.d.	n.d.	n.d
69	A	69	05.07.10	10.20	21	0.67	1
70	**Y**	70	06.07.10	1740	41.70	0.68	1
71	**Y**	71	06.07.10	2990	56.80	0.67	1
72	A	72	06.07.10	23.30	47.87	0.75	1
73	Y	73	06.07.10	17,80	41.40	0.70	4
74	Y	74	06.07.10	31,00	83.20	0.64	3
75	Y	75	06.07.10	12.20	24.80	0.70	1

Nr.	Beach	Track Nr.	Date	Distance to the sea (m)	Length (m)	Width (m)	Bodypits
76	**Y!*!**	76	08.07.10	2320	n.d.	1.10	2
77	Y	77	08.07.10	n.d.	n.d.	0.73	n.d
78	**A**	78	10.07.10	34.40	82.40	0.63	1
79	A	79	10.07.10	66.40	113.20	0.79	4
80	A	80	14.07.10	5.80	20.70	0.60	0
81	A	81	14.07.10	16.90	43.10	0.73	1
82	**A**	82	15.07.10	15.50	44.40	0.60	2
83	A	83	15.07.10	10.80	37.65	0.60	1
84	A	84	15.07.10	10.20	33.50	0.65	1
85	A	85	15.07.10	12.70	42	0.50	1
86	**Y**	86	17.07.10	13.90	34.40	0.64	1
87	**Y**	87	18.07.10	41	n.d.	n.d.	1
88	Y	88	24.07.10	9	17.50	0.60	1
89	Y	89	24.07.10	11.70	24.30	n.d.	1
90	Y	90	24.07.10	16.30	22.90	0.56	2
91	Y	91	24.07.10	12.60	23.90	0.78	1
92	Y	92	24.07.10	12.80	23.40	0.70	2
93	Y	93	24.07.10	11.20	29.40	0.65	1
94	Y	94	24.07.10	14.50	15.50	0.60	1
95	Y	95	24.07.10	11.30	23.30	0.60	1
96	Y	96	24.07.10	12.20	24.40	0.70	1
97	Y	97	24.07.10	11.90	25.60	0.70	1
98	Y	98	30.07.10	10.60	20.20	0.50	1
99	A	99	10.08.10	n.d.	46.10	0.75	2
100	Y	100	13.08.10	n.d.	53.50	0.69	1

Fig.1: Bathers in Akgöl (Photo: I. Gröger)
Abb.1: Badegäste in Akgöl (Foto: I. Gröger)

Fig.2: Lonely tree (Photo: I. Gröger)
Abb.2: Lonely tree (Foto: I. Gröger)

Fig. 3: Caliper (Photo: I. Gröger)
Abb.3: Schiebelehre (Foto: I. Gröger)

Fig.4: Cleaned up nest site
(Photo: I. Gröger)
Abb.3: Freigelegtes Nest
(Foto: I. Gröger)

Fig.5: Hatchling tracks (Photo: I. Gröger)
Abb.5: Hatchling Spuren (Foto: I. Gröger)

Fig. 8: Marking the nests in Akgöl (Foto: E. Rameder)
Abb. 8: Nester markieren in Akgöl (Photo: E. Rameder)

Fig. 13: Sandmining
(Photo: E. Rameder)
Abb. 13: Anthropogene Strandveränderungen
(Foto: E. Rameder)

Fig. 14: Bodypit of *Chelonia mydas* (Photo: I. Gröger)
Abb. 14: Bodypit von *Chelonia mydas* (Foto: I. Gröger)

Fig. 15: Comparison between a *Caretta caretta* (left) and a *Chelonia mydas* (right) track
Abb. 15: Vergleich einer *Caretta caretta* (links) und einer *Chelonia mydas* (rechts) Spur
Photos (Fotos): C. Fellhofer, I. Gröger

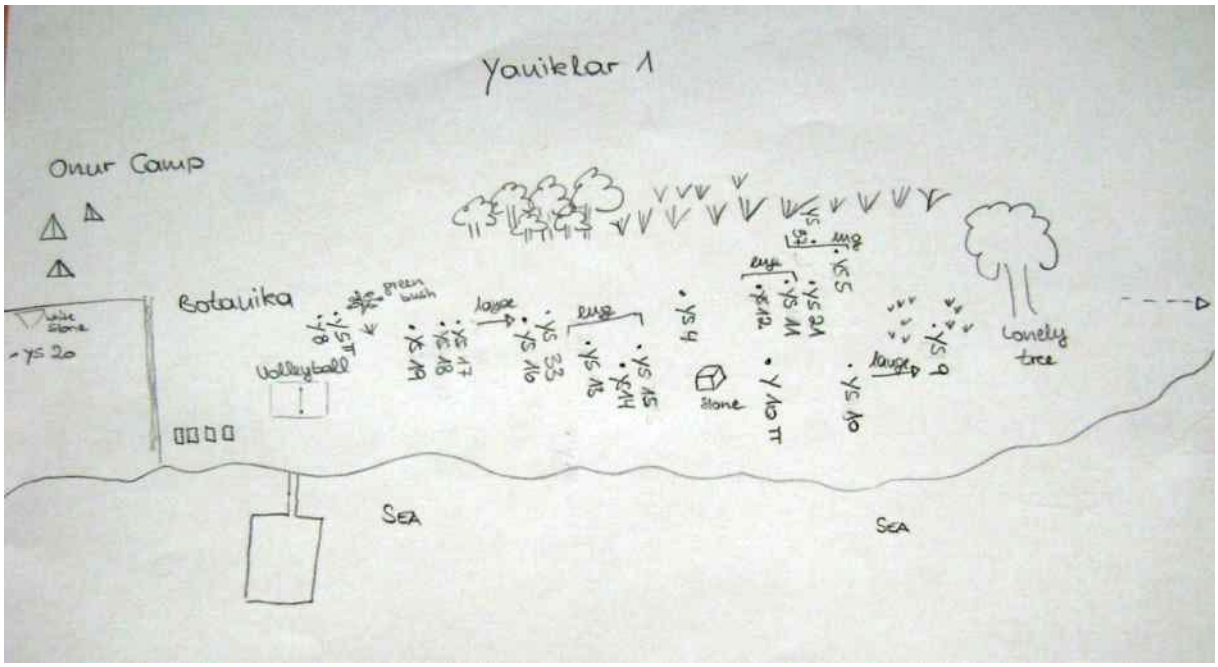

Fig. 16: Nesting sketch Yaniklar (Camp Onur - Lonely tree)
Abb. 16: Nestplan Yaniklar (Camp - Lonely tree)

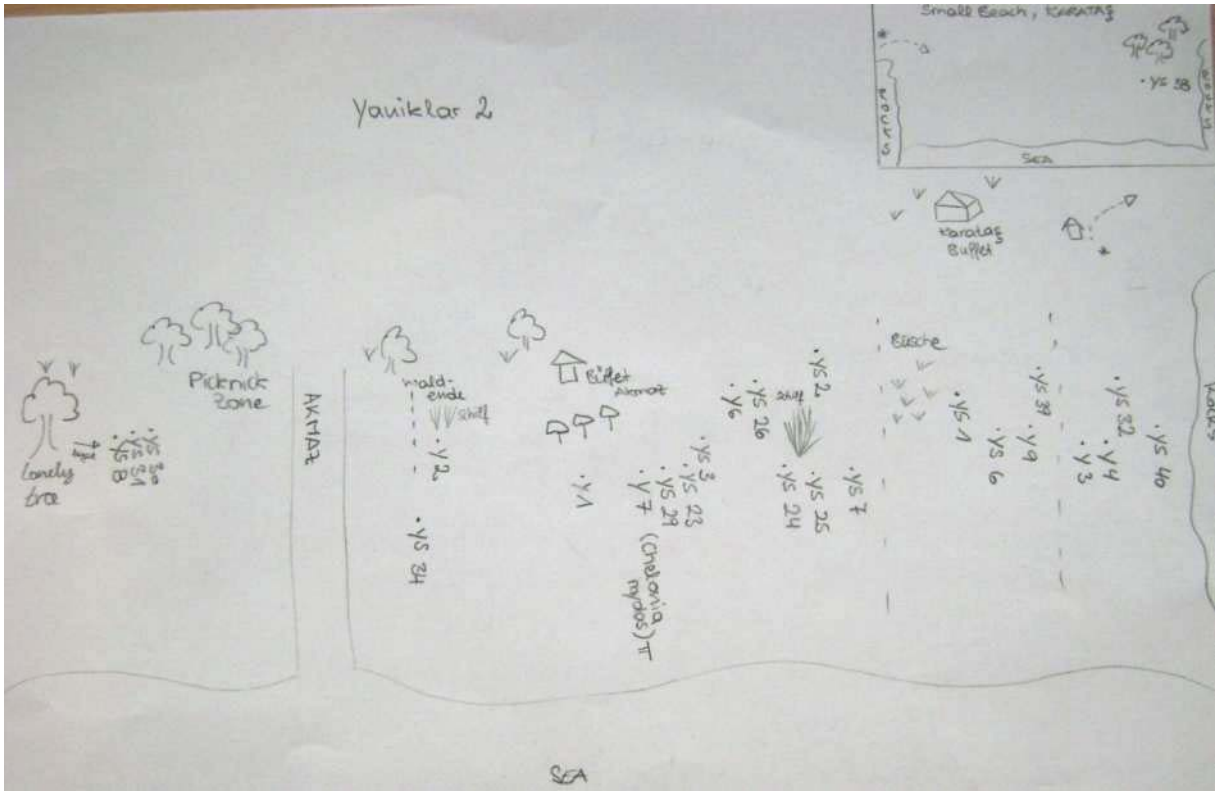

Fig. 17: Nesting sketch Yaniklar (Lonely tree - Karatas Beach)
Abb. 17: Nistplan Yaniklar (Lonely tree - Karatas Beach)

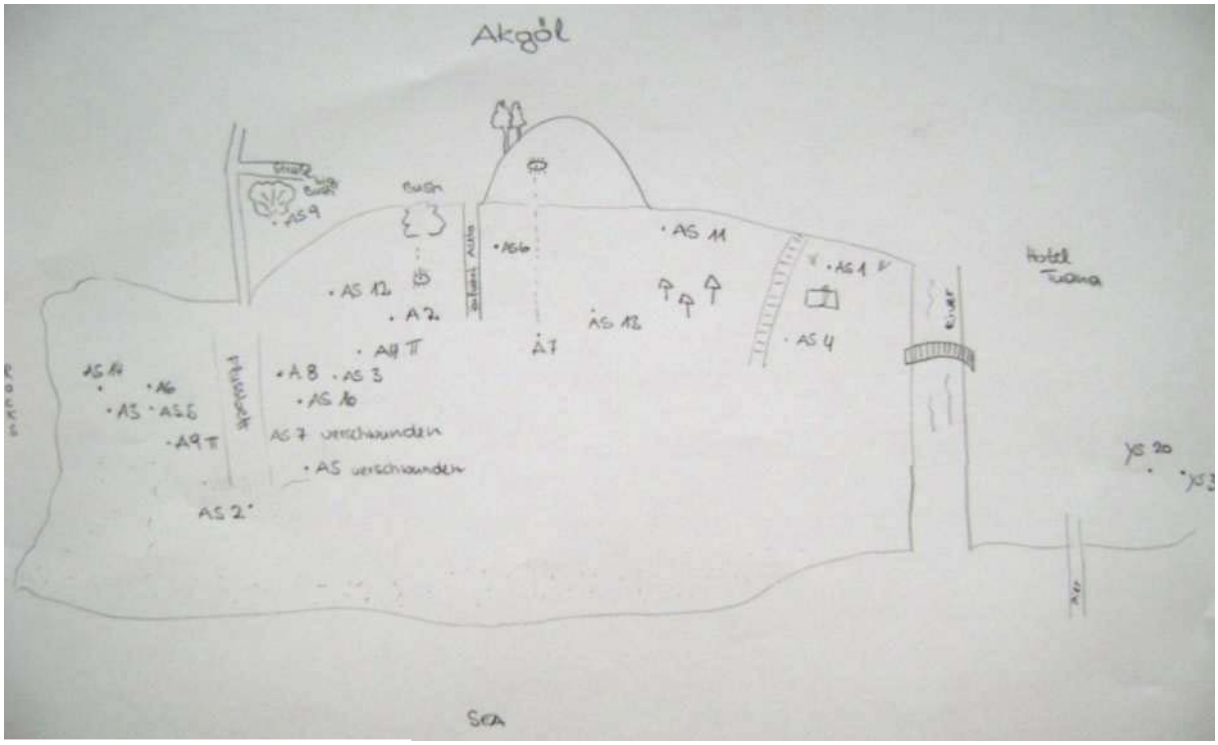

Fig.18 : Nesting sketch Akgöl
Abb. 18: Nestplan Akgöl

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The nesting behaviour of adult loggerhead (*Caretta caretta*) on Çaliş Beach (Fethiye, Turkey) in 2010

Nicole Grätzl & Sophie Greistorfer

KURZFASSUNG

Zwischen 03.07. und 11.9. 2010 wurde am Strand von Çaliş (Fethiye, Türkei) ein Projekt zum Schutz und zur Erforschung der gefährdeten Schildkrötenart *Caretta caretta* durchgeführt.
20 österreichische StudentInnen der Universität Wien haben über 70 Tage, das Nistverhalten der Schildkröten beobachtet und dokumentiert.
In den täglichen Morgen- und Abendschichten an dem ca. 3km langen Strand wurden Landgänge der adulten Weibchen notiert, die entstandenen Spuren vermessen, sowie die Nester markiert.
Da der Strand stark touristisch genutzt wird, entsteht durch die Bars und Hotels, sowie die Promenade, eine starke Lichtverschmutzung. Des Weiteren wird die Eiablage der Schildkröten durch Schirme und Liegen, sowie von Personen, welche sich in der Nacht am Strand aufhalten, gestört.
Insgesamt wurden 17 Spuren und 21 Nester dokumentiert. Drei Schildkröten konnten bei einem Landgang, jedoch ohne erfolgreiche Eiablage, beobachtet werden. Diese Schildkröten wurden vermessen und anschließend markiert.
Die erhobenen Daten sollen Rückschluss auf die Entwicklung der Population und auf die zunehmende Störung der Schildkröte auf dem vom Tourismus stark geprägten Strand geben.

ABSTRACT

Between 26.6. and 11.9.2010 at Çaliş Beach (Fethiye, Turkey) a conservation and research project on the loggerhead sea turtle (*Caretta caretta*) turtle was conducted.
Over 70 days, 20 students from the University of Vienna observed and documented the nesting behavior of the sea turtles. In daily morning- and night shifts at the 3-km-long beach, the positions of the nests were marked and tracks were measured.
Çaliş beach is a Special Protected Area, but there is a lot of light pollution because of the restaurants, bars and hotels for tourists and the strong promenade lighting.
This year, three adult female turtles were observed, measured and tagged. 21 nests and 17 tracks were found.

The data collection should provide information about the turtle population development and about the disturbance of the turtle nesting behavior.

INDRODUCTION

Compared to other turtles the loggerhead sea turtles have their nesting places in the greatest geographic range in terms of temperature and latitude; therefore they can be encountered everywhere in the Mediterranean Sea (Bolton, 2004).
Loggerhead turtles are one of three sea turtles living in this ocean; the others are the leatherback turtle *(Dermochelys coriacea)* and the green turtle (*Chelonia mydas)*

Fig.1: Location of Fethiye
Abb.1: Lageplan von Fethiye (maps.google.at)

(Casale, 2010).
Usually, *Caretta caretta* are not killed to obtain their meat, but the effects of commercial fisheries and habitat deterioration is reducing the loggerhead population. The carapace and the head of the adult loggerhead turtles is reddish brown, the lower side of the carapace is brighter, with diffuse dark margins. Compared to other species this turtle has a larger head and beak, probably because of their hard-shelled food, for example molluscs and crustaceans. These turtles lay one to seven clutches in one summer. Their nesting beach is not necessarily close to their foraging grounds, which are widespread.
The characteristic nesting beaches of *Caretta caretta* are sandy and wide with an unobstructed access from the sea, so that they can be easily approached by the turtles; they should also be high enough so that waves cannot overflow them (Bolton, 2004).
Loggerhead turtles emerge on the beach at night; they first swim parallel to the shoreline for some time. When the turtles come ashore they pause for 10-30 seconds, and such similar pauses occur during the ascent to the beach (Hailman & Elowson, 1992).
When a female turtle searches for a nesting site, she usually pauses at the site and then starts making a body pit. This involves turning the anterior edge of a flipper down in the sand and pushing the limb back so that sand is swept backward (Hailman & Elowson, 1992).

After making the body pit, the turtle starts digging a hole for the eggs. The egg chamber is at the bottom end of a cylindrical shaft that goes straight down into the sand.
Systematic hind limb movements continue until a depth of ca. 45 cm is reached.
The digging of the egg chamber is an energetically costly and complex phase of nesting. The female turtle remains stationary when laying eggs because the chamber is directly beneath the animal's extended cloacal tube (Hailman & Elowson, 1992).
After digging the nest the turtle camouflages the nest, with environmental material, by moments of the flippers. Then the turtle turns around and returns to the ocean.
The beach in Çaliş, next to Fethiye (Fig. 1), is heavily used by tourism. With the lighted promenade and the picnic area, where Turkish families have barbecues, it is problematic for loggerhead turtles to emerge and dig their nests. Another problem is the lack of sea turtle-relevant information, although it is a Special Protected Area, which makes it difficult to prevent tourists and local residents from impacting the ecosystem.

MATERIAL AND METHODS

From 26 June to 11 September 2010, students from the University of Vienna worked on a *Caretta caretta* protection project on Çaliş beach. This is a beach used by tourism. It is 3 km long with a lighted promenade. It belongs to a Special Protected Area, so that this nesting site of the endangered *Caretta caretta* sea turtle is protected by law.
To document the nesting behaviour of the turtles, every day two shifts were done. In every shift the students walked the entire length of the beach.
Before sunset, plastic netting on the nest cages had to be pulled down so that the baby turtles could not escape and could be collected during the night shift. This was necessary because of the light pollution from the bars and restaurants: the hatchlings would have run in the wrong direction and died because of exhaustion, heat in the morning or predators.
In the night shift the route along the beach was walked four times, from 10.00 pm until 2.00 am. In this shift the beach was monitored for adult turtles or their tracks.
When an adult turtle came out of the sea, the team members had to stay calm and quiet in order not to frighten it. The best strategy was to sit or kneel down.
If a tourist spotted a turtle, he or she was supposed to keep their distance: when a turtle is disturbed it can return to the sea without digging a nest.
After the turtle dug its nest, it made its way back to the sea. At this time it was measured and tagged. One student held the turtle from behind so nobody could be bitten. With a wooden

calliper, the straight length (SCL) and width (SCW) of the carapace was measured; the curved length (CCL) and width (CCL) was measured with a tape. The data was collected in a field documentation booklet and afterwards transferred to data sheets.
Old tags on the turtle were noted. If there was no tag the turtle was marked on the right front flipper. Any other details such as epibionts or injuries were recorded; after this the turtle was released to the sea.
When the time came for the first nests to hatch, which was about 45 days after the first nesting date, the search for hatchling tracks started. Because of the photo-orientation of the hatchlings, the focus was on the areas near the promenade lights. When tracks were found, this indicated a secret nest at the beginning of the tracks. A nest was called "secret" when nobody had seen an adult turtle digging it and no adult track was found, so that the hatchings were unexpected.

After two weeks without seeing the track of an adult turtle, the night shifts were changed because the nesting season was over. Accordingly, only the nests were controlled and the team looked for hatchling tracks. If a secret nest was found it was marked and covered by a protective cage.
On 14 August the night shift was changed a second time: only the nests were controlled (because any secret nests would have hatched by this time). In the morning shift, from 6.00 am until 8.00 am, the tracks of the turtles that had come out after the end of the last night shift were measured and the nests were marked. When a track was found, the length and the width were measured and the number of body pits was noted. This procedure was done with every track, regardless whether there was a nest or not.
To find the exact position of a nest, a metal rod was repeatedly carefully inserted into the sand at the location where nest was thought to be. At the exact position of the nest chamber, the sand is looser than elsewhere around the nest. Here the "shish" penetrates much more easily.
To find a nest again, a triangulation was made. For the triangulation, three points

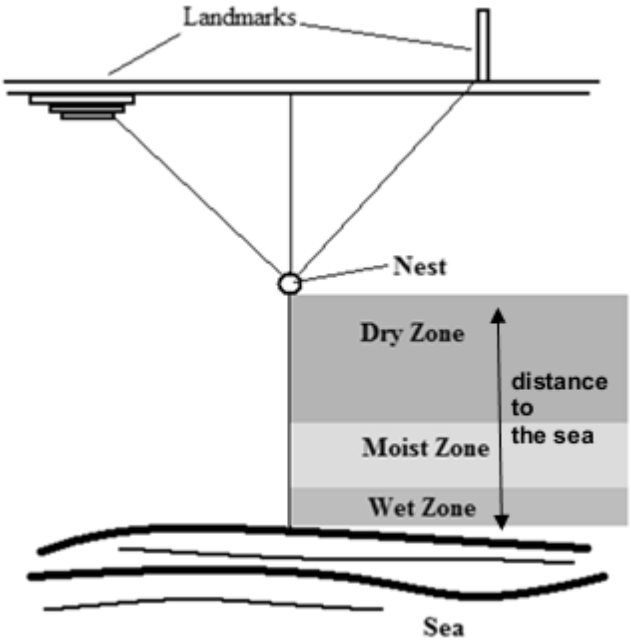


Fig. 2: Schematic illustration of a triangulation
Abb. 2: Skizze einer Triangulation

were needed: two landmarks, one on the left, one on the right sight, and the third one straight from the nest to the next landmark (Fig. 2).

A stairway or some structure on the promenade could be used as a mark – something that stays the whole summer and is easy to relocate.
Other measurements included the distance to the sea and the different (moisture) zones of sand.

Metal cages were put over the nests. They were equipped with loose plastic mesh nets, to protect the nest and the hatchlings from predators and retain the turtles when they hatch (Fig. 3).
This netting had to be pulled up every morning shift: if a hatchling emerges during the day, it must have a chance to find its way to the sea.

Fig.3: A cage with a sign and a mesh with which the sea turtle nests were protected (Photo: Elena Haeler).

Abb.3: Ein Käfig mit einem Hinweisschild und einem Netz, welcher zum Schutz des Nestes darüber platziert wurde (Foto: Elena Haeler).

When a nest is dug too close to the waterline and in danger of being flooded, or when there are too many stones in the sand, a hatchery had to be made. The eggs were excavated and a similar nest was made at a safer place.

RESULTS

Nests

On Çaliş Beach there were 21 nests in the nesting season 2010. Twelve of these nests were secret nests. Two-thirds of the secret nests were found in the area without a promenade wall (Fig. 6, Fig. 7 and Fig. 8). In contrast, half of the "normal" nests were near the wall. The "normal" nests (C1, C2, C4-C10) were dug between 14.06. and 10.07.2010 (Tab. 1). Compared with the last three years, the nesting time ended 18 days earlier (Federspieler & Sperandio, 2009; Olbrich & Pfabigan, 2008; Dornhofer & Lambropoulos, 2007). This year there were two more nests than the average number of the last 17 years (19 nests), but the overall trend appears to be declining (Fig. 4).

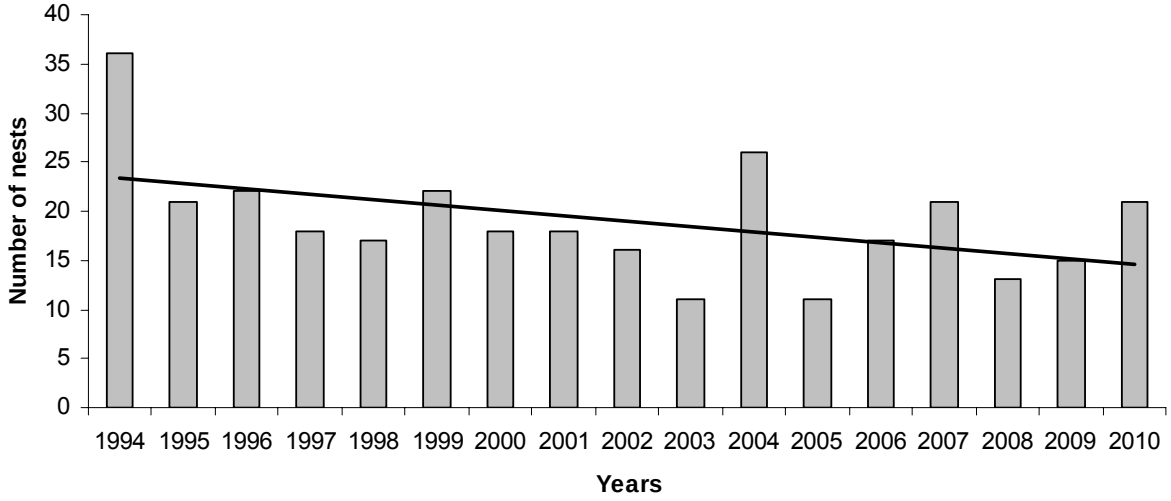


Fig. 4: Development of the number of nests in the years 1994 – 2010 on Çaliş Beach. The trend line shows a continuous decrease of the number of nests (y=-0.5515x+23.963; R^2=0.2185).

Abb. 4: Entwicklung der Nestanzahl in den Jahren 1994 – 2010 am Strand von Çaliş. Die Trendlinie zeigt eine stete Abnahme der Nestzahl (y=-0.5515x+23.963; R^2=0.2185).

The average distance of the nests to the sea next to the promenade was 13.1 m (n=10). Those nests along the promenade wall were 45% closer to the sea than the nests at sites without a promenade wall (23.8 meters; n=10) (Fig. 5).

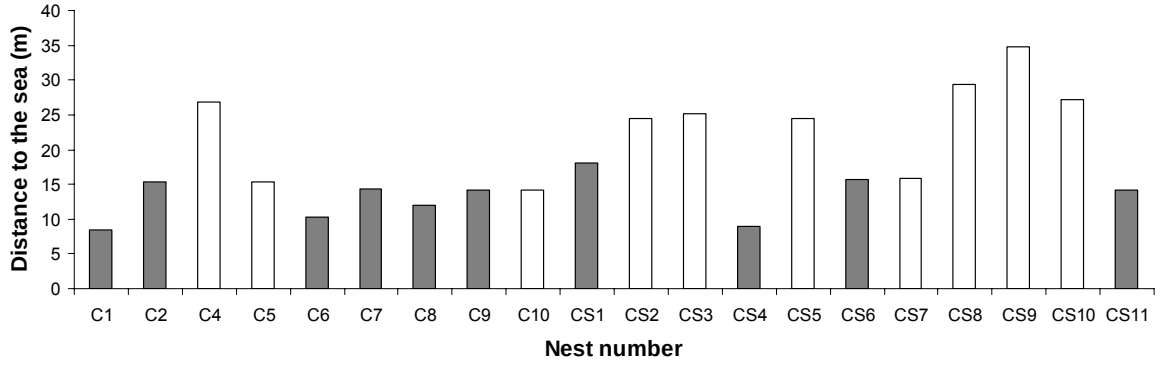


Fig. 5: Nest distance to the sea in meters, arranged according to nesting date (C1-C10) or the date at which a secret nest was detected (CS1-CS12). Gray bars: nests in front of promenade wall; white bars: nests positioned away from the promenade.

Abb. 5: Abstand der Nester in Meter von der Wasserlinie aufgereiht nach dem Datum des Nestbaues (C1-C10) und nach dem Datum des Auffindens (CS1-CS12). Die grauen Balken stellen die Nester bei der Promenadenmauer und die weißen die Nester abseits der Promenadenmauer dar.

At nest number C2, two children took the cage off the nest, dug in the sand and took out two hatchlings. This was noticed by beach-goers, who opened the nest at 3.00 p.m. (3.8.2010) and carried about 30 hatchlings to the sea.

Dogs dug in nest number CS 8 (31.7.2010) and killed some hatchlings (personal communication: tourists on the beach)
Nest numbers C1, C6 and CS 4 were flooded once. During the following morning shift, the wet sand was taken out of the nest and filled up with dry sand again.
In Çaliş Beach, no hatchery was built during the nesting season 2010.

Tracks

A total of 17 tracks were found on Çaliş Beach. In nine cases, a nest was built. All of the eight unsuccessful emergences were located in the area north-west of Mimoza Beach Club, where there was no promenade wall. The average track length, which can be used as an indicator for the level of disturbance of the turtle or the quality of the beach, was 69.8 m. The shortest track length was 9.5 m und the longest was 124.4 m. The latter took a course through three rows of sun beds, between the poles of a hammock and around a tree, before turning back to the sea in a wiggly line (Tab. 1). 53% (9 nests in 17 tracks) of the observed tracks were associated with successful nesting.

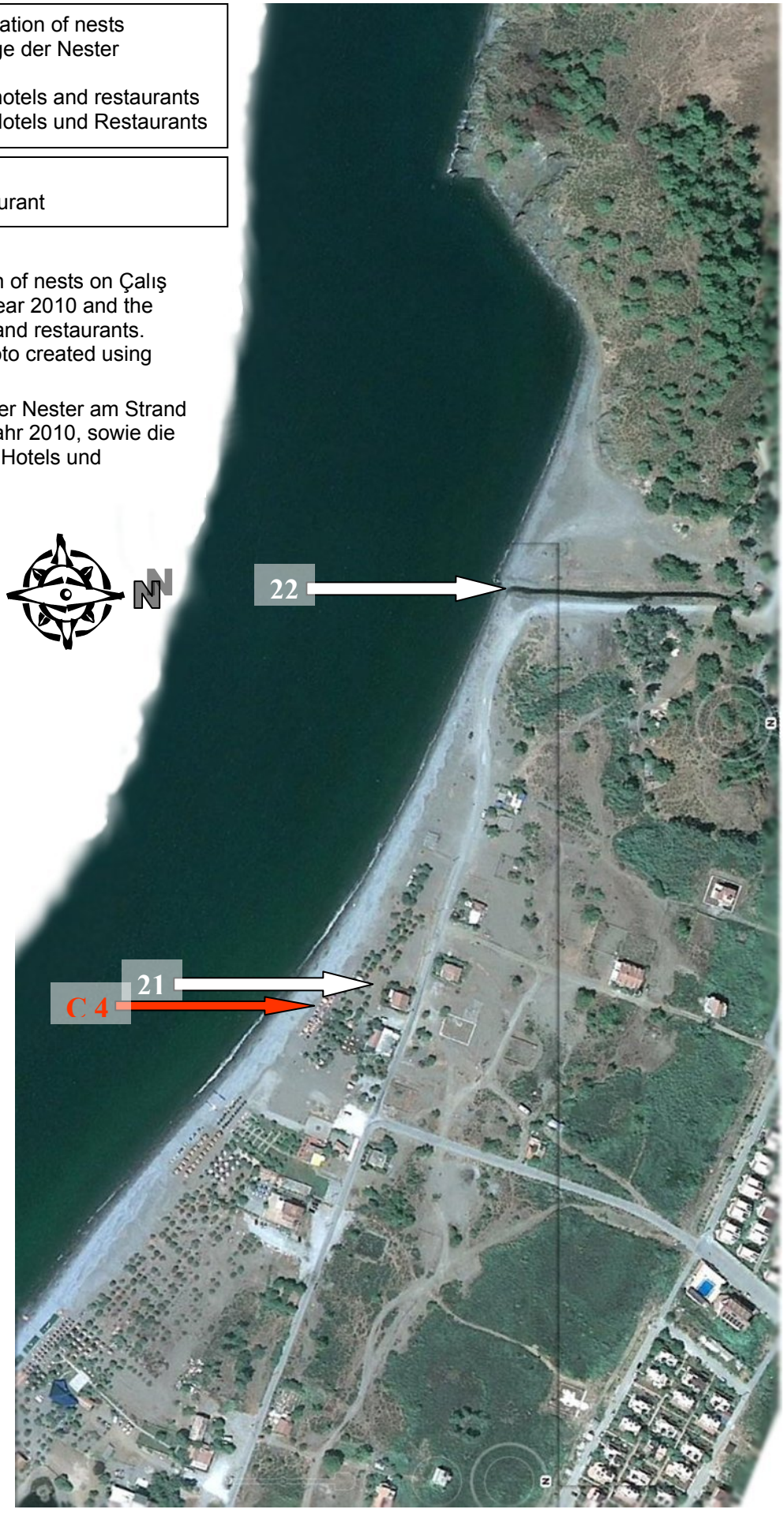
red arrows: location of nests
rote Pfeile: Lage der Nester

white arrows: hotels and restaurants
weiße Pfeile: Hotels und Restaurants

22 Drainage
21 Birlik Restaurant

Fig. 6: Location of nests on Çalış Beach in the year 2010 and the nearby hotels and restaurants. Composite photo created using GIMP.

Abb. 6: Lage der Nester am Strand von Çalış im Jahr 2010, sowie die angrenzenden Hotels und Restaurants.



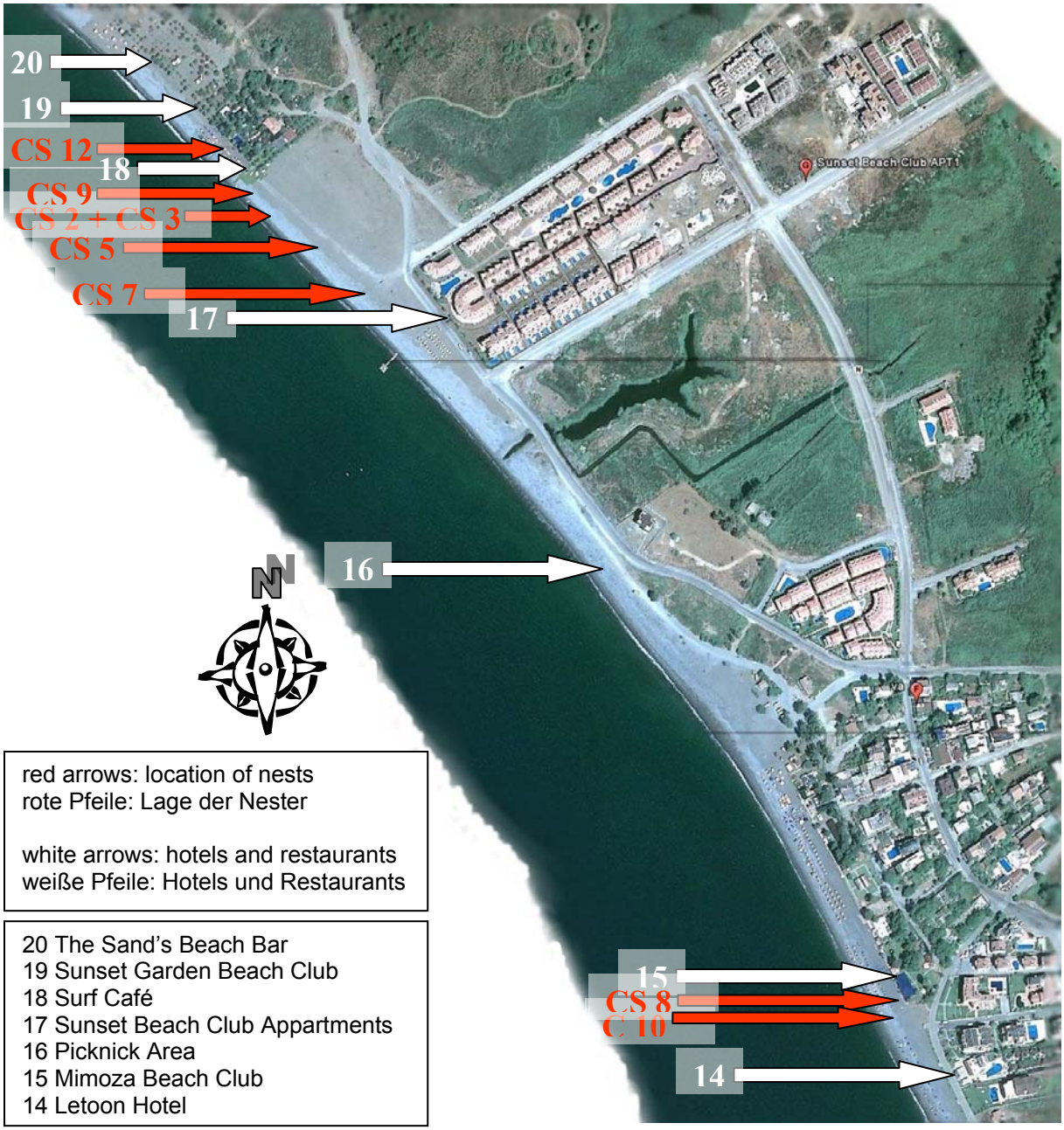


Fig. 7: Location of nests on Çalış Beach in the year 2010 and the nearby hotels and restaurants.

Abb. 7: Lage der Nester am Strand von Çalış im Jahr 2010, sowie die angrenzenden Hotels und Restaurants. Composite photo created using GIMP.
(earth.google.de)

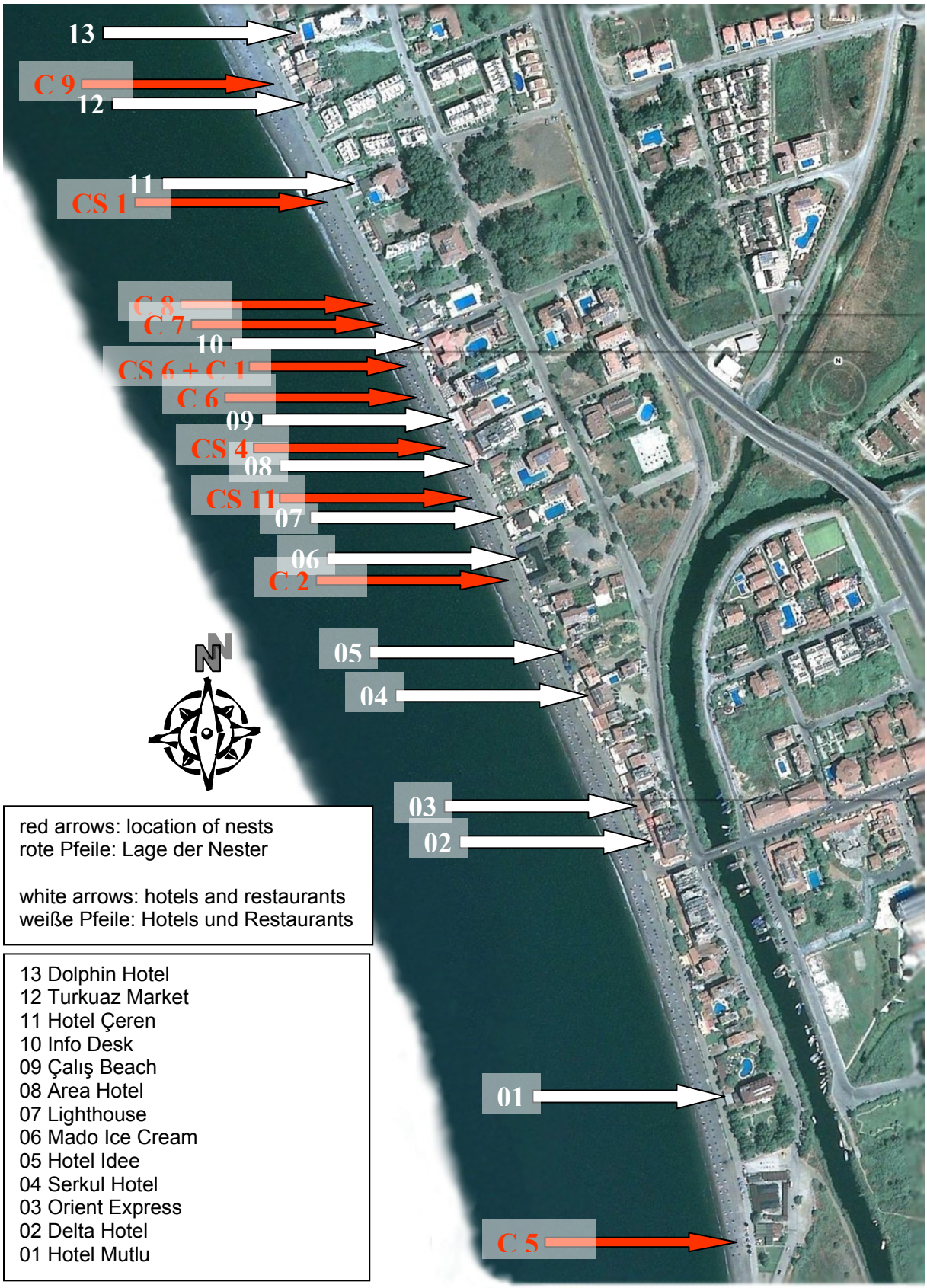


Fig. 8: Location of nests on Çalış Beach in the year 2010 and the nearby hotels and restaurants. Composite photo created using GIMP

Abb. 8: Lage der Nester am Strand von Çalış im Jahr 2010, sowie die angrenzenden Hotels und Restaurants..
(earth.google.de)

Tab. 1: Overview of the nests at Çalış Beach in 2010. The beach zones (1-3) give information about the wetness of the sand in which the nests were laid. (n.d.: no data, -: no nest or track was observed)

Tab. 1: Überblick über die Nester am Strand von Çalış im Jahr 2010. Die Standzonen (1-3) geben Information über die Feuchtigkeit des Strandes, in dem die Nester liegen. (n.d.: keine Daten, -: weder Nest noch Spur vorhanden)

NestNr.	Date	Distance to the sea(m)	Track Nr.	Total length of track (m)	Track width	Number of bodypits	Dry zone (1) (m)	Moist zone (2) (m)	Wet Zone (3) (m)
C1	14.06.	840	1	n.d.	n.d.	1	4.70	2.30	1.40
C2	16.06.	15.30	2	n.d.	n.d.	1	10.70	3	1.60
C4	18.06.	26.80	4	n.d.	n.d.	1	24	1.50	1.30
C5	20.06	15.40	5	n.d.	n.d.	1	13.30	0.80	1.30
C6	20.6.	10.30	6	n.d.	n.d.	1	5.30	3	2
C7	26.06.	14.30	7	n.d.	n.d.	1	8.10	3.80	2.40
C8	01.07.	12	8	n.d.	n.d.	1	7	3.10	1.90
-	05.07.	29.70	9	74.40	n.d.	2	n.d.	n.d.	n.d.
-	09.07.	6.90	10	16.30	0.67	0	1.80	0	14.50
C9	10.07.	1.20	11	32.30	0.70	1	8.30	5.70	3.20
-	12.07.	3.90	12	9.50	0.66	0	n.d.	n.d.	n.d.
-	13.07	43.40	13	124.40	0.66	3	40.30	1.40	1.70
-	14.07.	37.70	14	92.90	0.66	1	33.40	2.70	1.60
-	14.07.	n.d.	15	52.20	0.66	1	22.40	3	0.70
-	14.07.	n.d	16	69.90	0.66	1	66.90	2.20	0.80
-	15.07.	n.d.	17	119	0.62	2	27.40	1.30	0.90
C10	26.06.	14.2	-	n.d.	n.d.	0	10.90	2.50	0.80
CS1	<14.06.	18.10	-	n.d.	n.d.	1	12.40	3.80	1.90
CS2	<14.06.	24.50	-	n.d.	n.d.	1	21	1.80	1.70
CS3	<14.06.	25.10		n.d.	n.d.	1	21.60	1.80	1.70
CS4	<16.06	8.90	-	n.d.	n.d.	1	550	2.20	1.20
CS5	<18.06	24.50	-	n.d.	n.d.	1	21	1.80	1.70
CS6	n.d.	15.72	-	n.d.	n.d.	1	11.30	3.17	1.25
CS7	n.d.	15.90	-	n.d.	n.d.	1	8.30	4.10	3.50
CS8	n.d.	29.30	-	n.d.	n.d.	1	16.60	10.80	1.90
CS9	n.d.	34.80	-	n.d.	n.d.	1	32.50	1	1.30
CS10	n.d.	27.22	-	n.d.	n.d.	1	21.60	2.50	3.06
CS11	n.d.	14.20	-	n.d.	n.d.	1	n.d.	n.d.	n.d.
CS12	n.d.	n.d.	-	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

Adults

One adult turtle was seen in the period from 14.06. to 03.07.2010, when only morning shifts were done by the Turkish colleagues. From 03.07.2010 to 12.07.2010, two adult turtles were seen. After 12.07.2010, no further adult turtles were recorded on the beach. All three turtles were tagged on the right flipper and just one turtle had an epibiont (an organism living on the surface of another living organism, wikipedia.org). The average carapace lengths were 70 cm SCL and 76 cm CCL. The average carapace widths were 52 cm for the straight and 69 cm for the curved dimension (Tab. 2).

Tab. 2: Size of the observed adult turtles on Çalış Beach in 2010 (CCL: curved carapace length, CCW: curved carapace width, SCL: straight carapace length, SCW: straight carapace width).
Tab. 2: Daten der beobachteten adulten Schilkröten am Strand von Çalış im Jahr 2010 (CCL: curved carapace length, CCW: curved carapace width, SCL: straight carapace length, SCW: straight carapace width).

Adult-number	Date (2010)	Track-number	Tag-number	SCL (cm)	SCW (cm)	CCL (cm)	CCW(cm)	Epibionts
1	26.06.	7	TR C 2145	73	52	74	70	0
2	05.07	9	TR A 0988	73	58	84	76	1
3	12.07.	12	TR A 0975	65	46	70	60	0

DISCUSSION

Nests

Out of 21 nests, 58% were secret nests. This reflects the date at which the fieldwork began. Many turtles already had dug their nest before the project started. Another reason can be that the turtles often come ashore after 2 am, after the night shift had already stopped. Finally, turtles could also emerge between two beach patrols, each of which took about 35 minutes for one stretch. In the area north-west of the Sunset Beach Club, there were no public lights anymore, so tracks can be more easily overlooked.

The number of tourists, the lights and the amount of garbage is apparently increasing from year to year (Federspieler & Sperandio, 2009); this could be an explanation for the decreasing trend in the number of nests (see also “Changes at Çaliş Beach”).

Nests positioned in area of the promenade wall were 45% closer to the waterline than the other nests. One reason could be the condition of the substrate: in front of the promenade the beach is nearly exclusively sandy. In contrast to these good substrate conditions, a pebbly area starts after the Tuna Beach Hotel. At the promenade, the turtles found a suitable substrate directly where they emerged on the shore and didn’t have to crawl greater distances to find an

attractive nest place. Finally, however, the beach is less wide in front of the promenade wall, so the adult turtles didn't have the possibility to crawl much further inland. There are also two rows of sun beds along most of the promenade wall, which impeded the search for a nesting site.

The nest cages on the beach were indispensable. They protected the nests and, later the hatchlings from predators, such as dogs. Often they couldn't prevent human intrusions. Despite the information sheets on the cages, people often used them as garbage bins or moved the cages.

As addition to the triangulation, GPS data were taken. But it is very important to use the GPS data only as addition, not as alternative to the triangulation, because the accuracy of the GPS is only 3 meters. So nests could be easily lost when a cage was moved away by anyone.

The reason why a relatively high percentage (53%) of the observed tracks were associated with successful nesting could be that other tracks might have been missed in the morning shift. This is because of the large number of people walking on the beach and obscuring them. Conspicuously, all tracks that were observed and not connected with a successful nest, were located in the area north-west of Sunset Beach Club where there was no promenade. A reason for this could be that there were less people walking around in this sector of the beach than in front of the promenade, where no unsuccessful emergences were recorded. Furthermore, the condition of the beach in this sector prevented the turtles from digging a nest. Rather then being sandy, this sector consisted largely of pebbles and cobbles, making it a less attractive nesting area. In front of the Sunset Beach Club, the Surf Café, the Garden Beach Club, the Madame Dudus Bar and the Birlik Restaurant, the cobbled beach was heaped up with sand to make the beach more attractive to the tourists. The turtles chose this "artificial" sand zone twice to dig a nest. Interestingly, there were several more attempts to dig a nest at this artificial sand zone, but the turtles were unsuccessful, probably because they reached the hard underlying cobble zone. Some tracks were very short. This could be a result of the tourists and their flashlights. Tourists as well as local residents want to see a turtle and don't think about the consequences when they came too close to a turtle or take a photo with flash. Such adult turtles quickly returned to the sea or tried to get away from the people. One such an event occurred on 13.07.2010 at 2:30 am. This turtle made 3 body pits and tried to dig an egg chamber, but tourists and a waiter followed the turtle and took photos. That turtle crawled 124.4 m on the beach.

Tracks

53% of the observed tracks were associated with successful nesting. This seems to be high percentage, but probably not all tracks were noticed. Moreover the collection of the track data started on 03.07.2010, while the collection of nesting data had already started at 14.06.2010, by the Turkish students. That's why this probably irregular percentage occurred, because if more tracks were noticed the percentage of successful nest would go down immediately. The results of the sea turtle project in 2010 at Çalış Beach show that the nesting time ended 18 days earlier than in the last three years (Federspieler & Sperandio, 2009; Olbrich & Pfabigan, 2008; Dornhofer & Lambropoulos, 2007). One possible reason for such a development could be the shift in temperature caused by global warming. In the future, it may become necessary to adjust project times to this development.

Adults

Three adult female turtles were seen during the observation time. It is unclear, how many female turtles came ashore, to dig all the nests at Çalış Beach. They could crawl ashore in the time between the night and the morning shift. The sources of disturbance for the turtles were light pollution, noise, and garbage.

It would be a big step forward if local residents were better motivated to protect *Caretta caretta*. They know that these sea turtles exist, but apparently care little about their survival. In Çalış Beach there should be signs at the beach, as well as permanent information booths for the tourists in order to communicate how to behave in a Special Protected Area like Çalış Beach. Our info desk, open only during the summer months, is the only possibility to inform interested people about sea turtles and how visiters can help protect this valuable species.

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http://en.wikipedia.org/wiki/Epibiont (20.12.2010)

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Caretta caretta hatchlings in Akgöl and Yaniklar 2010

Ludwig Sommer, Katharina Baron

Kurzfassung

Im Laufe des Meeresschildkrötenprojektes wurden folgende Fragestellungen beantwortet: Nest- und Hatchlingsrate, Hatchlinge, die das Meer erreicht haben, Predation und Nesterfolg inklusive verschiedener Embryonalstadien, der Inkubationszeit und der Schlupfdauer. Desweiteren war Teil der Fragestellung das Vermessen und Analysieren der Nestproportionen, sowie dem Abstand des Nestes zum Meer.

In der Zeit zwischen dem 26. Juni und dem 11. September wurde der Strand observiert. Hatchlinge und ihre Spuren wurden gezählt und für die Datenverarbeitung notiert. Fünf Tage nach dem letzten Schlupf wurden die Nester geöffnet.

So ergaben sich 72 Nester inklusive 1 Nest von *Chelonya mydas*. Insgesamt wurden maximal 3884 Hatchlinge anhand der leeren Eierschalen gezählt. Die aufgenommenen Spuren wurden unterteilt in die Kategorien: Hatchlinge, die das Wasser erreicht haben, tote Hatchlinge durch Predation und Hatchlinge, die durch Hitze gestorben sind.

Abstract

In this part of the project we were interested in the nests and hatching rates in combination with hatchling numbers reaching the sea and predation, nesting success including embryonic stages, incubation time as well as hatch time. Additionally, we measured and analyzed the proportions of the nest chamber and the distances of the nests to the sea.

Between 26 June and 11 September the beach was inspected for hatchlings. Tracks and hatchlings (dead or living) were counted and recorded. Five days after the last hatch the nests were excavated.

The total number of nests (in Yaniklar (49) and Akgöl (23)) was 72, including 1 nest by *Chelonia mydas*. 68 nests were excavated. The number of hatchlings reaching the sea was between 1991 (min.) and 3884 (max.). Tracks were differentiated between those that reached the sea and those in which hatchlings were predated or died due to the morning sun.

Introduction

The sea turtle project of the University of Vienna is based on three different parts: scientific research, conservational biology and protection of the Loggerhead sea turtle (*Caretta caretta*). Since 1993 there hae been a cooperation between the University of Vienna and several universities in Turkey as well as the EKAD society. In this year the University of Vienna cooperated with EKAD. The fieldwork was located at two different Turkish coastal areas near Fethiye (province Mugla). These two different regions were Yaniklar/Akgöl and Calis beach, which are both special protected areas. In 2010, students from the University of Vienna were present from 26.06. to 11.09.2010.

In 2007, Hofstädter and Wurth described a total number of 83 nests, 5901 eggs and a total of 4357 empty shells; the hatch rate was 74%, the number of predated hatchlings 8%, the total number of dead embryos 740 and the total number of unfertilized eggs 774. The minimum number of hatchlings reaching the sea was 2502 based on counted tracks, and the maximum number of hatchlings reaching the sea based on the difference between empty shells and dead hatchlings was 3776.

In 2008, Mader and Trimmel reported a total of 65 nests, 3027 hatchlings reaching the sea (nearly 60% of the total number of hatchlings), and a total of 5380 eggs. In Yaniklar nearly half of the eggs did not hatch; most of them were in early embryonic stages. In Akgöl 22% did not hatch and nearly half of those were in an early embryonic stage.

In 2009, Sonnleitner and Westenberg reported a total of 77 nests; 11 of them hatched after the Austrian students left. 5690 eggs were documented, of which 2% were unfertilized. 69% of the fertilized eggs hatched. 15% died in the early embryonic stage. An average of 52 eggs hatched in each nest. 3841 empty shells and an overall hatch rate of 67% were reported. The number of hatchlings reaching the sea was between 2540 (min. estimate) and 3417 (max. estimate).

In the following, we describe the part of the project dealing, with hatchlings. Here, we were interested in: nests and hatching rates together with numbers reaching the sea and predation, nesting success including embryonic stages, incubation time as well as hatch time. Additionally we measured and analyzed the proportions of the nest chamber and the distances of the nests to the sea.

Material and Methods

Between 26 June and 11 September the morning shift started at 06:0, with at least two students on each of the two beaches (Akgöl and Yaniklar incl. Karatas Beach).

During these shifts, all found nest were marked with stone half-circles open to the sea, and all barriers including stones, wood or garbage in front of the nest on the way to the sea were removed.

These located nests were than triangulated with at least 3 different points and marked on the data sheets (see Figure 1) in order to ensure that the exact position of the nests could be located at any time.

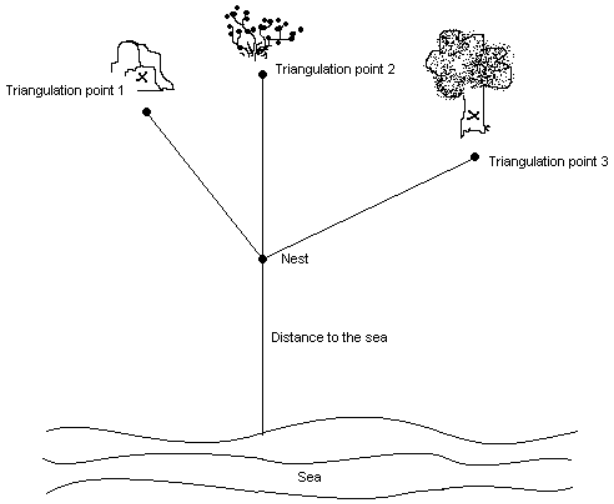

Figure 1: Exact position of a nest based on triangulation
Fig. 1: Exakte Nestposition der Triangulationsvermessung

The nests were subsequently checked every morning to determine whether they were in an appropriate condition.

This control included examining whether there were stones inside or above the nests, and whether dead hatchlings were present. If so, they were removed and the dead ones buried 20 m behind the nest. Living hatchlings were released into the sea, depending on the time, sun and physical conditions of the hatchlings. In case it was too late (too hot) or the physical condition of the animals was bad, they were brought to the camp in a small bucket (filled with a bit of moist sand and covered with a dark towel) and released in the evening after sunset at a dark beach site.

Moreover, the beach was inspected for hatchling tracks and hatchlings on the way to the sea or, if they were misoriented on their way into other directions. Tracks and hatchlings (dead or living) were counted and recorded and the hatchlings were treated as described before (see paragraph before).

Five days after the last hatch, the nests were excavated: Then the nests were dug up and all eggs, dead or living hatchlings removed. Then the eggs were counted in different categories: empty shells, hatchlings still living inside the nest, dead hatchlings in the nest, unfertilized, and total number of fertilized eggs. The fertilized eggs included those that were empty and three different embryonic stages (early, middle and late).

After this procedure the proportions of the chamber were measured, including data on the depth to the top eggs, to the bottom- and the diameter of the chamber as well as the distance to the sea. All remains were afterwards replaced into the nests and filled up with sand.

The data analysis took place in Vienna after digitizing the datasheets.

Results

The total number of nests in Yaniklar (44+1) and Akgöl (23) was 68 (excavated nests) including 1 nest by *Chelonia mydas*. There were further 4 nests which did not hatch until the end of the project and therefore no datasheets were filled out. The observed number of hatchlings was between 1991 as a minimum number based on tracks, and 3884 as a maximum number counting the empty shells. Tracks were differentiated between hatchlings that reached the sea (1798), those with predated hatchlings (222) and dead due to the sun (42). Fig.2 shows the percentages of these three categories. For example, hatchlings were predated on land by vertebrates (dogs) and crustaceans (beach crabs), and eggs were predated by insect larvae.

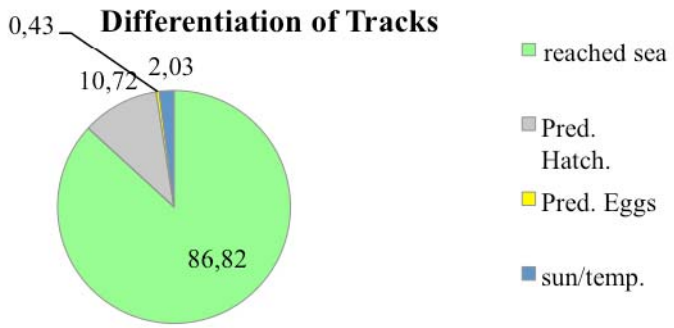

Figure 2: Differentiation of tracks (reached sea, predated, dead due to sun)
Fig. 2: Unterscheidung der Spuren (Hatchlinge, die das Wasser erreicht haben, tote Hatchlinge durch Prädation und Hatchlinge, die durch Hitze gestorben sind)

Based on the excavations there were a total of 814 unfertilized eggs and 4550 fertilized eggs, separated into four categories: empty shells (4148), early (79), middle (41) and late embryonic stages (288).

The following graphs (Fig.3a, b, c) show the distribution between these categories.

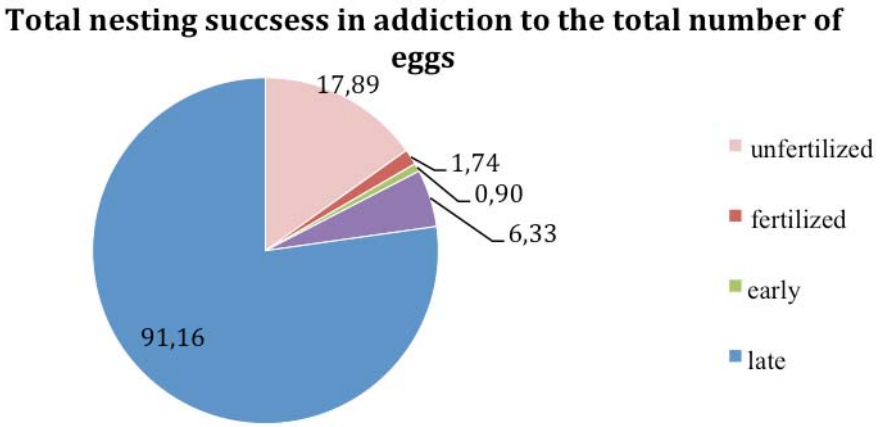

Figure 3a: Distribution of egg categories (total)
Fig. 3a: Verteilung der Eikategorien

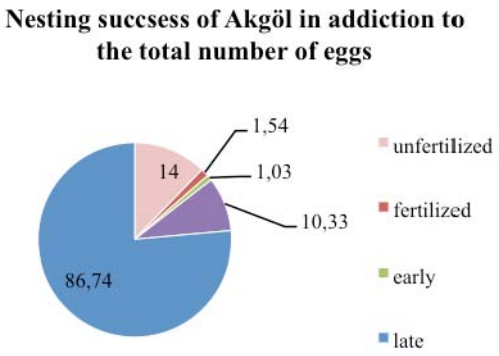

Figure 3b: Egg categories (Akgöl)
Fig.3b: Eikategorien (Akgöl)

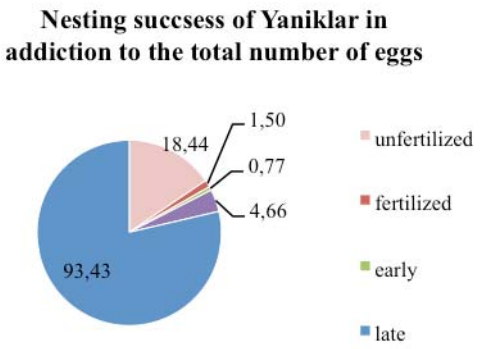

Figure: 3c: Egg categories (Yaniklar)
Fig. 3c: Eikategorien (Yaniklar)

In all the nests, dead (136) and living hatchlings (185) were counted; predated eggs were observed.

The following measurements of the nest were made, yielding the following averages: depth to the top eggs (0.28m), depth to the bottom of the nest (0.48m), the diameter of the nest chamber (0.25m) and the distance of the nest to the sea (24.63m).

The data includes the results of the *Chelonia mydas* nest; empty shells (36), hatchlings still living (1) and dead (2) inside the nest, unfertilized eggs (47), fertilized eggs (51), early (11), middle (3), late embryos (1), total number of eggs (98) and hatchlings reaching the sea (33). Also included are the depth to the top eggs (0.55m), to the bottom (0.66m) and the diameter of the nest chamber (0.28m).

Discussion

A total number of 1991 hatchling tracks were counted (3884 empty shells). Possible reasons for this discrepancy could be the quality and structure of the beach (e.g. stones, rain, vegetation, vehicle tracks) or the number of hatchlings hatching at the same time (crossover of tracks).

The dead embryos can be explained by several causes such as fungal infestation, invertebrate predation (for example Tenebrionidae larvae), the nest distance to the sea (too close to the sea), as well as weak embryos that failed to hatch, and other causes such as failed embryonic development, or premature excavation.

Because 55 nests were so-called “secret nests”, the incubation time was not possible to estimate for all nests (excluding secret nests: 48 days in average). Secret nests were defined as nests that were laid before 26 June and therefore not detected by students at the starting time of the incubation.

There is a discrepancy in nest numbers between the Adult data sheets (72 nests) and the Hatchling data sheets (68 nests). One explanation is that four nests did not hatch until 11 September and therefore the missing four Hatchling data sheets were not filled in. Another reason could be double counting or the counting of nests that later turned out not to be any nests.

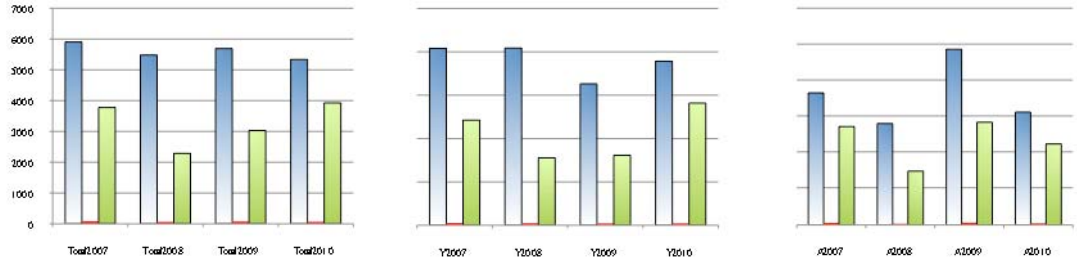

Figure 4: Comparison with the categories hatchlings (green), eggs (blue), nests (red) in 2007 - 2010
Fig. 4: Vergleich zwischen den Kategorien: Hatchlinge (grün), Eier (blau), Nester (rot) von 2007 bis 2010

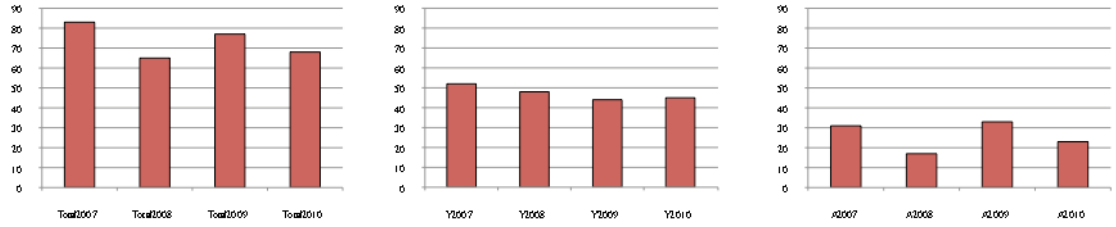

Figure 5: Comparison Number of number of nests in 2007, 2008, 2009 and 2010Y=Yaniklar, A=Akgöl)
Fig. 5: Vergleich der Anzahl der Nester von 2007, 2008, 2009 und 2010 (Y=Yaniklar, A=Akgöl)

Figure 4 shows the comparison of three categories (hatchlings, eggs, nests) during the last four years. Because in Figure 4 the nest bars are not clearly visible, Figure 5 compares the nests during the last four years in more detail.

We will discuss these three categories one by one.

Hatchlings: In 2007 the minimum number of hatchlings reaching the sea was 2502 based on counted tracks, and the maximum number of hatchlings reaching the sea based on the difference between empty shells and dead hatchlings was 3776 (Hofstädter and Wurth, 2007). In comparison, Mader and Trimmel (2008) described 3027 hatchlings reaching the sea. They did not differentiate between the counted tracks (minimum) and the maximum number of hatchlings based on empty shells and dead hatchlings. In 2009 the number of hatchlings reaching the sea was between 2540 and 3417 (Sonnleitner and Westenberg, 2009). In 2010 the correspondoing values were 1991 (counted tracks) and 3884 (empty shells minus dead hatchlings).

Empty shells: In 2007, Hofstädter and Wurth described 5901 eggs and a total number of 4357 empty shells. In 2008 a total number of 5480 eggs was counted, as well as 3279 empty shells (Mader and Trimmel, 2008). Sonnleitner and Westenberg reported 5690 eggs and 3841 empty shells in 2009. In 2010 a total number of 5336 eggs and 4148 empty shells were documented.

Nests: In 2007, Hofstädter and Wurth described a total number of 83 nests, Mader and Trimmel described a total number of 65 nests in 2008 and, in 2009, Sonnleitner and Westenberg described a total number of 77 nests. In 2010, 68 nests were documented (the adult count 72).

References

Hofstädter & Wurth (2007): *Caretta caretta* hatchlings in Yaniklar und Akgöl. In: Stachowitsch, M. & C. Fellhofer (eds.), Nature conservation field course: Protection of sea turtles (*Caretta caretta*) in Turkey 2007. Department of Marine Biology, University of Vienna. pp 35-64

Mader & Trimmel (2008): *Caretta caretta* hatchlings in Yaniklar and Akgöl 2008. Nature conservation field course: Protection of sea turtles (*Caretta caretta*) in Turkey 2008. Department of Marine Biology, University of Vienna. pp 47-73

Sonnleitner & Westenberg (2009): *Caretta caretta* hatchlings in Yaniklar 2009. Nature conservation field course: Protection of sea turtles (*Caretta caretta*) in Turkey 2009. Department of Marine Biology, University of Vienna. pp 61-76

Sea Turtle Project (2002): http://www.seaturtlecourse.com/eng/e_index.htm (25.10.2010)

Tab1: Excavation data of all nests in Yaniklar and Akgöl; / - not excavated
Tab1: Gesamtdaten aller Nestausgrabungen in Yaniklar und Akgöl; /- nicht ausgegraben

Nest Nr.	Hatchlings alive in nest	Dead hatchlings	Unfertilized eggs	Fertilized eggs	Early embryo	Middle embryo	Late embryo	Total nr. ofeggs	empty shells	Hatchlings reached sea	Depth of nest chamber: top eggs(m)	Bottom of nest chamber (m)	Diameter of nest chamber(m)	Nest distance to sea (m)
A1	0	2	8	64	1	0	1	72	62	29	0,33	0,50	0,30	29,50
A2	0	0	1	61	0	1	23	62	32	28	0,20	0,40	0,25	50,50
A3	0	0	1	1	0	0	1	2	0	17	0,22	0,44	0,23	23,50
A4	6	27	0	71	1	0	18	71	52	16	0,32	0,49	0,19	36,30
A5	0	0	36	51	6	2	29	87	14	13	0,38	0,47	0,31	6,10
A6	0	2	8	45	1	1	0	53	43	20	0,31	0,40	0,19	21,20
A7	3	10	30	55	0	3	22	85	30	20	0,22	0,43	0,19	19,00
A8	2	3	1	62	1	1	6	63	54	36	0,32	0,54	0,19	33,10
A9	0	0	7	65	0	0	2	72	63	60	0,26	0,42	0,20	13,20
AS01	3	2	21	70	2	0	3	91	65	58	0,23	0,48	0,24	27,50
AS02	1	0	9	69	2	1	9	78	57	4	0,21	0,47	0,24	7,20
AS03	1	0	6	109	2	0	0	115	107	49	0,36	0,46	0,27	24,80
AS04	0	0	16	30	1	4	3	46	22	31	0,18	0,41	0,26	20,84
AS05	4	0	8	57	0	0	5	64	52	20	0,21	0,44	0,25	22,10
AS06	0	0	20	10	0	0	0	30	10	0	0,08	0,30	0,17	35,70
AS07	/	/	/	/	/	/	/	/	/	/	/	/	/	/
AS08	32	12	0	82	2	0	0	82	80	52	0,18	0,37	0,25	33,40
AS09	4	5	1	68	0	1	0	69	67	25	0,21	0,47	0,25	60,00
AS10	2	0	5	75	0	0	1	80	74	29	0,26	0,44	0,29	24,50
AS11	0	0	2	89	0	0	0	91	89	45	0,42	0,73	0,25	57,10
AS12	0	0	6	88	0	0	0	94	88	58	0,25	0,40	0,20	27,30
AS13	4	0	3	69	2	0	18	72	49	49	0,38	0,48	0,26	15,70
AS14	0	0	0	74	0	0	0	74	74	29	0,15	0,44	0,24	25,70
AS15	x	x	x	x	x	x	x	x	x	x	0,22	0,37	0,24	33,00
Y1	0	0	12	64	1	0	0	76	63	15	0,24	0,49	0,25	19,40
Y2	1	0	2	64	1	0	0	67	64	7	0,37	0,57	0,26	24,40
Y3	0	0	12	58	0	1	1	114	56	51	0,26	0,52	0,28	35,70
Y4	4	4	2	49	1	1	2	56	49	45	0,50	0,65	0,22	24,20
Y5	0	0	8	55	5	1	0	63	49	49	0,32	0,53	0,22	14,70

Nest Nr.	Hatchlings alive in nest	Dead hatchlings	Unfertilized eggs	Fertilized eggs	Early embryo	Middle embryo	Late embryo	Total nr. ofeggs	empty shells	Hatchlings reached sea	Depth of nest chamber: top eggs(m)	Bottom of nest chamber (m)	Diameter of nest chamber(m)	Nest distance to sea (m)
Y6	0	0	40	27	1	1	1	67	27	27	0,07	0,43	0,23	27,70
Y7 Chel.myd	1	2	47	51	11	3	1	98	36	33	0,55	0,66	0,28	21,50
Y8	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Y9	7	1	10	66	0	0	18	76	48	27	0,25	0,50	0,15	41,20
Y10	5	0	3	87	3	0	0	90	84	58	0,39	0,58	0,23	14,50
YS1	11	5	2	111	0	0	5	113	106	32	0,22	0,54	0,31	31,50
YS2	0	0	7	113	1	0	3	124	109	40	x	0,48	0,25	39,90
YS3	0	0	0	83	4	1	1	83	77	40	0,34	0,72	0,22	25,00
YS4	0	0	108	0	0	0	0	114	6	5	0,20	0,35	0,25	28,50
YS5	3	0	8	118	0	1	5	126	112	89	0,21	0,30	0,25	27,00
YS6	3	7	3	77	1	0	35	80	41	20	0,24	0,49	0,24	31,50
YS7	0	0	4	69	2	1	0	73	66	45	0,38	0,65	0,28	29,00
YS8	0	0	4	63	1	2	1	67	59	24	0,23	0,37	0,22	15,60
YS9	3	0	7	73	0	2	0	80	71	35	0,15	0,35	0,26	9,50
YS10	2	0	50	24	1	1	7	74	15	13	0,21	0,45	0,23	15,30
YS11	0	1	18	76	1	1	3	94	71	57	0,25	0,51	0,20	18,10
YS12	8	4	9	85	2	0	4	94	79	51	0,34	0,49	0,32	19,60
YS13	0	1	63	27	0	1	1	90	25	19	0,19	0,50	0,26	20,60
YS14	7	7	3	102	1	2	2	105	97	40	0,35	0,50	0,29	13,30
YS15	3	1	2	86	1	0	0	88	85	41	0,38	0,48	0,24	17,70
YS16	6	1	2	89	0	1	0	91	88	40	0,15	0,45	0,25	13,40
YS17	4	7	15	58	0	1	3	73	54	47	0,24	0,44	0,31	15,00
YS18	5	3	3	82	0	0	0	85	82	26	0,21	0,45	0,32	16,50
YS19	0	0	7	80	1	3	5	87	71	32	0,31	0,40	0,26	16,30
YS20	5	17	22	60	4	1	2	82	53	13	0,26	0,53	0,25	9,20
YS21	0	0	32	57	2	1	1	89	53	53	0,43	0,55	0,25	24,40
YS22	/	/	/	/	/	/	/	/	/	/	/	/	/	/
YS23	0	0	2	88	0	0	1	90	87	14	0,29	0,46	0,30	20,00
YS24	0	1	18	55	5	1	7	73	42	2	0,25	0,47	0,22	23,90

Nest Nr.	Hatchlings alive in nest	Dead hatchlings	Unfertilized eggs	Fertilized eggs	Early embryo	Middle embryo	Late embryo	Total nr. ofeggs	empty shells	Hatchlings reached sea	Depth of nest chamber: top eggs(m)	Bottom of nest chamber (m)	Diameter of nest chamber(m)	Nest distance to sea (m)
YS25	0	1	8	90	0	0	13	105	77	74	0,23	0,39	0,29	31,70
YS26	1	0	15	29	0	0	9	44	20	12	0,26	0,44	0,28	25,00
YS27	/	/	/	/	/	/	/	/	/	/	/	/	/	/
YS28	/	/	/	/	/	/	/	/	/	/	/	/	/	/
YS29	0	0	0	63	0	0	0	63	63	2	0,23	0,67	0,26	21,40
YS30	2	0	15	115	0	0	1	130	115	38	x	0,40	0,18	x
YS31	1	3	1	89	0	0	0	90	89	8	x	0,40	0,20	x
YS32	18	0	0	83	2	0	2	83	79	63	0,36	0,28	0,23	x
YS33	9	0	13	64	2	0	2	77	58	58	0,20	0,45	0,18	4,80
YS34	1	1	0	74	0	0	0	74	74	25	0,23	0,43	0,19	16,90
YS35/YS36	1	1	7	103	4	0	1	110	96	95	0,30	0,37	0,29	10,70
YS37	3	0	23	73	0	0	5	96	68	51	0,36	0,64	0,35	21,50
YS38	5	1	8	95	0	0	5	103	90	41	0,35	0,61	0,28	16,30
YS39	0	0	8	54	0	0	0	66	54	48	0,21	0,42	0,28	47,70
YS40	4	4	2	56	0	0	0	58	56	45	0,32	0,50	0,22	29,20
Sum	**185**	**136**	**814**	**4550**	**79**	**41**	**288**	**5434**	**4148**	**2338**	**17,73**	**32,21**	**16,79**	**1576,54**
Average	**2,80**	**2,06**	**12,33**	**68,94**	**1,20**	**0,62**	**4,36**	**82,33**	**62,85**	**35,42**	**0,28**	**0,48**	**0,25**	**24,63**
STABW	**4,86**	**4,41**	**17,58**	**25,24**	**1,86**	**0,90**	**7,31**	**21,91**	**26,67**	**20,25**	**0,09**	**0,09**	**0,04**	**11,20**
%Anteil			**15,18**	**84,8**	###	**10,05**	**70,59**	**100**	**76,33**	**43,03**				

Caretta caretta hatchlings in Calış 2010

Sigrid Amon, Anna Dünser

EINLEITUNG

Dieser Bericht entstand als Teil des Meeresschildkröten-Projektpraktikums, welches zum Schutz und zur Erforschung der unechten Karettschildkröte (*Caretta caretta*) seit mehr als 17 Jahren an den Stränden von Fethiye (Türkei) stattfindet. Fethiye ist eine SPA (Special Protected Area) da die Strände in Calış und Yaniklar von *Caretta caretta* als Niststrände genutzt werden. Sie werden allerdings auch touristisch genutzt. Wir beschränken uns in diesem Bericht auf den Strand in Calış.

Da dieses Projekt seit mehr als 17 Jahren unter Zusammenarbeit von türkischen und österreichischen Studenten betrieben wird, lassen sich die Daten der einzelnen Jahre gut miteinander Vergleichen und Trends, falls vorhanden, feststellen.

Im Sommer 2010 wurden am Strand von Calış 21 Nester von *Caretta caretta* gefunden. Zwölf dieser 21 Nester waren so genannte Secret nests, die erst durch das schlüpfen der Hatchlinge bemerkt wurden. Ein Nest konnte nicht lokalisiert werden, weshalb es keine Daten zu diesem Nest gibt. Insgesamt wurden 1714 Eier gelegt, aus denen 1417 Hatchlinge schlüpften. 921 Hatchlinge erreichten das Meer, da sie von Studenten freigelassen wurden oder ihre Spuren eindeutig Richtung Meer führten. Die maximale Erfolgsrate beträgt 74,6% (1279 Hatchlinge).

ABSTRACT

This report was produced as a part of the research and conservation project on *Caretta caretta* (loggerhead sea turtle), which has been taking place on the beaches of Fethiye in Turkey for more than 17 years. The beaches of Calış and Yaniklar are used by *Caretta caretta* as nesting areas and are both touristic areas too. This report is restricted to the beach in Calış. Because this is a long-term project (a cooperation between Turkish students and students from the University of Vienna), it is possible to compare the results of the single years and to draw some conclusions.

In the summer of 2010 we found 21 nests of *Caretta caretta* at Calış beach. Twelve of the nests were so-called secret nests, which means that they were not discovered until the hatchlings emerged. One nest could not be localised, and therefore there are no data on it. In total, 1714 eggs were laid, of which 1417 hatched. 921 hatchlings definitely reached the sea: they were either released by students or their tracks led to the waterline. The maximum

estimated success rate (taken as the number of hatched eggs minus dead or predated animals) is 74.6% (1279 hatchlings).

INTRODUCTION

The female turtles return to the beach where they hatched (natal homing) every two to four years and lay two to four nests in about two weeks. The amount of eggs can vary from 23 to 134 (Stachowitch and Fellhofer, 2010). The incubation time varies from 44 to 64 days, depending on the surrounding conditions like temperature, location and the composition of the sand. The sea turtles usually hatch at night and orientate toward the brightest point, which is normally the horizon over the sea. If the land is too brightly lit, the hatchlings cannot find their own way to the sea and die either due to exhaustion or predation, while running in the wrong direction.

Material and Methods

At Çalis beach the nests were protected with triangular metal cages with a plastic or wire net wrapped around. The net could be lifted up or pulled down to protect the hatchlings from predation, from tourists and most importantly to prevent them from running into the wrong direction. The cages were marked as sea turtle nests in English, Turkish and German.

The beach in Calış was monitored from 26 June to 9 September by altogether 10 students from the University of Vienna. The monitoring was divided into a morning shift and a night shift during which the 3-km-long beach was patrolled by two to three students. The morning shift started in front of the Türkü cadiri bar at 6 a.m. and ended at about 8 a.m. in front of the cliffs on the other side of the beach. The night shift started at the same place at 10 p.m. and ended about 2 a.m. after the Surf Café. During the morning shift the beach was patrolled once, whereas it was patrolled 4 times during the night shift.

From late June until late August we searched for adult and juvenile tracks, and adult sea turtles were measured after nesting if they were encountered. The position of each nest was noted and a cage was put over it. From late August on only the nests were monitored in the night shift.

In the morning shift the nets were pulled up (about 40 days after the nest was laid) to let those hatchings that might emerge during the day find their way to the sea and prevent them from dying due to heat. If hatchlings were found in the cages during the morning shift they were either set free (if the sun was not too high), or taken to the camp (if it was already too hot). In

the latter case they were put into a plastic bucket filled with wet sand (Fig. 3) and covered with a moist towel. The hatchlings were then released at the following nightshift.
Before the night shift started, the nets were pulled down again to prevent emerging hatchlings from running into the wrong direction. If hatchlings were found during the night shift they were put into a plastic bucket with wet sand, covered with a black plastic bag to shut out the light and brought to a dark part of the beach, where they were released a few meters away from the water line and monitored until they reached the sea. During the morning and night shift we also searched for fresh hatchling tracks to detect potential secret nests.
If hatchling tracks were found they were followed to determine if they led to the sea or not and what happened to the hatchlings.
The nests were excavated about five days after the last hatchlings emerged. The empty eggshells, fertilized and unfertilized eggs and dead embryos were counted. The fertilized eggs were divided into three groups according to their size: the early embryonic stage (< 1cm), middle embryonic stage (1 - 2 cm) and late embryonic stage (> 2 cm). The nest was also measured, including the depth to the top of the eggs, the depth and diameter of the egg chamber and the distance to the sea.
The minimal success rate is based on the number of hatchlings, which were released by students, and hatchling tracks, which led to the sea. The maximum success rate was calculated from the total number of eggs and the maximum number of hatchlings reaching sea (maximum: total number of empty eggshells minus dead hatchlings.)
The average incubation time was calculated without the nests CS12 and C6, because those data were given to us by tourists and their accuracy could not be determined.

Results

On Calış beach, twenty-one nests of *Caretta caretta* were found in 2010. Twelve of these nests were “secret”, which means that there are no data about the nesting date. A total of 1726 eggs were laid and 1417 eggs hatched. The student team is certain that 930 hatchlings reached the sea: these animals were released by the students themselves or it was clearly visible that the tracks led to the sea. 139 fully developed dead hatchlings were found: 126 of them died in the nest, the other 13 hatchlings died because of the heat, were run over by a car or were predated. That means that at least 9.8% of all hatchlings died before they could leave the nests or reach the sea.

Table 1: Summary of all nests and their data, Calış 2010
Tabelle 1: Zusammenfassung aller Nester und ihrer Daten, Calış 2010

Nest number	Nest date	Incubation Time	Total nr. of eggs	Empty eggshells	Hatchlings reaching the sea (min)	Hatchlings reaching the sea (max)	Unfertilized eggs	Fertilized eggs	Dead embryos	Dead hatchlings
CS1	n.d.	n. d.	77	56	46	56	8	69	13	0
CS2	n.d.	n. d.	135	98	68	91	14	121	23	7
CS3	n.d.	n. d.	103	74	58	61	21	82	8	13
CS4	n.d.	n. d.	98	68	22	68	25	73	5	0
CS5	n.d.	n. d.	60	45	26	31	4	56	11	14
CS6	n.d.	n. d.	100	94	87	87	1	87	5	7
CS7	n.d.	n. d.	64	63	45	47	0	64	1	16
CS8	n.d.	n. d.	60	54	11	50	2	58	4	4
CS9	n.d.	n. d.	64	55	40	47	9	55	0	8
CS10	n.d.	n. d.	103	86	54	86	8	95	9	0
CS11	n.d	n. d.	100	84	37	69	3	97	13	15
CS12	n.d.	ca. 50	94	82	46	77	5	89	7	5
C1	14.06.	48	95	82	81	81	12	83	1	2
C2	16.06.	48	60	52	31	47	6	54	2	5
C4	18.06.	48	68	54	32	49	3	65	11	5
C5	20.06.	51	70	59	35	52	9	61	2	7
C6	20.06.	ca. 56	41	3	2	3	27	14	11	0
C7	26.06.	47	77	71	15	71	3	74	3	0
C8	28.07.	49	60	54	43	53	2	58	4	1
C9	10.07.	47	86	80	54	52	3	83	3	28
C10	26.06.	47	111	103	97	101	5	106	3	2
Total		(average:) 48.1	1726	1417	930	1279	170	1544	139	139

The maximal estimated number of hatchlings reaching the sea is 1279, the minimum 930, the exact fate of the 349 hatchlings is unclear. Of the 1714 laid eggs, 160 to 170 eggs (9.3 to 9.9%) were identified as unfertilized. 139 embryos, that means 9% of the 1544 to 1554 fertilized eggs perished before being fully developed. The bigger proportion of the embryos (86) died during the late embryo state, 38 embryos during the early and 15 during the middle embryo state. The average incubation time was 48.3 days (excluding Nest C6).
The single nests included very different numbers of eggs (Figure 1). The lowest number of eggs per nest was 41, the highest 135. One nest (C3) could not be localized, so there are data about it. On average the nests contained 82.2 eggs.

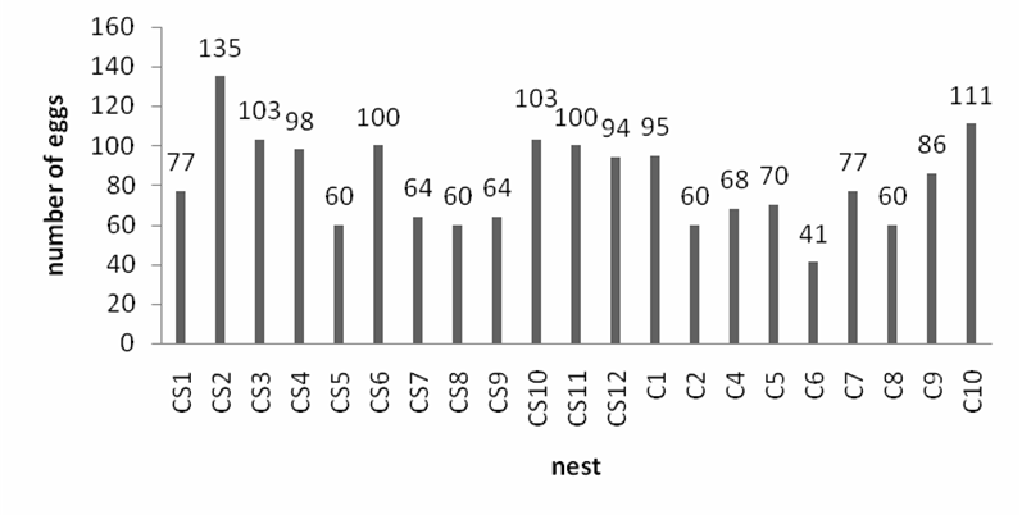

Fig. 1 Total number of eggs per nest in Calış 2010
Fig. 1 Gesamtzahl der Eier pro Nest in Calış 2010

The maximal success rates indicate how successfully the single nests hatched, while the minimal success rates contain only the number of hatchlings that were hand-released by the students or in some rare cases by tourists. The discrepancies between these maximum and minimum rates for the nests show the extent of hatchlings with uncertain fates. The lowest percentage of dead embryos and dead hatchlings in a nest were found in nest C7, but the number of hatchlings with uncertain fates is high (low minimal success rate). A very successful nest was C10, with a high maximum and minimal rate. C6 is characterized by a very high number of dead embryos, which led to very low success rates (Figure 2). The average maximum success rate of the nests is 72.4%. This means that, on average, slightly over 30% of the eggs could not fully develop or hatchlings hatched but died before leaving the nests.

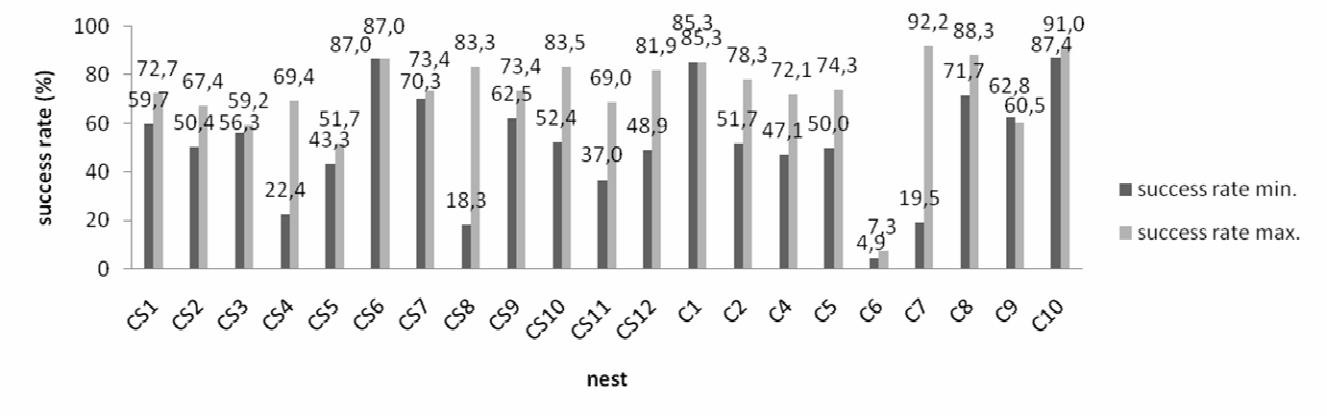

Fig. 2 : Minimum and maximum estimated success rates of the nests in Calış 2010
Fig. 2: Geschätzte minimale und maximale Erfolgsraten der Nester in Calış 2010

Because the sea turtle project has been carried out in Calış for more than 15 years, the hatchling numbers of the last 15 years can be compared. The total number of eggs in 2010 is the fourth highest since 1995, being only lower than the numbers of 1996 with 1769 eggs, 2004 with 1762 and 2007 with 1728 eggs (Stachowitsch & Fellhofer 2007,2008).The average total number of eggs from 1995 to 2010 is 1276. This means that the number of the year 2010 exceeds the average by about 34%. Interestingly the maximal number of hatchlings reaching the sea is the highest of all years, even higher than in the years 2007, 2004 and 1997 cited above. This means that the death rate before leaving the nest or/and the number of unfertilized eggs are lower in 2010 (Table 2). The relatively low numbers of dead embryos or hatchlings also led to a comparatively high maximum success rate, being exceeded only by the year 2009. Note, however, that the maximum numbers also contain hatchlings with unclear fates. Since 1995 a maximum of 764 hatchlings on average reached the sea every year at Calış beach.

Table 2: The total number of eggs, the maximal number of hatchlings reaching the sea (max. nr. of hrs.) and the average maximal success rate from the year 1995 to 2010.
Tab. 2: Die Gesamtzahl der Eier, die maximale Anzahl der Hatchlinge welche, das Meer erreichten, sowie die durchschnittliche maximale Erfolgsrate von 1995 bis 2010.

year	total nr. of eggs	max. nr. of h.r.s.	max. success rate
1995	1323	901	68,1%
1996	1769	1001	56,6%
1997	906	595	65,7%
1998	1093	466	42,6%
1999	1611	845	52,5%
2000	1167	676	57,9%
2001	1353	922	68,1%
2002	1178	696	59,1%
2003	885	381	43,1%
2004	1762	994	56,4%
2005	689	359	52,1%
2006	1193	883	74,0%
2007	1728	837	48,4%
2008	916	540	59,0%
2009	1117	849	76,0%
2010	1726	1279	74,1%

Nest description

A total of twelve secret nests were laid. The first "non-secret" nest was laid on 14 June and the first hatchlings reached the sea on 15 July. Seven non-secret nests were laid before the Turkish students arrived in Calış. The exact positions of the nests are presented in the chapter: "The nesting behavior of adult *Caretta caretta* on Calış beach (Fethiye, Turkey) in this volume.

Nest C1

Table 3: Data of nest number C1
Tab. 3: Daten des Nests C1

Total nr. of eggs	95
Nr. of empty egg shells	82
Nr. of h.r.s. (minimum)	81
Nr. of h.r.s. (maximum)	81
Nr. of unfertilized eggs	12
Nr. of dead embryos	1
Nr. of dead hatchlings	2

Nest C1 was laid on 14 June in front of the "Sim-Café", very close to the water line (8.3 m nest distance to the sea). After being flooded on 28 July, the wet sand was exchanged by dry sand by the turtle team. Hatch date was on 1 August, but on this night only tracks were found. The hatching period lasted five days. The incubation time was 48 days. The nest excavation was carried out five days after the last hatchlings emerged. In the nest one living and one dead hatchling was

found. Another hatchling died during the day in the bucket. The dead embryo was in the late embryonic stage.

Nest C2

Table 4: Data of nest number C2
Tab. 4: Daten des Nests C2

Total nr. of eggs	60
Nr. of empty egg shells	52
Nr. of h.r.s. (minimum)	31
Nr. of h.r.s. (maximum)	47
Nr. of unfertilized eggs	6
Nr. of dead embryos	2
Nr. of dead hatchlings	5

On 16 June Nest C2 was laid. It was in front of "Mado Ice Cream". The nest distance to the sea was 14.3 m. The incubation time was 48 days. On 3 August, children moved the cage and dug into the nest. Consequently, five hatchlings died because of the heat. Another thirty hatchlings were brought into the sea by tourists at about 03:00 pm. Five days later the nest was excavated, where one living hatchling and two embryos (middle- and late-embryonic stage) were found.

Nest C4

Table 5: Data of nest number C4
Tab. 5: Daten des Nests C4

Total nr. of eggs	68
Nr. of empty egg shells	54
Nr. of h.r.s. (minimum)	32
Nr. of h.r.s. (maximum)	49
Nr. of unfertilized eggs	3
Nr. of dead embryos	11
Nr. of dead hatchlings	5

Nest C4 was laid on 18 June in front of "Sanas Beach Bar" with a nest distance to the sea of 27.8 m. The hatch started on 5 August, yielding an incubation time of 48 days. On that night, eleven tracks led away from the nest but it was not possible to follow them. At five days after the last hatchlings, the nest excavation was made: five dead, seven living hatchlings and eleven embryos in the late-embryonic stage were found.

Nest C5

Table 6: Data of Nest number C5
Tab. 6: Daten des Nests C5

Total nr. of eggs	70
Nr. of empty egg shells	59
Nr. of h.r.s. (minimum)	35
Nr. of h.r.s. (maximum)	52
Nr. of unfertilized eggs	9
Nr. of dead embryos	2
Nr. of dead hatchlings	7

Nest C5, near the hotel "Mutlu" and in 14.8 m away from the sea, was laid on 20 June. As it was in the immediate vicinity of tables and chairs, especially used by the tourists at night, it was no surprise that tourists released at least two hatchlings and a child was caught playing with a hatchling in the sea. The first hatch date was on 10 August, yielding an incubation time of 51 days. During nest

excavation, five days after the end of the four-day hatch period, seven dead, ten living, one embryo in early-embryonic stage and one albino embryo in late-embryonic stage were found.

Nest C6

Table 7: Data of Nest number C6
Tab. 7: Daten des Nests C6

Total nr. of eggs	41
Nr. of empty egg shells	3
Nr. of h.r.s. (minimum)	2
Nr. of h.r.s. (maximum)	3
Nr. of unfertilized eggs	17-27
Nr. of dead embryos	11
Nr. of dead hatchlings	0

Nest C6, in front of the "Secil Market", was laid on 20 June 8.2 m away from the sea (measured during full moon). For some unknown reason, empty eggshells were found twice on the surface of the sand, one with insect larvae inside. This nest was also flooded, and the wet sand had to be changed by the students. One of the two hatchlings reaching the sea was released by tourists; the other one emerged about one week later on 22 August. The incubation time was about 56 days. Three days later during nest excavation, eleven embryos were found, three in the early-, one in the middle- and seven in the late-embryonic stage. In ten eggs it was not possible to distinguish if they were fertilized or not because most were covered in mold and many of them were completely black (Fig. 4). We attributed this condition to the wetness in the nest.

Nest C7

Table 8: Data of nest number C7
Tab. 8: Daten des Nests C7

Total nr. of eggs	77
Nr. of empty egg shells	71
Nr. of h.r.s. (minimum)	15
Nr. of h.r.s. (maximum)	71
Nr. of unfertilized eggs	3
Nr. of dead embryos	3
Nr. of dead hatchlings	0

Nest C7, in front of the sea turtle info desk, was laid on 26 June at a distance to the sea of 13.9 m. The hatching period started on 12 August and lasted two days, yielding an incubation time of 47 days. During the excavation, which was done five days after the last hatch, three embryos in the late-embryonic state were found.

Nest C8

Table 9: Data of nest number C8
Tab. 9: Daten des Nests C8

Total nr. of eggs	60
Nr. of empty egg shells	54
Nr. of h.r.s. (minimum)	43
Nr. of h.r.s. (maximum)	53
Nr. of unfertilized eggs	2
Nr. of dead embryos	4
Nr. of dead hatchlings	1

Nest C8 was laid on the 1st of July in front of "Evim" 10.8 m from the sea (measured during full moon). This nest was also flooded on 28 July. The hatch started on 18 August, when some hatchlings managed to break out of the cage. Eighteen hatchlings were found. The hatch lasted two days and the incubation time was 49 days. The excavation was carried out five days after the last hatchlings came out. In the nest, one dead hatchling, two embryos in the early- and two in the late-embryonic stage were recorded.

Nest C9

Table 10: Data of nest number C9
Tab. 10: Daten des Nests C9

Total nr. of eggs	86
Nr. of empty egg shells	80
Nr. of h.r.s. (minimum)	54
Nr. of h.r.s. (maximum)	52
Nr. of unfertilized eggs	3
Nr. of dead embryos	3
Nr. of dead hatchlings	28

Nest C9, in front of the "Turkuaz Market", was made on 10 July 12.5 m from the waterline. The hatch, starting on 26 August lasted four days. The 1st of September was characterized by heavy rainfall. The nest excavation was done on 3 September and we made the following discovery. The sand was very dense. Twenty-eight dead hatchlings were found, most of them very close to the surface. Thirty-eight hatchlings were still alive inside the nest. Also, two embryos in the early- and one in the late-embryonic stage were found. The number of empty eggshells was apparently incorrectly counted (too low) because the maximum number of hatchlings reaching the sea (eggshells minus dead hatchlings) cannot be lower than the minimum number.

Nest C10

Table 11: Data of nest number C10
Tab. 11: Daten des Nests C10

Total nr. of eggs	111
Nr. of empty egg shells	103
Nr. of h.r.s. (minimum)	97
Nr. of h.r.s. (maximum)	101
Nr. of unfertilized eggs	5
Nr. of dead embryos	3
Nr. of dead hatchlings	2

Nest C10, in front of the "Mimoza Beach Club", 14.1 m from the sea, was laid on 26 June. The hatch period was eight days and started on 11 August, leading to an incubation time of 47 days. Five days after the last hatchling reached the surface, the excavation was done. A total of two dead, five living hatchlings and three embryos in the late-embryonic stage were found.

Nest CS1

Table 12: Data of nest number CS1
Tab. 12: Daten des Nests CS1

Total nr. of eggs	77
Nr. of empty egg shells	56
Nr. of h.r.s. (minimum)	46
Nr. of h.r.s. (maximum)	56
Nr. of unfertilized eggs	8
Nr. of dead embryos	13
Nr. of dead hatchlings	0

The secret nest CS1 was laid in front of the hotel "Ceren", at distance of 17.4 m from the sea. The hatching period lasted six says and started on 20 July. During the excavation, six days after the last hatchlings emerged, thirteen dead embryos, three in the early-, six in the middle- and four in the late-embryonic stage, were found. Some eggs were covered with mold and one egg contained an insect larva.

Nest CS2

Table 13: Data of nest number CS2
Tab. 13: Daten des Nests CS2

Total nr. of eggs	135
Nr. of empty egg shells	98
Nr. of h.r.s. (minimum)	68
Nr. of h.r.s. (maximum)	91
Nr. of unfertilized eggs	14
Nr. of dead embryos	23
Nr. of dead hatchlings	0

Nest CS2, between "Surfcafé" and "Sunset Beach Club (24.4 m nest distance to the sea), started to hatch on 19 July and a very long hatching period followed, a total of fifteen days. The excavation was done on 3 August, one day after the last hatchling reached the surface. One predated egg, six dead hatchlings, and three embryos in the early-, three in the middle- and seventeen in the late-embryonic stage were found. There was a Muscidae larvae in one egg.

Nest CS3

Table 14: Data of nest number CS3
Tab. 14: Daten des Nests CS3

Total nr. of eggs	103
Nr. of empty egg shells	74
Nr. of h.r.s. (minimum)	58
Nr. of h.r.s. (maximum)	61
Nr. of unfertilized eggs	21
Nr. of dead embryos	8
Nr. of dead hatchlings	13

On 18 July nest CS3, between "Surfcafé" and "Sunset Beach Club", started to hatch. The hatch lasted three days and the nest excavation was done three days after the last hatchlings came up because there were many stones in this area. The nest distance to the sea was 25.22 m. A total of thirteen dead hatchlings were found, eleven in the nest and two on the beach, the latter died because of the heat. Nineteen hatchlings were still living in the nest and there also were four embryos in the early- and four in the late-embryonic stage. Muscidae larvae were found in the nest.

Nest CS4

Table 15: Data of nest number CS4
Tab. 15: Daten des Nests CS4

Total nr. of eggs	98
Nr. of empty egg shells	86
Nr. of h.r.s. (minimum)	22
Nr. of h.r.s. (maximum)	68
Nr. of unfertilized eggs	25
Nr. of dead embryos	5
Nr. of dead hatchlings	0

Nest CS4, in front of "Ögret Menevi", was characterized by a short nest distance to the sea (9.3 m). It was also flooded on 28 July. The hatch started on 10 August and lasted three days. During nest excavation, five days after the last hatchlings reached the surface, one embryo in the early- and four in the late-embryonic stage were found.

Nest CS5

Table 16: Data of nest number CS5
Tab. 16: Daten des Nests CS5

Total nr. of eggs	60
Nr. of empty egg shells	45
Nr. of h.r.s. (minimum)	26
Nr. of h.r.s. (maximum)	31
Nr. of unfertilized eggs	4
Nr. of dead embryos	11
Nr. of dead hatchlings	14

Nest CS5 was located between "Surfcafé" and "Sunset Beach Club" (24.7 m from the sea).It started to hatch on 21 July. It hatched for four days. Four days after the last hatchlings emerged the nest was excavation was. Nineteen living, fourteen dead and eleven embryos (five in early-, two in middle- and four in late-embryonic stage) were found. Many stones were found inside the nest, which could explain the high number of dead hatchlings. Four hatchlings were damaged (front flippers).

Nest CS6

Table 17: Data of nest number CS6
Tab. 17: Daten des Nests CS6

Total nr. of eggs	100
Nr. of empty egg shells	94
Nr. of h.r.s. (minimum)	87
Nr. of h.r.s. (maximum)	87
Nr. of unfertilized eggs	1
Nr. of dead embryos	5
Nr. of dead hatchlings	7

Nest CS6, between the Info desk and the "Sim Café" (15.3 m from the sea), hatched on 15 July. The nest excavation was made four days after the five-day hatching period. Three living, seven dead hatchlings, four embryos in the early- and one in the late-embryonic stage were found.

Nest CS7

Table 18: Data of nest number CS7
Tab. 18: Daten des Nests CS7

Total nr. of eggs	64
Nr. of empty egg shells	63
Nr. of h.r.s. (minimum)	45
Nr. of h.r.s. (maximum)	47
Nr. of unfertilized eggs	0
Nr. of dead embryos	1
Nr. of dead hatchlings	16

Nest CS7, in front of the "Sunset Beach Club", was 16.3 m from the sea. It was found on 27 July when it already hatched. In this area there were a lot of stones. One hatchling was run over by a car. During nest excavation on 2 August, thirty-eight living, fifteen dead hatchlings and one embryo in the early-embryonic stage were found. Many hatchlings still living inside the nest had disabled flippers, four a distorted carapace. We attributed this to the dense sand and many stones.

Nest CS8

Table 19: Data of nest number CS8
Tab. 19: Daten des Nests CS8

Total nr. of eggs	60
Nr. of empty egg shells	54
Nr. of h.r.s. (minimum)	11
Nr. of h.r.s. (maximum)	50
Nr. of unfertilized eggs	2
Nr. of dead embryos	4
Nr. of dead hatchlings	4

Nest CS8, close to the wall in front of "Mimoza Beach Club" (20.9 m distance to the sea), was found on 31 July by waiters. On that night they released three hatchlings. Someone dug at the nest before the hatchlings emerged. Nine days later we excavated the nest because we never recorded other hatchlings emerging. Tracks were difficult to see because of the character of the sand, which consisted mostly of little stones. Eight living, four dead and four embryos (one in early-, three in late-embryonic stage) were found. One of the dead hatchlings was covered with maggots and two of the living hatchlings had a deformed carapace.

Nest CS9

Table 20: Data of nest number CS9
Tab. 20: Daten des Nests CS9

Total nr. of eggs	64
Nr. of empty egg shells	55
Nr. of h.r.s. (minimum)	40
Nr. of h.r.s. (maximum)	47
Nr. of unfertilized eggs	9
Nr. of dead embryos	0
Nr. of dead hatchlings	8

Nest CS9, located in front of the "Surfcafé" at a nest distance to the sea of 35.6 m, was found on 2 August. Five days later, during excavation, fifteen living and seven dead hatchlings were found. One hatchling was run over by a car. One unfertilized egg was much smaller and contained only egg white (Fig. 5).

Nest CS10

Table 21: Data of nest number CS10
Tab. 21: Daten des Nest CS10

Total nr. of eggs	103
Nr. of empty egg shells	86
Nr. of h.r.s. (minimum)	54
Nr. of h.r.s. (maximum)	86
Nr. of unfertilized eggs	8
Nr. of dead embryos	9
Nr. of dead hatchlings	0

Nest CS10 was laid in front of the "Surfcafé" with a nest distance to the sea of 27.22 m. This nest was found by a local resident, who released fifty-four hatchlings on 4 August. The nest excavation occurred seven days later, when nine embryos (four in early-, one in middle- and four in late-embryonic state) were found. Four of the eight unfertilized eggs were covered with mold.

Nest CS11

Table 22: Data of nest number CS11
Tab. 22: Daten des Nests CS11

Total nr. of eggs	100
Nr. of empty egg shells	84
Nr. of h.r.s. (minimum)	37
Nr. of h.r.s. (maximum)	69
Nr. of unfertilized eggs	3
Nr. of dead embryos	13
Nr. of dead hatchlings	15

Nest CS11, in front of the hotel "Area" (distance to sea 11.40 m), probably hatched on 14 August for the first time. During nest excavation (five days after the last hatchlings reached the surface), four living, fourteen dead hatchlings very close to the surface, four embryos in the early-, one in the middle- and eight in the late-embryonic stage were found. One hatchling died due to heat and one of the living ones could not move its flippers. There were insects in the nest.

Nest CS12

Table 23: Data of nest number CS12
Tab. 23: Daten des Nests CS12

Total nr. of eggs	94
Nr. of empty egg shells	82
Nr. of h.r.s. (minimum)	46
Nr. of h.r.s. (maximum)	77
Nr. of unfertilized eggs	5
Nr. of dead embryos	7
Nr. of dead hatchlings	5

Nest CS12, in front of "Miss Dudu's" (21.2 m nest distance to the sea), was laid on 1 July according to the information provided by local inhabitants, yielding an incubation time of 50 days. The nest excavation occurred two days after the last hatchlings emerged. Seven living, four dead hatchlings and seven embryos in the late-embryonic stage were found. One hatchling died because of the heat. One of the living hatchlings died in the collection bucket during the day in the camp.

The average hatching period of the non-secret nests (except for those nests with only one listed hatching day) was 4.6 days.

DISCUSSION

This year we recorded a relatively high number of nests on (21) Calış beach. Compared to the last two years the number of nests increased (2008 with fourteen nests, 2009 with fifteen nests). On the other hand, the number of nests in 2010 is almost equal to 2007, with twenty-two nests. The nesting season 2010 started in early June and ended in early July (the last nest was laid on 10 July). Twelve of the nests were secret nests, probably all being laid in June before the Austrian students arrived. Eight of the observed laid nests were made in June, only three in early July. Accordingly, the month with the greatest nesting activity in Calış is June, i.e. this study yielded similar results about nesting activities as other studies in Fethiye (Baran and Türkozan 1996).

Comparing the average egg numbers of the nests (82.2) in Calış shows that this number is also similar to other studies in Turkey: Baran and Türkozan (1996), for example, reported an average of 82.9 eggs per nest. On the other hand, the average egg numbers per nest of *Caretta caretta* in Zakynthos – over 120 eggs – is considerably higher than in Calış (Skoufas 2005).

Of the 930 hatchlings (minimum estimate) that reached the sea, a total of 341 emerged in July, 589 in August.

With an average incubation time of 48.1 days, the hatchlings needed almost the same time to develop as in 2009 (47.8 days) (Stachowitch & Fellhofer 2009).

The small differences between the single incubation times for the nests cannot be related to different locations (nest distances to sea) or the time in which they were laid, but the data for incubation time for eleven out of twenty-one nests is not really representative. Maybe a higher number of nest dates could have provided more information about the dependence of incubation times.

In six nests (C6, CS1, CS2, CS3, CS8, CS11) insect larvae were found. Although CS2 (Table 23) showed the highest number of dead embryos, our data did not reveal a causal relationship between insects and embryo death-rate. Eggs of three nests (C6, CS1, C10) were covered with mold. We can explain this only for one nest, C6, because this nest was flooded.

Some nests are exceptional for different reasons. C6 (Table 7) was the nest with the lowest maximum success rate (7.3%). Only three of 41 eggs hatched, of which only two hatchlings reached the sea; 27 eggs were unfertilized. The low number of eggs, the high number of unfertilized eggs and the location of the nest, which was only 8.2 m distant from the water line (measured during full moon), might be explained if a very young sea turtle laid the nest. Nest C9 (Table 10) is characterized by a very high number of dead hatchlings, which might be attributed to a heavy rainfall two days before excavation. We conclude that rainfalls have a strong influence on sand density. The sand got very hard and the hatchlings could not emerge even though they were very close to the surface.

This year, 349 hatchlings had unknown fates. Several explanations are possible. The nests with the highest numbers of missing hatchlings were CS8, CS4 and C7. The high number of "missing" hatchlings of CS8 (Table 19) could be explained by the late discovery of the nest. Therefore, some could have emerged before it was monitored. Another reason could be predation. Dogs were observed digging into some nests. The discrepancy between the minimum and maximum number of hatchlings reached the sea could also be caused by tourists who released hatchlings into the sea without our knowledge. One extreme case was C2 (Table 4), where children dug into the nest and then thirty hatchlings emerged during the day. Such cases were noticed by us mostly by coincidence. Nest C7 (Table 8), located in front of the university's information booth, is also characterized by a major loss of hatchlings. We watched some tourists leaving the info desk to have a look at the nests, even after we explained that this is a special protected area. We therefore believe that tourists might also have released some hatchlings when we weren't watching them. Another possible reason for the uncounted hatchlings is the fact that it is not always easy to count empty eggshells. This explanation, however, is only valid for a very small number of missing individuals.

In principle the cages are essential for protecting the hatchlings from predation, death due to exhaustion or being run over by a car. This situation is worsened by their inability to find their way into the sea because of the major light pollution at Calış beach. Nevertheless, the cages were often confused with trash cans or they were even moved, whereby sometimes hatchlings could escape. In such a case it was almost impossible to find the hatchlings again, unless their escape was noticed immediately. The construction of the cages could be improved by making them bigger and harder to move, but it would also be important to signpost them more obviously. Litter in general is a serious problem in Fethiye. If hatchlings get entangled in fishing nets or trapped in drinking cups, they often are unable to free themselves (Triessnig 2006).

It can be assumed that tourism in Calış will increase rather than decrease in the next few years. Therefore this project is very important and probably one of the only chances to preserve this sea turtle beach.

Fig. 3: Hatchlings in a plastic bucket after an excavation. They were brought to the camp because the sun was already too high to release them. They were released in the following night shift. Calış 2010
Abb. 3: Hatchlinge in einem Plastikkübel nach einer Excavation. Da die Sonne schon zu hoch stand, wurden sie ins Camp gebracht und in der folgenden Nachtschicht frei gelassen. Calış 2010
Photo: Sigrid Amon

Fig. 4: Excavated eggs of C6, Calış 2010
Abb. 4: Ausgegrabene Eier aus dem Nest C6, Calış 2010
Photo: Sigrid Amon

Fig 5: Miniature egg, after excavating CS9, Calış 2010
Abb. 5: Sehr kleines Ei, Excavation CS9, Calış 2010
Photo: Anna Dünser

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Changes at Calis Beach 2010

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KURZFASSUNG

Seit 1994 besteht das Arterhaltungs- und Forschungsprojekt der Universität Wien in Kooperation mit verschiedenen türkischen Universitäten und Vereinen (dieses Jahr fand die Kooperation mit EKAD statt).
Hierbei arbeiteten StudentInnen am Strand von Calis, in Fethiye in der Türkei, um die Niststellen der Unechten Karettschildkröte (*Caretta caretta*) zu schützen.
In den letzten Jahren wurden Berichte verfasst, die die Veränderungen am Strand von Calis aufzeigen sollten und die mit Hilfe von Fotos und Zählungen von Sonnenliegen und -schirmen und seit diesem Jahr auch von parkenden Autos auf dem Strand dokumentiert wurden. Am Strand von Fethiye gibt es durch den zunehmenden Tourismus viele Störungen und Barrieren für *Caretta caretta*, weswegen der Strand immer ungeeigneter als Nistplatz für die Tiere wird. Diese Störungen bestehen aus Partylärm, vielen Lichtquellen und vielen Touristen, die den Strand tagsüber und nachts für verschiedene Aktivitäten nutzen (z.B. Picknicken, Kite-surfen und Quadfahren) und auch hier übernachten oder campieren. Zudem wird viel Müll produziert und liegengelassen, welcher zumindest im Strandabschnitt der Promenade weggeräumt wird, im Strandabschnitt von Ciftlik jedoch liegen bleibt. In diesem Jahr gab es einen Zuwachs an Sonnenliegen von 6,4% und an Sonnenschirmen von 11,2% und vor allem in Ciftlik werden Sitzsäcke und Sitzpolster immer mehr am Strand ausgelegt.
Darüber hinaus werden die Bars im Abschnitt von Ciftlik von Jahr zu Jahr mehr und mehr ausgebaut, was eine Luftbilddokumentation von 2004 und 2010 zeigt. Neue Konstruktionen sind beispielsweise ein seit 2009 bestehender Bootssteg vor den „Sunset Beach Appartments“, welche ebenfalls vor zwei Jahren fertig gestellt wurden und auch hier wird der Strand in Form von Sonnenliegen und -schirmen, sowie einem Kinderspielplatz genutzt, der im letzten Jahr das erste Mal im Sommer aufgebaut wurde und dieses Jahr im August aufgestellt wurde. Außerdem existieren zwei neue hölzerne Stelzenhäuser – eines zwischen den Sunset Beach Appartements und dem Sörf Café und eines westlich des Sörf Cafés, welche ebenfalls neue Bepflanzungen von Akazienbäumen aufweisen. Vor dem Sörf Cafe und vor dem Sunset Garden Beach Club wurden einige grüne Matten ausgelegt, die das Areal als Nistzone für *Caretta caretta* unbrauchbar machen.

Durch die Befahrung des Strandes wird der Sand komprimiert und ebenfalls durch tiefe Reifenspuren aufgerissen, die Nester zerstören können, Schlüpflinge am schlüpfen hindern oder unüberwindbare Barrieren darstellen können. Dieses Jahr wurden von Anfang Juli bis Anfang September 2607 Autos auf dem Strand in der Picknickzone abgestellt.
Eine weitere Verschlechterung ist, dass seit diesem Jahr keine Schilder mehr am Strand existieren, die auf die Special Protected Area hinweisen.

ABSTRACT

Since 1994 a conservation and research project has been conducted by the University of Vienna in cooperation with various universities in Turkey and associations (in this year there was a cooperation with EKAD).
Here, students worked on the beach of Calis, a part of Fethiye, Turkey, to protect the nesting places of the loggerhead turtle (*Caretta caretta*).
In recent years, reports show changes on the beach of Calis. The documentation is made with the help of photos and also involves counting of sunbeds and umbrellas, and since this year, also of parked cars on the beach.
On the beach of Fethiye, there are many problems due to increasing tourism and barriers for *Caretta caretta*, which is the reason why the beach is becoming increasingly unsuitable as a nesting site. These disturbances consist of party noise; many light sources and many tourists who use the beach during the day and night for various activities (e.g. picnics, kite surfing and quad driving) and even spend the night here or camp. In addition, much waste is produced and left behind. The beach section of the promenade is cleaned up by the hotel staff, but in the beach section of Ciftlik the garbage remains uncollected. This year there was an increase in the sunbeds of 6.4% and 11.2% of umbrellas, and especially in Ciftlik, beanbags and seat cushions are increasing in number. Furthermore, the bars in the section of Ciftlik are expanding from year to year, which is clearly evident based on an aerial documentation in 2004 versus 2010. The new constructions include a pier that was erected in 2009 in front of the "Sunset Beach Apartments”, a complex which was completed two years ago; here, the beach is used for sunbeds and umbrellas. A children's playground was set up last year for the first time, and this year it was set up in August. Moreover, there are two new wooden stilt houses – one between Sunset Beach Apartments and the Sörf Cafe and another one westwards of the Sörf Cafe, which have also new plantings of acacia trees. In front of Sörf Cafe and the Sunset Beach Garden Club, some green mats were laid out on the beach, making the area

unusable as a nesting area for *Caretta caretta*.
By driving on the beach, the sand is compressed and also deep vehicle tracks occur; this can destroy nests and may prevent hatchlings from hatching or can form insurmountable barriers. This year between early July and early September, 2607 cars were parked on the beach in the picnic area.
Another negative development is that, since this year, no more signs are present on the beach to indicate that this is a Special Protected Area.

INTRODUCTION

One of the beaches belonging to the Special Protected Areas in Turkey is Calis beach in Fethiye, where since 1994 students from different Turkish universities and Austrian students from the University of Vienna are working together in a conservation and research project on the Loggerhead sea turtle (*Caretta caretta*). This year the nesting area of Fethiye was assigned to EKAD and between 13 June and 4 September the beach of Calis was observed by Turkish and Austrian students.

Although Fethiye is one of the six Special Protected Area (besides Dalyan, Patara, Ekincik, Göksu and Belek), every year the situation for *Caretta caretta* is becoming more and more critical and ,since this year, there is not even a sign showing that the beach is a sea turtle beach and furthermore a Special Protected Area.
12 areas have been selected for the list of specially protected areas by the United Nations Environmental Program (UNEP). Nine of the twelve SEPAs are Special Environment Protection Regions, and three of them are National Parks. These are Köyceğiz-Dalyan, Foça, Fethiye-Göcek, Datça, Gökova, Göksu, Patara, Kekova, Belek, National Park of Dilek Yarımadası, National Park of Gelibolu, and National Park of Beydağları.

There are a lot of hotels and bars and, because of this; there is a lot of light pollution from the promenade, which affects the sea turtle hatchlings, which naturally orientate themselves on the horizon above the sea. They always follow the brightest point, which in Calis is the artificial light influence. This means they go in the wrong direction and don't find their way to the sea. Many tourists use the beach not just during the day, but also during the night. They have parties and produce noise all over the beach. Campfires on the beach are also common, so that there is a great disturbance for adult turtles that need to crawl onto the beach to dig their nests. For the hatchlings, not just the stray dogs but also the humans pose a threat when they

walk on the beach during the night. The visitors could step on the hatchlings.

On the beach there are lot of constructions, sunbeds, umbrellas and a lot of garbage. These form barriers for the adult turtles and hatchlings, and the sunbeds and umbrellas also produce shade over the nests, which can influence the development of the embryos in the eggs.

In the framework of the research every year, data are collected. This includes information on the development and the changes at the beach of Calis. For example, every year the sunbeds and umbrellas and the lights on the promenade are counted, and photos are taken. The changes of the beach and the promenade are compared to the status of the previous years. The following report is a continuation of the project-reports of the previous years, and the changes at Calis beach will be shown in the context of the year 2009. In some aspects, also a longer period of time will be regarded.

RESULTS

TOURISM IN NUMBERS

The numbers of foreign tourists coming to Turkey increased during the last years and the beaches are increasingly used by tourists (http://www.tuerkei-reise-info.de/content/view/39/661/). In such cases two different interests collide - the interests of the tourism sector and the nature conservation of sea turtles. The statistics of the Turkish ministry of culture and tourism show that the number of arriving and departing foreigners and citizens in Turkey from January – August 2010 increased by 5.11% compared to that period of time of the previous year. In May 2010, the number of arriving tourists increased by 15.8% , in June by 7.26% and in July by 0.35%, whereas in August 2010 it decreased by 1.1% compared to the same month of the year 2009 The beaches around Fethiye are becoming a more and more a popular holiday destination (http://www.kultur.gov.tr/EN/Genel/Default.aspx?17A16AE30572D313AAF6AA849816B2EF4376734BED947CDE). 10% of all incoming tourists entered the country through the province Mugla, to which Fethiye belongs (http://www.hurriyetdailynews.com/n.php?n=turkey8217s-2010-tourist-income-data-mark-no-surprise-2010-09-14). An increasing number of tourists demand an increasing number of hotel beds, sunbeds and umbrellas on the beaches. It is also

associated with more garbage on the beaches and more motorboats and kite-surfers in the bays. Accordingly the increasing tourism could cause an increasing risk for the survival of *Caretta caretta* in the Mediterranean Sea.

LEISURE-TIME ACTIVITIES

In the bay of Fethiye, there are many speed boats, jetskis and kite-surfers during the day. Most of the surfers of Calis use the area in front of the „Sörf café“for water sports. These activities and, most importantly, the motorized activities, can cause collisions with adult turtles. This is because the turtles come close to the beach, and the females wait for the night-time to crawl onto the beach to lay their eggs. Collisions can produce severe injuries (www.thefra.org/turtle%20interactions.pdf).

There is also one big boat called ‘Baris’ from Fethiye, called the party boat (Fig. 1) which is seen often during the night from Calis beach. It has big, flashy disco lights and loud music that can be heard from a long distance. Sometimes fishermen come to the beach during the night with their small but illuminated motorboats and drive close to the shore. These boats – the big party boat and also the fisher boats – are no doubt a disturbance for the female turtles that need to come onto the beach. The omnipresent motorboats that drive in the shallow water are a dangerous factor known to cause carapace or flipper injuries.

The hotels and bars and their guests are always producing major noise and lots of light pollution. Especially on Friday and Saturday nights, there are partys and fireworks in front of the bars, on the promenade and e.g. in front of the “Sörf Café” on the beach. This year there was a new laser show from the rooftop-terrace of the Hotel “Mendos”, that was beamed onto the promenade and the beach.

Often, the visible results of the night time party activities were rubbish including bottles in the protective metal cages for the nests. These cages, especially those in front of the „Sunset Beach Appartments“ and the “Sörf Café”, were often moved or knocked over. On one occasion a cage was damaged. Such events do not just occur during the night, but also during the day. For example, children and stray dogs were observed digging into a nest.
These examples show that most visitors don't see or ignore the signs on the protective cages, even though these are written in Turkish, German and English language. They state that this is a sea turtle nest and ask people not to throw rubbish

inside. There is still clearly not enough environmental awareness, and little knowledge that Calis is part of a Special Protected Area, where *Caretta caretta* nests exist. This is also evident in the reaction of many people who come to the information desk in the evenings. Some people are quite well informed and know a lot, but most are really surprised about the presence of sea turtle nests on Calis beach.

At the beginning of August 2010, two small tents were set up right on the beach in front of "Turkuaz market" (Fig. 2). They remained there for about one week. The tents were placed next to a sea turtle nest, and if there would have been an unknown nest in this area, it would have been in the shade. Such activities are unacceptable on a sea turtle nesting beach.

SAND COMPRESSION

Sometimes quad-drivers were seen on the beach (Fig. 3). Such quads and other vehicles can compress the sand. This makes it more difficult for the adult turtles to dig nests and can also destroy already existing nests. It also makes it more difficult for hatchlings to dig themselves out of the sand when they are hatching. This year, like in the years before, deep vehicle tracks came from the road that passes the "Sunset Beach Appartments" leading to the "Sörf Café" some resembled deep craters (Fig. 4) and are directly next to an area where every year turtle nests are found. Such vehicle tracks are like canyons for the little hatchlings: they can fall into them and follow them in the wrong direction, not finding the way to the sea.

Along the promenade wall, there are since 2000 new plantations of palm trees. On the promenade wall one can find flower pots. These are watered regularly, and the sand is watered to reduce the dust on windy days. This water runs onto the sand on the beach and can cause a hard crust on the sand surface. At these sites it would be more difficult to dig a nest or for the hatchlings to emerge from the nest after hatching.

CHANGES AT CIFTLIK BEACH

The part of the beach that belongs to the town of Ciftlik is the part that stretches from "Sörf Café" to Calistepe. Here, most of the severe changes during the last years have taken place. The prognosis for the future is more changes, most of which will pose a threat to *Caretta caretta.*

NEW CONSTRUCTIONS

The whole promenade and mainly the western end of the beach changed a lot during the last years. There is a photo documentation from aerial pictures of 2004 and a new one of 2010. In those 6 years the constructions on the beach changed considerably.

In 2004, “Mimoza Bar” was a small wooden hut and there where just a few sunbeds and umbrellas (Fig. 21). In 2010, new bars were constructed westwards of “Mimoza Bar”, like “Yücel Hotel” and there are a lot of sunbeds, umbrellas and beanbags (Fig. 20).

Two years ago, the construction of the “Sunset Beach Appartments” was completed (Fig. 22). In 2004, there was still an area cleared of trees, where they filled up the wetlands with sand to prepare for the construction site of the apartments (Fig. 23). Since the finishing of the apartments, there are new sunbeds and sun umbrellas on nesting area frequented by nesting turtles. Since last year, there is a children playground built on the beach (Fig. 5). In 2009 this playground was in operation during the whole summer; this year it was set up in August.

On Ciflik beach in the last few years a lot of new constructions occurred. There are two new wooden huts on stilts that where built between summer 2009 and 2010. One is on the backmost part of the beach between the “Sunset Beach Appartements” and the “Sörf Café” (Fig. 24), and the other one is westwards of the “Sörf Café” (Fig. 6). The new constructions and also the new acacia-tree plantations in front of it (Fig.7) are close to an area that is used every year as a nesting zone. Like the experience in the last years has shown, such wooden constructions initially have a provisional status and are then modified and enlarged. Also the “Sörf Café” itself developed a lot in the last years and exhibited more sunbeds and -umbrellas (Fig. 24 and Fig. 25).

All of the bars westwards of the “Sörf Café” did not exist in 2004, except for the bar “Birlik” at the western end of Ciftlik Beach. Six more bars were built in the last 6 years. Last year, they also started with a construction site, and this that site already contains a new bar called “Miss Dudu's” with also new sun umbrellas and sunbeds. “Miss Dudu's” is located between the “Sörf Café” and “Sunset Garden Beach Club” (Fig 26).

The asphalt road in front of the “Sunset Beach Appartments” and behind the “Sörf Café”, and the new bars of the part of Ciftlik Beach are only present since 2009. Before, there was just a gravel road.

All of this shows the ongoing development of new constructions at the Ciftlik part. Now, with the new road and the new bars, it is more attractive for tourists and less attractive for sea turtles. The expectation is that such barriers and disturbances at the beach will increase in the future.

GREEN MATS

In front of the area of the “Sörf Café”, there are since 2008 green carpets that cover the sand. They are allegedly there to pull the kite boards and boats more easily into the water (Fig. 8). Last year the area covered by these carpets was larger – so they have been reduced compared to 2009. This year, however, the mats were also fixed with nails and wood to the ground. These mats make it impossible for turtles to use this zone as a nesting area. Since last year there are also green carpets covering the stones in front of the sunbeds of the “Sörf Café”, so that the tourists don't have to step onto the cobbles when they want to go swimming (Fig. 9).
There are also new green mats in front of the “Sunset Garden Beach Club”. They are spread out on the cobbles of the beach. New large white stones now separate the cobble part of the beach from the sand part in front of the café (Fig. 10). As a nesting area, these parts have become useless.

PIER CONSTRUCTION

In the area in front of the “Sunset Beach Appartements” there has been a new wooden pier construction since 2009 (Fig. 11). It facilitates water sports and attracts swimmers and sunbathers. This pier was enlarged in summer 2009 between July and August (Fig. 12), although between 30 April and late October in the whole province of Mugla there is a prohibition against construction, to protect touristic areas against noise (http://www.landoflights.net/local-news/prohibition-on-constructions-starting-on-the-30th-of-april-478.html). This is also an obstacle for adult turtles coming to the beach or going back to the sea after laying their eggs.

ACACIA TREES

There are new plantations of acacia-trees on the part of the beach belonging to

Ciftlik. These provide sun protection for visitors in a few years. One new big plantation that was planted between the summer 2009 and the summer 2010 is in front of a new wooden stilt hut westwards of "Sunset Beach Appartments" (Fig. 24), another one is in front of a other new stilt hut westwards of the "Sörf Café" (Fig. 7) and another big one is close to Calistepe at the end of the beach. Thus, along the whole section of the beach of Ciftlik, new plantations have been made almost every year. Those acacia-trees have a major impact on *Caretta caretta* because their long and dense root system makes the sand useless for digging nests. This leads to unfinished egg-chambers, because the female turtle often stop digging after encountering the strong acacia-roots. These fast-growing roots are also a threat to already existing nests: hatchlings sometimes cannot emerge because they are retained in the root system.

"PICNIC AREA" CIFTLIK

The section of the beach between the dolmus bus station and the "Sörf Café" in Ciftlik is mostly used by local people as a campsite or for picnics. It is really crowded during the evenings and the early night (Fig. 13). Some people stay the whole night and sleep on the beach. Most of the people drive their cars directly onto the beach. This is a big problem because the sand is compacted and this makes it difficult for female loggerhead turtles to dig. Furthermore, people make campfires there and often use strong halogen lights during the dinner or play loud music. This is a major disturbance for the adult turtles. Moreover, the artificial lights can confuse the hatchlings. Typically the campers leave big amounts of garbage at the beach, especially packaging waste and food remains. The latter attracts stray dogs, which occasionally also dig out the nests and are potential predators for the hatchlings.

This year we prepared for the first time a car list to demonstrate the increasing number of cars at the beach. Accordingly we counted the cars at approximately at the same time at the picnic area every night (Tab. 1).

RESULTS

There were 1309 cars in July and 1298 cars in August, so a total of 2607 cars were recorded at this small area in only two months during the night. Also, some buses and trucks use the picnic area as a parking space. This is not only an unacceptable blight, it is also nearly impossible for the hatchlings to reach the sea between all these cars and people (Fig. 14).

Tab. 1: Car list “Picnic area” Ciftlik 2010
Tab. 1: Autoliste für die „Picnic area“ in Ciftlik 2010

Date	Day	Time	Cars
04.07.2010	Sunday	23:10	33
05.07.2010	Monday	23:10	38
06.07.2010	Tuesday	22:50	22 + 2 buses
07.07.2010	Wednesday	22:30	25
08.07.2010	Thursday	22:50	39
09.07.2010	Friday	22:45	40
10.07.2010	Saturday	22:50	31
11.07.2010	Sunday	22:45	41
12.07.2010	Monday	22:50	35
13.07.2010	Tuesday	22:43	49
14.07.2010	Wednesday	23:00	46
15.07.2010	Thursday	22:25	56
16.07.2010	Friday	22:40	54 + 3 trucks
17.07.2010	Saturday	22:45	69
18.07.2010	Sunday	22:55	62
19.07.2010	Monday	22:11	52
20.07.2010	Tuesday	22:50	53
21.07.2010	Wednesday	23:00	60
22.07.2010	Thursday	22:55	73
23.07.2010	Friday	22:40	56
24.07.2010	Saturday	23:30	54
25.07.2010	Sunday	23:10	59
26.07.2010	Monday	23:05	24
27.07.2010	Tuesday	23:00	50
28.07.2010	Wednesday	23:23	38
29.07.2010	Thursday	23:15	33
30.07.2010	Friday	23:00	58 + 1 truck
31.07.2010	Saturday	23:10	59
01.08.2010	Sunday	22:55	60
02.08.2010	Monday	23:14	75
03.08.2010	Tuesday	23:00	74
04.08.2010	Wednesday	23:00	65

05.08.2010	Thursday	23:40	54
06.08.2010	Friday	22:240	33 + 2 trucks
07.08.2010	Saturday	23:00	35
08.08.2010	Sunday	22:50	56
09.08.2010	Monday	22:42	78
10.08.2010	Tuesday	01:10	10
11.08.2010	Wednesday	23:30	25
12.08.2010	Thursday	23:00	35
13.08.2010	Friday	23:18	54
14.08.2010	Saturday	22:50	47
15.08.2010	Sunday	01:45	17
16.08.2010	Monday	22:57	39 + 1 truck
17.08.2010	Tuesday	22:55	45 + 1 truck
18.08.2010	Wednesday	23:30	19
19.08.2010	Thursday	23:00	35
20.08.2010	Friday	23:00	45
21.08.2010	Saturday	22:45	69 + 2 buses+ 1truck
22.08.2010	Sunday	23:00	63 + 1 bus
23.08.2010	Monday	23:52	14 + 2 buses+ 1truck
24.08.2010	Tuesday	00:00	14 + 1 bus
25.08.2010	Wednesday	23:00	41
26.08.2010	Thursday	n.d.	n.d.
27.08.2010	Friday	23:00	39
28.08.2010	Saturday	22:56	64
29.08.2010	Sunday	23:00	57
30.08.2010	Monday	23:15	23
31.08.2010	Tuesday	23:45	13
01.09.2010	Wednesday	23:15	5
02.09.2010	Thursday	23:20	8

GARBAGE ON THE BEACH

As the years before, there was a big amount of garbage left on the beach. There are rubbish bins all along the promenade and since 2008 (Blasnig & Schachner, 2008) there are also half-buried plant pots for cigarette butts at regular intervals. Nevertheless, many people still use the protective cages over the nests to throw their garbage away (Fig. 15).
These visitors fail to recognise the signs on the cages, even though they are written in three different languages (German, English and Turkish). We found partially filled bottles (alcoholic and non-alcoholic), plastic packaging, sun lotion and ice cream remains inside the protective cages. Garbage that contained liquids presents a particular threat to hatchlings because these substances can drip into the sand and harm the eggs. They can also harden the sand which makes it difficult for the hatchlings to break through.

SIGNBOARDS

Unfortunately, the situation regarding information boards on Calis beach is catastrophic. Between 1999 and 2005, signboards on the beach of Calis were erected from ÖCK (=Özel Cevre Koruma; nature conservation). They informed the visitors about the Special Protected Area and illustrated the appropriate behaviour on the beach (Fig. 16). As of 2005, no new signs were erected and so there was only one sign left last year (S. Alexandroff & S. Hindinger, 2009). It was in bad condition and rust and dirt made it largely illegible (Fig. 17). This year there are no more signboards at all along the beach. This is a big problem because most visitors have no idea that there is a nesting beach of *Caretta caretta* and that they can disturb the turtles with their behaviour on the beach.

SUNBEDS AND UMBRELLAS

Sunbeds and umbrellas, which are provided by restaurants and hotels along the beach, are further problems for the sea turtles (Fig. 18). The increasing number of sunbeds represents barriers for the female loggerhead turtles coming onto the beach to lay their eggs. Also, the people who use the sunbeds at night can disturb the adults and later the hatchlings. This problem could be easily solved by piling the sunbeds over the night. Furthermore, the umbrellas can destroy existing nests when they are moved by tourists. The shadow they make can have an impact on the temperature inside the nests.
As the number of sunbeds and umbrellas changes every year, we count them to determine whether the conditions are getting better or worse.

METHOD AND MATERIALS

To count the sunbeds, umbrellas and other objects lying on the beach, Calis beach was divided into two sections: one to the east and one to the west of the Mimoza Beach Club. The eastward part along the major promenade was subdivided into 27 sections between the stairs going down to the sea. In the western part the sunbeds and umbrellas were attributed to the particular bars and restaurants.

RESULTS

On Calis beach, which has a length of about 3.5 km, 1288 sunbeds and 644 umbrellas were recorded in late August 2010 (Tab. 3). This is an increase of 6.4% in sunbeds and 11.2% in umbrellas from the year 2009 to 2010.

This year´s investigation showed 566 sunbeds and 348 umbrellas (Tab. 3) on the promenade part of Calis beach, in contrast to last year, when 610 sunbeds and 416 umbrellas were counted. This represents a decrease of sunbeds by 7.2% but an increase of umbrellas by 16.3%.

In Ciftlik, the western beach part, the counting showed 722 sunbeds and 296 umbrellas (Tab. 3), whereas last year there were 600 sunbeds and 360 umbrellas. This is an increase of sunbeds by 16.9%, but a decrease of 21.6% concerning umbrellas. In Ciftlik, also other objects placed on the beach attracted our attention. There the restaurants and bars put tables with chairs, loft beds or beanbags for their costumers on the beach. As a bad example one can mention the „Sand Beach Bar“, which placed 33 beanbags on the beach. These form a “wall” for sea turtles (Fig. 19).

Also the “Sörf Café” can be mentioned as a bad example, with the highest number of sunbeds (90) and the highest number of umbrellas (46) (Tab. 2)

Tab. 2: Changes in sunbed and umbrella numbers of selected hotels/restaurants over the years.
Tab. 2: Veränderungen der Sonnenliegen- und Sonnenschirmanzahl ausgewählter Hotels/Restaurants im Jahresvergleich.

Beachsection	**Year**	**Sunbeds**	**Umbrellas**
Promenade	2008	460	378
	2009	610	416
	2010	566	348
Mimoza Beach Club (Barracuda Bar)	2007	100	20
	2008	61	50
	2009	33	50
	2010	74	34
Sunset Beach Club	2008	80	30
	2009	60	30
	2010	48	31
Sörf Cafe	2002	14	n.a.
	2003	19	n.a.
	2004	n.a.	n.a.
	2005	40	15
	2005	26	17
	2007	79	18
	2008	80	16
	2009	89	40
	2010	90	46
Garden Beach Club	2008	69	33
	2009	80	30
	2010	60	28
Miss Dudu´s (new)	2009	0	0
	2010	44	11
Sand Beach Bar	2008	36	16
	2009	-	-
	2010	51	25
Birlik Restaurant	2005	50	30
	2006	55	34
	2007	67	38
	2008	50	33
	2009	55	25
	2010	51	25

Tab. 3: Overview of the number of sunbeds, umbrellas and other objects in the different beach sections, as indicated by prominent hotels/restaurants.
Tab. 3: Übersicht über die Anzahl der Sonnenliegen, Sonnenschirme und anderer Objekte in den einzelnen Strandabschnitten.

Number	**beach section**	**sunbeds**	**umbrellas**	**others**
1	Yörük	26	20	
2	Mutlu	16	9	
3	Mutlu Pool	9	8	
4	Hamsi Cafe	18	12	
5	Bollywood	17	10	
6	Anna Bar	23	13	
7	Hotel Berlin	24	14	
8	Gül market, Bridge	24	12	
9	Bus Stop Bar	31	16	
10	Nil Bar	31	16	
11	Han Otel	29	18	
12	Serkul 2	33	18	
13	Palm Restaurant	25	16	
14	Taksi Office	22	14	
15	Light House	19	14	
16	Area	24	17	
17	Ögretmenevi	19	14	
18	Merhaba	18	10	
19	Mendos	10	6	
20	Calis beach	25	14	
21	Günes Hotel	23	14	
22	Secil/Open house Restaurant	22	12	
23	Sim Cafe	17	12	
24	Info Desk	18	10	
25	Ceren	16	10	
26	Malhun	17	10	
27	Hotel Letoon	10	9	
SUM Promenade		**566**	**348**	
28	Mimoza Beach Club (Barracuda Bar)	74	34	
29	Yücel Hotel	40	20	
30	Yörük Cadiri	66	39	
31	Güven's Restaurant	69	28	
32	Özgür's Restaurant	29	16	
33	Dirlic Cafe	35	10	
34	Sunset Beach Club	48	31	
35	Sörf Cafe	90	46	25 tables + chairs
36	Kutup Vildiz Hotel	0	0	
37	Miss Dudu´s	44	11	1 loft bed
38	Sunset Garden Beach Club	60	28	2 tables + chairs, 7 beanbags
39	Mutlu	49	18	
40	Sand Beach Bar	51	14	33 beanbags
41	Birlik Restaurant	51	25	2 loft beds
42	Otlantic 61 Cafe	16	10	1 table + chairs
SUM Ciftlik		**722**	**296**	**3 loft beds** **28 tables + chairs** **40 beanbags**
SUM Promenade + Ciftlik		**1288**	**644**	

DISCUSSION

In spite of being a Special Protected Area, there is no trend of better conditions for the loggerhead sea turtle (*Caretta caretta*) in Calis, as illustrated for example by the number of beach furniture. Every year there is an increase in the utilization of the beach, especially in Ciftlik, because there is a steady increase of tourism in Calis beach. To really advance the situation for *Caretta caretta* over the long term there, serious changes need to be made in the handling of the beach. For example, it would be necessary to stack the sunbeds at night, to switch off the lights in the late night along the promenade. One effective measure would be to control public access to the beach or fully close the beach during the night. The latter, however, would affect the tourism sector in Calis beach. Furthermore, it would require a closer cooperation between local residents and the turtle conservationists. Moreover, there should be more information for the tourists and also for the local people, because without signs and information the people have little idea about how to behave correctly. It is evident, especially at the info desk, that lots of people are really interested and want to help to save *Caretta caretta*. The sea turtle project is necessary to conserve them, but if there is no rethinking, the future looks dim for the loggerhead turtle in Calis beach.

Fig. 1: Partyboat passing close to shore
Abb. 1: Partyboot

Abb.2: Zwei Zelte am Strand

Fig. 3: Quad-driver at the beach
Abb. 3: Quadfahrer am Strand (photo 3, 4:C.Fellhofer)

Fig. 4: Vehicle tracks eastwards Sörf Cafe
Abb. 4: Autospuren östlich von Sörf Cafe

Fig. 5: Children´s playground in front of Sunset Beach Apartments 2009
Abb. 5: Kinderspielplatz vor den Sunset Beach Appartments 2009 © C. Fellhofer

Fig. 6: wooden stilt hut westwards of Sörf Cafe
Abb. 6: Hölzerne Stelzenhütte westlich von Sörf café © C. Fellhofer

Fig. 7: New line of acacia trees 2009
Abb. 7: Neue Reihe von Akazienbäume © C. Fellhofer

Fig. 8: Green mats in front of Sörf Café
Abb. 8: Grüne Matten vor dem Sörf Cafe © C. Fellhofer

Fig. 9: Green mats in front of Sörf Cafe in 2010
Abb. 9: Grüne Matten vor dem Sörf Cafe

Fig. 10: Green mats in front of Sunset Garden Beach
Abb. 10: Grüne Matten vor dem Sunset Garden Beach

Fig. 11: Pier construction in the beginning of the summer in 2009
Abb. 11: Stegkonstruktion am Anfang des Sommers 2009

Fig. 12: Pier construction in August 2009
Abb. 12: Stegkonstruktion im August 2009

Fig. 13: Crowded „picnic area“
Abb. 13: Überfüllte „Picknick Zone“

Fig. 14: Nests surrounded by vehicles at picnic area
Abb. 14: Nester in der Picknickzone

Fig. 15: Garbage in a nest protection cage
Abb. 15: Müll in einem Käfig

Fig. 16: New signboard 1999
Abb. 16: Neues Schild 1999

Fig. 17: Rusty signboard in 2008;
no signs remained in 2010
Abb. 17: Rostiges Schild im Jahr 2008

Fig. 18: Dense row of sunbeds and umbrellas at Calis beach
Abb. 18: Dichte Reihe von Sonnenliegen und -schirme am Strand von Calis

Fig. 19: Beanbag-wall in front of „Sand Beach Bar"
Abb. 19: Sitzsackfront vor der „Sand Beach Bar"

Fig. 20: Yücel Restaurant, Mimoza bar and adjoining bars 2010
Abb. 20: Yücel Restaurant, Mimoza Bar 2010

Fig. 21: Westwards of Mimoza Bar 2004. Yücel restaurant area in 2004
Abb. 21: westlich der Mimoza Bar in 2004

Fig. 22: Sunset Beach Apartments 2010, built on former wetland area; note green pier
Fig. 22: Sunset Beach Apartments 2010, auf einen ehemaligen Feuchtgebiet gebaut

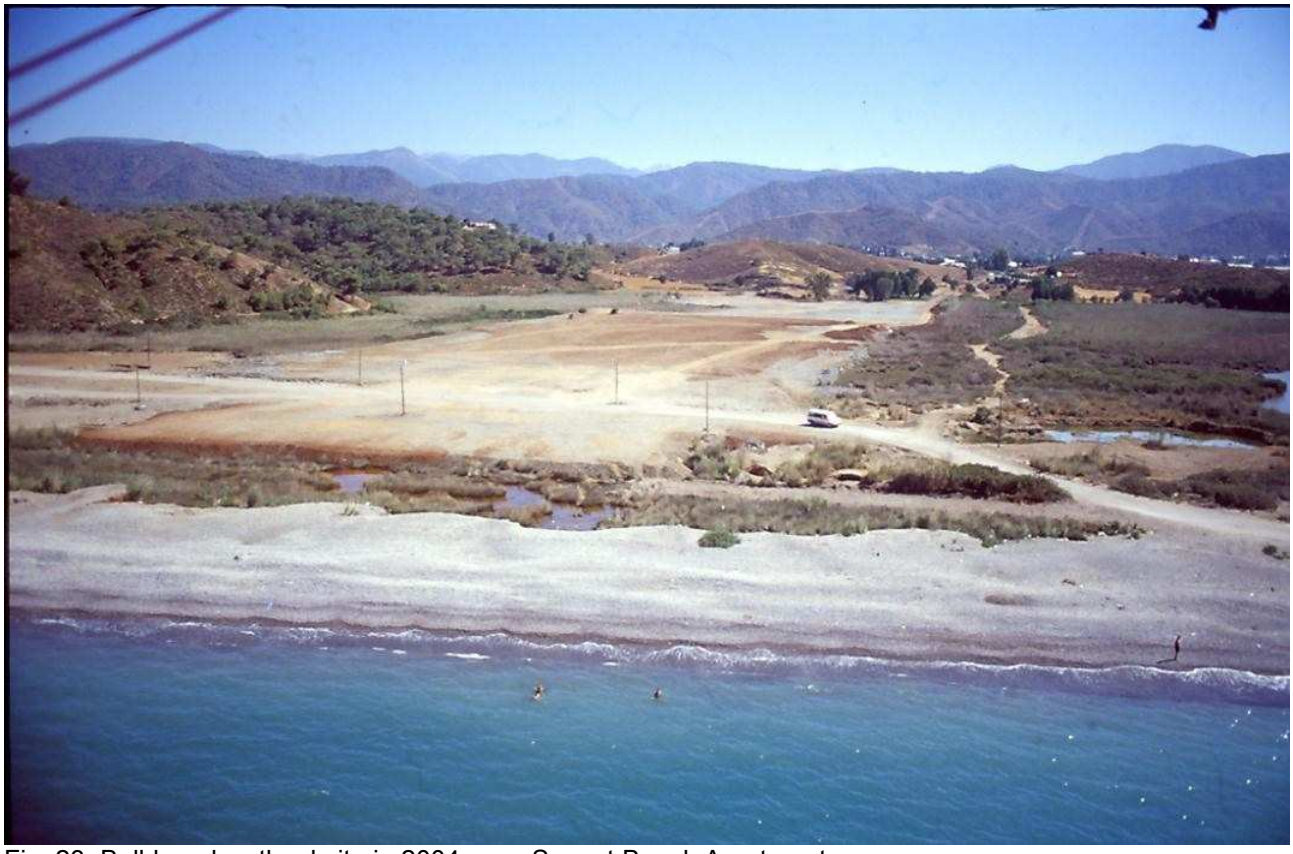

Fig. 23: Bulldozed wetland site in 2004, now Sunset Beach Apartments
Abb. 23: Trockengelegte Feuchtgebiet in 2004 – nun stehen Sunset Beach Apartments an dieser Stelle

Fig.24: Sörf Cafe 2010; note new hut surrounded by newly planted trees on right
Fig.24: Sörf Café 2010 mit neuerbauten Hütten und neuen Bepflanzungen rechts

Fig.25: Sörf Cafe 2004
Fig.25: Sörf Café 2004

Fig.26: Miss Dudu´s 2010 and new wooden stilt hut
Fig.26: Miss Dudu´s 2010

Fig.27: 2004 no restaurant or bar next to Sörf Cafe.
Fig.27: 2004 gab es keine Restaurant und Bars neben dem Sörf Cafe.

Fig. 28: Sunset Garden Beach Club and Miss Dudu´s 2004. Note rows of newly planted trees.

Fig. 28: Sunset Garden Beach Club 2010

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Status of Yaniklar/Akgöl beach 2010

Kathleen Bartz, Florian Scharhauser

KURZFASSUNG

Dieser jährliche Bericht dokumentiert die Veränderungen bzw. den Statuts eines Nistgebietes auf von *Caretta caretta*. Das Augenmerk liegt hierbei auf dem Bereich Karatas bis Akgöl bei Fethiye. Die größten Störfaktoren bilden die fortschreitende Erweiterung der Hotelanlagen, wie auch deren Außenbereiche. Gemeint sind hiermit das Majesty Club Tuana, Lykia Botanika & Fun Club, sowie die angrenzenden Campingplätze. Im Vergleich zum Vorjahr hat sich der Steg des Lykia Botanika & Fun Clubs vergrößert. Allerdings wurde dieses Jahr, nach dem Rückgang der Liegenanzahl von 2008 auf 2009, ein erneutes Absinken der Liegenzahl festgestellt von 157 Liegen auf 136. Weiteres wurde ein Amateursteg aus Paletten auf dem Strand verlegt (Akgöl). Die Anzahl der Volleyballfelder ist gestiegen. Am Ende des Akgöl wurden bereits in den Jahren zuvor vorhandene Zufahrtswege zum Strand verbreitert und neue Zufahrten geschaffen. Generell konnten auf dem Strand vermehrt Spurrillen von PKWs und Quads beobachtetet werden. Ein weiterer negativer Faktor stellt die fortschreitende Bepflanzung des Strandes dar. Dies wurde vor allem vor den Campingplätzen und der „Caretta Beach Bar“ verzeichnet. Um diesen Störfaktoren entgegenzuwirken wurden bestimmte Maßnahmen ergriffen, wie z.B. das Ausheben von Gräben. Das Kapitel der Müllverschmutzung der Strände und Wege wird hier nicht weiter vertieft, doch besteht diese Problematik weiterhin, in großem Maße.

ABSTRACT

This annual report shows the status and the changes on the nesting are of *Caretta caretta*. It focuses mainly on the area between Karatas and Akgöl beach near Fethiye. The major disturbances are the enlargements of the hotels and their surrounding areas, namely Lykia Botanica & Fun Club, Majesty Club Tuana and the camping sites between these two hotel resorts. The pier of Lykia Botanika has grown in comparison to the year 2009. After a reduction in the number of sunbeds from 2008 to 2009, another decrease was recorded this year (2009=157, 2010=136). Wooden pallets were arranged to form a walkway down to the beach from the bar at Akgöl beach. The number of volleyball fields also increased. At the end

of Akgöl beach the old access roads were broadened and new ones were built. Generally, many car and quad tracks were seen. Another negative factor is the planting of trees around the hotel and camping areas. This was mainly seen in front of the camping sites and the "Caretta Beach Bar". To stop some of these disturbances we dug ditches at critical access sites. The pollution of the beaches, especially with trash, remarks a big problem.

INTRODUCTION

Caretta caretta is a sea turtle belonging to the suborder Cryptodira and to the family Chelonidae. It lives in all the tropical and subtropical seas including the Mediterranean Sea.

Every year from May to July, adult female loggerhead turtles come to the beaches in the south-west of turkey to lay their eggs. The first time, an adult female loggerhead turtle lays her eggs; she is about 30 years old. The turtle chooses the same beach where she hatched 30 years ago. It is important to choose a beach which consists of fine sand. This annual phenomenon also takes place at the beaches of Yaniklar and Akgöl.

The University of Vienna runs a course in association with several Turkish universities and the ÖCK (Özel Cevre Koruma – Special Protected Area) to protect the loggerhead sea turtle and its hatchlings. One of the biggest risks for C*aretta caretta* is the trash of the local residents, hotels and beach visitors, which is dropped on the beaches and hardly cleaned up. This makes it very hard for the sea turtles to find an appropriate place to lay their eggs. The roots of newly planted trees in the hotel areas and camping sites are additional problems for *Caretta caretta* when it comes to find a place with fine sand.

The cars and quads driving on the beach harden the sand and sometimes even destroy the nests. As a result the sand is too hard for the hatchlings to emerge, so they die inside of the nest. Even though some hatchlings find their way out of the nest, there is the immediate danger of them getting lost in the car or quad tracks. Here, they are unable to see the waves, the moon or other orientation cues. When they get caught in the tracks, they often die of exhaustion.

MATERIAL AND METHODS

Barrier construction

It was important to prevent cars, quads and motorcycles from parking or driving on the beach. We therefore built barriers out of stones, wooden sticks, cans, barrels and fences made of reed sand parcel string.

At the end of Akgöl beach, ditches were dug with shovels and picks and signs were erected. The ditches were dug approximately knee-deep and reached from one bush on one side of the access way, to the other side of the way to make sure that cars can't pass them (Fig. 1). At the same location, a barrier was built with stones and wooden sticks; this "wall" was 30 centimeters high (Fig. 2a).

Another attempt at preventing people from driving on the beach was a fence mainly made out of local and natural resources like reed grass; it was meant to simulate plants growing along the side of the road. For construction, wooden pallets from a beach walkway (Fig. 3a & 3b) were fixed with parcel string onto bushes on the left and the right side of the path. The fence was decorated with reed grass sticks and branches with leaves to look more natural (Fig. 4a).

Photodocumentation

After the construction, photos were taken for comparison and documentation. The fluctuation in the number of sunbeds and parasols along the beach was documented with a photographic series. Photos were taken from the ground and from the air from an ultra-light plane.

The number of lights shining on the beach and the size of the pier of the hotel were also recorded.

RESULTS

Barrier construction

The building of the fence was not very effective because it was destroyed by local residents after a few hours (Fig. 4b). Unfortunately, the barrier made of stones also did not last long: it was driven over and flattened (Fig. 2b). The ditches proved to be the most useful and effective way to keep cars away from the beach (Fig.5a). After the completion of the ditches, fewer cars were seen (Fig. 5b & 5c). Another positive effect was the decrease of car tracks in the sand. Although the ditches were mostly filled with sand by visitors before the departure of the last sea turtle project team (Fig. 6), they proved to be the only effective method.

Photodocumentation and censuses

Tab.1. Type and number of facilities offered by "Sunset Restaurant"
Tab.1 Art und Anzahl von Gegenständen die von „Sunset Restaurant" angeboten werden

Facilities	Number (2009)	Number (2010)
Sun beds	18	19
Tables	2	3
Chairs	1	-

Additionally to the increase of sunbeds and tables, the Sunset Restaurant now also offers beanbag chairs (about 10) to their customers (Fig. 7).

Tab. 2: Type and number of facilities offered by "Majesty Club Tuana"
Tab. 2: Art und Anzahl der Freizeitangebote von "Majesty Club Tuana"

Facilities	**Number (2005)**	**Number (2006)**	**Number (2007)**	**Number (2008)**	**Number (2009)**	**Number (2010)**
Sun beds	214	248	310	326	268	233
Parasols	33	33	33	33	33	40
Paddleboats*	2	*	*	0*	2	**
Canoes*	11	*	*	0*	8	**
Sailing boats*	1	*	*	2	2	**
Motorboats	3	4	6	6	8	8

*Paddleboats, canoes and sailing boats apparently are shared between "Lykia Botanica & Fun Club" and "Majesty Club Tuana", ** No records

The number of sunbeds at the "Majesty Club Tuana" beach has not decreased from 2009 to 2010, while sun pavilions are now replacing parasols. (Fig. 8a & 8b)

Tab. 3: Type and number of beach facilities offered by "Lykia Botanika & Fun Club"
Tab. 3: Art und Anzahl des Freizeit- und Strandangebots von "Lykia Botanika & Fun Club"

Facilities	**Number (2003)**	**Number (2004)**	**Number (2005)**	**Number (2006)**	**Number (2007)**	**Number (2008)**	**Number (2009)**	**Number (2010)**
Sun beds	151	144	150	153	134	191	157	157
Parasols	42	41	22	40	45	53	34	80
Paddleboats*	*	*	*	2	**	2	2	**
Canoes*	*	*	*	7	**	4	4	**
Sailing boats*	*	*	*	2	**	0	0	**
Motorboats	*	*	*	*	**	0	1	1
Jetskis	*	*	*	*	**	0	2	**

* Paddleboats, canoes and sailing boats and motorboats apparently are shared between "Lykia Botanica & Fun Club" and "Majesty Club Tuana" (see report 2008)

** No records

The number of sun beds at the "Lykia Botanika" did not rise, while the 34 parasols of 2009 were replaced by 80 canopies (Fig. 7b).

Tab. 4: Type and number of facilities offered by “Buffet-Restaurant”
Tab. 4: Art und Anzahl des Strandangebots vom Restaurant

Facilities	Number (2009)	Number (2010)
Sun beds	14	15
Tables	2	2
Parasols	5	7

The number of sunbeds and parasols at the “Buffet-Restaurant” has also increased slightly. (Fig.18).

Tab.6: Type and number of beach facilities offered by “Karatas beach bar”
Tab.6: Art und Anzahl des Strandangebots von der “Karatas Beach Bar”

Facilities	Number (2010)
Sun beds	18
Tables	0
Parasols	1

Another clearly visible change was the broadening of the pier of Lykia Botanika & Fun Club (Fig. 7).

A new development in 2010 was a report of suspicious boats in the night. After spotting the boats, eyewitnesses heard a loud bang and also saw light flashes in the water. On the next morning many dead fish were found on the shore. This is strong evidence for dynamite fishing.

An ongoing problem is the use of Akgöl beach as a free camping place (Fig.10). This year we found one nest inside of a new volley ball court on the beach (YS39) and one next to it (Y9), close to the Karatas beach bar (Fig. 11). In Akgöl there was not only the problem of too many sunbeds in front of one restaurant, but also beanbags filled with polystyrene. Some were damaged and so the polystyrene particles were blown all over the beach (Fig. 12). Another problem is the light pollution at the beach areas near hotels and bars, especially the newly added lights on the pier of Lykia Botanica (Fig. 20).

DISCUSSION

Although the construction of fences and other barriers were not very successful, the ditches were very effective. Digging ditches should be done in every year of the sea turtle project, at the beginning because they showed their positive potential. One problem is that the ditches do

not last long: visitors try to drive over them to get on the beach, although it is a Special Protected Area. Interestingly, Turkish visitors help to dig the ditches (Fig.13) but knowledge about the prohibition of driving on the beach seemed to be non-existent. The complete absence of signs that designate this beach as a Special Protected Area can explain this situation and is not beneficial for the protection of sea turtles. Communication barriers between the Turkish visitors and the Austrian students did not simplify matters.

One solution for this problem would be for a Turkish student to be stationed at the Yaniklar camp. One problem with building barriers between the parking area and the beach is that people occasionally have to pay money to park near the beach and so they expect to have a beachfront spot with a view of the sea. It is crucial to prevent that in order to keep the cars from driving over the nests and destroying them. This might also be the reason why the number of tracks counted this year does not match the number of empty shells (Tab. 5). Moreover, the hatchlings are disoriented by the tire tracks, which hinder them from reaching the water (Fig. 14a & 14b).

Either the complete area must be closed for all cars or better designated parking areas must be created away from the beach. Another solution would be to dig ditches with a caterpillar or construct other more permanent barriers. It would also be important to remove the trees on the beach to enlarge nest space for the turtles.

This year more nests than on an average were found at the end of Akgöl beach. This could be caused by the camping areas and hotels in other parts of Akgöl and in adjoining Yaniklar beach, where the female turtles could feel disturbed by lights, humans, fires at night, light and sound pollution. In some places it has become harder to dig nest because of the many trees, as seen on Fig. 20a, and because of the sunbeds wooden pallets on the sand. These areas are dangerous for small hatchlings. So, Akgöl beach is probably increasingly attractive for the female loggerhead turtles: there less human disturbance even though some parts are used as a camping area. Hatchlings have better chances to reach the sea because it is more natural than the other beach areas with larger hotels and camps. This can also be seen in the drawn map of Yaniklar beach (Fig. 21).

The stray dogs should be kept away from the beaches because they are the main group of predators in the backzone of Yaniklar beach (Fig.9a & 9b). Crabs also play a role as a predator in the far end of the beach (Fig. 15).

The coast guard was never seen to do anything against the fishermen's use of dynamite. The fishing with small nets a short distance away from the shore should also be prohibited, because some hatchlings do not reach the water until the late morning. (Fig. 16a & 16b)

The sunbeds, parasols and beanbags should be prohibited because they pose a threat to both adult and baby sea turtles.

CONCLUSION

Over the past years the sea-turtle project has proven to be effective and important for the protection of *Caretta caretta.* It may have some influence on the local residents.

They know that the students come every summer and they know that the condition of the beach is being monitored. Digging ditches to prevent car access is one of the most visible signs of our presence because people can actually see that the project is tackling bad habits such as parking on the beach.

The sea turtle project of the University of Vienna needs to be continued over the next few years in order to prevent the hatching rate and the number of nests from decreasing.

Fig.1: Ditch and mount for separating parking area from beach (Photo: M. Stachowitsch)
Abb.1: Graben und Wall zur Trennung des Parkbereichs vom Strand

Fig.2a: “Stone barrier” for separating parking area from beach (Photo: K. Bartz)
Abb.2a: Wall zur Trennung des Parkbereichs vom Strand

Fig.2b: Mound flattened by visitors shortly after construction (Photo: K. Bartz)
Abb.2b: Wall nach Zerstörung durch Strandbesucher

Fig.3a: Pallet walkway in front of the Gün Batimi Restaurant (Photo: M. Stachowitsch)
Abb.3a: Amateursteg vor dem Restaurant Gün Batimi

Fig.3b: Old pallets removed from walkway in front of the Gün Batimi (Photo: M.Stachowitsch)
Abb.3b: Amateursteg des Gün Batimi Restaurants wird entfernt

Fig.4a: Fence made of natural products (Photo: K. Bartz)
Abb.4a: Zaun aus Paletten des Amateursteges und Naturprodukten

Fig.4b: Fence a few hours later (Photo: M. Stachowitsch)
Abb.4b:Zaun einige Stunden nach Fertigstellung

Fig.5a: Akgöl beach before digging the ditches (Photo: M. Stachowitsch)
Abb.5a: Befahrener Strand vor Errichtung der Gräben

Fig.5b: End of Akgöl beach after digging the ditches (Photo: M. Stachowitsch)
Abb.5b: Strand von Akgöl nach Errichtung der Gräben

Fig.5c: End of Akgöl beach after digging the ditches (Photo: M. Stachowitsch)
Abb.5c: Strand von Akgöl nach Errichtung der Gräben

Fig.6: Partially filled ditches before departure of the last sea turtle project team (Photo: M. Ritzbauer)
Abb.6: Teilweise verschütteter Graben vor Abreise des letzten Sea Turtle Project Teams

Fig.7a: Pier of the “Lykia Botanika & Fun Club” (Photo: M. Stachowitsch)
Abb.7a: Steg des „Lykia Botanika & Fun Clubs”

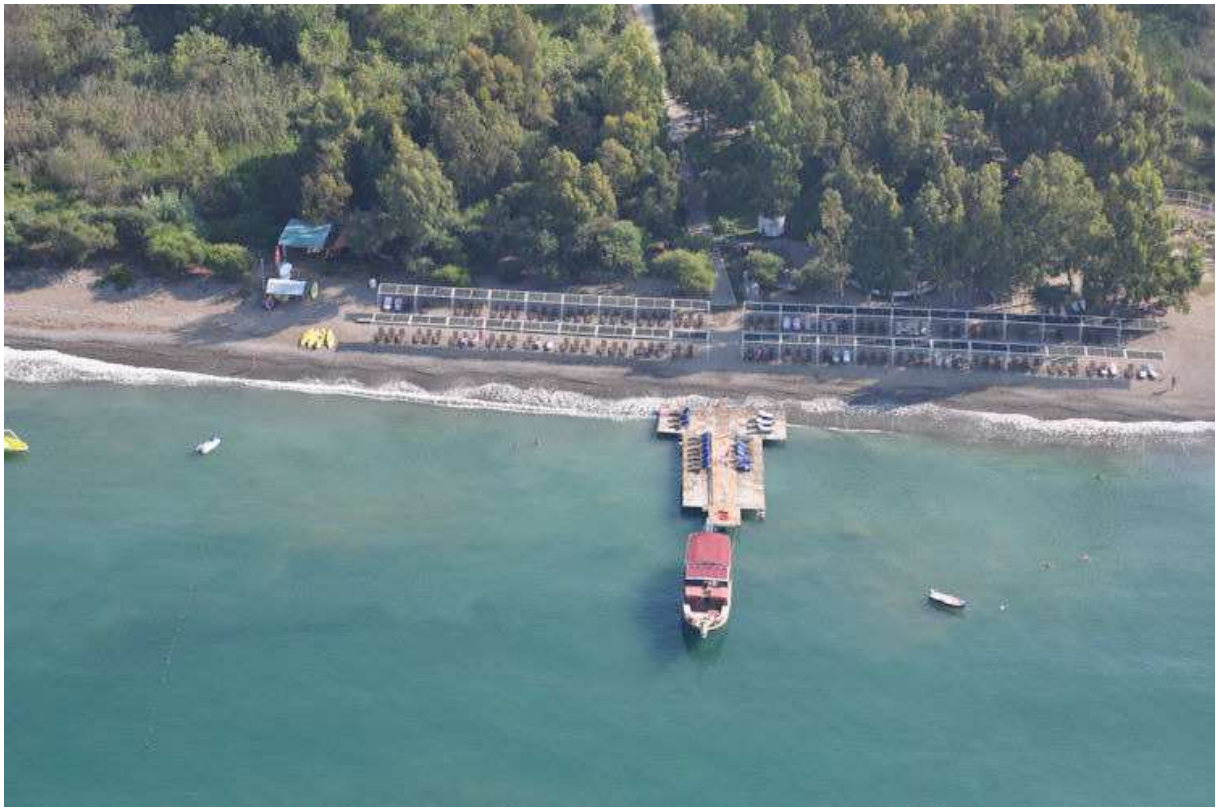

Fig.7b: Pier of the “Lykia Botanika & Fun Club“(Photo: Michael Stachowitsch)
Abb.7b: Steg des „Lykia Botanika & Fun Clubs”

Fig.7: Beanbags in Akgöl (Photo: Michael Stachowitsch)

Fig.9a: A dog at Yaniklar beach, digging up something (Photo: M. Stachowitsch)
Abb.9a: Ein Hund vom Strand von Yaniklar, der gerade etwas ausgräbt

Fig.10: Free camper in Akgöl (Photo: M. Stachowitsch)
Abb.10: Camper(unerlaubterweise) am Akgöl Strand

Fig.11: Volleyball court in front of the Caretta beach bar with nest (YS 39) (Photo: M. Stachowitsch)
Abb.11:Volleyballfeld vor Caretta Beach Bar, mit Nest (YS 39)

Fig.13: Helpful Turkish visitor during the ditch digging campaign (Photo: M. Stachowitsch)
Abb.13: Hilfsbereiter türkischer Einwohner, während der „Grabenaktion“

Fig.14: Tracks of quads and cars next to a nest in Akgöl (Photo: Michael Stachowitsch)
Abb.14: Quad und PKW Spuren, in unmittelbarer Nähe eines Nests in Akgöl

Fig.14a: Tracks of quads and cars entering beach in Akgöl (Photo: Michael Stachowitsch)
Abb.14a: Quad und PKW Spuren, die auf den Strand von Akgöl führen

Fig.15: Hole from a crab at the end of Akgöl beach with hatchling tracks (Photo: M. Stachowitsch)
Abb.15: Krabbenlöcher und Hatchling Tracks am Strand von Akgöl

Fig.16a: Fishermen working from a small boat near the shore of Akgöl (Photo: M. Stachowitsch)
Abb.16a: Fischer auf einem kleinen Boot im Uferbereich von Akgöl

Fig.16b: Fishermen working from the beach of Akgöl
Abb.16b: Fischer im Uferbereich von Akgöl

Fig. 8a: Sun pavilion and walkway of “Majesty Club Tuana” (Photo: M. Stachowitsch)
Abb. 8a: Sonnenpavillon und Steg des „Majesty Clubs Tuana“

Fig. 8b: Sun pavilion and pier of “Majesty Club Tuana” (Photo: M. Stachowitsch)
Abb. 8b: Sonnenpavillon und Steg des „Majesty Clubs Tuana“

Fig.18: “Buffet – Restaurant” Akmaz (Photo: M. Stachowitsch)
Abb.18: „Buffet- Restaurant“ Akmaz

Fig.19: “Caretta beach bar” (Photo: M. Stachowitsch)
Abb.19: „Caretta Beach Bar“

Fig.20: Light pollution on the pier of “Lykia Botanika & Fun Club” (Photo: M. Stachowitsch)
Abb.20: Lichtverschmutzung am Steg von „Lykia Botanika & Fun Club”

Fig.20: “Onur” Camp from the air (Photo: Michael Stachowitsch)
Abb.20: Aufnahme des Campingplatzes „Onur“

Dead turtles at Yaniklar and Çaliş beach 2010

Elisa Burtscher, Franziska Eibenberger

KURZFASSUNG

Im Sommer 2010 wurden zwei tote Schildkröten am Strand von Yaniklar und Çaliş gefunden. Ein Individuum gehörte der Meeresschilkrötenart *Caretta caretta*, die andere der Art *Trionyx triunguis* an. Beide Individuen waren adulte Tiere und wiesen Verletzungen auf. Von den ProjektteilnehmerInnen wurden Körperdaten der gefunden toten Tiere aufgenommen und Fotos gemacht. Anhand der Verletzungen wurde versucht auf die Todesursache zu schließen. In den letzten zehn Jahren wurden an den Stränden von Fethiye 25 tote Schildkröten dokumentiert, wobei die Dunkelziffer sicher höher angenommen werden kann. Im Durchschnitt wurden 2,5 tote Schildkröten pro Jahr erfasst.

ABSTRACT

In summer 2010, two dead turtles were found on the beaches of Yaniklar and Çaliş. One individual belonged to the sea turtle species *Caretta caretta,* the other one to *Trionyx triunguis*. Both turtles were adult and showed injuries. The project team measured body proportions and photographed the dead turtles. Furthermore, they tried to determine the cause of death of the turtles based on their injuries. Over the last decade, 25 dead turtles were documented on the beaches of Fethiye, although higher numbers can be assumed.

INTRODUCTION

The human impact on sea turtles is increasing as marine pollution, fishing and boating increases and beaches become more frequently used. Besides the loss of nesting space and sites, the direct or indirect interaction with humans and anthropogenic infrastructure have become key threats to survival of sea turtles, especially during mating and nesting periods (Ernst et al.).

The Mediterranean Sea has become highly overfished over the last century and the fishing industry has collapsed in certain regions and for certain species. For many fishermen this has

meant either the loss of their job or at least a drastic change in their personal living conditions. Sea turtles in fishing areas are often viewed as competitors for fish and are actively killed or passively caught in nets. Another circumstance which causes severe lethal injuries to sea turtles is shipping traffic near the coast (Casale and Maragaritoulis, 2010).

Caretta caretta is classified as endangered and is listed in the International Union for Conservation of Nature Red List of Threatened Species. *Trionyx triunguis* is not listed because the species is considered to have a marginal occurrence in the region, although there are important population refugees in the Dalyan delta and the Dalaman area (Kasparek 1994).

MATERIAL AND METHODS

Sighting reports by local residents and tourists were a major source of information during the monitoring period. Both dead turtles were reported by foreign guests and were examined by members of our team. We measured curved and straight carapace length, estimated age, sex and state of decay, and documented photographically the location and position where the turtle was found and well as its injuries.

RESULTS

The dead *Caretta caretta* was found on 21 July 2010 in a small forest section behind the Yaniklar beach side near the hotel “Botanica”. The body showed an advanced degree of decomposition. We identified the dead turtle as a young female, it was not tagged. The head showed major damage and was concavely deformed. We assume that the turtle was hurt or killed on purpose by a strike on the head and thrown into the woods.


Figure 1: left side, under the carapace of dead *Caretta caretta* (Photo: C. Fellhofer, late July 2010)
Abbildung 1: linke Seite, tote *Caretta caretta*
Figure 2: right side, dead *Caretta caretta* (Photo: E. Burtscher, 31 August 2010)
Abbildung 2: rechte Seite, tote *Caretta caretta*

In the morning shift on 16 August 2010, a dead *Trionyx triunguis* was found at Çaliş beach, which was washed up by the sea. Before the cadaver was removed, the turtle's body proportions were measured and photos were taken. The sex could not be determined. The carapace showed severe damage, most likely caused by contact with a ship propeller.


Figure 3: left side, dead *Trionyx triunguis* in face-down position (Photo: S. Amon, 16. August.2010)
Abbildung 3: linke Seite, tote *Trionyx triunguis* in Bauchlage
Figure 4: right side, dead *Trionyx triunguis* in face-up positon (Photo: S. Amon, 16.August.2010)
Abbildung 4: linke Seite, tote *Trionyx triunguis* in Rückenlage

Figure 5: left side, a flipper skeleton of *Caretta caretta* (Photo: C. Fellhofer, late July 2010)
Abbildung 5: linke Seite, Flossenskelett von *Caretta caretta*
Figure 6: right side, supracaudal part of carapace, *Caretta caretta* (Photo: C. Fellhofer, late July 2010)
Abbildung 6: linke Seite, Supracaudalschild von *Caretta caretta*

Table 1: Dead adult sea turtles found at Fethiye in summer 2010
Tabelle 1: Tote Schildkröten gefunden in Fethiye im Sommer 2010

Turtle	Individual 1 (*Caretta caretta*)	Individual 2 (*Trionyx triunguis*)
date of find	21.07.2010	16.08.2010
site of find	Yaniklar beach	Çaliş beach
sex	female	unknown
SCL (cm)	not measured	91
SCW (cm)	not measured	62
CCL (cm)	64	100
CCW (cm)	57	79
injuries	not determined	big hole on carapace
cause of death	not determined	not determined

Table 2: Dead and severely injured turtles found in Çaliş (C) and Yaniklar (Y) during the last 10 years (f = female, m = male, n.d.= not determined, a = adult, j = juvenile)
Tabelle 2: Tote Schildkröten gefunden in Çaliş (C) und Yaniklar (Y) in den letzten 10 Jahren (f = weiblich, m = männlich, n.d.= nicht aufgenommen, a = adult, j = juvenil)

Year	**Species**	**Site of find**	**Date of find**	**Sex**	**Age**	**Injuries**	**Probable cause of death**
2000	*Caretta caretta* Tagnr. TR035	F	31.07 – 31.08.	f	a	still alive with injuries of the head and carapace	alive! Injured by a blunt object
2001	*Caretta caretta*	C	n.d.	f	a	swallowed a large fish hook	fish hook

Year	Species	Site of find	Date of find	Sex	Age	Injuries	Probable cause of death
2002	*Caretta caretta*	F	n.d.	n.d.	n.d.	very decomposed, age and sex unknown	n.d.
2003	*Caretta caretta*	Y	04.09	m	n.d.	decomposed and gnawed, especially in the skull area	n.d.
	Chelonia mydas	F	n.d.	f	n.d.	bursted carapace; broken flipper	ship propeller
2004	*Chelonia mydas*	C	24.08	m	j	small right hind limb; raw parts on bottom side of throat	caught up in a fisherman's net, drowned
	Caretta caretta	F	end of june	n.d.	n.d.	carapace torn open	ship propeller
2005	no dead turtles recorded						
2006	*Caretta caretta*	C	June	f	a	right hind limb missing, perhaps hereditary	n.d.
	Caretta caretta	C	19.08	f	a	front extremity and eyes missing	n.d.
	Caretta caretta	C	25.08	n.d.	n.d.	back part of body missing	n.d.
	Caretta caretta	Y	July	m	n.d.	head and body skeletonized, hole in skull	ship propeller
	Chelonia mydas	C	September	f	j	one eye missing	n.d.
	Trionyx tringuis	C	August	n.d.	n.d.	no external injuries	n.d.
2007	*Caretta caretta*	C	07.08	m	a	head injuries; decomposed	maybe collision with a boat
	Chelonia mydas	C	05.08	f	j	head injuries; parts of the flipper missing	maybe killed by a human
	Cehlonia mydas	C	02.09	f	j	carapace torn open, injury extending down to the plastron	ship propeller
	Chelonia mydas	F	04.09	m	a	still alive! no external injuries; unable to dive	alive
2008	*Caretta caretta*	Y	02.07.	m	n.d.	scars on top of head, cut on the side of the body, carapace damaged	maybe boat accident
	Caretta caretta	C	04.07.	f	n.d.	n.d.	n.d.
	Caretta caretta	C	15.07.	m	n.d.	fishing line around neck, 80% of carapace missing	n.d.

Year	Species	Site of find	Date of find	Sex	Age	Injuries	Probable cause of death
	Caretta caretta	F	30.07.	n.d.	n.d.	n.d.	
2009	*Caretta caretta*	C	04.08	f	a	Left flipper entangled with a fishing net, fishing hook	n.d.
	Chelonia mydas	C	05.08	f	n.d.	n.d.	n.d.
2010	*Caretta caretta*	Y	21.07	f	a	decomposed	maybe strike on the head
	Trionyx triunguis	C	16.08	n.d.	n.d.	hole in the carapace	ship propeller

DISCUSSION

The number of sea turtles is decreasing worldwide and shows an urgent need for improved conservation programs. The intention is not only to establish new protected refuges to provide space for the turtles, but also to maintain the protected sea and coast areas and keep them free of interference of all kinds.

We assume that neither of the found dead turtles during of our stay died from natural circumstances, but rather were killed by direct influence of humans. Human beings actively shape the sea turtle environment, and strict rules have to be framed to enable the survival of these marine reptiles. These rules shouldn´t exclude but rather include our own life styles, especially those of local residents, to guarantee the future of these animals.

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Table 2 was taken and updated from last year's report.