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SEA TURTLE CONSERVATION AND ALLIED ACTIVITIES WITH COMMUNITY PARTICIPATION AT VELAS, MAHARASHTRA, INDIA

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INTRODUCTION

Velas (17.9588°N, 73.0361°E) is a tiny hamlet in the Mandangad taluka, Ratnagiri District of Maharashtra, India. Velas has an isolated 3km stretch of coast-line dotted by *Casuarina* trees facing the Arabian Sea. A small stream passes through the village to the beach surrounded by dense mangroves which flood in the rainy season.

The secluded, wide beach with offshore sand bars is suitable for olive ridley turtle nesting. The sea turtle breeding and nesting season in Maharashtra lasts from November to April. In Velas, nesting usually occurs from December to the first week of April and accounts for 40% of the nesting in Maharashtra.

SNM AND THE TURTLE FESTIVAL

Sahyadri Nisarga Mitra (SNM), a non-governmental organization, initiated marine turtle conservation along the coast of Maharashtra with the involvement of the local community. Its first onsite olive ridley conservation efforts were carried out in 2002 at Velas (Katdare & Mone, 2003) and now encompasses 36 beaches and 12 villages of Ratnagiri district.

The Turtle Festival was first organised by SNM in 2006 and has occurred every year since then. Local

villagers joined the initiative in 2006 which led to the formation of Kasav Mitra Mandal (KMM), a local club of individuals supporting the conservation in Velas. At present, the local governing body i.e. the Grampanchayat along with KMM the Forest Department, Joint Forest Management Committee (JFM) and Biodiversity Management Committee (BMC) work together for the conservation programme “The Turtle Festival”.

The members of KMM provide homestay arrangements for visitors to the Turtle Festival. Nineteen families initially extended their traditional hospitality wherein they serve home-cooked Maharashtrian style food to the visiting tourists. However, the number has increased to 31 in recent times and the number is expected to increase to 34 in the next year or so. Members of the KMM contribute 10% of the total income to the SNM turtle conservation programme.

One of the major fundamental activities during the Turtle Festival is to check the local hatchery and release emerged hatchlings into the sea. The volunteers of KMM check for hatchlings at 7am and 6pm and new hatchlings are released for tourists to observe. Other activities KMM hosts during the festival are visits to a variety of birdwatching sites in and around Velas via a bullock cart safari. They also project a screening on turtle conservation during the festival followed

by an interactive session with Mr Mohan Upadhye.

The members who actively participate in the Turtle Festival include self-help groups that sell home-made products, *Mahila Bachat Gats*, local villagers and volunteers, all of which are a part of KMM. The Turtle Festival lasts from January to April in which the first three months are considered to be the peak season for egg hatching. The Turtle Festival has a positive impact on the local community as it facilitates new source of income for the local community.

The Turtle Festival is a purely a conservation effort by the local community. The primary goal of the effort is to protect the olive ridley eggs from predation and other natural threats to their survival. The Turtle Festival also focuses on the active participation of the local community and visiting tourists in conservation of sea turtles and to increase the livelihood sources of local villagers

EX-SITU TURTLE CONSERVATION METHOD PRACTISED AT VELAS

SNM volunteers patrol the beach throughout day and night during the nesting season to locate newly laid nests and supervise nests in the hatchery. A hatchery of 8m x 3m

(Katdare & Mone, 2003) is established at Velas, and all the nests laid on its 3km beach are collected and placed in hand-dug egg chambers to protect them from tidal erosion and predators. A galvanised iron mesh fixed to wooden poles fencing surrounds the hatchery to prevent depredation of nests. Wooden batons are numbered to identify individual nests, which are covered with a wicker basket and a piece of jute to reduce predation of hatchlings by birds.

In the 2002/03 nesting season when the conservation programme began at Velas, SNM relocated the 50 olive ridley turtle nests laid on the beach to the hatchery (Figure 1). The number of nests has fluctuated since, with a low of 8 in 2014/15. As female olive ridley turtles reach maturity at about 13 years ranging from 10 to 18 years (Zug *et al*, 2006), SNM hopes that nesting numbers will soon reflect the conservation effort of the past years. The trend of number of eggs produced (Figure 2) follows that of number of nests laid. Emergence success also fluctuates over time, with a high of 64% in 2015/16 and low of 30% in 2006/07.

BEACH RULES AND RESTRICTIONS PRACTISED AT VELAS

Restricted facilities for tourists: To promote the conservation of sea turtles, the use of tents, umbrellas,

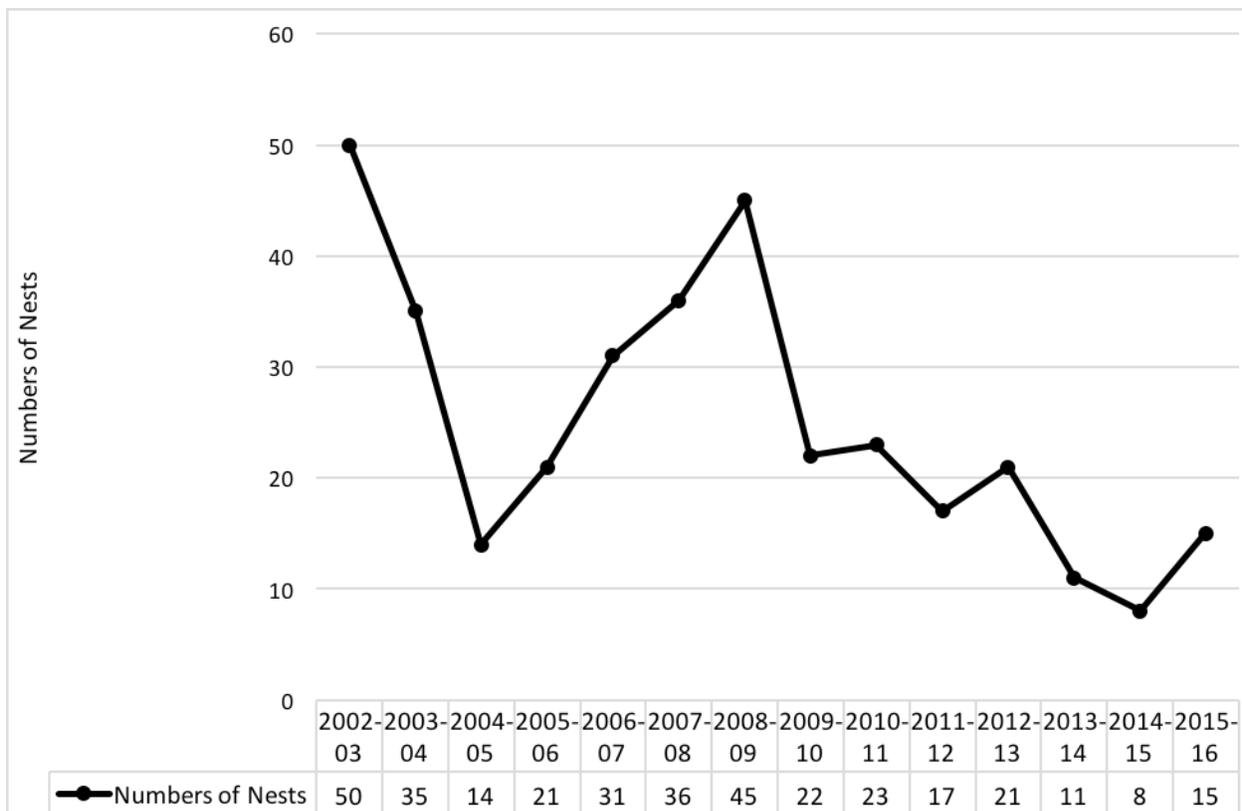


Figure 1. Number of olive ridley turtle nests from 2002-2016 at Velas Beach. (Source: SNM)

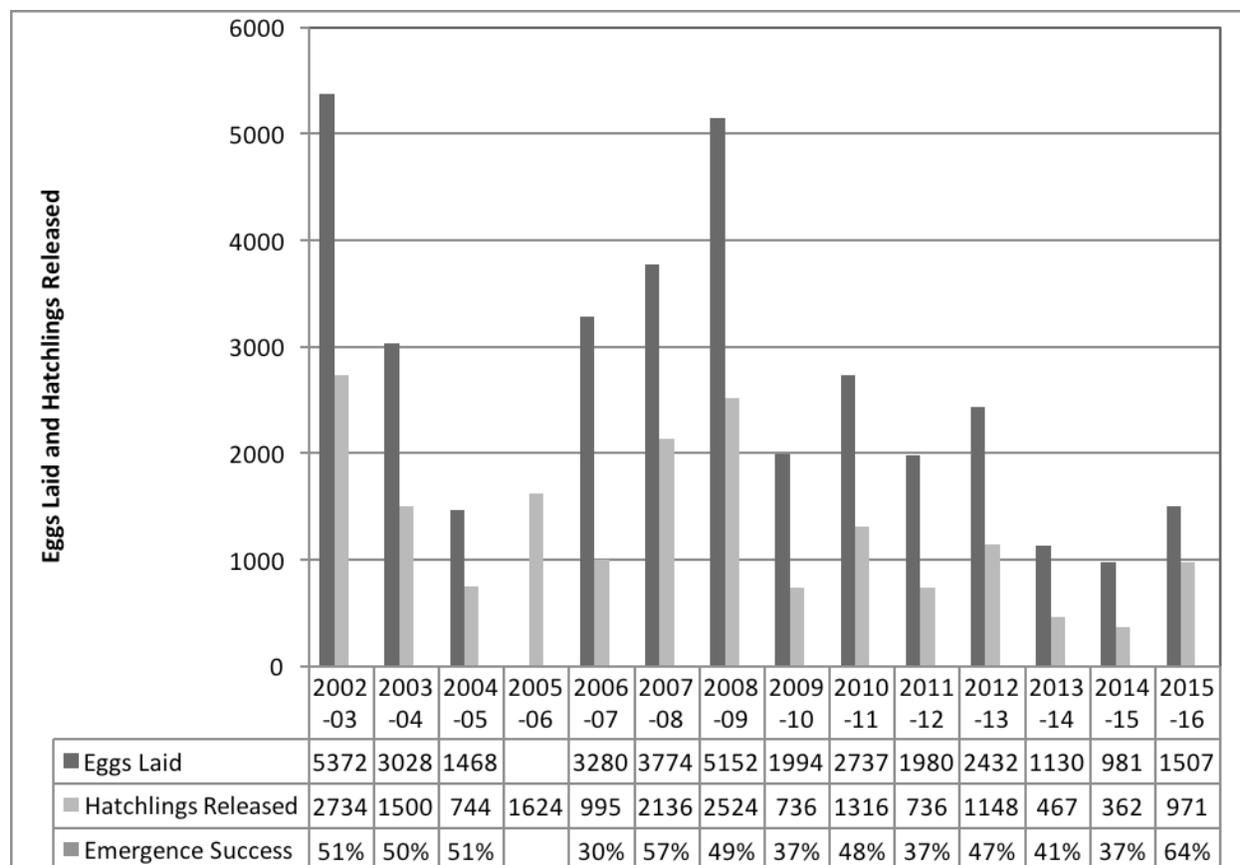


Figure 2. Eggs incubated and hatchlings released from hatcheries at Velas Beach 2002-2016. Note: 2005/06 data is not available. (Source: SNM and Forest Department).

canopies, beach chairs, sun beds at the beach is restricted as such structures can stop female turtle from reaching suitable nesting location and/or effect the nest temperature due to shading (Shenoy *et al.*, 2011). There are no accommodation facilities on the beach.

Also, the local governing body (Gram Panchayat) has recently prohibited the use and sale of thermocol plates and cups and is planning to ban the use of all plastic materials on the beach in the upcoming year.

Informal fishing ban: Before the conservation programme was in action, local fishermen used to fish during the nesting season, with purse seine, trawl, gill and cast nets in addition to hook and line gear. Turtles were entangled, drowned, bruised, killed or maimed after interactions with such gear and this was duly noted by SNM, resulting in an informal ban on fishing during the nesting season. The fishermen are provided with an alternative location (Harnai) to fish at a distance from the nesting beach.

No coastal illumination: Artificial light poses a threat to the turtles which rely solely on their visual stimuli

for finding a route to the sea; they orient using the brightness of open seaward horizon and the illumination appearing from the reflection of stars and the moonlight on water. Artificial lighting on the beach and adjacent habitat create results in poor orientation and the same can happen to adult female sea turtles as they try to return back to the sea after nesting. Disoriented turtles still on land during the day may die by dehydration, predators, exhaustion and other such similar factors (Shenoy *et al.*, 2011). Thus, it is imperative to bar any sort of artificial lighting on the beach in order to facilitate an efficient conservation programme. Keeping this in mind, SNM jointly with the Forest Department and Gram Panchayat of Velas has taken crucial steps to make sure that no artificial lighting is installed on the entire beach and on the approach road as well. A 'No coastal illumination, water or sand sports' resolution was passed in 2012-13 to help create an undisturbed habitat for the incubation of turtle nests and hatching of baby turtles.

No water sports: The boats used for water sports are mainly propeller driven and may injure turtles who visit the beach for nesting purposes. The loud

noise of the propeller under the sea may deter the turtles from arriving at the beach. Hence, no water sports are allowed during the turtle nesting season.

No sand sports allowed: Sports like sand biking, paragliding, and beach volleyball causes sand to become compacted which causes difficulty for the sea turtles when nesting. Sea turtles lay their eggs at an optimal depth by digging a nest with their hind limbs, so hard sand requires more effort to dig which may result in reduced depth of excavation and sub-optimal incubation conditions. Sand sports may also uproots and-binding plants and result in sand erosion, and so are banned.

Although the conservation programme is at its peak and every possible effort is taken to conserve and save as many turtles as possible, last year there were a total of eight turtles found dead due to a variety of reasons which could be avoided if the following recommendations are adopted.

Recommendations:

- 1. Tag sea turtles:** Permanently marking individuals with flipper tags will give useful insight into the biology of sea turtles nesting at Velas, including reproductive biology, growth, population size, and migration. In conjunction with more extensive field surveys, data to determine the number of clutches per season and the estimated number of nesting females per season could more easily be collected
- 2. Carry out field survey seasonally on nesting beach habitat:** Field survey on nesting beach habitat could help us understand the factors that affect turtle nesting success, nest hatching success and hatchling emergence success and also enable specific recommendations to safeguard olive ridley turtles and their habitat (Anonymous, 1997).
- 3. Monitor hatchling sex ratio:** There are no previous records of hatchling sex ratios at this location hence it is highly recommended to do so. Calculating hatchling sex ratios can help determine potential dynamics in reproductive ecology and reasons of fluctuating numbers of nesting females (Wibbels, 2003) as well as provide a baseline against which to compare the outcomes of management techniques (e.g. hatcheries) which may influence sea turtle populations (Godfrey & Mrosovsky, 1999).
- 4. Replace *Casuarina* trees:** Pandav *et al.* (2006) found that *Casuarina* tree plantations are responsible for changes in the beach terrain with their permeated roots and litter which may impact the success of

sea turtle nests, but the trees also provide shelter to animals like jackals and hyenas which feed on sea turtle eggs. Mohanty (2002) reported that formation of sand dunes is greatly hindered due to *Casuarina* plantations, which ultimately leads to coastal erosion and in some cases total elimination of dunes (e.g. Orissa coast). Awale and Phillott (2014) also give valuable insights on the devastating effects of *Casuarina* spp. on factors including beach ecology, nesting habitat, and nest temperature leading to changes in the sex ratio of hatchling sea turtles. They suggest beaches be vegetated with native plant species such as neem, coconut, *banyan*, fig, *jamun*, bakul, *peepal* etc. instead of tropical plant species like *Casuarina* spp.

- 5. Fishing and other vessels:** A resolution of the fishing ban should be passed in order to prevent entanglement of female sea turtles in fishing nets during the breeding and nesting season, and the use of turtle excluder devices (TEDs) should be strictly monitored and regulated. Barges from coal-based mining activities should follow routes that do not disturb nesting females coming to the shore.

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DIARY OF THE SSTCN CHENNAI TURTLE SEASON JANUARY – APRIL 2016

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INTRODUCTION

As the Student Sea Turtle Conservation Network (SSTCN) looks back at the season just gone by in Chennai, Tamil Nadu, the primary feeling is that it was a muted one and also shorter as it ended a couple of weeks earlier than usual. In comparison, the last few years had been big, both in terms of the number of nests and in the number of dead turtles encountered! In one of our early walks this season, a fisherman told us that they were spotting many dead turtles in the sea and it would not be long before these washed ashore. We counted more than 300 stranded and dead turtles in the 2015 season and hoped not to experience another such year. Fortunately, we encountered only 85 dead adult turtles this season. While it is still a big number, it was only a third of the number of dead turtles found in the last few years. However, we also found far fewer nests, suggesting fewer nesting olive ridley turtles than in 2015.

Number of nests

We have been averaging around 100 nests per season in our southern stretch of beach, extending from Neelangarai to the Adyar River, close to the Besant Nagar beach. This year we found only 51 nests on this stretch.

In our northern stretch of beach extending from Adyar River Creek to the Cooum River, popularly referred as the Marina Beach, we found around 110 nests where we usually find between 150 and 180. In all, we ended the season with 175 nests, 75 fewer than last year and 73 less than 2014. All the nests were relocated, 101 into the two SSTCN hatcheries and 74 to the Forest Department hatchery. The two SSTCN hatcheries are set up on either side of the Adyar estuary, one to cover Besant Nagar stretch and the other to cover the Marina beach. The Forest Department hatchery was set up about 50 meters from the SSTCN hatchery on the Besant Nagar side.

Working with the Forest Department

The Forest Department and SSTCN have been co-patrolling these beaches for the past two years. We tried patrolling at different hours of the night to maximise nest collection last year, but that resulted in confusion between the two organisations. This year we divided the northern stretch into two parts and each did one stretch with the other providing back up support when required. This arrangement worked better as there was no confusion or overlap in terms of time. The Forest Department hatchery was built close to ours so that volunteers and care takers could monitor