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Wildlife Institute of India

No. WII/RTI/CPIO/2022-23 (Qtr-III)/50

Date: 30 November, 2022

To,

Ms. Sriraksha V Srivatsav
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Maandhinaicker tho, Ramapuram, Chennai, Pin:600089
Email: sriraksha.v.srivatsav@gmail.com

Sub.: Information under RTI Act, 2005–reg.

Ref.: Your Online RTI No. WLIOI/R/E/22/00048 dated 17/10/2022

Sir,

Please refer to your application cited above under RTI Act, 2005. In this context, the information sought by you has been collected from concerned authority of the Institute (**Appendix-I**) and due to big size of reports are being sent to you separately through email.

If you are not satisfied with the above reply, you may appeal to the Appellate Authority of Wildlife Institute of India, Dehradun.

Thanking you,

Yours faithfully,

(M.M. Uniyal)
N.O. & CPIO

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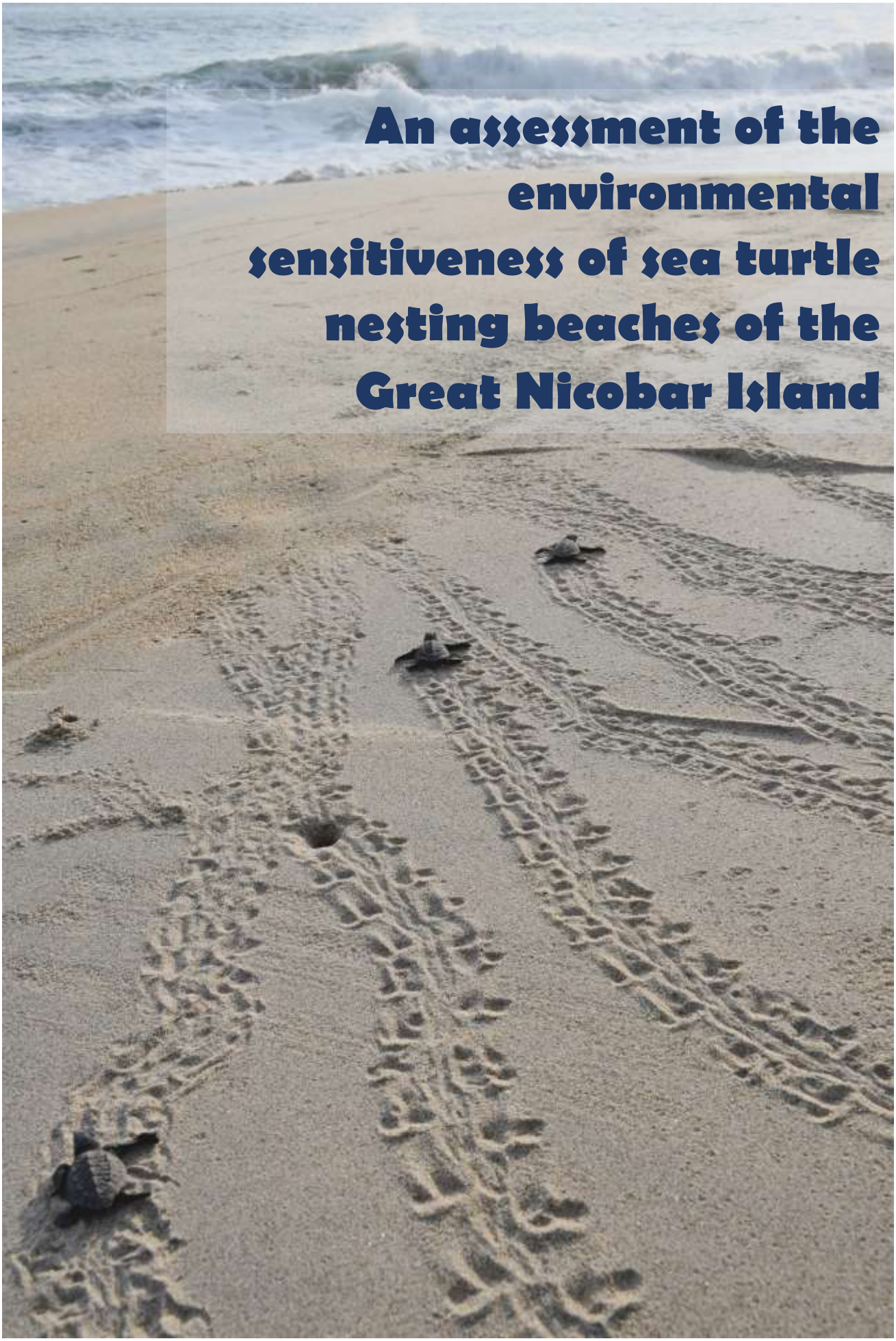

An assessment of the environmental sensitiveness of sea turtle nesting beaches of the Great Nicobar Island

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The secondary information presented in the document are sourced from published literatures, WII, ZSI and A &N Forest Department. WII acknowledges all concerned for the same.

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

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- **K. Sivakumar**

Contents

Introduction

The Andaman and Nicobar Islands in the Bay of Bengal arch from Arakan Yoma in Mayanmar in the north to Sumatra in Indonesia in the south. The Andaman group has more than 325 islands (21 inhabited) covering 6,408 sq km, and the Nicobar group has over 23 islands (12 inhabited) with an area of 1,841 sq. km. Nicobars are one of the four biodiversity hotspots of India. The Nicobar Islands can be subdivided into three distinct subgroups; the south lies the Great Nicobar group consisting of two islands over 100 km^2 in area, nine islets less than five km^2 in area, and a few rocks. Great Nicobar, Little Nicobar, Kondul and Pilo Milo are inhabited. Meroe, Treis, Trax, Menchal, Megapod, Cabra and Pigeon are uninhabited islets. The shore line of Nicobar Islands are endowed with varied landscapes such as rocky shore, sandy beaches, backwaters, bays, lagoons, mangrove forests and coral reefs. To the interior most of the islands have undulating terrain with the main ridges running north-south, falling steeply and irregularly on both sides to the floor of the Bay of Bengal and the Andaman sea. The Great Nicobar groups is significantly more hilly than the Nancowry group, with the hight peak, Mt. Thullier at 670 MSL.

The soil shows considerable variability from heavy clay, loams, gravelly loams, sandy loam and sand. The depth of soil depends on the slope, with deep alluvial deposits often found along the lower reaches of the creeks. The soil lacks humus due to continuous leaching by heavy rainfall.

Four Islands in the Nicobar group have areas protected as wildlife preserves, and all islands are tribal reserves. Tillanchong and Batti Malv islands are Wildlife Sanctuaries. Great Nicobar has two National Parks (536 km^2) and is also a Biosphere Reserve (885 km^2), whose core areas are the National Parks.

The vegetation and the floristic composition of the Car Nicobar group, Nancowry and Great Nicobar groups of islands differ from one another. In general the vegetation of the Nicobar Islands can be classified into six groups: Marine vegetation, beach vegetation, tidal mangrove forest, inland evergreen forests, patches of deciduous forest and grass land and open vegetation. The beach forests or the dune forests are restricted to the beaches of fine calcareous sand which stretch along the shores. Creepers that mark the beginning of beach vegetation are *Ipomoea per-caprae, Vigna retusa, Ischaemum muticum, Phyla nodiflora* and herbs like *Acalypha indica* etc. *Scaevola frutescens* is the immediate successor to these plants. *Tournefortia argentina* is a large shrub with silvery pubescent leaves and is very common in Great Nicobar Island.

Pandanus leram, Pandanus tectorius and *Pandanus furcatus* grow luxuriantly in this coastal forest.

Mangrove forests are found in patches of varying sizes in most islands. The dominant species present in this mangrove forests are *Rhizophora mucronata*, *Bruguiera gymnorrhiza*, *Excoecaria agallocha, Carallia brachiata, Sonneratia acida, Timonius jambosella* and *Nipa fruticans*.

The Great Nicobar Island, which is located between 6o45' N - 7o15' N, and 93°38' E - 93°55' E. The total area of the island is 973 km^2 with five perennial rivers and five hill ranges. The highest point is Mt Thullier (670 MSL). South Bay or Galathea Bay is located near to the Indira Point, which is the southernmost point of India.

The island is exposed to both south-west and north-east monsoons, with an average rainfall of 200 cm. The bulk of the rainfall comes during the southwest monsoon, and the wettest months are August to November, while the driest months are February and March when less than 5 cm of rainfall is received. The climate is humid, tropical-coastal due to its proximity to the equator. The average temperature varies from 25.5°C and 34.4°C. The average relative humidity is 80.8% and seldom goes below 70%. The islands get northeast wind from November to January and southwest from May to October. Cyclones sometimes bring huge devastation, endangering life.

Two groups of indigenous communities inhabit Great Nicobar. The Shompen, who now number less than 150, are a semi-nomadic tribe who inhabit the forests of the central uplands. It is probable that they were pushed into inaccessible areas by the Nicobarese who have several settlements along the coast. The Nicobarese constitute the largest tribal group in the islands.

The Government's vision for holistic development of Great Nicobar Island, which inter alia envisages the sustainable development of Great Nicobar Island, including setting up of Transhipment Port, Airport and a Township. The project is of strategic importance and also significant from the points of view of National Security.

Sea turtles and their habitats in Nicobars

Five of the seven species of marine turtles found worldwide are reported to occur in Indian coastal waters, of these, four species such as Leatherback, Green sea, Olive Ridley and Hawksbill, nests along the coastline of Andaman and Nicobar islands (Sivakumar, 2002; Namboothri el al. 2012). Andaman and Nicobar Islands have some of the best nesting beaches and foraging grounds for marine turtles in India. A proportion of world's Leatherback turtle population migrates every winter to the off coast of Little Andaman, Little Nicobar and Great Nicobar islands. Most importantly on the beaches of Galathea, Dagmar (Casuarina Bay) and Alexandria in Great Nicobar Island as well as on the beaches of Little Nicobar and Little Andaman. The Leatherback turtle nesting population in Andaman and Nicobar islands forms one of the four large colonies in Indo-Pacific region. Leatherback turtles that nest on the beaches of Andaman Nicobar Islands migrate up to Australia and Africa on either side.

Increased egg predation by wild pigs, domestic and feral dogs, hunting and incidental capture of turtles and fishery related mortality have been widely reported in the islands. Therefore, the Forest Department has already identified all-important sea turtles nesting beaches of islands and continuously monitoring these beaches with a Special Sea Turtle Monitoring and Protection Force (STPF). Andaman administration has also banned sand mining in all turtle nesting beaches in the region. Feral dogs, which pose a great risk to the survival of turtles, were also monitored and regulated. Artificial hatcheries have been established at several nesting sites to protect nests from predation. Further, the department is successful in getting supports of communities and other stakeholders in conservation of sea turtles and their habitats in islands.

In Nicobar district, both Little and Great Nicobar Islands are historically well known for the nesting of leatherbacks. In the Great Nicobar Island, there are nine important turtle nesting beaches, of these, Galathea Bay is one of the three important nesting sites of Leatherback turtles, other two being Casuarina Bay and Alexandria Bay (Sivakumar, 2002). Other beaches are used by multiple species of turtles. Sporadic nesting of leatherback was also reported from Anderson Bay and Shashtri Nagar (ANIFD). About 150 to 500 Leatherback turtles nest at Galathea Bay every year. The 2004 tsunami has adversely affected this species and its nesting areas. But after few years, the species could bounce back that indicates that this species has a good resilience and adaptability for the changes, provided their habitats are protected.

Objective and Background

The Government's vision for holistic development of Great Nicobar Island, which inter alia envisages the sustainable development of Great Nicobar Island, including setting up of Transhipment Port, Airport and a Township. The project is of strategic importance and also significant from the points of view of National Security.

In this context, ANIIDCO after having a meeting with Additional Secretary (UT), MHA, vide its letter No.1-1552/ANIIDCO/Projects/2020-21/1275, dated 9th April, 2021, and with reference to 260th Meeting of EAC of MoEF&CC, had requested WII to undertake a study to assess the environmental sensitivity of the project to suggest most suitable location for the Port. In this context, WII has agreed making a recee inspection visit to the area to study the critical wildlife habitat at Galathea Bay and other parts of Great Nicobar to understand the area and the issues and set the future course of action subject to minutes of the 260th Meeting of EAC, MoEF&CC that was held on 5-6 April, 2021.

In this context, WII has carried out a **rapid assessment** study to understand the biological or ecological significance of five sites identified by ANIIDCO for the port. This study was conducted with aim of assessing the current status of important turtle nesting beaches with special focus on sea turtles especially leatherback. Study was also aimed to assess the status of megapodes and dugong habitats along these beaches.

Methodology

1. In the Andaman and Nicobar islands, the main nesting season for sea turtles is from November to March, therefore, this survey was largely based on sign surveys especially surveying the number of old tracks and nests laid in the season, and also secondary data collected by the Forest Department and other agencies and literature. This survey was carried out from 14th to 19th April, 2021 to understand the current status of beaches with respect to sea turtles nesting in the Great Nicobar Island. Aerial surveys were also carried out using a helicopter for reconnaissance and then all selected beaches visited by foot with six persons and a drone for the detailed survey.

2. Aerial survey. The entire coasts of Great Nicobar Island was surveyed using a helicopter on 15th April, 2021 to select the important beaches for detailed surveys by foot. Helicopter flew at the slower speed at the altitude of 500 m. Based on this survey, Anderson Bay (Joingdar Nagar), Vijay Nagar, Laxmi Nagar, Gandhi Nagar, Shashtri Nagar, Galathea Bay, Pemayya Bay, Alexandria Bay and Casuarina Bay were chosen for further detailed survey. These beaches were chosen largely due to its length and width, and historical reporting of sea turtles nests in these beaches that was based on literature and Forest Department's records. There were also several smaller but potential beaches that are conducive for turtle nesting were seen between Pemayya Bay and Alexandria along the west coast, and between Campbell Bay and Laful along east coast of the Great Nicobar Island.

3. Drone survey: A drone with a special application was used to study the beach profile, geomorphology of the bay, inter-tidal profile and locating old nests. Land-cover of surroundings of the beaches was also studied using the drone. Minimum two flights were made at over each beach at the height of 100 m. Further, one more flight was exclusively used for locating old nests at the height of 50 m. Geo-coded images of drone was later analysed for calculating the beach length, width, inter-tidal width, slope of the beach from the low-tide line. Drone was also used to check the presence of seagrass beds (and dugongs) and coral reefs in the bay areas. Drone also helped us to locate a leatherback nesting at the night on 15th April, 2021 at the Galathea

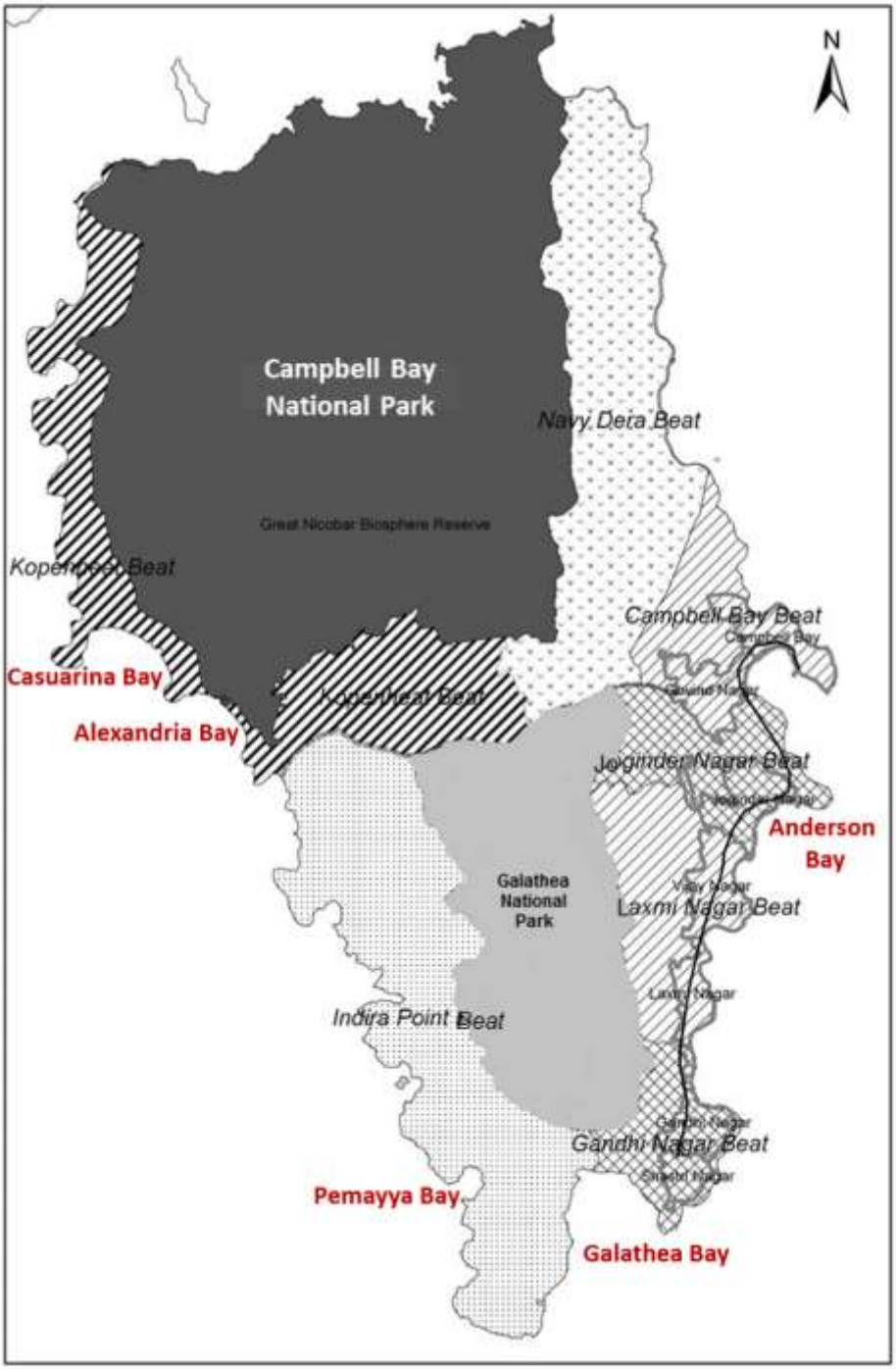
Bay and subsequently, we could observe the entire nesting behaviour of that turtle for about two hours.

4. Foot survey: All selected beaches were surveyed by foot with help of a six members team. Entire beach was walked for locating the old nests of sea turtles and recorded. Old tracks of turtles were identified at species level whenever it could possible. Presence of predators based on indirect evidences were also collected. Soil samples were collected while doing surveys. Beach width and inter-tidal width were measured manually at selected points to reconfirm the drone data. Nearby, coastal forest was surveyed for the presence of megapode mounds. Assessment of abundance of seagrass beds in the bay area using drone was also done. All the beaches were approached from sea with help of the Coast Guard boats and their team members.

5. Night survey: On 15th and 16th April, 2021, the entire Galathea Bay beach was surveyed for sea turtle nestings. Only one leatherback turtle laid eggs on 15th April, 2021 at 11.05 PM. Wild pigs were seen during the night hours on the beaches.

6. Soil grain-size analysis: Soil samples were collected from all nesting beaches to understand the relationship between soil texture profile and species that used for nesting. At each sampling point, soils weighing about 100 grams were collected at high tide line, turtle nesting area and in-between these two points. Multiple sampling points at each beach were fixed at equal distances. Collected samples were air-dried and analysed at the Wildlife Institute of India. A weighed sample of soil material was separated through a series of sieves with progressively smaller openings ((0.13mm, 0.25mm, 0.5mm, 1mm, 2mm). Particle size distribution was determined by weighing the material retained on each of the sieves and dividing these weights by the total weight of the sample. A correction was made for the moisture content of the sample and all calculations were based on dry weight.

Map 1. Important Sea Turtle Nesting Areas of Great Nicobar Island. Casuarina Bay, Alexandria Bay and Galathea Bay are largely used by the Leatherback. Pemayya Bay and Anderson Bay used by multiple species including Leatherback.



Results and Discussion

1. A total of nine beaches viz. Anderson Bay, Vijay Nagar, Laxmi Nagar, Gandhi Nagar, Shashtri Nagar, Galathea Bay, Pemayya Bay, Alexandria Bay and Casuarina Bay (Dagmar) were chosen based on aerial survey for the detailed assessment on the ground. It was found that all these beaches had signs of turtle nesting. Of these, Galathea Bay, Anderson Bay, Pemayya Bay, Alexandria Bay and Casuarina Bay were used by the Leatherback turtles. But, high intensity of turtle nests of leatherback found in Alexandria, Casuarina and Galathea bays (**Table 1 & 2**). Sporadic nesting of leatherbacks on the Pemayya and Anderson bays was also recorded during this survey. However, both Pemayya and Anderson bays were also observed with nesting other species of turtles in high numbers especially the green sea and hawksbill.

2. In 1991-92, more numbers of leatherback turtle nests laid in Alexandria Bay (N=343 nests) than Dagmar Bay (N=171 nests) and the Galathea Bay (N=158 but in 1993-94, leatherback nests reported only from the Galathea Bay (N=237) (**Namboothri, et al., 2012**) (**Table 2**). Further, the Forest Department could establish the turtle monitoring hut just after the tsunami but there was no reporting of Leatherback from 2005 to 2010 at Galathea. The first reporting of leatherback turtle nesting in the Galathea Bay was in 2011, when 146 nests reported (**Namboothri, et al., 2011**) but Jadeja et al. (2016) claimed the first reporting of leatherback nests after tsunami that was in 2015 (**Jadeja, et al., 2016).** Since 2004, beaches along west coast of the Great Nicobar were not monitored for turtle nests till February, 2016. Therefore, it would be difficult to confirm whether the leatherback used other beaches of Great Nicobar for nesting during this 6 years period, when they were not laid eggs at the Galathea Bay. In 2016, more number of leatherback laid in the Galathea Bay than Dagmar and Alexandria. Variations in the nests laid by the leatherback between years could be due to variations in the environmental settings or conduciveness of the beaches for nesting as leatherback known to be having the poor nest site fidelity. It may change the nesting site

temporarily if the environmental settings of the beach is not favourable for nesting (**Kelly et al., 2014)**.

3. Leatherbacks are known to distribute nests up to 460 km apart within a nesting season in Florida, USA (**Kelly et al., 2014**). Therefore, the Leatherbacks appears to have adopted a regional rather than a local optimum for nesting, possibly due to their poor nesting beach fidelity and the frequent erosion and degradation of their nesting beaches (**Kamel and Mrosovsky, 2004; Kelly et al., 2014**). Indian Institute of Science, Dakshin Foundation and ANET have earlier tagged 10 leatherbacks using satellite transmitters from the Little Andaman and monitored for their movements from 2011 to 2014. Of these, one turtle that laid eggs at Little Andaman was observed laying eggs in February, 2021 on the beach of the Galathea Bay, Great Nicobar by ZSI Team (**pers: C. Sivaperuman, ZSI**) that reiterate the weak nesting site fidelity of Leatherback as well as it reveals that the leatherback may distribute nests in different places between years.

4. Increased egg predation by wild pigs, domestic and feral dogs, hunting and incidental capture of turtles and fishery related mortality have been reported in the islands. Therefore, the Forest Department has already identified all-important sea turtles nesting beaches of islands and continuously monitoring some of these beaches with a Special Sea Turtle Monitoring and Protection Force (STPF). Andaman administration has also banned sand mining in all turtle nesting beaches in the region. Feral dogs, which pose a great risk to the survival of turtles, were also monitored and regulated. Artificial hatcheries have been established at several nesting sites (Galathea Bay, Gandhinagar, Vijay nagar and Anderson Bay) to protect turtle eggs predation to enhance nesting success. Further, the department is successful in getting support of communities and other stakeholders in conservation of sea turtles and their habitats in island especially at Anderson Bay, Shashtri Nagar, Gandhi Nagar and Vijay Nagar.

5. Beaches of Galathea Bay is one of the three important nesting sites of Leatherback turtles in Great Nicobar Island, others being at Casuarina Bay and Alexandria Bay (**Sivakumar, K. 2002**). About 150

to 480 Leatherback turtles nest at Galathea Bay every year (ANIFD). The 2004 tsunami has adversely affected this species and its nesting areas. But after few years, the species could bounce back, which indicates that this species has a good resilience and adaptability for the changes, provided their habitats are protected. The information on the post Tsunami use of the other two beaches i.e. Casuarina Bay and Alexandria Bay was not available perhaps owing to lack of monitoring,

6. Soil analysis has revealed that all nine beaches are conducive for sea turtles to nest (**Mortimer, 1990; Kamel and Mrosovsky, 2004; Behera et al., 2013; Kelly et al., 2014)**. However, Casuarina, Alexandria and Galathea beaches had more fine sands than other beaches. These three beaches had more similarities with respect to soil texture, inter-tidal flats, slope and connectivity with perennial rivers and these environmental settings are largely preferred by leatherback to nest in larger numbers (**Table 3**). Pemayya bay, Anderson Bay, Gandhi Nagar and Shahstri nagar bays had moderate slope with moderate inter-tidal flats that are seems to be more conducive environmental settings for other turtle species to nests.

7. Status of threat especially the nest predation was assessed at high level in all beaches that was concurrence with the similar observations made earlier by Swaminathan et al, **(2017)**. Wild pigs were the main predators on the beaches of Casuarina, Alexandria, Pemayya and Galathea but domestic and feral dogs were major predators observed on the other beaches (**Table 3**). More than 85% of nests laid by the leatherback were predated that brought down the success rate of leatherback's nests about 15%, which is a very serious issue that needs to be addressed immediately.

8. Megapode nest mounds were found along the beaches of Casuarina (N=4), Alexandria (N=2), Pemayya (N=2), Galathea (N=1) and Anderson(N=1) (**Map 2 and Table 1**).

9. This short term survey could not find the presence of seagrass beds in the bay areas of these nine beaches. Therefore, the occurrences of dugong in these bays was doubtful.

10. Except the Galathea Bay, coral reefs were found near the all nesting beaches (**Map 2 and Table 1**). But, composition and qualities of these reefs were not studied during this survey owing lack of expertise and to shortage of time.

Table 1. Distribution of sea turtles nests, megapode and dugong at the important beaches/bays of the Great Nicobar.

	Anderson Bay	Vijay Nagar	Laxmi Nagar	Gandhi Nagar	Shashtri Nagar	Galathea Bay	Pemayya Bay	Alexandra Bay	Casuarina Bay
Leatherback	√	√	√	√	√	√	√	√	√
Green Sea	√	√	√	√	√	√	√	√	√
Olive Ridley	√	√	√	√	√	√	√	√	√
Hawksbill	√	√	√	√	√	√	√	√	√
Megapode	√	X	X	X	X	√	√	√	√
Dugong	X	X	X	X	X	X	X	X	X
Coral reefs	√	√	√	√	√	X	√	√	√

Photo: A leatherback turtle covering her nest after laying eggs on 15th April, 2021 in the Galathea Bay, Great Nicobar Island (Photo by K. Sivakumar)

Map 2. Critical wildlife habitats along coastal areas of the Great Nicobar Island (Source: WII, ZSI & Forest Department)

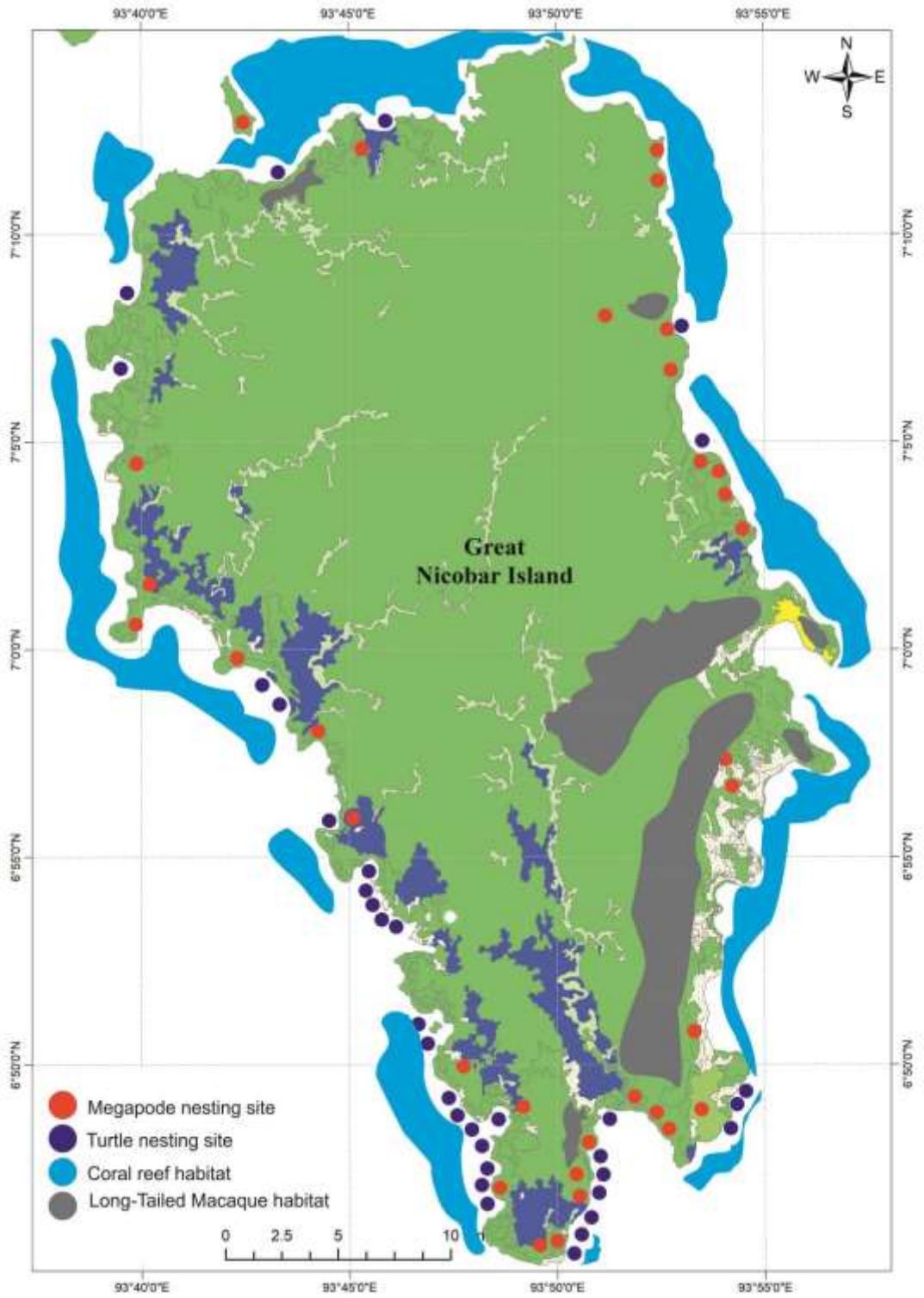


Table 2. Status of Leatherback turtle nests at the important beaches/bays of the Great Nicobar.

Year	Anderson Bay	Vijay Nagar	Laxmi Nagar	Gandhi Nagar	Shashtri Nagar	Galathea Bay	Pemayya Bay	Alexandria Bay	Casuarina Bay
1991-92*	-	-	-	-	-	158	-	343	171
2000-01**	-	-	-	-	-	524	-	866	362
2015-16#	-	-	1	-	-	412	-	66	166
2016-17##	4	-	0	-	4	90	-	-	-
2017-18##	4	-	0	-	0	182	-	-	-
2018-19##	4	-	1	-	0	203	-	-	-
2019-20##	11	-	0	-	0	483	-	-	-
2020-21##	4	-	0	-	0	484	-	-	-

**Namboothri, N., A. Swaminathan & K. Shanker. 2012. A compilation of data from Satish Bhaskar's sea turtle surveys of the Andaman and Nicobar islands. Indian Ocean Turtle Newsletter 16: 4-13.*

***Andrews, H.V., S. Krishnan & P. Biswas. 2006. Distribution and status of marine turtles in the Andaman and Nicobar Islands. In: Marine Turtles of the Indian Subcontinent (eds. Shanker, K. & B.C. Choudhury), pp. 33-57. Universities Press, Hyderabad. India.*

#Swaminathan, A., S. Thesorow, S. Watha, M. Manoharakrishnan, N. Namboothri and M. Chandi. 2017. Current status and distribution of threatened leatherback turtles and their nesting beaches in the Nicobar group of islands. Indian Ocean Turtle Newsletter 25:12-18

Forest Department, Andaman and Nicobar Islands

- Not monitored/surveyed either by Forest Department or by any other experts or organization, but signs of turtle nesting were recorded during this study. Attempt was not made to calculate the total number of nests laid for this season based on existing tracks/nests signs.

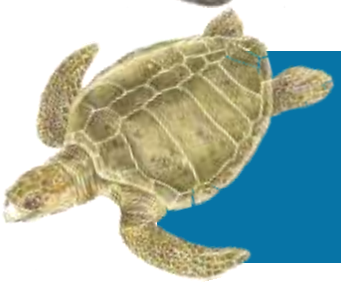
Table 3. Profile of important sea turtle nesting beaches of the Great Nicobar on 14th – 19th April, 2021. Galathea Bay, Casuarina Bay and Alexandria Bay had more fine sands than other beaches.

Beach Profile	Anderson Bay	Vijay Nagar	Laxmi Nagar	Gandhi Nagar	Shashtri Nagar	Galathea Bay	Pemayya Bay	Alexandra Bay	Casuarina Bay
Length	3.5 km	2.8 km	2.4 km	2.5 km	1.2 km	4.5 km	3.0 km	3.2 km	4.2 km
Avg Beach Width*	16 m	15 m	12 m	15 m	15 m	23 m	18 m	20 m	24 m
Beach Slope	Moderate	Steep	Steep	Moderate	Moderate	Gradual	Moderate	Gradual	Gradual
Intertidal Flats width	120 m	40 m	55 m	110 m	120 m	370 m	145 m	360 m	375 m
Sand grain size (2.0 mm)	0.21%	0.26%	0.28%	0.17%	0.29%	0.09%	0.12%	0.11%	0.09%
Sand grain size (1.0 mm)	0.18%	0.18%	0.17%	0.18%	0.16%	1.14%	0.12%	1.14%	1.12%
Sand grain size (0.5 mm)	0.21%	0.14%	0.11%	0.18%	0.18%	3.16%	0.08%	4.11%	3.18%
Sand grain size (0.25 mm)	0.26%	0.21%	0.31%	0.21%	0.22%	3.47%	0.49%	3.48%	3.45%
Sand grain size (0.13 mm)	0.45%	0.15%	0.25%	0.25%	0.36%	1.18%	0.15%	1.12%	1.09%
Perennial Freshwater	-	-	-	-	-	Yes	-	Yes	Yes
Predation	High (Feral dogs)	High (Feral dogs)	High (Feral dogs)	High (Feral dogs)	High (Feral dogs)	High (Wild Pigs and dogs)	High (Wild Pigs)	High (Wild Pigs)	High (Wild Pigs)

* high tide line to vegetation line on 14-19 April, 2021

Leatherback:

- A total of 484 nests recorded in 2020-21
- One of the three important nesting sites of Leatherback turtles in Great Nicobar Island.
- Old signs of five nests of leatherback observed western side of Galathea and one nest on the eastern side of the Galathea river mouth on 15-16 April, 2021. Nesting of one turtle observed on 15th April, 2021 .

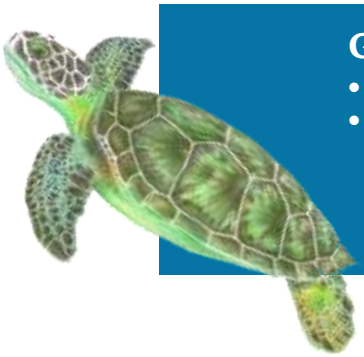


Olive Ridley:

- This species reported to be nesting in the Galathea Bay but there was no record of number of nests laid in the recent past.
- A total of 1182 nests recorded in 9 monitoring years, during 1991-92, 1998-2005 and 2012-13

Hawksbill:

- A total of 17 nests recorded in 2000-2001.
- There was no record of number of nests laid in the recent past.

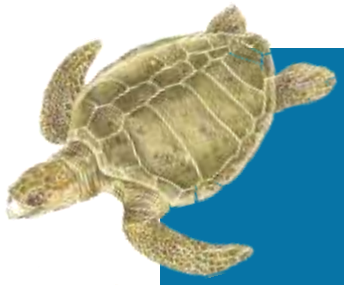


Green Sea:

- Three nests recorded in 1998-99.
- There was no record of number of nests laid in the recent past.

Leatherback:

- Maximum number of nests laid in 2000-01 (N=362) but this beach was not regularly monitored.
- There was no monitoring of this beach for last five years.
- One of the three important nesting sites of Leatherback turtles in Great Nicobar Island.
- Old signs of seven nests of leatherback observed on 18th April, 2021.



Olive Ridley:

- This species reported to be nesting in this each but there was no record of number of nests laid in the recent past.
- A total of 57 nests recorded in 2000-01
- Old signs of one nest observed probably of Olive Ridley.

Hawksbill:

- There was no record of number of nests laid in the recent past.
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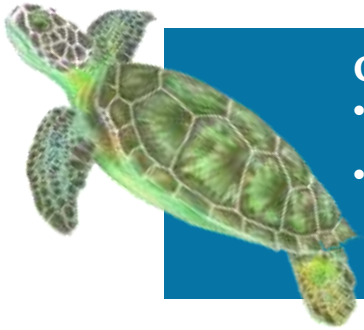


Green Sea:

- There was no record of number of nests laid in the recent past.
- Old signs two nests observed on 18th April, 2021

Alexandria Bay

Leatherback:

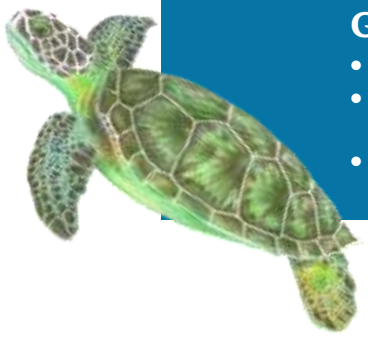
- Maximum number of nests laid in 2000-01 (N=866),which was the highest number of nests reported from any beaches of Andaman and Nicobar islands for leatherbacks but this beach was not regularly monitored.
- There was no monitoring of this beach for last five years.
- One of the three important nesting sites of Leatherback turtles in Great Nicobar Island.

Olive Ridley:

- This species reported to be nesting in this beach but there was no record of number of nests laid.
- A total of 163 nests were recorded in 2000-01.
- Old signs of two nests observed during this survey

Hawksbill:

- There was no monitoring of nesting of this species in the past.
- But, it was reported that this species use this beach for nesting

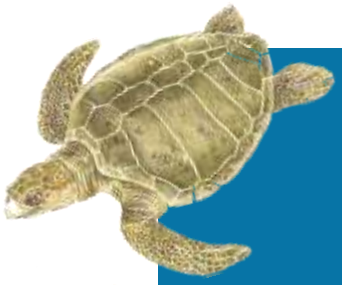


Green Sea:

- Three nests recorded in 1998-99.
- There was no record of number of nests laid in the recent past.
-

Leatherback:

- This beach became more conducive for sea turtles to nest just after tsunami.
- This beach was never monitored in the past.
- Old signs of six nests of leatherback observed on 18th April, 2021.

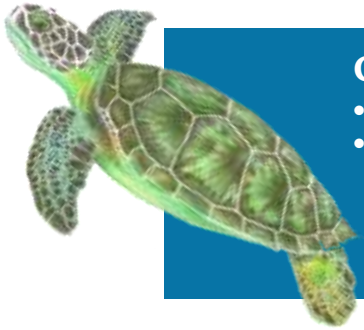


Olive Ridley:

- Old signs of seven nests observed probably of Olive Ridley.
- This beach was never monitored for sea turtles nests in the past as it has became more condusive for turtles after tsunami

Hawksbill:

- There was no record of number of nests laid in the recent past.
- Old signs of two nests probably of this species observed during this survey.

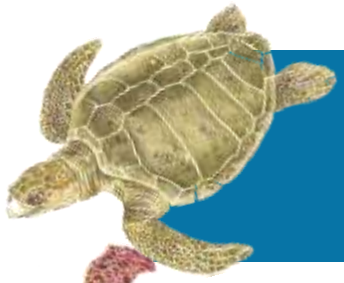


Green Sea:

- Old signs 11 nests observed on 18th April, 2021
- Highest number of nests of Green sea turtles reported from this beach during this survey.

Leatherback:

- Maximum number of nests laid in 2019-20 (N=11), but average of four nests reported every year in the recent past.
- There was no old signs of turtles seen during this survey but two nests were protected inside the artificial hatchery that was managed by the Forest Department.



Olive Ridley:

- About 20 to 70 turtles laid nests every year from 2017 to 2021. Maximum of 71 nests reported in 2017. Forest Department collect the eggs and protect inside the artificial hatchery.

Hawksbill:

- There was no record of number of nests laid in the recent past. But, local people confirmed the sporadic nesting of this species in larger number after tsunami. Further, fishermen confirmed that this species feeds in the adjoining coral reefs

Green Sea:

- Green sea turtles were also reported from this beach Old signs of two nests observed during this survey.

Conclusion & Recommendations

1. In the Great Nicobar Island, a total of nine beaches have been identified as important turtle nesting beaches, of these, five beaches such as Galathea Bay, Casuarina Bay, Alexandria Bay, Pemayya Bay and Anderson Bay were assessed as the most important beaches for sea turtles (**Table 2 & Map 1**). Galathea Bay, Casuarina Bay and Alexandria Bay are important for Leatherback turtles and other two beaches i.e. Anderson Bay and Pemayya Bay were assessed as good for nesting of multiple species especially green sea, hawksbill and olive ridley turtles.

2. Megapode mounds were found along the beaches of Casuarina, Alexandria, Pemayya, Galathea and Anderson bays (**Table 1 & Map 2**).

3. This short term study could not find any dugongs and their seagrass habitats in these five bays during the survey.

4. Except the Galathea Bay, nearby areas of all other important turtle nesting beaches have coral reefs (**Table 1 & Map 2**).

5. Therefore, this rapid assessment study may conclude that all five sites are ecologically or biologically significant sites especially for sea turtles, and may be equally environmentally sensitive for any changes due to development. Coral reefs were not found nearby areas of Galathea bay but it was found in nearby areas of all other bays.

6. Intensity of Leatherback turtle nesting varied between beaches located at Galathea Bay, Casuarina Bay and Alexandria Bay, and it was also varied between years. More number of leatherback turtles laid nests in Alexandria Bay than in Casuarina and Galathea Bay in 1991 and 2001. But in 2015, the Galathea Bay was estimated with higher number of leatherbacks nests (Table 2). There was no reporting of nests from the Galathea Bay between 2004 and 2011.

Just after tsunami, beaches of Galathea Bay were not conducive for turtle to lay eggs as it was inundated and swampy (**Sivakumar, 2010a & 2010c**).

7. There was no monitoring of sea turtles along the west coast including the beaches of Casuarina and Alexandria bays, therefore, it would be difficult to confirm whether leatherback turtles used these beaches for nesting from 2005 to 2011, when they have avoided the Galathea Bay. But, higher numbers of leatherback turtle tracks were seen on the beaches of Casuarina, Alexandria and Pemayya bays during this rapid assessment.

8. Leatherbacks are known to change the nesting sites depending upon the conduciveness and safety of the beaches. A leatherback turtle that laid eggs in the Little Andaman before 2014 was observed laying eggs in the Galathea Bay in February, 2021 that might be due to poor nest site fidelity of this species (**Kamel and Mrosovsky, 2004; Kelly et al., 2014)**. Therefore, it is equally important to monitor, protect and conserve beaches of Casuarina and Alexandria beaches for the long term conservation of leatherback in Andaman and Nicobar Islands.

9. Further, three beaches such as Casuarina, Alexandria and Galathea were observed having more finer soils, and with gentle slope of inter-tidal flat that might probably be helping the gigantic leatherback to reach shore and lay eggs here conveniently. More similarities were also seen in the soil texture of these three beaches with smaller granules. But, other beaches comparatively had larger soil-granules.

10. In overall, more than 85% of leatherback turtle nests were known to be predated in the Great Nicobar (**Swaminathan et al, 2017**) possibly by wild predators such as wild pigs and water monitor lizard especially in Casuarina Bay, Alexandria Bay, Pemayya Bay and Galathea Bay, and domestic and feral dogs in other beaches (**Sivakumar, 2010b**). Therefore, the success rate of leatherback

turtle nests in the Great Nicobar was less than 15% (**Swaminathan et al, 2017**) that needs to be addressed immediately. There is a lot of scope to enhance the success rate of nests up to 90% with a turtle conservation planning.

11. Pemayya Bay, Anderson Bay, Shastri Nagar, Laxi Nagar, Gandhi Nagar and Vijay Nagar bays and nearby areas were observed with coral reefs and mangroves. These beaches were used by multiple species of sea turtles largely by Green sea, Olive Ridley, Hawksbill and fewer leatherbacks. Of these, except Pemayya Bay that is located at west coast, all other beaches are with revenue or private parties, therefore, the beaches located along east coast between Shashtri Nagar and Campbell need to be managed with participation of local communities.

12. Now, the Government's has a vision for holistic development of Great Nicobar Island, which inter alia envisages the sustainable development of Great Nicobar Island, including development of an International Transhipment Terminal. In this context, the Government of Andaman and Nicobar Islands and the Government of India has identified the South Bay (Galathea Bay) as most conducive location for the International Transhipment Terminal as it is of national importance owing to strategic and security reasons.

13. In this context, WII strongly urge the concerned authorities to develop and implement a mitigation plan to facilitate leatherback and other turtles to continuously nest in the Great Nicobar Islands including in the beaches of Galathea Bay for which the connectivity between the Galathea River and the Bay should be ensured.

14. Further, beach between Indira Point and Galathea Bay was also observed with sporadic nesting of leatherback two decades ago (**Sivakumar, 2002**), is now observed with more nests that also needs to be secured and conserved as part of the mitigation measures.

15. Mitigation Plan should also facilitate the establishment of a research centre for marine biodiversity of islands with more focus on sea turtle conservation.

16. WII urge the authorities to establish the camps at Kopenheat, Alexandria and Casuarina bays to monitor and protect the nests of leatherback turtles from predators, which is the most critical conservation action required immediately.

17. Further, the mitigation plan should facilitate the long term conservation of sea turtles in Andaman and Nicobar Islands especially in the Great Nicobar and Little Nicobar islands. The long-term conservation plan is required to monitor, protect and conserve sea turtles and their habitats without disturbing the livelihoods of people especially the indigenous communities of the islands, but that needs to be prepared after a detailed EIA study as envisaged by the EAC of MoEF&CC in its 260th Meeting. In addition, we suggest that that EIA study should also include the satellite tracking of few leatherback turtles from Galathea, Casuarina and Alexandria beaches to understand their movements and nest site fidelity that are critical for the development of mitigation measures.

18. WII has very limited expertise to conduct EIA study covering all aspects of ToR provided by EAC of MoEF&CC in its 260th Meeting as they are very vast and include areas where WII has no expertise., Therefore, this study may be assigned to the Zoological Survey of India as they have a Regional Centre at Port Blair with required expertise and logistics. Further, ZSI has already assessing the status of biodiversity in connection with this project for considerable time. WII would be willing to provide the technical inputs to ZSI to conduct EIA study, if required.

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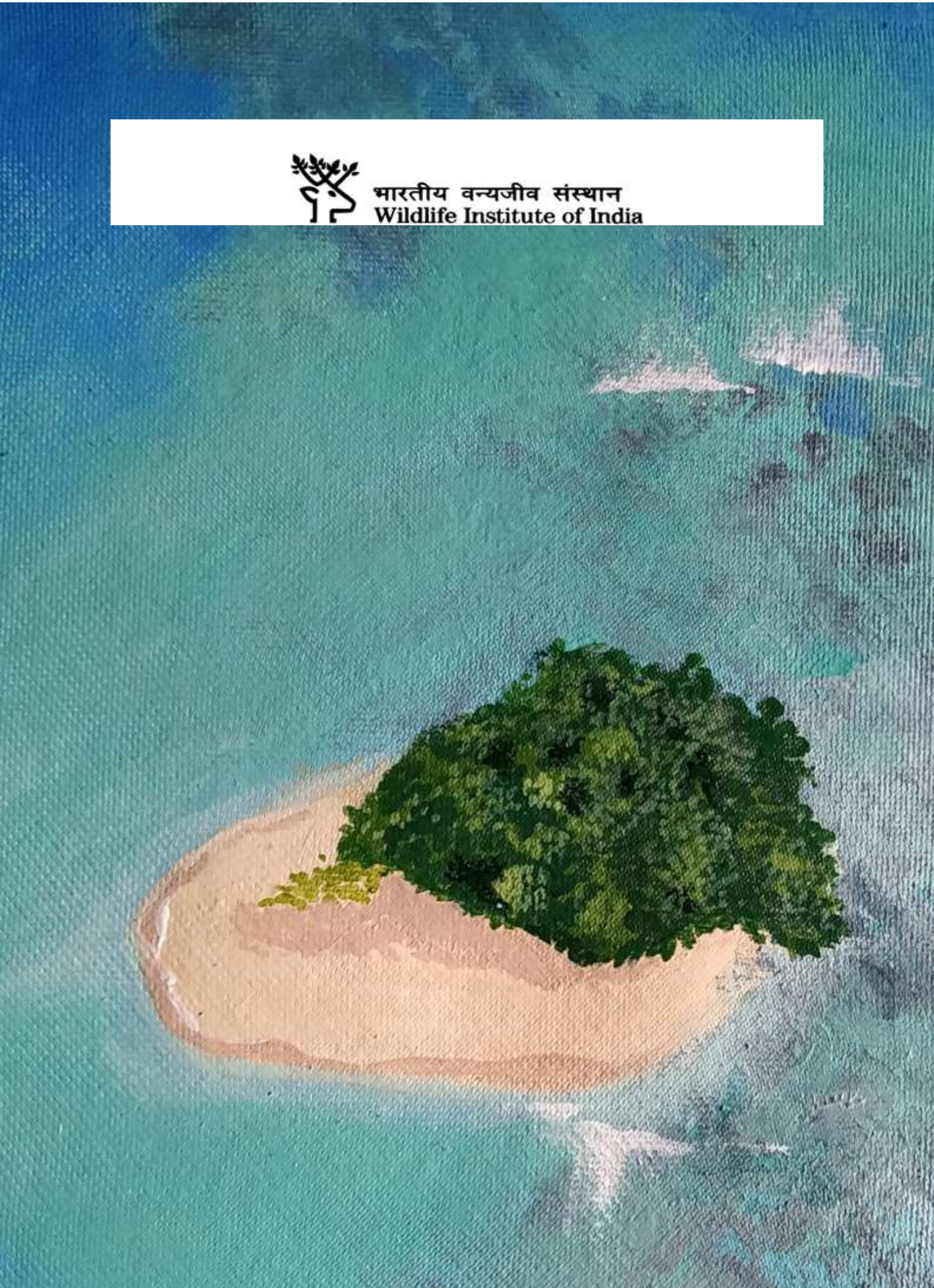
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Wildlife Institute of India

Curriculum Vitae

Prof. K. Sivakumar, *MSc., MPhil., Ph.D.,*

Present Position

Professor
Department of Ecology and Environmental Sciences,
Pondicherry University, India
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Past Position

Scientist F, Head, Department of Endangered Species Management
Wildlife Institute of India, Dehradun, India Email: ksivakumar@wii.gov.in
(From 6th December, 1999 to 14th January, 2022)

Scientist In-Charge

National Centre for Coastal and Marine Biodiversity (2003 to 2008)

Coordinator, Environment Information System (ENVIS) Centre at WII 'Wildlife Management and Protected Areas'.

Technical Advisor to EBSA (India)

1. Participated as a *Technical Support* in a Regional Workshop to facilitate the description of Ecologically or Biologically Significant Marine Areas (EBSAs) in the North-West Indian Ocean and adjacent Gulf areas from 20-25 April 2015, preceded by a training session on EBSAs on 19 April 2015 held in Dubai, UAE.
2. Expert Advisor to the 'Committee on United Nations Convention on the Law of the Sea (UNCLOS)- related to EBSA and Sustainable Fisheries in India'
3. Expert Advisor to the 'Committee on UN Sustainable Development Goals (SDG)14 - related to Marine Protected Areas and Sustainable Fisheries in India'
4. Identified and prioritized 106 'Important Coastal and Marine Biodiversity Areas' that are potential EBSAs of India
5. Prepared Management Plans for seven Marine Protected Areas in India
6. Expert member to identify 'Important Marine Mammals Areas of India' (IUCN/CBD)
7. Member of Informal Advisory Group (IAG) for ecologically or biologically significant marine areas (EBSAs), CBD, SBSTTA.

Involved in the Preparation of India's

5th National Biodiversity Report for CBD
National Biodiversity Action Plan
3rd National Wildlife Action Plan (2017-2032)
National Dugong Recovery Plan
National Marine Turtle Action Plan
National Marine Mega-fauna stranding management guidelines

Present Assignments

Teaching

Teaching evolutionary biology, behavioural sciences. Coastal zone management, aquatic biology, applied population ecology, conservation biology, wildlife census techniques, and ornithology to the students of M.Sc (Ecology) and M.Sc (Environmental Sciences)

Research

Projects completed:

1. Fish biodiversity of the river Ganges basin.
2. Status, ecology and conservation perspectives of the certain rare and endemic birds of the Andaman and Nicobar Islands.
3. Status and conservation of the Wild buffalo in Peninsular India
4. Status and ecology of the Lotic fishes of Ladakh
5. Hydrology of wetlands in Uttar Pradesh, India.
6. Fishes of 'Ban Ganga Conservation Reserve'
7. A rapid survey on impact of avian influenza on wild birds in India in 2006.
8. Biodiversity assessment in the forests and wetlands of Mahoba regions (north Chatarpur forests).
9. Preparation of management plan for the Gulf of Mannar Marine National Park
10. Tiger beetle, butterflies and birds of Shivalik landscape.
11. Evaluation of CSS Plan Schemes on the conservation of Wetlands in India
12. Compilation of Research Information on Biological and Behavioural Aspects of Olive Ridley Turtles along the Orissa Coast of India – A Bibliographical Review for Identifying Gap Areas of Research.
13. Habitat monitoring after relocating gujjars from the Rajaji National Park
14. Preparation of management plan for Keshopur Chhumb Community Reserve, Punjab.
15. Conservation Plans for Kaylana and Gadisar Lakes of Rajasthan.
16. Status of Horseshoe Crabs along the East Coast of India
17. Preparation of Management Plan for the Okhla Wildlife Sanctuary
18. Assessment on cumulative impact of hydroelectric projects on aquatic and terrestrial biodiversity of Alaknanda and Bhagirathi basins, Uttrakand.
19. Status of Indian coastal and marine environment and a network of marine protected areas.
20. Current status of threatened and protected marine fauna and flora in wildlife trade
21. Sea turtle tracking in off shore of Orissa coasts using satellite telemetery.
22. Preparation of India's Fifth National Report on Biodiversity and Addendum to NBSAP of India to CBD
23. Professionalizing Protected Area Management for the 21st Century: A

World Heritage Biodiversity Programme for India

24. Impact of Indra Sagar Multipurpose Project on Papikonda National Park, Andhra Pradesh

25. A study on the ecology and migration pattern of the Lesser Florican Sypheotides indica in Western India using satellite tracking techniques.

26. Status and Habitat assessment of Bengal Florican Houbaropsis bengalensis in the grasslands of Uttar Pradesh.

27. Ecology, taxonomy and conservation of fish diversity in Subansiri River basin of Arunachal Pradesh, North East India with special reference to climate change.

28. Mainstreaming Coastal and Marine Biodiversity Conservation into Production Sectors in the East Godavari River Estuarine Ecosystem; Development of Knowledge Management System for East Godavari Estuarine Ecosystem. UNDP-GEF-MoEF Project.

29. Kailash Sacred Landscape Conservation Initiative implementation plan: Aquatic Ecosystem with special reference to fish diversity.

30. Capacity Need Assessment for Integrated Management of Marine Protected Areas in India.

31. BfN Project 'Landuse Planning and Strategic Environmental Assessment'

32. Mapping of Marine Protected Areas in India

33. Evaluation of Conservation Values of Mangrove ecosystems in Gujarat.

34. Development of Management Plan for the Thane Creek Flamingo Bird Sanctuary

35. Preparation of Seaturtle Recovery Plan for Puducherry

36. Status and distribution of dugong in India.

37. Capacity Building for Integrated management of coastal and marine Protected Areas in India.

38. DST-NMSHE – Impact of climate change on aquatic ecosystem in Himalaya

39. Ecology and management of invasive species such as Prosopis juliflora and Lantena spp in Tamil Nadu.

40. Study on ecology and migratory patterns of golden mahseer (Tor putitora) in river Ganga using radio telemetry techniques

41. Conservation of black necked crane and e-flow requirement for their habitat in the proximity of Nyamjan Chu – Hydro Electric Project

42. Multiple seasonal replicate study for the preparation of Wildlife Conservation Plan for the impact zone of Etalin HEP, Dibang Valley District, Arunachal Pradesh.

43. Management Plan for Human-Crocodile Conflict in Andaman and Nicobar Islands.

44. Status of fish fauna of Sahaydri Tiger Reserve, Maharashtra.

45. Planning aquatic species restoration for Ganga, National Mission on Clean Ganga, Ministry of Water Resources

Ongoing projects

1. Recovery of dugongs and their habitats in India: A project supported by CAMPA.
2. Long term monitoring of birds and mammals of Indian Southern Ocean and Antarctica – funded by MoEF&CC
3. Long term Ecological Observation of Fish fauna of Western Himalaya – Funded by MoEF&CC
4. Identification of Critical Habitat of Malvan Marine Sanctuary, Maharashtra, Funded by Maharashtra Government
5. Tracking the Nearshore and Migratory Movements of Sea Turtles occurring in the coastal waters of Maharashtra. Funded by the Government of Maharashtra
6. Ecology and conservation of Olive Ridley Sea Turtle (Lepidochelys olivacea) along the Odisha coast using satellite telemetry and drone technologies – Funded by the Government of Odisha
7. Management Plan of Mansar and Surensar wetlands, Jammu, funded by the Government of Jammu
8. Ecology and management of Indian Peafowls in the President's Estate, funded by the Government of Andaman and Nicobar Islands
9. Status and ecology of crocodiles in Powai Lake, Mumbai, Funded by the Government of Maharashtra
10. Pan India assessment and monitoring of endangered species covered under the 'Integrated Development of Wildlife Habitats' (IDWH) scheme of MoEF&CC, Government of India.
11. Preparation of Management Plan for the Bakhira Wildlife Santuary, funded by the Government of Uttar Pradesh.
12. Preparation of Ramsar Dossier for the wetlands of Uttrakhand (Biagul and Dhora wetlands).

Academic Distinction

1. Won the University Gold Medal in 1994 for I rank in M.Sc., Pondicherry University.
2. Selected as the Meritorious Student of the year 1995 by the Human Resource Development Ministry, Government of India.
3. Won the University Gold Medal in 1996 for I rank in M. Phil., Pondicherry University.
4. Awarded the UNITAR fellowship to attend a Training Workshop on 'Ecosystem, Water and Biodiversity' in Kushiro, Japan from 27-31 August, 2006 organized by the UNITAR.
5. Awarded the UNITAR Fellowship to attend a training workshop on "Biodiversity and climate change', Kushiro, Japan, 29 June to 4 July 2008
6. Awarded the Netherland Fellowship to attend a certificate course on

International Training of Trainers on Integrated Water Resources Management at the Centre for Development Innovation, Wageningen University, Wageningen, Netherlands, May-June 2013.

Administration

1. **Scientist In-charge**: National Institute for Coastal and Marine Biodiversity, Kanyakumari (a marine research centre of Wildlife Institute of India). From September 2003 to 2010.
2. **Coordinator**: Environmental Information System (ENVIS): Wildlife and Protected Areas
3. **Head of the Department**: Department of Endangered Species Management
4. **Nodal Officer**: CITES/CMS/IWC Cells, Wildlife Institute of India
5. **Coordinator**: Matters related to International Conventions, Parliament Questions, Wildlife (Protection) Act, 1972
6. **Member**: Library Development Committee, Departmental Promotion Committee, High level Purchase Committee, Training and Research Advisory Council (2005-2007) and Annual Research Seminar Committee of Wildlife Institute of India.

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41. S.K. Sajan, 2020. Systematics And Diversity Of Terrestrial Gastropods (Mollusca: Gastropoda) In Great Himalayan National Park And Valley Of Flowers National Park, India. Wildlife Institute of India-Saurashtra University, PhD., dissertation.
42. Sonalika Mamgain, 2020. Quantitative Analysis of Plastic Pollution in India's First Marine Protected Area- A Preliminary Study from Gulf of Kutch, Marine National Park. MSc Dissertation (Environmental Sciences) submitted to Amity Univerity, Uttar Pradesh.
43. **Ongoing Dissertation Works**
44. Sajan 2017 ZSI PhD – Molluscan diversity of Himalaya
45. Prem 2017 WII PhD – Ecosystem services of seagrass habitats
46. Swapnali 2017 WII PhD – Community ecology of seagrass habitats
47. Sumedha 2017 WII PhD – Ecology of sea turtles along west coast India
48. Rukmini, 2018 WII PhD – Ecology of dugong and seagrass, Tamil Nadu
49. Sameeha, Pathan, 2018, WII PhD – Ecology of Seagrass, Gujarat

Books/Chapters in Book

48 A Pande, K Sivakumar, 2022. Climate Change and Seabirds: Insights from Ecological Monitoring of Snow Petrels in the Indian Antarctic Program In N. Khare (ed.), Assessing the Antarctic Environment from a Climate Change Perspective, Earth and Environmental Sciences Library, https://doi.org/10.1007/978-3-030-87078-2_13

47 Pande, A., Seal, S., Tripura, V., Johnson, J.A., Sivakumar, K. (2021). A field guide to seagrasses of India and associated fauna. Wildlife Institute of India, Dehradun, Ministry of Environment, Forest and Climate Change, Government of India. (ISBN 81-85496-55-2)

46 K. Sivakumar, 2020. Impact of climate change on coastal and marine biodiversity (in Tamil). In: (Ed) K. Nagarathinam, Climate Change; An

International Guide to Media Persons. Earth Journalism Network, Internews and Madurai Kamaraj University, Madurai, India. 82 pp.

45 Bhawna Dhawan, Vineet K. Dubey, Aashna Sharma, J. A. Johnson and K. Sivakumar, 2020. Field Guide to Fishes of Rudraprayag. Wildlife Institute of India, Dehradun, 16 pp.

44 K. Sivakumar, J.A. Johnson And Deep Shah, 2020. Participatory Monitoring Of Aquatic Ecosystems In Kailash Sacred Landscape With Special Reference To Fishes. In Manual For Comprehensive Environmental And Socioeconomic Monitoring In Kailash Sacred Landscape, India, Wildlife Institute Of India, Dehradun.

43 Sharma, A., V. Dubey, J.A. Johnson and K. Sivakumar, 2018. Gangetic mystus Mystus cavasius, pp 29-31, IN: Sathyakumar, K and Mathur V.B (eds) Wildlife Watch Series IV. A user guide for monitoring wildlife species in the Indian Himalayan Region. Wildlife Institute of India, Dehradun, 62 p

42 Sharma, A., V. Dubey, J.A. Johnson and K. Sivakumar, 2018. Stone loach Schistura rupecula, pp 25-28, IN: Sathyakumar, K and Mathur V.B (eds) Wildlife Watch Series IV. A user guide for monitoring wildlife species in the Indian Himalayan Region. Wildlife Institute of India, Dehradun, 62 p.

41 Sivakumar, K., 2019. Gulf of Mannar Marine Biosphere Reserve: A paradise of livelihoods and Centre of conservation. *Webzine*, Ramsar Regional Centre – South Korea, 9: 2-8

40 Sivakumar, K., 2018. Conservation of dugongs in India. Hornbill, (April-June): 84-89.

39 Sharma, A., VK Dubey, JA Johnson and K Sivakumar, 2018: Bibiliography of Fishes of the Indian Himalayan Region. ENVIS Bulletin, Wildlife Institute of India, Dehradun: 142-185

38 Sivakumar, K., JA Johnson and Deep Shah, 2018. Participatory monitoring of aquatic ecosystems in Kailash Sacred Landscape with special reference to fishes. In Rawat, GS and Gopi, GV (ed) Manual for comprehensive environmental and socio-economic monitoring in Kailash Sacred Landscape. Wildlife Institute of India, pp: 138-153.

Rawat, G.S., BS Adhikari, K Sivakumar and Philip Bubb, 2018. Monitoring ecosystem services in Pilot Areas of Kailash Sacred Landscape – India. In In Rawat, GS and Gopi, GV (ed) Manual for comprehensive environmental and socio-economic monitoring in Kailash Sacred Landscape. Wildlife Institute of India, pp: 32-52.

Sharma, A., V. Dubey, J.A. Johnson and K. Sivakumar, 2017. Common carp Cyprinus carpio, pp 29-32, IN: Sathyakumar, K and Mathur V.B (eds) Wildlife Watch Series II. A user guide for monitoring wildlife species in the Indian Himalayan Region. Wildlife Institute of India, Dehradun, 55 p.

35 Sharma, A., V. Dubey, J.A. Johnson and K. Sivakumar, 2017. Brown trout *Salmo turtta fario*, pp 25-28, IN: Sathyakumar, K and Mathur V.B (eds) Wildlife Watch Series II. A user guide for monitoring wildlife species in the Indian Himalayan Region. Wildlife Institute of India, Dehradun, 55 p.

34 A. Mohan, G.S. Bhardwaj, S. Sen, Y.V. Jhala and K. Sivakumar, 2016. Ecology and management of semi-arid grasslands in India with special reference to endangered Lesser F l o r i c a n Sypheotides indica Miller. In: Ecology and Management of Grassland Habitats in India, Edited by GS Rawat and BS Adhikar, ENVIS Bullettin, Wildlife Instittue of India. Pp 202-215.

33 Satyaranjan Behera, Basudev Tripathy, K. Sivakumar, B.C. Choudhury, and Punyasloke Bhadury, 2015. Distribution and Abundance of Two Sympatric Species of Horseshoe Crabs Along the Odisha Coast, India: In, R.H. Carmichael et al. (eds.), Changing Global Perspectives on Horseshoe Crab Biology, Conservation and Management, DOI 10.1007/978-3-319-19542-1_9. Springer International Publishing Switzerland.

32 S. Prakash, C. Ramesh & K. Sivakumar (2013). Techniques and methods to assess and monitor coastal habitats in India. In Sivakumar, K. (Ed.) Coastal and Marine Protected Areas in India: Challenges and Way Forward, ENVIS Bulletin: Wildlife & Protected Areas. Vol. 15 Wildlife Institute of India, Dehradun-248001, India. 292-298 pp.

31 N. Khera, V.B. Mathur, K. Sivakumar, Y. Yadava, D. d'monte, S. G. Warrier, S. Dave, R. Mukherjee & V. Hariprakash (2013). Capacity development needs for sustainable management of marine and coastal protected areas in India: a cross-sector assessment. In Sivakumar, K. (Ed.) Coastal and Marine Protected Areas in India: Challenges and Way Forward, ENVIS Bulletin: Wildlife & Protected Areas. Vol. 15 Wildlife Institute of India, Dehradun-248001, India. 292-298 pp.

30 K. Sivakumar, J.A Johnson & A. Pande (2013). Research gaps in coastal and marine conservation in India. In Sivakumar, K. (Ed.) Coastal and Marine Protected Areas in India: Challenges and Way Forward, ENVIS Bulletin: Wildlife & Protected Areas. Vol. 15 Wildlife Institute of India, Dehradun-248001, India. 292-298 pp.

29 A. Pande, Y. Singh, B. Jasmine, A. Rajbhar, G. Katlam & K. Sivakumar (2013). Biodiversity of coastal islands of India. In Sivakumar, K. (Ed.) Coastal and Marine Protected Areas in India: Challenges and Way Forward, ENVIS Bulletin: Wildlife & Protected Areas. Vol. 15 Wildlife Institute of India, Dehradun-248001, India. 292-298 pp.

28 K. Saravanan, B.C. Chowdhury & K. Sivakumar (2013). Important coastal and marine biodiversity areas on East coast of India. In Sivakumar, K. (Ed.) Coastal and Marine Protected Areas in India: Challenges and Way Forward, ENVIS Bulletin: Wildlife & Protected

Areas. Vol. 15 Wildlife Institute of India, Dehradun-248001, India. 292-298 pp.

27 P. Vyas, K. Sengupta, A. Pande & K. Sivakumar (2013). Status report of Coastal and Marine Protected Areas in West Bengal. In Sivakumar, K. (Ed.) Coastal and Marine Protected Areas in India: Challenges and Way Forward, ENVIS Bulletin: Wildlife & Protected Areas. Vol. 15 Wildlife Institute of India, Dehradun-248001, India. 292-298 pp.

26 S. Prakash, A. Pande & K. Sivakumar (2013). Status report of Coastal and Marine Protected Areas in Gujarat. In Sivakumar, K. (Ed.) Coastal and Marine Protected Areas in India: Challenges and Way Forward, ENVIS Bulletin: Wildlife & Protected Areas. Vol. 15 Wildlife Institute of India, Dehradun-248001, India. 292-298 pp.

25 K. Sivakumar, V.B. Mathur & A. Pande (2013). Coastal and Marine Protected Areas of India: challenges and way forward In Sivakumar, K. (Ed.) Coastal and Marine Protected Areas in India: Challenges and Way Forward, ENVIS Bulletin: Wildlife & Protected Areas. Vol. 15 Wildlife Institute of India, Dehradun-248001, India. 292-298 pp.

24 K. Sivakumar (Ed.) 2013. Coastal and Marine Protected Areas in India: Challenges and Way Forward, ENVIS Bulletin: Wildlife & Protected Areas. Vol. 15 Wildlife Institute of India, Dehradun-248001, India. 368 pp.

23 Basudev Tripathy, K. Sivakumar, Sajan John, Satyaranjan Behera, B. C. Choudhury., 2013. Assessment of the population status and threats to the Horseshoes along the northern East Coast of India. In Venkataraman, K.; Sivaperuman, C.; Raghunathan, C. (Eds.): Ecology and conservation of tropical marine faunal communities. Springer, 553 pp.

22 Subrata K. Behera, Satyaranjan Behera, Sajan John, C.S Kar, K.Sivakumar, and B.C.Choudhury., 2013. Abundance of Olive ridleys at Odisha coast: sources of mortality and relative importance of fisheries impacts. In Venkataraman, K.; Sivaperuman, C.; Raghunathan, C. (Eds.): Ecology and conservation of tropical marine faunal communities. Springer, 553 pp.

21 Sajan John, B.B. Praveen Kumar, K. Sivakumar and B.C. Choudhury, 2013. An assessment of marine fauna of Indian Wildlife (Protection) Act, 1972 in curio trade in India - A market study. In Venkataraman, K.; Sivaperuman, C.; Raghunathan, C. (Eds.): Ecology and conservation of tropical marine faunal communities. Springer, 553 pp.

20 Sivakumar, K., 2013. Coastal and Marine Protected Areas in India: Challenges and way forward. In Venkataraman, K.; Sivaperuman, C.; Raghunathan, C. (Eds.): Ecology and conservation of tropical marine faunal communities. Springer, 553 pp.

19 Sivakumar, K., 2013. Status and conservation of Dugong dugong in India: Strategies for species recovery. In Venkataraman, K.; Sivaperuman, C.; Raghunathan, C. (Eds.): Ecology and conservation of tropical marine faunal communities. Springer, 553 pp.

18 Subrata K. Behera, Ved Prakash Ola, Satyaranjan Behera, Sajan

John, Sivakumar, K., Choudhury, B.C. and Kar, C.S. 2012. A Study On Detrimental Effect Of Developmental Activities Along Coast And Off-Shore Waters Of Orissa - An Olive Ridley (Lepidochelys Olivacea) Sea Turtle Perspective. In Biodiversity Utilization and Threats, Narendra Publishing House. Pages 793–804.

17 Bilal Habib, Shivam Shrotriya, K. Sivakumar, V.B. Mathur and P.R. Sinha, 2012. Radio telemetry in India – Issues and wayforward. (In) Sivakumar, K. and Habib, B. (Eds.) 2010. Telemetry in Wildlife Science, ENVIS Bulletin : Wildlife & Protected Areas. Vol. 13 No. 1. Wildlife Institute of India, Dehradun-248001, India. 3-19. (ISSN 0972-088X)

16 Sivakumar, K., B.C. Choudhury, R. Suresh Kumar, Basudev Tripathy, S. K. Behera, S. Behera, Sajan John and V P Ola, 2012. Application of satellite telemetry technique in sea turtle research in India. (In) Sivakumar, K. and Habib, B. (Eds.) 2010. Telemetry in Wildlife Science, ENVIS Bulletin : Wildlife & Protected Areas. Vol. 13 No. 1. Wildlife Institute of India, Dehradun-248001, India. 140-145. (ISSN 0972-088X)

15 Sivakumar, K. and Habib, B. (Eds.) 2010. Telemetry in Wildlife Science, ENVIS Bulletin : Wildlife & Protected Areas. Vol. 13 No. 1. Wildlife Institute of India, Dehradun-248001, India. 246 Pp. (ISSN 0972-088X)

14 Sivakumar, K and R. Sankaran, 2012. Habitat preference of the Nicobar megapode *Megapodius nicobariensis* in the Great Nicobar Island. In. K. Venkataraman et al. (eds). Ecology of Faunal Communities on the Andaman and Nicobar Islands, Springer-Verlag Heidelberg, pp 231-250. (ISBN 978-3-642-28334-5)

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12 Vidhyadar, A., K. Sivakumar and A.J.T. Johnsingh, 2012. Diversity distribution and conservation status of freshwater fishes in the tributaries of river Ramganga, Shivalik Himalayas, Uttarakhand, India. LAP Lambert Academic Publishing. (ISBN 978-3-8473-0190-5), 76 Pages.

11 Sivakumar, K and S. Sathyakumar, 2012. Climate Change and its Impact on the Distribution of Birds in Southern Indian Ocean and Antarctica. In, G.K. Saha (Eds) Climate Change: Man and Environment. Daya Publishers, Delhi. 300 p. (ISBN 978-81-7035-771-1)

10 Sivakumar, K. 2010. Strategic plan and management of alien invasive fauna in the Andaman and Nicobar Islands. In. Ramakrishna, Raghunathan, C. And Sivaperuman, C. Recent trends in biodiversity of Andaman and Nicobar Islands. Zoological Survey of India, Kolkota. 502-510. (ISBN 978-81-8171-252-3)

9 Sivakumar, K. 2010. Impact of tsunami on certain rare and threatened species of Nicobar group of islands with special reference to the Nicobar Megapdoe *Megapodius nicobariensis*. In. Ramakrishna, Raghunathan, C. And Sivaperuman, C. Recent trends in biodiversity of Andaman and Nicobar Islands. Zoological Survey of India, Kolkota. 435-441. (ISBN 978-81-8171-252-3)

8 Sivakumar, K, 2009. Invasive species of Andaman & Nicobar islands. In: 125 Year of Forestry (1883-2008) in Andaman & Nicobar Islands – Department of Environment and Forests, Andaman & Nicobar Islands. Pp 111.

7 Sivakumar, K., Goyal, S.P. and S.K. Mukerjee. 2007. Identification of Galliformes using the microstruture of feathers: Preliminary findings. IN Sathyakumar, S. and Sivakumar, K. (Eds.). 2007. Galliformes of India. Envis Bulletin, Vol. 10(1). Wildlife Institute of India, Dehradun, India. Pp 197-202. (ISSN 0972-088X)

6 Sivakumar, K. 2007. Protocol for monitoring megapode and its habitat. IN Sathyakumar, S. and Sivakumar, K. (Eds.). 2007. Galliformes of India. Envis Bulletin, Vol. 10(1). Wildlife Institute of India, Dehradun, India. Pp 183-188. (ISSN 0972-088X)

5 Sivakumar, K. and R. Sankaran, 2007. Impact of tsunami on Galliformes and their habitats in the Andaman and Nicobar islands. IN Sathyakumar, S. and Sivakumar, K. (Eds.). 2007. Galliformes of India. Envis Bulletin, Vol. 10(1). Wildlife Institute of India, Dehradun, India. Pp 149-154. (ISSN 0972-088X)

4 Sivakumar, K., Sankaran, R., and A. Saxena, 2007. Status, distribution and management of Galliformes in Andaman and Nicobar islands. IN Sathyakumar, S. and Sivakumar, K. (Eds.). 2007. Galliformes of India. Envis Bulletin, Vol. 10(1). Wildlife Institute of India, Dehradun, India. Pp 109-114. (ISSN 0972-088X)

3 R. Jayapal, K. Sivakumar, S. Sathyakumar and V. B. Mathur, 2007. Biogeographical analysis of Galliformes distribution in India and pheasants in the Himalayan Protected Areas. IN Sathyakumar, S. and Sivakumar, K. (Eds.). 2007. Galliformes of India. Envis Bulletin, Vol. 10(1). Wildlife Institute of India, Dehradun, India. Pp 83-94. (ISSN 0972-088X)

2 Sivakumar, K. 2007. Megapode. IN Sathyakumar, S. and Sivakumar, K. (Eds.). 2007. Galliformes of India. Envis Bulletin, Vol. 10(1). Wildlife Institute of India, Dehradun, India. Pp 1-2. (ISSN 0972-088X)

1 Sathyakumar, S. and Sivakumar, K. (Eds.). 2007. Galliformes of India. Wildlife Institute of India, Dehradun, India. 252 pp. (ISSN 0972-088X)

International Workshop

1. Sivakumar, K., 2019. Status and management of marine mammals bycatch in India. Bycatch Mitigation Workshop organized by the

Scientific Committee of the International Whaling Commission, 7-9 May, 2019, Nairobi, Kenya.

2. Sivakumar, K., 2019. Mudflats of India with reference to coastal birds, International Conference on Wetlands and Migratory Birds, 18-21 November, 2019 at Lonavala.

3. Sivakumar, K., 2019. Marine Protected Areas: Is it enough for pelagic birds in India?, International Conference on Wetlands and Migratory Birds, 18-21 November, 2019 at Lonavala.

4. Ms Aashna Sharma, Dr Vineet Dubey, Dr Jeyaraj Johnson and Dr Kuppusamy Sivakumar, 2019. Detection simplified: delineating climate sensitive zones along the north-western Himalayan rivers. Species on the Move International Conference, 22-26 July 2019. Krugar National Park, South Africa.

5. Sivakumar, K, 2018. 'Identification of Important Marine Mammals Areas in India' organized by IUCN Marine Mammals Task Force at Kota Kinabalu, Malaysia, 12-16 March, 2018.

6. Sivakumar, K. 2018. Participated in the Steering Committee Meeting of IUCN WCPA – South Asia, on 9 May 2018 at Wildlife Institute of India, Dehradun, India

7. Sivakumar, K, 2020. Participated in the 68th Meeting of Scientific Council of International Whaling Commission, 17th to 25th May, 2020, via Webiner, Cambridge, UK.

8. Attended as a Resource Person in the 'Training Series on Biodiversity' organised by the UNITAR in India, in August 2007.

9. Integrated Management Plan for the Gulf of Mannar Marine National Park and Biosphere Reserve (2007-2016): Process and Methodology. An International Workshop jointly organized by the Biodiversity Authority of India and UNESCO. 20-21 September 2007, Chennai. pp 68-69.

10. Distribution of Olive ridley sea turtle *Lepidochelys olivacea* off the southern coast of orissa, india during the 2006-2007 breeding season. Annual Symposium on Sea Turtle Biology and Conservation, in Loreto, Baja California Sur, Mexico (January 23 - 25, 2008).

11. M.Muralidharan, K. Sivakumar, and B.C. Choudhury, 2010. Effects Of Anthropogenic Changes To The Rushikulya Nesting Beach On Olive Ridley Sea Turtles, Orissa. 30th Annual Symposium On Sea Turtle Biology And Conservation. 24 - 30 April, 2010, Goa, India

12. Subrata K. Behera, B.C. Choudhury, K. Sivakumar, Satya Ranjan Behera, and Sajan John, 2010. Impact Of Fishery Related Activities On Nesting, Mortality And The Feeding Ecology Of Olive Ridley Sea Turtles Along The East Coast Of Orissa. 30th Annual Symposium On Sea Turtle Biology And Conservation. 24 - 30 April, 2010, Goa, India

13. Ved Prakash Ola, B.C. Choudhury, and K. Sivakumar, 2010. Oceanographic Factors Determining The Post-Nesting Migration Of Olive Ridley Turtles In The Bay Of Bengal. 30th Annual Symposium On Sea Turtle Biology And Conservation. 24 - 30 April, 2010, Goa, India

14. Satya R. Behera, B.C. Choudhury, K. Sivakumar, C.S. Kar, A.K. Nayak, 2010. Impact Of Erosion On Hatching Success In Mass Nesting Sites Of

Olive Ridley Turtles Along The Orissa Coast, India Coast, India. 30th Annual Symposium On Sea Turtle Biology And Conservation. 24 - 30 April, 2010, Goa, India.

15. Suresh R. Kumar, K. Sivakumar, B.C. Choudhury, 2010. Clutch Size And Hatching Success In The Olive Ridley Sea Turtle Lepidochelys Olivacea At The Rushikulya Mass Nesting Site, India. 30th Annual Symposium On Sea Turtle Biology And Conservation. 24 - 30 April, 2010, Goa, India

16. Attended a three-days training workshop on Strengthening CITES implementation capacity to ensure sustainable wildlife management and non-detrimental trade, has been jointly organized by CITES Secretariat and the Protected Areas and Wildlife Bureau, Philippines at Makati City, Philippines, between 15th and 17th June 2010. Participants are from South and Southeast Countries.

17. Attended the First Official Signatory State Meeting of UNEP/CMS Memorandum of Understanding for the Conservation and Management of Dugong and their Habitats throughout their Range States, has been jointly organized by UNEP/CMS Secretariat and the Environment Agency of the United Arab Emirates, Abu Dhabi, being held at Abu Dhabi from 4th to 6th October 2010.

18. Conservation perspectives of wild buffalo in the peninsular India: Where did we fail? Workshop on Status of Wild cattle in South Asia jointly organized by IUCN Wild Cattle Specialist Group, WWF-International and Wildlife Institute of India on 28-29 June 2011 at Dehradun.

19. Workshop Organiser: First South Asia Regional Dugong Workshop held at Tuticorin on 6-7 June 2011.

20. CMS CoP10. Scientific Committee Meeting. Bergen, Norway, November 16-19, 2011.

21. Regional Workshop for South, East and Southeast Asia on the Preparation of The fifth National Report and Regional Scenario Analysis. Incheon City, Republic of Korea, 20-24 May 2013.

22. Climate Change Adaptation Strategy Plans for World Heritage Sites in India. UNESCO Head Quarter, 5-6 July 2013, Paris. France.

23. Indo-German Scientific Mission Workshop on 'Integrated Management of Marine Protected Areas in India', Hamburg, 27 October to 1 November, 2013.

24. Paromita Ray, 2015. Impact of climate change on estuarine fish species diversity in the upper Godavari Estuary, Andhra Pradesh. National Seminar on Climate Change- Ecosystem, Environment and Society, September, 2015, Andhra University.

25. Giridhar Malla, 2015. Status and conservation perspectives of the fishing cat (Prionailurus vivverinus) in Coringa Wildlife Sanctuary. First International Fishing Cat Symposium, Nepal.

26. Giridhar Malla and Paromita Ray, 2017. Climate change and EGREE ecosystem. International Congress on Conservation Biology, Cartagena.

27. Giridhar Malla and Paromita Ray, 2016. Status and ecology of birds of EGREE with respect to climate change. International Wader Study Group Meeting, Ireland.

28. Anant Pande, K Sivakumar, S Sathyakumar, R Suresh Kumar, JA Johnson, Samrat Mondol, Alexander Fell and Vinod B Mathur, 2016. Monitoring wildlife and their habitats in the Southern Ocean and around Indian Research.SCAR Open Science Congress, 20-30 August, 2016, Malayasia.

29. Giridhar Malla, Paromita Ray and K. Sivakumar Eavesdropping on an Elusive Cat: A Preliminary Study of Fishing Cat Vocalization in a Tropical Mangrove of South India Fourth International Symposium on Acoustic Communication by Animals, held at Omaha's Henry Doorly Zoo and Aquarium in Omaha, Nebraska, U.S.A. on 18-21 July 2017. Pp 68-69

30. Participated as an Expert in the 'Review of EBSA Criteria' organized by CBD, on 5-9 December, 2017 at Berlin, Germany.

31. Participated in the expert workshop on 'Identification of Important Marine Mammals Areas' organized by IUCN Task Force at Kota Kinabalu, Malaysia, 12-16 March, 2018.

32. Participated in the Steering Committee Meeting of IUCN WCPA – South Asia, on 9 May 2018 at Wildlife Institute of India, Dehradun, India

33. Sumedha A K.and K. Sivakumar, 2019. Filling the knowledge gap of nesting temperature of Olive ridley sea turtle in the west coast of India by indigenously developed temperature data logger. International Congress for Conservation Biology, Kuala Lumpur, 20-25 July 2019.

34. Srinivas Yellapu, Sivakumar Kuppusamy, JA Johnson, and Samrat Mondal, 2018. Phylogeography of Dugong: Molecular Insights from Indian Subcontinent. 5th International Marine Conservation Congress., Sarawak, Malaysia, 24th - 29th June, 2018.

35. Swapnali Gole and Sivakumar, K, 2018. Assessing seagrass habitat characteristics for Dugong conservation in India: An integrated participatory approach, 2018. World seagrass conference and International Biology for Seagrass workshop (ISBW 13), 11-17 June, 2018, Singapore.

National Workshop

1. Sivakumar, K., 2019. Important Coastal and Marine Biodiversity Areas of India, International Conference on Aquatic Biodiversity Conservatoin, 19-21 December, 2019, IISER, Pune.

2. Sivakumar, K., 2019. Reconciling development with megapode conservation in Islands, 19 October, 2019, IISc, SCCB- Ravi Sankaran Research Seminar, Bangalore
3. B.C. Choudhury and K. Sivakumar, 2007. Creating an Enabling Framework for Marine National Park and Biosphere Resrve-A case Study of Development of the Management Plan for the Gulf of Mannar MNP and Biosphere Reservein Tamil Nadu,India.-. National Workshop on Marine Protected Areas organized by the Greenpeace. 8-10 October 2007, New Delhi.

4. Status of protected coral species in illegal trade in India. National workshop on STAPCOR-08 - Coral Reef Conservation and Management Action Plan organized by the NIO at Lakshawdweep. 21 to 24 January 2008.

5. Sivakumar, 2006. Status and conservation of the Nicobar megapode after tsunami. National Seminar on Wildlife Biodiversity Conservation during 5-7th October 2006. Pondicherry University.

6. An assessment on proteceted marine species in fishing and in trade in Indian coast. Marine Biodiversity conservation and community. 15-16, June, 2006. GEER Foundation at Gandhinagar.

7. Sivakumar, 2006. Challenges in fisheries resources conservation and utilization in relation to emerging fish biodiversity regulation of Biodiversity Act 2002, on 28th January 2006, at NBFGR, Lucknow.

8. All India Tiger Census Regional Workshop at Bandipur, 8th to 11th November 2005.

9. Sivakumar, 2004. People and marine life, 2004. National workshop on 'Medicinal plants and Environment' jointly organized by the M.S. Swaminathan Research Foundation and Vivekananda Kendra on 18 May 2004, Kanyakumari.

10. Sivakumar, 2004. Human health and environment, 2004. National seminar on 'Indian Ayurvedic Doctors Meet' organized by the Vevekananda Kendra on 1 June 2004, Kanyakumari

11. Sivakumar, 2003. Wildlife and its conservation in India. National Workshop on 'Conservation Education' at Songtsen Library between 2nd – 4th October, 2003, Dehradun

12. Atkore, V.M., K. Sivakumar, A.J.T. Johnsingh, Patrick David (2009). 'Need to study the impact of Climate Change on Himalayan Freshwater Fishes' *Abstract* for the Poster. BNHS International Conference on

'Conserving Nature in Globalizing India', at Indian Institute of Science, Bangalore. *Proceedings In Press*

13. Atkore, V.M., K. Sivakumar, A.J.T. Johnsingh (2008). 'The Freshwater Fish Diversity in the Tributaries of River Ramganga in the Shiwaliks of the Western Himalaya, A paper presented in the Symposium 'Lake 2008: Conservation and Management of River and Lake Ecosystems' 22nd to 24th December, 2008. Indian Institute of Science, Bangalore, India. *Proceedings in Press*.

14. Sajan John, Praveen Kumar, B.C. Choudhury and K. Sivakumar, 2009. Status of threatened and protected species in trade in marine fishery sector in India. fisheries. In: Marine Ecosystems Challenges and Opportunities, Marine Biological Association of India, February 9-12, 2009, Cochin.

15. Sajan John, B.C. Choudhury and K. Sivakumar, 2009. A market study on the marine curio trade: an assessment of the threatened and protected marine fauna in illegal trade in the east coast of India. Paper presented in the 'International conference on emerging trends in environmental research', held in St. Albert's College, Kochi, Banerji Road, India, 14-16 August 2009.

16. Sivakumar, K. 2009. Ecology and Management of fish biodiversity ad wetland ecosystem in India with special reference to Keoladeo National Park. In: 'Nature Guide Training Workshop' conducted by the Rajasthan Forest Department, in Bhartpur between 27-29 June 2009.

17. Resource Person in a two-days training workshop on Strengthening CITES implementation capacity to ensure sustainable wildlife management and non-detrimental trade in India, had been jointly organized by CITES Secretariat, MoEF, Govt of India and the Wildlife Institute at Dehradun, between 20th and 21st December 2010. Participants are from various scientific organisations and MoEF.

18. Presented 'Policy issues while preparing National Red Listing of Species in India' in the IUCN Red Listing Process in India jointly organised IUCN and MoEF, Government of India, 3 February 2011 at New Delhi.

19. Sivakumar, K. 2012. Identification of research gaps in the coastal and marine biodiversity conservation in the Godavari Estuarine Ecosystem. National Consulation Workshop of EGREE. 8 May 2012. Kakinada.

20. Participated in the UNESCO-WHS Climate Adaptation Field Testing of Tool Kit, 2-3 April 2013, Wildlife Institute of India.

21. Important Coastal and Marine Biodiversity Areas in India: Consultation Workshop to delineate and mapping of Ecologically Sensitive Areas of coastal and marine habitats of India, National Centre for Sustainable Coastal Management, Chennai 10-11, October 2013.

22. Species Recovery Plan for Lesser Florican in Madhya Pradesh. Bustards Species Recovery Plan Workshop, Bhopal, Madhya Pradesh, 2 December 2013.

23. Sivakumar K, and S. Sathyakumar, 2014. Long term monitoring of birds and mammals in southern Indian Ocean and Antarctica. National Workshop on Research Evaluation in Antarctica. 2-3 July 2014, NCAOR, Goa.

24. Deep Shah, K. Sivakumar, B.S.Adhikari, G.S.Rawat, 2016. Ecosystem Services of Water Springs in Kailash Landscape, India. Proceedings of 30th Gujarat Science Congress, Pp 261

25. Tarachand Kumawata, K. K. Joshib, Latha Shenoyc, K. Sivakumar, 2017. A review on coastal and marine protected areas as ecosystem based management tool: Goodwill for marine life. 11th Indian Fisheries and Aquaculture Forum (IFAF)" organized by ICAR-CIFT during 21st to 24th November, 2017 at Kochi, Kerala, India

26. Sivakumar, K., 2018. Impacts of Climate Change on Aquatic Systems & E-Flow Requirements. in IUKWC Workshop: Integrating precipitation forecasts and climate predictions with basin-scale hydrological modelling in the Himalayas Workshop Held at Wildlife Institute of India, Dehradun, India between 2nd - 4th May 2018

Visiting faculty

International Centre for Information System and Auditing, Noida
Indira Gandhi National Forest Academy, Dehradun
Forest Research Institute, Dehradun
Institute of Forest Genetics and Tree Breeding, Coimbatore
International Centre for Environment Audit and Sustainable Use, Jaipur
Central Academic for State Forest Services, Dehradun
Ramsar Regional Center – East Asia (RRC-EA, South Korea

IUCN SSC Membership

1. Member of IUCN-SSG Galliformes Specialist Group
2. Member of IUCN-SSG Invasive Species Specialist Group
3. Member of IUCN-World Commission on Protected Areas
4. Member of IUCN/WI Freshwater Fish Specialist Group

5. Member of IUCN-SSG Marine Species Specialist Group
6. Member of IUCN - WCPA Climate Change and Protected Areas
7. Member of IUCN - WCPA South Asia
8. Member of IUCN - WCPA World Heritage
9. Member of IUCN - WCPA Transboundary Conservation Specialist Group

Minutes of the 297th meeting of Expert Appraisal Committee held on 24th – 25th May, 2022 INDUS Conference hall in the Ministry of Environment, Forest & Climate Change (MoEF&CC), Indira Paryavaran Bhavan, New Delhi for the projects related to Infrastructure Development, all Ship breaking yards including ship breaking units 7(b); Industrial Estate/Parks/Complexes/Areas, Export Processing Zones, Special Economic Zones, Biotech Parks, Leather Complexes7(c); Ports, harbors, breakwaters, dredging7(e) and National Highways7(f).

The 297th Meeting of Expert Appraisal Committee (EAC) of Infra-1 (IA-III) was held at INDUS Conference hall in the Ministry of Environment, Forest & Climate Change (MoEF&CC), Indira Paryavaran Bhavan, New Delhi during **24th – 25th May, 2022** under the Chairmanship of Dr. Deepak Arun Apte. A list of participants is annexed as **Annexure-A**.

1. OPENING REMARKS OF THE CHAIRMAN

At the outset, Dr. Deepak Arun Apte, Chairman, EAC welcomed the Members of the EAC and requested Shri Amardeep Raju, the Member Secretary of the EAC to initiate the proceedings of the meeting with a brief account of the activities undertaken by the Ministry under Infra-1 Division.

2. CONFIRMATION OF THE MINUTES OF THE LAST MEETING

The Committee confirmed the Minutes of 296th EAC meeting held on 28th – 29th April, 2022.

AGENDA WISE CONSIDERATION OF PROPOSALS:

Agenda wise details of proposals discussed and decided in the meeting are as following:

Agenda No. 3.1

Integrated development of International Container Transhipment Terminal (ICTT)-14.2 Million TEU along with Greenfield International Airport (4000 Peak Hour Passengers-PHP), Township & Area development and 450 MVA Gas and Solar based power plant in 16610 ha. Great Nicobar Islands, Nicobar District by M/s Andaman and Nicobar Islands Integrated Development Corporation Ltd – Environmental Clearance

[Proposal No. IA/AN/NCP/260108/2021 and File No. 10/17/2021-IA.III].

"*The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EM P report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent."*

3.1.1. Ministry of Home Affairs vide letter no. 15020/10/2022 dated 30th March, 2022 mentioned that the Greenfield International Airport proposed at Gandhi Nagar-Shastri Nagar area of Great Nicobar Island as part of the Integrated development of the Island, will be developed as a joint military-civil, dual-use airport, under the operational control of Indian Navy. This project is for Defense, Strategic, National Security, and Public Purpose. In view of this, the portion of deliberation made for Airport component may not be made public due its strategic nature.

3.1.2. The abovementioned proposal was placed before the EAC in its 293rd meeting during 24th – 25th March, 2022. The EAC noted that the document submitted by the PP were received only 2 days before the EAC meeting and therefore members have sought some time to study the entire set of documents due to multiple components involved in the project. In view of this, the EAC *deferred* the proposal and informed to submit all relevant studies undertaken for the project. The PP accordingly submitted the relevant studies to the Committee. The proposal is reconsidered in the 297th EAC Meeting held on 24th-25th May, 2022. The project proponent along with the EIA Consultant M/s Vimta Labsand M/s AECOM India Pvt Ltd made a presentation in a hybrid (Physical-Video Conferencing) mode of meeting and provided the following information: -

3.1.3. The proposal is part of interlinked projects with Deep Berth Port (International Container Trans-shipment terminal -ICTT) as primary component and 3 interlinked projects i.e., Greenfield International Airport (4000 Peak Hour Passengers-PHP), Township & Area development; 450 MVA Gas, Diesel and Solar based power plant. There is no oil spill envisioned as the storage facility for DG sets is proposed within the Power plant site on land.

3.1.4. Water Bodies & impact on Drainage: Magar Nala is near Govind Nagar and Matai Nala Near Gandhi Nagar. No major drainage channels/ water bodies are being blocked/ impacted by proposed development. All major water channels/ nalas/ drains are being conserved and are part of green land use within the proposed land use plan.

3.1.5. Water requirements:

Activity	**Water Demand in KLD***
ICTT	2,100
Airport	1,000
Power Plant	1,500
Township	80,000
TOTAL	**86,600**
This demand includes recycled and reuse water. Total fresh water demand is 45 MLD which will be met through 2 reservoirs (rain fed) proposed within the project area. **The above figure represents the potable and recycled water demand. No groundwater extraction is proposed.	

3.1.6. Waste water Management: There will be 3 STPs, one with the capacity of 34 MLD, and other two with the capacity of 16 MLD proposed as part of integrated development.

Type of solid waste	**Quantities in TPD**	**Centralised solid waste management facility**
Biomedical waste	3	As per Bio-Medical Waste (BMW) Management Rules, 2016 and subsequent amendments
Municipal waste	200	As per SWM rules 2016 and subsequent amendments

Industrial waste	8	Waste will be transferred to the integrated solid waste facility at township for treatment and disposal
STP sludge	15-18	Used as manure for greenbelt development

3.1.7. Tree cutting and Green Belt Development: Total estimated tree cutting is 8,52,245 numbers.

3.1.8. Diversion of forest land: The holistic development of GNI requires diversion of 130.75 sq.km of forest land and application has been submitted to MoEFCC vide letter No: PCCF/FCA/325/VOL.II/249 dated 7th October 2020. Application for diversion of forest is under process.

3.1.9. The project site is within 10 kms radius of Galathea Bay National Park and Campbell Bay National Park. The project site is outside the Ecologically Sensitivity Zone (ESZ) notified around these 2 National Parks. Also UT Administration has intention notification for 3 Wildlife Sanctuaries namely Leatherback Turtles at Little Nicobar Island with an extent of 13.75 Sq. Km, Magapode at Menchal Island with an extent of 1.29 Sq.m, Corals at Meroe Island with an extent of 2.73 Sq.km for Leatherback Turtles, Magapodes and Corals, as part of the conservation of these species.

3.1.10. A leatherback turtle conservation Plan will be prepared as part of the Biodiversity Management Plan for the Nicobar Group of Islands and implemented to conserve and protect the leatherback turtles with a budget of 100 Crores and 12 Crores which has been earmarked for studies for leatherback conservation. Implementation of the "National Marine Turtle Action Plan of the Govt. of India 2021- 26" and Potential turtle nesting areas in Nicobar group of islands are protected and conserved.

3.1.11. Great Nicobar has a wider habitat for saltwater crocodiles. During construction phase the same shall be handled as per provisions of wildlife Act through Department of Forest and as per the action plan prepared by WII. Further, an action plan is also prepared as "Action plan of mitigation of human-crocodile conflicts in the Andaman and Nicobar Islands"

3.1.12. Apart from the above, ZSI has suggested for restoration of coral Reef/translocation. This is proposed on the basis of experience gained by ZSI in Gulf of Kutch, Gujrat. ZSI carried out Ecological Restoration in coral reef areas of Gulf of Kachchh with support of the Marine National Park Authority of Gujarat Forest Department. ZSI restored a total of about 2000 sq.m. degraded coral reef area in Gulf of Kutch and 2320 native coral were restored in Pirotan site, 1170 native coral were restored in Narara site, 1050 native coral were restored in Mithapur site. There projects were executed between 2012-18. The survival rate of the same at Pirotan site - 97.20%, Narara site - 96.50%, Mithapur site - 96.57%. Further, 9000 corals from 49,000 m^2 area will be translocation and restoration is being done in Narare Reef area of Kalubar Island, Gulf of Kutch which is 40 times bigger than the previous one with the approx budget of INR 10 Crores / ha.

3.1.13. Mangroves: 12-20ha of mangrove cover loss has been envisaged for the proposed port project and is mentioned in table 10.1 of Chapter 10 of the EIA report. The extent of loss of mangroves may be compensated in GNI by re-densification of existing mangroves or planting

of mangroves to non-forest area as per the principals of compensatory afforestation.

3.1.14. Shoreline change: The observed trend of the shoreline at the proposed project location reveals that the shoreline remains with not noticeable change over a period of 5 years from 2015 to 2020. The shoreline analysis shows that the project site at port is surrounded with elevated hill promontories and rocky shores.

3.1.15. Dredging and Reclamation: The total quantity of capital dredging for the development of port is about 17.7 million cum MIKE 21-PA (Particle Analysis) module was used to identify a suitable location for dumping the dredge spoil and to understand the dispersion pattern of disposed material after dumping. The maximum increase in seabed level over the disposal area is about 0.03 m at the proposed dumping location. Due to availability of deeper water depth of 600m the change in bed level at the proposed disposal location due to dumping is insignificant. The plume of suspended sediment after dumping tends to spread towards northeast to an extent of 1 km with an increase in seabed level of <0.008 m. Therefore, the proposed disposal location is found to be more ideal and it will not cause any adverse impact on the proposed port development facilities and the marine environment.

3.1.16. Reclamation: About 298 Ha area to be reclaimed. It is estimated that around 33.35 million m^3 material will be required for reclamation. Suitable dredged material shall be used for reclamation, remaining of reclamation shall be achieved by borrowed fill.

3.1.17. Cargo handling with dust control measures: Since the proposed port is International Container Transshipment Terminal (ICTT), there will be no dusty cargo, dry bulk cargo such as coal, iron ore or hazardous cargo, etc. will be handled at port. All the vehicles engaged for construction should have valid pollution check certificate as per the motor vehicle act. Further, any regulations related to vehicle emission issued by local government should also be adhered to. Generators and machineries are to be serviced and maintained regularly to avoid generation of dust and other air pollutants. Oil Spill Contingent Management Plan includes Boom containment, Spray of dispersant and Skimmers. No hazardous industries are envisaged at GNI however the containers may contain hazardous cargo, Hazardous cargo shall be handled in accordance with The Manufacture, Storage and Import of Hazardous Chemicals Rules, ACT 1989. Containers carrying hazardous cargo are labelled as Hazardous Cargos and stored at separate locations in the yard designated for the storage of hazardous cargo and a dedicated Nodal officer will be appointed who will be responsible to check the compliance of the regulations from time to time. Hazardous waste like used oil, insecticide/ herbicides, paints, solvents, lubricants etc. would be generated from the project, the same hazardous substances will be securely stored at site before transportation, Double chamber Incinerator has been proposed to treat the possible hazardous waste generated from Port, Airport, Power plant and the Township.

3.1.18. No marine disposal is involved in the proposed project.

3.1.19. Energy conservation: List of materials to be used for construction will be decided at the details design stage. However, the design will follow Energy conservation building code (ECBC 2017), Indian Green Building Council (IGBC) guidelines and Code of green buildings by Council of Architecture (COA).

3.1.20. Land acquisition and R&R issues: Total land acquisition required for project is

approximately 421.57 ha. Total families affected is 379 and total affected population is 1761.

3.1.21. While considering the proposal of sustainable development of Great Nicobar Island, the administration has consented in principal that (a) The project will not disturb or displace any Shompen/ Nicobari tribal or their habitation, (b) There will be a clear demarcation of land so that there is no scope of conflict that would arise in future, (c) Habitat rights of the tribal will be taken care of as per the Forest rights Act. These has also been considered while making Environmental Impact Assessment (EIA). The Shompens will be eligible under the FRA, 2006 and the RFCTLARR, 2013 for compensation for the loss of their habitat (if any). A fair compensation will be devised and compensatory package would be developed exclusively and in addition to the resources already available, for the welfare and development of Shompen, while ensuring that their survival as a community, unique identity, culture and heritage.

3.1.22. Rain Water Harvesting: Rainwater harvesting shall be mandated as part of development control regulations to be formulated at the stage of finalization of master plan post EIA and CRZ approval. Buildings/ Development within the proposed project area shall have appropriate provision for rainwater harvesting techniques in confirmation with approved development control regulations. This shall be regulated during building plan approval stage.

3.1.23. Employment Potential:

Item	2025	2040	2052
Direct Employment	6,939	24,734	51,423
Indirect Employment	10,408	37,101	77,135
Total Employment	17,347	61,835	128,558
Total Population	52,550	164,730	332,596

3.1.24. EAC Observations: The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 297th meeting during 24th – 25th May 2022 and made following observations.

Township

i) Some of the township clusters seems to have several defense installations abutted by commercial and tourism infrastructure. It is not advisable considering strategic and safety requirements. Revised layout in this regard shall be submitted.

ii) Golf course will not be permitted considering extremely water intensive activity and also considering very high number of endemic species that inhibit GNI. It is misfit in the holistic vision for the island.

iii) Many parts of the proposed road are falling with in the CRZ IA, CRZ I B yet no details have been given about the location and design of the road in such areas. Location of such parts of the road should be clearly spelt with undertaking that roads will be on stilt in such stretches. RoW of 55 meters has been proposed for the road which appears to be very wide even as per the standards fixed for National Highways and Expressways as per IRC guidelines of MoRTH. The Committee suggested that the width of RoW shall be revised in the master plan keeping the ROW not more than 30 m. Revised lay out of master plan should be submitted after excluding such excess width of 25 meter

which instead be kept and shown as green belt/ shelter belt without cutting existing trees on both side of road in revised layout.

iv) Over 50 Km of low-lying coastal area of the eastern side of the GNI is now being developed in the form of township and port as well as power plants which will obstruct the forest-sea shore- forest movement of several animals like Robber or Coconut Crab and birds, especially coastal birds like megapod. However, no provision for forest- sea shore wildlife corridors have been kept in the Master Plan Therefore, there is a need to revise the master plan layout keeping natural forest corridor between Campbell Bay / Galathea NPs and sea shore of at least 300-500 meter width generally at every 3 km interval. Such corridors shall be excluded from project area. Location of such corridors shall be identified in consultation with ANFD. Roads crossing such wildlife/ animal corridors shall have animal underpasses in the form of elevated roads or animal over bridges depending upon the terrain. No provision for canopy bridges for road crossing by Nicobar Long-tailed Macaque, Nicobar tree shrew and other arboreal animal as well as passages for like crocodiles, crabs, frogs, snakes and other amphibians/reptiles are made. Same need to be made in road design. Such provision shall be made in road design and revised layout of the masterplan generally at every 2 Km interval between green belt on both sides of roads as per WII guidelines and in consultation with SFD. Provide chainage wise details of canopy crossings and underpasses as mentioned above.

v) It is observed by the Committee that the building components do not have detailed information like waste management plan, its size and management, built-up area, amenities, water requirement, waste-water treatment etc. The Committee therefore suggested that a detailed plan for Phase-I may be submitted at this stage which shall have all details specifically for Phase-I. Broad plan for the other phases of the building component may also be submitted along with the detailed Phase-I plan.

vi) Considering above observations, revised plan for township be submitted

ICTT

vii) Considering the fact that due to ICTT construction in Galathea Bay, township development and other development activities as part of integrated development of Great Nicobar Islands the movement of Leatherback turtles as well as Nicobar Megapods and their nesting is likely to be disturbed and therefore the turtles and Nicobar Megapod birds are likely to shift their nesting sites in nearby western coast of the GNI and other areas. Though Andaman and Nicobar administration has declared some of the islands as WLS in little Andaman and other places for Leatherback turtles and Nicobar Megapods yet considering the Pemayya Bay, Casuarina Bay and Alexandria Bay as established sites for Leatherback and Nicobar Megapod nesting are potential site for developing them as Wildlife Sanctuaries/ Conservation Reserve in to additional legal protection for these species. All the areas except the area proposed for defense purpose in western coast of GNI including Pemayya and Casuarina Bay shall be excluded from the master plan as stated in the previous meeting observations as well.

viii) PP shall clearly demarcate the proposed dredging area, avoiding the dredging activity in Rocky areas to avoid any type of Disaster risk. The same shall be submitted to the Ministry.

ix) Though attempt have been made to mitigate the impact of ship movement on the movement of turtles to and from nesting sites in western flank of the Galatea Bay by way of providing isolated breakwater yet it may not be very useful because ship movement inside the port boundary beyond breakwaters may discourage the turtles to enter in the bay for nesting in western flank. However, if an undisturbed channel is created for turtle movements by way of extending the western breakwater between port area and western flank there may be some possibility of turtles approaching the western flank of the Bay. The same shall be explored and submitted to the Ministry

x) Though many parts of the proposed master plan for port falling within CRZ IA and CRZ IB (Viz area B, C, D etc) are proposed to be eliminated from masterplan yet the revised layout map of the project after excluding such areas have not been submitted.

xi) Wildlife Institute of India (who have done sea turtle monitoring and satellite tracking across parts of India for several decades) should submit detail road map with financial requirement for monitoring Leatherback Turtle movement through satellite tracking in GNI and habitat restoration & nest protection measures at all other nesting sites in A & N for minimum 10 years.

xii) SACON is requested to submit Nicobar Megapod monitoring and conservation plan for minimum 10 years.

Gas-based power plant

xiii) The clarity on power demand for phase 1 to be estimated and based on that gas/solar based power generation to be proposed. The numbers are to be quantified.

xiv) Oil spills are not modelled. Diesel/LNG is required for Power Plant. Impacts of accidental oil spill etc shall be submitted.

xv) Regarding the proposed Power Plant, the Committee proposed that Gas-Based power plant may take time to commission, therefore an alternate plan for the power supply and the location of such temporary plant may be submitted.

xvi) PP should carry out load carrying capacity in addition the location of FSRU (LNG) as to why it needs to be on the western bay. Committee asked to explore having Gas-based power plants on the eastern part of GNI instead of at Galathea Bay.

xvii) No details are available on what will be the alternate source of fuel for power till such time LNG facilities are commissioned. A detailed “plan of action” on how they plan to meet the power demands for the construction phase of ICTT, Airport etc to be provided. Committee felt that ideally they should use the existing HSD storage facility (may be with enhanced storage) instead of creating a new one.

xviii) with regards to Solar power the land requirement for installation of solar panels needs to be highlighted

Other Comments

xix) Measures taken for the notified sanctuaries shall be incorporate in the EIA/EMP report.

xx) Water balance and Power consumption for all components has to be detailed in EIA / EMP report.

xxi) PP shall submit the number of mounts of Nicobar Megapod are located over the proposed area and its impact on mounts shall be mapped, it is also requested to submit the measures taken for its protection and sustainability for Migratory birds.

xxii) Any alternate site proposed for inactive and active mounts shall be prepared along with the location maps showing in KML.

xxiii) Project proponents were asked to furnish the details of loss of mangrove cover with mitigation/conservation plan for the loss of mangrove. PP has not submitted any Mangrove conservation Plan/coral conservation plan which normally forms the part of EIA/EMP for CRZ purposes. No justification has been given for not including mangrove conservation plan including the plan for compensatory planting in lieu of loss of mangrove cover.

xxiv) Similarly coral conservation plan has not been included in the EIA/EMP without giving any justification for non-inclusion in EIA/EMP.

xxv) In response to EACs request for Saltwater Crocodile management plan, no plan have been submitted except the assurance of following Action plan for mitigation of Human crocodile conflict in A&N Islands along with the SOP. These areas of GNI being good nesting sites of Saltwater Crocodile are likely to fall in category of Crocodile Conservation Zones (CCZ) and therefore as per prescriptions of Action plan no human activities including tourism is permitted unless it is prescribed in wildlife management plan/working plan. Prescriptions for mitigation of conflict as per Action plan will be applicable only if areas within project site fall in human-crocodile co-existence zone or crocodile free zone. Therefore there is a need to submit the actual status of the Saltwater Crocodile habitat/nesting sites falling within the project area as per Action plan for mitigation of human crocodile conflict areas along with a Saltwater Crocodile conservation plan in case areas inside project fall in Crocodile conservation Zone category.

xxvi) Evacuation plans for natural disaster needs to spelt out clearly and in detail since this area is prone to Tsunami, frequent earthquakes and Cyclone etc

3.1.27 Conclusion and Recommendations: Accordingly, the EAC concluded and **recommended that PP shall submit following information** besides above observations to enable the EAC to take well informed decision regarding Environmental and CRZ Clearance

A. Exclusion of areas from Total Project areas: - Following areas should be excluded from the total project area for the reasons explained under observations as above

i. Areas proposed for any activity other than defense in the western coast of the GNI especially the areas of Pemayya Bay, Casuarina Bay and Alexandria Bay which can be used by Leatherback and other sea turtles and Nicobar Megapods and even by crocodiles as alternative nesting sites.

ii. RoW for the roads should be not more than 30 meters and remaining 25-meter width shall be excluded from the total project area and shall be kept as natural green belt on both sides of road without cutting any trees. Accordingly revised tree enumeration be submitted.

iii. Parts of proposed master plan for Ports which are falling within CRZ IA and IB areas (viz areas B C D etc shown in presentation) shall be excluded from the revised layout of master plan.

iv. Some of the township clusters seems to have several defense installations abutted by commercial and tourism infrastructure. It is not advisable considering strategic nature and safety requirements.

v. Golf course will not be permitted considering extremely water intensive activity and also considering very high number of endemic species that inhibit GNI. It is misfit in the holistic vision for the island.

vi. Patches of wildlife corridors as explained under (b)(ii) below shall also be excluded from the project area

B. Amendment in Port, Township and Road designs:

vii. Possibility of extending the western isolated breakwater up to base of the Galathea bay parallel to the eastern flank shall be explored so that an independent channel can be created between the port and the western flank of the bay for the possible unhindered movement of the turtles to and fro nesting grounds in western flank.

viii. 300 to 500 Mtr wide natural forest corridor should be kept as animal corridor at every 3 Km interval all along project area for facilitating movement of wildlife between forest and the sea shore so that development plants at GNI does not stop the access of several endemic and endangered wild animals like Nicobar Long-tailed Macaque, Nicobar tree shrew, Robber or Coconut crabs, Saltwater Crocodiles Nicobar Megapod, Nicobar Crake etc. to the sea which is actually the part of their habitat. This shall be done in consultation of A&NFD and wildlife experts. Chainage wise details to be provided in the road alignment

ix. Stretches of road crossing these above-mentioned wildlife corridors shall be elevated to facilitate the movement of wildlife under these elevated road stretches or alternatively wildlife over bridges can be constructed if terrain demands. Chainage wise details to be provided in the road alignment

x. Provision shall be made in road design for canopy walks/bridges for crossing the arboreal animals as well as for passage of snakes, crabs crocodiles etc and other amphibians/ reptiles. Chainage wise details to be provided in the road alignment

xi. The stretches of the road falling in CRZ IA and IB area shall be on stilts as per the prescriptions in CRZ notification. Revised lay out of plan shall clearly indicate such stretches along with geo coordinates and the mention of road on stilts shall also be made in the master plan as per this revised lay out. Chainage wise details to be provided in the road alignment

C. Submission of revised project area and layout of the masterplan: -

xii. After exclusion of the areas as mentioned in para A above and doing necessary amendment in master plan as mentioned in Para B above a revised project area and

revised layout /master plan shall be submitted.

D. Declaration of Protected Areas for conservation of the Turtles, Megapode bird and crocodiles: -

xiii. A&N FD in consultation with WII shall identify the areas in Pemayya Bay, Casuarina Bay and Alexandria Bay suitable for habitat and nesting ground of Leatherback turtles, Nicobar Megapode and Saltwater Crocodiles. Additional legal protection to these areas by way of declaring these areas as WLS or Conservation Reserves as per provisions of Wildlife Protection Act. This may help in ensuring the continued nesting of these animal/birds in Great Nicobar Islands. These will be in addition to the PAs already in the process of notification.

xiv. Wildlife corridors as proposed in above paras can also be declared as Conservation Reserves/ Community Reserves under WLPA.

E. Conservation/Mitigation Plans:

xv. Mangrove Conservation Plan: Mangrove areas falling inside the project areas should be clearly demarcated and area calculated. Total loss of Mangrove cover shall be intimated which shall form the basis for Mangrove Conservation Plan. Detailed Mangrove Conservation Plan should be prepared by PP in consultation with A&NFD which shall include compensatory planting of Mangrove as well as re-densification of the degraded mangrove areas in Great Nicobar, and other islands of Nicobar group and Andaman group of Islands. This plan shall form the part of EIA/EMP reports. PP shall also indicate the time frame for preparation of the plan and its inclusion in the EIA/EMP report.

xvi. Coral Conservation Plan: A detailed Coral Conservation/Translocation Plan shall be prepared by the PP in consultation with A&NFD and ZSI following IUCN sp translocation protocols and the same shall be made the part of EIA/EMP report. PP shall also indicate the time frame for preparation of the plan and its inclusion in the EIA/EMP report.

xvii. Crocodile Conservation and Management Plan: PP shall indicate the crocodile habitats and nesting grounds inside the project area along with the geo coordinates and intimate the status of such crocodile habitat and nesting grounds as per the Action Plan for Mitigation of Human-Crocodile Conflict in Andaman & Nicobar Islands. In case these identified crocodile habitats/nesting grounds are categorized as Crocodile Conservation Zone attempts shall be made to exclude these crocodile habitats/nesting grounds from the project area and in case it is unavoidable to exclude such areas then a crocodile Conservation Plan shall be made by PP in consultation with A&NFD and WII and same shall be part of EIA/EMP reports. PP shall also indicate the time frame for preparation of the plan and its inclusion in the EIA/EMP report.

xviii. Wildlife Institute of India should submit detail road map with financial requirement for monitoring Leatherback Turtle movement in GNI and habitat restoration & nest protection measures at all other nesting sites in A & N for minimum 10 years.

xix. SACON/ Wildlife Institute of India is requested to submit Nicobar Megapod monitoring and conservation plan for minimum 10 years.

xx. The PP has to submit revised ICRZ recommendation letter issued on 22/03/2022 by Andaman & Nicobar Islands Coastal Zone Management Authority (ANCZMA) especially regarding effective ICRZ area involved in various activities has been revised and part of holistic project now declared for Defence, Strategic, National Security, and Public Purpose.

Agenda No. 3.2

Development of 4 lane access controlled New Greenfield Highway from Warangal (Ch: 112+240) to Khammam (Ch: 220+480) section (total length 108.24 km) in the state of Telangana – Environmental Clearance.

[Proposal No. IA/TG/NCP/217090/2021 and File No. 10/32/2021-IA.III].

"*The EAC noted that the Project Proponent and the consultant have given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in PFR/DPR/Form-1/Annexure-III. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and ToR/Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.*

3.2.1. The above mentioned proposal was placed before the Expert Appraisal Committee (EAC) for Infrastructure, CRZ and other miscellaneous projects in its 297th meeting on 24th – 25th May 2022. The project proponent along with the EIA Consultant M/s Mantras Green Resources Ltd. (formerly known as Mantras Resources) made a presentation and presented at the Ministry in Physical mode and provided the following information:–

3.2.2. The proposed project is for "Development of 4 lane access controlled New Greenfield Highway from Warangal (Ch: 112+240) to Khammam (Ch: 220+480) section (total length 108.24 km) in the state of Telangana" The proposed project starts near Agrampahad village (Ch: 112+240) in Warangal district and ends at the outskirts of Khammam (Ch: 220+480) in the state of Telangana. The RoW for the proposed highway is 45 meters. Geographical location of the proposed alignment is Start from 18°02'37.12"N, 79°41'08.16"E t o 17°15'12.13"N, 80°12'42.87"E.

3.2.3. The Terms of Reference (ToR) proposal was considered by the Expert Appraisal Committee(EAC) for infrastructure, CRZ and other miscellaneous projects in its 268th meeting during 26th-27th July 2021 and the committee recommended for grant of ToR, Ministry granted the ToR vide File No. 10/32/2021-IA.III on dated 16thAugust 2021.

3.2.4. The Proposed project is a green field Highways. As per the EIA Notification, 2006 and its subsequent amendments, it is a category "A" project and will fall under the category-7(f) Highways of the EIA notification 2006, thus Environmental Clearance is required from the EAC of MoEF&CC. Total cost of the Project is for the proposed development is estimated to be Rs. 2899.21Cr.

3.2.5. The total land acquisition for the proposed highway is 567.74 ha out of which 50.159 ha is Govt land. The proposed alignment is not passing through any forest area in the State.

3.2.6. Land Use and Land Cover of 500 m buffer radius of project site:

Sl. No.	Category	Area (ha.)	Percentage (%)
1	Water body	549.22	4.69
2	Vegetation	1693.67	14.43
3	Built-up Area	754.41	6.43
4	Barren land	3577.23	30.50
5	Open scrub	2782.88	23.72
6	Agriculture land	2373.82	20.23
	Total	11731.23	100

3.2.7. Right of Way: The Proposed Right of Way is 45 m as per the requirement keeping in view the fully access controlled Highway with 4-lane dual carriage way configuration.

3.2.8. Public Hearing: The details are as following-

S. No.	**Date**	**Location**	**Name of District**	**Presided by**
1.	23.03.2022	Zilla Parishad High School, Gatlakaniparthy Village, Shayampet Mandal,	Hanumakonda	Additional District Collector
2.	2.02.2022	Grain Market Yard, Nekkonda (V&M),	Warangal	Collector and District Magistrate
3.	11.02.2022	The Gramapanchayat Office, Ayyagaripalle(V), Kuravi(M)	Mahabubabad	Additional District Collector
4.	26.03.2022	Open Land, Mandal Parishad Development Office, Raghunadhapalem (V&M)	Khammam	Additional Collector and Addl. District Magistrate
Major issues raised		● Service road along the side of proposed highway affected people demanded for vehicular underpass for day activities ● Providing the quality drinking water and irrigation facilities. ● Air and Noise Pollution was not a big concern. However, dust pollution in dry season and noise due to traffic movement sometimes disturbs immediate roadside dwellers. ● Green Belt development along the highway.		
Compliance by the PP		● Adequate Provision of underpasses to cross the highway are made in the project in the form of Interchanges/VUP‟s-9 Nos, LVUPs-47 Nos, and also utility duct is provided for crossing of water pipelines & other cables if any at every		

	500m for facility of public and as per the request of Public, Cart tract/Utility corridors of 3.5 mts on both sides are provided for entire length of alignment. ● Hydrology study has been conducted as the part of the DPR study and the alignment will be constructed in such a way that there shall not be impact on the ground water sources and total 435 Numbers of Cross drainage structures are proposed. Major bridge -1 No, Minor Bridge – 44 Nos. Culverts – 390 nos. ● Baseline studies were conducted within 10 km radius as per the guidance manual from MoEF&CC. Upon summing up the emissions during construction and operation phase, The emissions shall fall within limits prescribed. Further to mitigate any abnormalities, EMP is in place to monitor. A budget of Rs.41,93,18,016.00 has been kept for Environmental Monitoring of air, water, soil, noise and Soil. In addition to it, Dense linear vegetation along the NH trees will be planted which may reduce the air & noise pollution. ● Plantation of native species shall be made and control of it vests with the forest department. The plantations shall be taken as per Green Highway Policy 2015. ● Adequate Provision of underpasses to cross the highway are made in the project in the form of Interchanges/VUP‟s-9 Nos, LVUPs-47 Nos, and also utility duct is provided for crossing of water pipelines & other cables if any at every 500m for facility of public and as per the request of Public, Cart tract/Utility corridors of 3.5 mts on both sides are provided for entire length of alignment.

3.2.9. Land Use/Land Cover: The Land use pattern on 10 km on either side of the proposed National Highway primarily comprises of agricultural land, forest area, land for cattle grazing, village settlements and village ponds/nallah. The proposed alignment passes mostly through uninhabited area avoiding village establishments. The agriculture practiced is mostly multi crop due to the network of canals/rivers and main crops grown in the area are Wheat, rice, maize, sugarcane, cotton etc. The proposed highway lies generally in plain terrain. However certain length of highway lies in rolling terrain.

3.2.10. Rainwater harvesting: The proposed alignment is crossed One River, 38 Nala/Canal/Village pond and the natural drainage of the project impacted area shall be maintained through improvement of 390 nos. of culverts, 435 nos. of cross drainage structures and 01 major bridge and 44 nos minor of bridges. The proposed alignment does not pass through any flood prone area. Rainwater harvesting structures shall be provided at the interval

of 500 m on either side of carriageway as per availability of RoW and depending on the water table of first aquifer (Approx. 216 nos. of structures shall be constructed).

3.2.11. Water requirement: The peak water requirement is 2668323 KL during construction stage and will be extracted from local surface water resources i.e. from local surface water after getting necessary permission from concerned authority by the appointed contractor. No Groundwater extraction is proposed.

3.2.12. Diversion of Forest Land: The Proposed Project does not involve any Forest land. The proposed alignment does not pass through Wildlife Sanctuary/National Park and its eco sensitive zone within 10 km radius from the proposed project. The proposed project does not passes through any CRZ locations.

3.2.13. Tree cutting: About 4022 trees are to be felled. About 666trees/km on either side of proposed highway and median shall be planted in accordance to IRC SP21:2009 and Green Highway Policy 2015.

3.2.14. Waste Management: The total waste generation shall be 270 TPA. Construction and demolition waste due to demolition of existing structures & construction activities shall be managed as per Construction and Demolition Waste Management Rules, 2016. Municipal wastes generated from the construction workers camp shall be managed as per Solid Waste Management Rules, 2016. Hazardous wastes generated due to activities like maintenance and repair work on vehicles shall be managed as per Hazardous and Other Wastes (Management, & Trans-boundary Movement) Rules, 2016.

3.2.15. Parking requirement: As per the detailed field surveys and reconnaissance, truck lay byes and bus stop have been proposed. The rest area will provide common facilities like petrol pump, first aid medical facilities, restaurant and vehicle parking etc. For petrol pump, the guidelines issued by OISD of Ministry of Petroleum shall be followed. The facilities shall be planned at approximately 50 km interval.

3.2.16. R&R Issues: Total length of the project is 108.24 Km, passing through 4.86 km lies in Hanumakonda district,36.1km in the Warangal district, 50.6km in Mahabubabad district and 16.68km in Khammam district and the Total 48 No.of villages area affected (4 Hanamkonda, 18 villages in Warangal, 18 villages in Mahbubabad and 8 villages in Khammam district) in state of Telangana. Adequate compensation would be paid as per the measurement and prevailing state government norms. Further the compensation towards the acquisition of land will be made as per the provisions of the NH Act 1956 and applicable clauses and procedures as laid down in the RFCT LARR Act, 2013.

3.2.17. Employment Potential: Project shall provide direct employment opportunities for about 1400 persons(including permanent and temporary) based on Ministry of Road Transport & Highways.

3.2.18. Benefits of the Project: In addition to the direct benefits, there are number of indirect benefit attributed to Highway project. Lowering transportation cost for users and improving access to goods and services enables new and increased economic and social activity. After the development of state highway, the land prices may increase and there would be changes in development of business in order to take advantage of improved speed and reliability in the

transportation system. Hence these benefits will lead to increase property values, increased productivity, employment and economic growth. The indirect benefit of the proposed highway would work through the dynamic developmental externalities generated through the forward and backward linkages. A better connectivity will increase the business, which will reflect in the changes in the pattern of economic activities, income generation, price evolution, and employment condition. There will be also increase in greater accessibility to market, health and educational facilities.

3.2.19. The comprehensive socio-economic assessment for the proposed project has been carried out by the independent expert of Punjabi University, Patiala. The traffic study has been done at 9 homogenous sections all along the highway and with the help of the traffic study various numbers of Underpasses, VUP (vehicle underpasses), PUP (Pedestrian underpass, Culverts, Minor and major bridges, major and minor junctions, flyovers/interchanges etc have been designed and proposed on the National highway.

3.2.20. Details of Court Cases: No court cases are pending on this Project

3.2.21. The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 296th meeting during 24th – 25th May 2022 and observe that regarding the above proposal several representations by local people regarding Public Hearing and bad effect of proposed project on environment and agriculture land were received. A DO letter from Hon'ble Minister for Panchayat Raj written to Hon'ble Ministry for Road Transport and Highways is also forwarded to the EAC and the Ministry. In this regards, the Committee is of the view that a detailed enquiry need to conduct by the District Collector and reply has to submit to the Ministry.

3.2.22. In view of the above, The EAC **deferred** the proposal. The Proposal may be placed before the EAC after receipt of enquiry report from the Concern District Collector.

Agenda No. 3.3

Subject: **Construction of 4 lane access controlled New Greenfield Highway section of Khammam - Vijayawada of length 89.429 km from V. Venkatayapalem village to Jakkampudi village (on NH-16) (Design Chainage 220+480 to 309+909) under Other Economic Corridor in the states of Telangana & Andhra Pradesh by M/s National Highways Authority of India(NHAI)– Environmental Clearance.**

[Proposal No. IA/TG/NCP/215098/2021 and File No. 10/30/2021-IA.III]

"*The EAC noted that the Project Proponent and the consultant have given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and ToR/Environmental Clearance/validity Extension given, if any, will be revoked at the risk and cost of the project proponent.*

3.3.1. The above mentioned proposal was placed before the Expert Appraisal Committee (EAC) for Infrastructure, CRZ and other miscellaneous projects in its 297th meeting on 24th – 25th May 2022. The project proponent along with the EIA Consultant M/s Enviro Infra Solution Pvt.Ltd. made a presentation and presented at the Ministry in Physical mode and provided the

following information:–

3.3.2. The proposed proposal of "Construction of 4 lane Access Controlled New Greenfield Highway Section of Khammam to Vijayawada of length 89.429 km from V.Venkatayapalem village to Jakkampudi village (on NH-16) (Design Chainage 220+480 to 309+909) under other Economic Corridor in the states of Telangana & Andhra Pradesh by M/s National Highways Authority of India (NHAI)" The proposed project highway starts from V. Venkatayapalem village in Khammam district of Telangana state and terminates at Jakkampudi village in Krishna district of Andhra Pradesh state. The proposed Row is 45 m and the total Length of the Project is 89.429 km.

3.3.3. The proposed project falls under 7(f) - Category-A, Highway as per EIA notification 2006 and its subsequent amendments. Total cost of the project is Rs. 3091.76 crores.

3.3.4. The Proposed project scoped for Terms of Reference (ToR) was considered in 266th Meeting on 12th July 2021 wherein the committee recommended for grant of ToR and Ministry granted the ToR vide letter no. F. No. 10/30/2021-IA.III, dated 26th July, 2021.

3.3.5. The total land acquisition for the proposed highway is 433.02 ha out of which 22.75 ha is Government land and 410.27 ha is Private Land. The proposed RoW of the project is 45 m.

3.3.6. Public Hearing: The Public Hearing for the project was conducted by the Telanaga Pollution Control Board on 15.03.2022 at Khammam, which was presided by Additional District Collector & Additional District Magistrate, Khammam in the presence of Environmental Engineer, Regional office, Kothagudem and the Public Hearing in Andhra Pradesh was conducted by the Andhra Pollution Control Board on 03.03.2022. at Z.P.High School, G.Konduru(V&M), Krishna District, A.P which was presided by Additional District Magistrate, Krishna District in the presence of Environmental Engineer, Regional office, Vijayawada, APPCB.

Details of advertisement given	
Date of Public Consultation	15.03.2022 at Khammam, Telangana and 03.03.2022 Krishna District, Andhra Pradesh
Venue	Govt. Junior College & High School, Siripuram (V), Madhira (M), Khammam Dist, Telangana and Z.P.High School, G. Konduru(V&M), Krishna District, A.P
Presiding Officer	Additional District Magistrate
Major issues raised	Improvement of Road efficiency with economic growth. With the above approach to design, Construction and operation the project will be socially feasible. Reduction of the air and noise pollution in the vicinity of the highway. Provision of truck lay bays, bus bays, underpasses and Pedestrian underpasses in some villages. Villagers have also demanded

	service roads and Vehicular Underpass at every 500m in the built up areas and adequate compensation to the Project affected persons.
Compliances	The concerns raised by the villagers have been addressed in the project design. Baseline studies were conducted within 10 km radius as per the guidance manual from MoEF&CC. Upon summing up the emissions during construction and operation phase, The emissions shall fall within limits prescribed. Further to mitigate any abnormalities, EMP is in place to monitor The Compensation to project affected persons will be paid as per Right to Fair Compensation and Transparency in Land Acquisition, Resettlement and Rehabilitation Act, 2013, National Highways Act (NH Act), 1956.

3.3.7. The land use pattern on 10 km either side of the project highway is predominately agriculture followed by habitation, forest and waste land. The proposed project does not involve any diversion of forest land. The alignment does not pass through any wild life sanctuary, protected area and its eco sensitive zone. The proposed alignment passes mostly through uninhabited area avoiding village establishments. The agriculture practiced is mostly multicrop due to the network of canals/rivers and main crops grown in the area are Wheat, rice, maize, sugarcane, cotton etc.

3.3.8. There are 02 no's Rivers, 05 no's of local streams & 14 no's Canals are crossing the proposed alignment. The natural drainage of the project impacted area shall be maintained through improvement of 09 nos. of reconstruction of existing culverts, 01nos. of Widening of existing culverts, 431 no's of Box Culverts and 24 no's of Box Culverts. The proposed alignment does not pass through any flood prone area. The peak water requirement is 19,62,869 KLD during construction stage and will be extracted from local surface water resources i.e. from local surface/ground water after getting necessary permission from concerned authority by the appointed contractor. No Groundwater extraction is proposed.

3.3.9. Rainwater harvesting structures shall be provided at the interval of 500 m on either sides of carriageway as per availability of RoW and depending on the water table of first aquifer (Approx. 179 nos. of structures shall be constructed). The total cost of the rainwater harvesting structures including its maintenance is Rs. 8,95,0000and this cost has been covered in the EMP cost.

3.3.10. The proposed alignment does not pass through Wildlife Sanctuary/National Park and its eco sensitive zone within 10 km radius from the proposed project. The proposed project does not passes through any CRZ locations.

3.3.11. Tree cutting: The alignment will require cutting of approximately 53,396 no. of trees. Avenue plantation shall be carried out as IRC:SP:21:2009 on available RoW apart from statutory requirements.

3.3.12. Waste Management: Approx. 200 TPA waste during construction phase waste during operation phase at tolls and wayside amenities area within PROW may be generated. Bio degradable waste shall be disposed through bio composting and other waste through landfill site.

3.3.13. Parking requirement: As per the detailed field surveys and reconnaissance, truck lay byes and bus stop have been proposed. The rest area will provide common facilities like petrol pump, first aid medical facilities, restaurant and vehicle parking etc. For petrol pump, the guidelines issued by OISD of Ministry of Petroleum shall be followed. The facilities shall be planned at approximately 50 km interval.

3.3.14. R&R Issues: The total land acquisition for the proposed highway is 433.02 ha. The total no of PAFs area 4390 nos, The Project Adequate compensation would be paid as per the measurement and prevailing state government norms. Further the compensation towards the acquisition of land will be made as per the provisions of the NH Act 1956 and applicable clauses and procedures as laid down in the RFCT LARR Act, 2013. The estimated cost for Rehabilitation & Resettlement including land cost has been worked out to Rs. 381Crores.

3.3.15. Benefits of the project: The proposed project would act as the prime artery for the economic flow to this region. The project will enhance connectivity between rural & urban population which will benefit the all sections of the society like general population, small-medium-large scale industries, farmers, businessmen etc. Improved access to higher education facilities & modern health facilities. It will strengthen both rural & urban economies which in turn will improve economic scenario of the state and country. Faster transportation will strengthen tourist development in the area. Improved road connectivity will help in better implementation and management of government schemes. The proposal shows a potential of economic growth along the highway & including employment generation. Construction highway is expected to generate around 800 persons would be employed temporarily for a period of 2 years. However due to construction of toll plazas approx. 40 persons will be employed on permanent basis. Preference will be given to local people for employment.

3.3.16. The comprehensive socio-economic assessment for the proposed project has been carried out by the independent expert of Punjabi Universty, Patiala. The traffic study has been done at 9 homogenous sections all along the highway and with the help of the traffic study various numbers of Underpasses, VUP (vehicle underpasses), PUP (Pedestrian underpass, Culverts, Minor and major bridges, major and minor junctions, flyovers/interchanges etc have been designed and proposed on the National highway.

3.3.17. Details of Court cases: No court case is pending against the proposed project.

3.3.18. The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 296th meeting during 24th – 25th May 2022 and observe that

regarding the above proposal several representations by local people regarding Public Hearing and bad effect of proposed project on environment and agriculture lands were received. A DO letter from Hon'ble Minister for Panchayat Raj written to Hon'ble Ministry for Road Transport and Highways is also forwarded to the EAC and the Ministry. In this regards, the Committee is of the view that a detailed enquiry need to conduct by the District Collector and reply has to submit to the Ministry.

3.3.19. In view of the above, The EAC **deferred** the proposal. The Proposal may be placed before the EAC after receipt of enquiry report from the Concern District Collector.

Agenda No. 3.4

Subject: Development of 6 lane Access Controlled Greenfield Highway of Shamli – Ambala Sec. from Km Ch. 0+000 to Km Ch. 120+970 (Total length: 120.970 km) in the States of Uttar Pradesh and Haryana under Bharatmala Pariyojana Phase II (Lot-9/Package-1) by M/s National Highways Authority of India – Environmental Clearance.

[Proposal No. IA/HR/NCP/231468/2021 and File No. 10/33/2021-IA.III]

"*The EAC noted that the Project Proponent and the consultant have submitted undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent."*

3.4.1. The proposed proposal is for 'Development of 6 lane Access Controlled Greenfield Highway of Shamli –Ambala Sec. from Km Ch. 0+000 to Km Ch. 120+970 (Total length: 120.970 km) in the States of Uttar Pradesh and Haryana under Bharatmala Pariyojana Phase II (Lot-9/Package-1) by M/s National Highways Authority of India'

3.4.2. The abovementioned proposal was placed before the EAC in its 297th meeting on 24th–25th May 2022. The project proponent along with the EIA Consultant M/s Mantras Green Resources Limited made a presentation and presented at the Ministry in Physical mode and provided the following information:-

3.4.3. The proposed highway starts near Gogwan Jalalpur village (Ch: 0+000) in Shamli district of Uttar Pradesh and ends at Sadopur village in Ambala district in Haryana. Total length of the proposed section is ~120.970 km. The proposed access-controlled highway is a complete greenfield project falls in Uttar Pradesh (Shamli, Saharanpur district), (Yamuna Nagar, Karnal, Kurukshetra, Ambala district) Haryana & Punjab State (SAS Nagar district). The RoW for the proposed highway is 60 meters. The Geo-coordinates of the proposed projects are in Latitude 29° 32' 57.51" N 77° 26' 33.68" E and Longitude 30° 24' 48.27" N, 76° 47' 1.26" E.

3.4.4. The Terms of Reference (ToR) proposal was considered in 271st EAC Meeting held on 26th -27th August, 2021 and The Terms of Reference (ToR) was granted by Ministry vide File No.10-33/2021-IA.III on dated 22nd Sept 2021 & amended on 6th Dec 2021.

3.4.5. Proposed project will fall under the category-7(f) Highways of the EIA notification 2006 and Total cost of the Project is for the proposed development is estimated to be Rs. 3963.80Cr.

3.4.6. The total land acquisition for the proposed highway is 893.81 ha out of which 5.97 ha is forest land. The Area is presented in the below table. The stage-1 Forest Clearance is under process at DFO level. The proposed RoW of the project is 60 m.

S. No.	Date	**Location**	**Name of District**	**Presided by**
1	15th March, 2022	Community Centre Village- Tepla, Saha, Ambala	Ambala District, Punjab	Additional Deputy Commissioner
2	09 March, 2022	Block Development and Panchayat Office, Near Bus Stand, Indri	Karnal, Haryana	Additional Deputy Commissioner
3	25 March, 2022	Shree Sahid Udham Singh Kamboj Dharamsala, Radaur	Yamunanagar, Haryana	Additional Deputy Commissioner
4	16 March, 2022	Panchayat Bhavan, Village- Ghajlana, District- Kurukshetra	Kurukhetra, Punjab	Additional Deputy Commissioner
5	12 March, 2022	Community Centre, Village Nagla, Dera Bassi	SAS Nagar District, Punjab	Additional Deputy Commissioner
6	22 March, 2022	Conference Hall Collectorate Shamli	Shamli, Uttar Pradesh	Additional District Collector
7	28 March, 2022	Jan Manch, Sabhagar near Gandhi Park, Saharanpur	Saharanpur, Uttar Pradesh	Additional District Collector
Major issues raised		Water logging. water harvesting every 50 meter of the road facility for crossing of pipeline and wires will be provided. Tree cutting issues, Compensation regarding underground water pipeline. Improvement of Road efficiency with economic growth. With the above approach to design, Construction and operation the project will be socially feasible. Reduction of the air and noise pollution in the vicinity of the highway.		

	Provision of truck lay bays, bus bays, underpasses and Pedestrian underpasses in some villages. Villagers have also demanded service roads and Vehicular Underpass at every 500m in the built up areas and adequate compensation to the Project affected persons.
Compliances	Adequate number of bridges and culverts are proposed to maintain the natural flow of storm water. Rain water harvesting system is provided to solve the rain water logging problem. Compensation for the pipeline falling within the proposed ROW shall be made as per evaluation of the concerned department. The average distance of underpass/ flyover/culverts is All existing roads are provided with underpass and adequate Box type culverts will be provided, as per site requirement. approx. 500m Baseline studies were conducted within 10 km radius as per the guidance manual from MoEF&CC. Upon summing up the emissions during construction and operation phase, the emissions shall fall within limits prescribed. Further to mitigate any abnormalities, EMP is in place to monitor. Approx. 19632 trees will be cut & about 120000 trees will be planted for the complete project.

3.4.8. The Land use pattern on 10 km on either side of the proposed National Highway primarily comprises of agricultural land, forest area, land for cattle grazing, village settlements and village ponds/nallah. The proposed alignment passes mostly through uninhabited area avoiding village establishments. The agriculture practiced is mostly multicrop due to the network of canals/rivers and main crops grown in the area are Wheat, rice, maize, sugarcane, cotton etc. The proposed highway lies generally in plain terrain. However certain length of highway lies in rolling terrain.

3.4.9. The natural drainage of the project impacted area shall be maintained through improvement of 177 nos. of culverts, 8 nos. of major bridges and 21 nos. minor of bridges. Rainwater harvesting structures shall be provided at the interval of 500 m on either sides of carriageway as per availability of RoW and depending on the water table of first aquifer the proposed alignment does not pass through any flood prone area. The peak water requirement is 2,70,91,578 KLD during construction stage and will be extracted from local surface water resources i.e. from local surface/ground water (which is easily available) after getting necessary permission from concerned authority by the appointed contractor. No Groundwater extraction is proposed.

3.4.10. The proposed alignment does not pass through Wildlife Sanctuary/National Park and its eco sensitive zone within 10 km radius from the proposed project. The proposed project does not passes through any CRZ locations.

3.4.11. Tree cutting, types, number, girth size etc.: The alignment will involve cutting of approx. 19632 nos. of trees. The avenue plantation will be carried out as per IRC SP-21 and National Green Highway policy 2015 within the available ROW.

3.4.12. Parking requirement: As per the detailed field surveys and reconnaissance, truck lay byes and bus stop have been proposed. The rest area will provide common facilities like petrol pump, first aid medical facilities, restaurant and vehicle parking etc. For petrol pump, the guidelines issued by OISD of Ministry of Petroleum shall be followed. The facilities shall be planned at approximately 50 km interval.

3.4.13. R&R Issues: About 3719 nos. of Titleholders are likely to be affected due to proposed development. Adequate compensation would be paid as per the measurement and prevailing state government norms. Further the compensation towards the acquisition of land will be made as per the provisions of the NH Act 1956 and applicable clauses and procedures as laid down in the RFCT LARR Act, 2013.

3.4.14. Benefits of the project: The proposed project would act as the prime artery for the economic flow to this region. The project will enhance connectivity between rural & urban population which will benefit the all sections of the society like general population, small-medium-large scale industries, farmers, businessmen etc. Improved access to higher education facilities & modern health facilities. It will strengthen both rural & urban economies which in turn will improve economic scenario of the state and country. Faster transportation will strengthen tourist development in the area. Improved road connectivity will help in better implementation and management of government schemes. The proposal shows a potential of economic growth along the highway & including employment generation. Construction highway is expected to generate about 1600 employment of peoples.

3.4.15. The comprehensive socio-economic assessment for the proposed project has been carried out by the independent expert of Punjabi University, Patiala. The traffic study has been done at 9 homogenous sections all along the highway and with the help of the traffic study various numbers of Underpasses, VUP (vehicle underpasses), PUP (Pedestrian underpass, Culverts, Minor and major bridges, major and minor junctions, flyovers/interchanges etc have been designed and proposed on the National highway.

3.4.16. Details of Court cases: No court case is pending against the proposed project.

3.4.17. The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 296th meeting during 24th – 25th May 2022 and **recommended** the proposal for grant of Environmental clearance with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

SPECIFIC CONDITIONS

i. In borrow pits, the depth of the pit shall be regulated such that the sides of the excavation will have a slope not steeper than 1:2, from the edge of the final section of bank. Soil erosion checking measures shall be carried out. Details for Borrow area operation and rehabilitation given in Chapter 4 and Chapter 9 of the EIA report shall be followed.

ii. Quarry areas shall be barricaded during mining operations. The abandoned quarry shall be developed as water reservoirs with proper fencing around quarry area. Details for Quarry area operation and rehabilitation given in Chapter 4 of the EIA report shall be followed.

iii. In all the construction sites within 150m of the nearest habitation, noisy construction work such as crushing, concrete mixing will be stopped during the night time between 10.00 pm to 6.00 am. No noisy construction activities will be permitted around educational institutions/health centres (silence zones) up to a distance of 100 m from the sensitive receptors. All plants and equipment used in construction shall strictly conform to the CPCB/SPCB noise standards.

iv. Traffic Control Devices/Road Safety Devices/ Roadside Furniture including various types of cautionary, informatory, regulatory as mandatory signboards, road markers, studs, etc. shall be provided at appropriate locations all along the project stretch in accordance with the specifications laid down in Manual of Specifications and Standards for Expressways (IRC: SP:99-2013) and IRC:8, IRC:25, IRC:26, IRC:35, IRC:67, IRC:79, IRC:103 and Section 800 of MORTH Specifications.

v. All the major, minor bridges and culverts should not affect the drainage systems. Flood plains of the rivers/ drainage systems are not to be disturbed.

vi. About 15721 nos. of trees are likely to be felled along the proposed alignment after obtaining permission from the competent authorities. Afforestation using compensatory plantation in the ratio of 1:10 shall be carried out. Native tree species shall be provided as per the IRC Guidelines on Landscaping and Tree Plantation (IRC:SP:21-2009). Effort should be made to plant native trees and Ficus species on both sides of the alignment. Special attention shall be given for protecting giant trees, and locally important trees (having cultural importance).

vii. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent shall abide by all the commitments made by them to address the concerns raised during the public consultation. The project proponent shall initiate the activities proposed by them, based on the commitment made in the public hearing. All other activities including pollution control, environmental protection and conservation, R&R, wildlife and forest conservation/protection measures including the NPV, Compensatory afforestation etc., either proposed by the project proponent based on the social impact assessment and R&R action plan carried out during the preparation of EIA report or prescribed by EAC, shall also become part of EMP and shall be implemented.

viii. Proponent shall keep the finish road level sufficiently elevated from ground level with

provision of railing on both sides to restrict animal crossing in order to avoid the possibility of wildlife injury/death. Major water bodies have been observed in the vicinity of the proposed road alignment & may be potential human elephant conflict points, appropriate nos of animal safe passages as per the guideline framed by the Wildlife Institute of India.

ix. No Ground water shall be extracted and used. Approval/permission of concerned authority shall be obtained before drawing surface water from canal or any other sources.

x. Rain water harvesting pit shall be at least 3 - 5 m above the highest ground water table.

Agenda No. 3.5

Subject: Expansion of Dighi Port at Taluka Murud and Taluka Shrivardhan, District Raigad, Maharashtra by M/s Dighi Port Limited – Terms of Reference Proposal No. IA/MH/NCP/269319/2022 and File No. 10/23/2022-IA.III

"*The EAC noted that the Project Proponent and the consultant have submitted undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent."*

3.5.1. The proposed proposal is for 'Expansion of Dighi Port at Taluka Murud and Taluka Shrivardhan, District Raigad, Maharashtra by M/s Dighi Port Limited'

3.5.2. The abovementioned proposal was placed before the EAC in its 297th meeting on 24th–25th May 2022. The project proponent along with the EIA Consultant M/s Aditya Environmental Services Pvt. Ltd made a presentation and presented at the Ministry in Physical mode and provided the following information:-

3.5.3. The proposed project is 'Expansion of Dighi Port located at Taluka Murud and Taluka Shrivardhan, District Raigad, Maharashtra by M/s Dighi Port Limited' Dighi lies in Raigad District of Maharashtra, at 18°16'29.24"N, 72°58'8.38"E & 18°16'56.67"N, 72°59'11.21"E.

3.5.4. Initially the Environment Clearance was granted by the Ministry of Environment & Forest (MoEF) vide letter no. 10-8/2005-IA-II dated 30th September 2005, thereafter EC Corrigendum was issued on 26th December 2005 for clarification regarding Phase I involving development of 4 new multipurpose berth and strengthening & upgrading of existing (one number) berth Subsequently EC Corrigendum was issued on 25th June 2012 to treat the EC issued on 30th September 2005 as EC and CRZ clearance and also DPL was permitted to handle LPG as per the corrigendum letter. Further corrigendum to EC & CRZ clearance was issued on 7th December 2021 mentioning the berth dimensions.

3.5.5. As per the existing approval DPL has a permission to construct 4 New multipurpose berths and strengthen upgrade existing (one number) berth having total key length 1650meters, to cater to all kinds of dry cargo, project cargo, container cargo, liquid cargo and Cryogenic

Gas upto -1600c. At present DPL is operating two multipurpose berths on south side (Dighi side). Out of the three approved berths on north side two berths are constructed and are in commissioning phase and one berth is yet to be constructed.

3.5.6. Now DPL is proposing construction of 6175 meters quary length berth including 2 SPM having 900mtr quary length as per the master plan along with back up infrastructure facilities for handling of all type of dry cargo, project cargo, ro-ro, container cargo, ship repair & ship building and all type of liquid cargo and cryogenic gas up to -160^{0}C.

3.5.7. The total length area of the project is 584.50ha, out of which, DPL envisages to development of 7825 meter (6175 new + 1650 existing approved) berth length for cargo handling capacity of 140 MMTPA (Existing 23.65 and expansion 116.35). The total reclamation area will be 445ha (already reclaimed 141 and expansion 304).

3.5.8. During the Meeting PP submitted the following:

S. No.	Component	As per Existing EC Approval	Construction Completed	Construction pending	Proposed expansion	Total after expansion
a)	Total quay length of berth	5 berths of 325 meter X 35 meter each	4 berths are constructed: 2 on North side and 2 on South side	1 berth of 325 m is pending for construction	6175 meter (North side: 1925 meter + South side: 4250 meter) + 1 berth of 325 m approved earlier on North side	7825 meter (North side: 2925 meter + South side: 4900 meter)
b)	Single Point Mooring (SPM)	-	-	-	2 SPM's	2 SPM's
c)	Cargo handling	23.65 Million metric ton per Annum	-	-	116.35 MMTPA	140 MMTPA

S. No.	Component	As per Existing EC Approval	Construction Completed	Construction pending	Proposed expansion	Total after expansion
		(MMTPA)				
d)	Total reclamation	141 Ha	114 Ha	-	304 Ha (North side: 160 Ha. + South side: 144 Ha.)	445 Ha
e)	Total land acquisition	139.5 Ha	-	-	Not proposed	139.5
f)	Total area of the project	280.5 Ha	-	-	304 Ha	584.5 Ha
g)	Total capital dredging	-	-	-	114 Million m^3	114 Million m^3
h)	Total water requirement	1.4 Million litres per day (MLD)	-	-	50 MLD	51.4 MLD
i)	Power requirement	240 MWh/day	-	-	700 MWh/day	900 MWh/day
j)	Type of cargo	All kinds of dry cargo (coal, bauxite, Fertilizer and Fertilizer raw material, molasses,	-	-	Handling and storage of multipurpose cargo including coal, iron ore, bulk, break bulk, general cargo, project cargo, dry cargo, container, RO-RO, ship building, ship repair, fertilizers and raw materials, automobiles and other non-hazardous	

S. No.	Component	As per Existing EC Approval	Construction Completed	Construction pending	Proposed expansion	Total after expansion
		cement, clinkers, Iron, Steel, sugar, project cargo, break bulk, container cargo, POL, LPG, all types of chemicals and other miscellaneous cargo			cargo. Liquid/ gas/ cryogenics up to -160°C to liquid cargo including class A, B, C, petroleum product, excluded petroleum products, non-classified chemicals and petroleum products, other hazardous, toxic and non-hazardous chemicals, crude etc.	

3.5.9. The Committee after deliberation noted that the PP has obtained the EC under the provisions of EIA notification 1994 the EC validity expires in 5 years. Therefore, the EC granted in 2005 is construed to the facilities established with in the validity period and operation. Through the present application submitted online, PP had applied for the expansion of the port project without considering and mentioning the part of the unit which was not completed in the earlier EC dated 2005. Now therefore the Committee advised the PP to include the incomplete part in the present expansion proposal & resubmit the proposal for consideration by the Ministry.

3.5.10. The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 296th meeting during 24th – 25th May 2022 and **return in present form** and asked the PP to submit the revised Form-I and PFR.

Agenda No. 3.6

Subject: Development of 4/6 lane Greenfield Highway starts from Jalbehra (km 00.000) near Ismailabad to Patti Kankra (km 22.850) near Shahbad in the state of Haryana under Bharatmala Pariyojana (Lot-6/package-6) by M/s National Highways Authority of India (Total length – 22.850 km) – Environmental Clearance.

[Proposal No. IA/HR/NCP/242896/2021 and File No. 10/57/2021-IA.III]

"*The EAC noted that the Project Proponent and the consultant have submitted undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent."*

3.6.1. The abovementioned proposal was placed before the EAC in its 297th meeting on 24th – 25th May 2022. The project proponent along with the EIA Consultant M/s P and M Solution made a presentation and presented at the Ministry in Physical mode and provided the following information:

3.6.2. The Proposed project is of Development of 4/6 Lane Greenfield Highway Starts from Jalbehra to Patti Kankara. Connecting NH-152 with NH-44 and passing through important settlements like Ismailabad, Pehowa, and Shahbad of district Kurukshetra in the state of Haryana and the Total length of the Project is 22.850 Km. Project stretch commences from Jalbehra that is about 7 km from Ismailabad and terminates at Patti Kankara which is around 4 km from Shahbad in the state of Haryana. The Geo-Coordinates of the Proposed Project are Start from Location:30°5'28.59"N, 76°40'2.42"E and End at Location: 30°11'35.73"N, 76°51'55.09"E.

3.6.3. The Proposed Project was considered in the 284th meeting during 29th -30thDec, 2021, the Ministry granted the ToR on 28th Jan, 2022.

3.6.4. Proposed project will fall under the category-7(f) Highways of the EIA notification 2006 and Total cost of the Project is for the proposed development is estimated to be Rs 92722 Lakhs.

3.6.5. Landuse/Landcover of project site is as the following:

S.No.	Land use/Landover	Area (ha)	Percentage %	Remarks if any
1.	Private land	108.89	90.93	Agriculture/Barren Land
2.	Government land	3.197	2.67	Agriculture/Barren Land
3.	Forest land	7.663	6.40	-
	Total	**119.75**	**100**	-

3.6.6. Public Hearing: The Public Hearing in Haryana was conducted by the Haryana Pollution Control Board on 08th April, 2022 at Village – Jhansa, District Kurukshetra, Haryana, which was presided by Additional Deputy Commissioner, Kurukshetra in the presence of, Regional officer, Kurukshetra Region, HSPCB.

Date of Public Consultation	08th April, 2022
Venue	Village – Jhansa, District Kurukshetra, Haryana
Presiding Officer	Additional Deputy Commissioner
Major issues raised	Prevent the dust during the construction of the road, causing pollution water during construction, Reduction of the air and noise pollution in the vicinity of the highway, Provision of truck lay bays, bus bays, underpasses and Pedestrian underpasses in some villages. Villagers have also demanded

	service roads and Vehicular Underpass at every 500m in the built up areas and adequate compensation to the Project affected persons.
	Frequent water sprinkling will be done on RoW to suppress the dust arising during construction of project. The Proposed project involves Major Bridge(01), Minor Bridge(01) Flyover(01), Interchange(01), ROB(01), Vehicular underpass(01),LVUP(07), SVUP(10), and Box Culverts(23). Baseline studies were conducted within 10 km radius as per the guidance manual from MoEF&CC. Upon summing up the emissions during construction and operation phase, The emissions shall fall within limits prescribed. Further to mitigate any abnormalities, EMP is in place to monitor.

3.6.7. The natural drainage of the project impacted area shall be maintained through improvement of 23 nos. of culverts, 01 nos. of major bridges and 01 nos. minor of bridges. The proposed alignment does not pass through any flood prone area. The peak water requirement is 6833 KLD during construction stage and will be extracted from local surface water resources i.e. from local surface/ground water (which is easily available) after getting necessary permission from concerned authority by the appointed contractor. No Groundwater extraction is proposed.

3.6.8 Rainwater harvesting structures shall be provided at the interval of 500 m on either sides of carriageway as per availability of RoW and depending on the water table of first aquifer (Approx. 46 nos. of structures shall be constructed). The total cost of the rainwater harvesting structures including its maintenance is Rs. 23,00,000 and this cost has been covered in the EMP cost.

3.6.10. The proposed alignment does not pass through Wildlife Sanctuary/National Park and its eco sensitive zone within 10 km radius from the proposed project. The proposed project does not passes through any CRZ locations.

3.6.11. Tree cutting, types, number, girth size etc.: The alignment will involve cutting of approx. 1686 nos. of trees. The avenue plantation will be carried out as per IRC SP-21 and National Green Highway policy 2015 within the available ROW.

3.6.12. Diversion of Forest Land: Approx. 7.663 ha of forest land (Railway line crossing and canal crossing) need to be diverted for construction of proposed highway. Forest Diversion proposal has been prepared and submitted as per the guidelines and consultation with concerned authorities via proposal no. FP/HR/ROAD/151373/2022 dated 31/01/2022.

3.6.13. Waste Management: Waste Management: Approx. 63 TPA waste during construction phase waste during operation phase at tolls and wayside amenities area within PROW may

be generated. Bio degradable waste shall be disposed through bio composting and other waste through landfill site.

3.6.14. Parking requirement: As per the detailed field surveys and reconnaissance, truck lay byes and bus stop have been proposed. The rest area will provide common facilities like petrol pump, first aid medical facilities, restaurant and vehicle parking etc. For petrol pump, the guidelines issued by OISD of Ministry of Petroleum shall be followed. The facilities shall be planned at approximately 50 km interval.

3.6.15. R&R Issues: Land Acquisition and R&R: About 119.75 ha land likely to be acquired, adequate compensation would be paid as per the measurement and prevailing state government norms. Further the compensation towards the acquisition of land will be made as per the provisions of the NH Act 1956 and applicable clauses and procedures as laid down in the RFCT LARR Act, 2013.

3.6.16. Benefits of the project: The proposed project would act as the prime artery for the economic flow to this region. The project will enhance connectivity between rural & urban population which will benefit the all sections of the society like general population, small-medium-large scale industries, farmers, businessmen etc. Improved access to higher education facilities & modern health facilities. It will strengthen both rural & urban economies which in turn will improve economic scenario of the state and country. Faster transportation will strengthen tourist development in the area. Improved road connectivity will help in better implementation and management of government schemes. The proposal shows a potential of economic growth along the highway & including employment generation. Construction highway is expected to generate about 500 employments of peoples during the construction phase and 70 persons during operation phase.

3.6.17. The comprehensive socio-economic assessment for the proposed project has been carried out by the independent expert of Punjabi University, Patiala. The traffic study has been done at 9 homogenous sections all along the highway and with the help of the traffic study various numbers of Underpasses, VUP (vehicle underpasses), PUP (Pedestrian underpass, Culverts, Minor and major bridges, major and minor junctions, flyovers/interchanges etc have been designed and proposed on the National highway.

3.6.18. Details of Court cases: No court case is pending against the proposed project.

3.6.19. The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 296th meeting during 24th – 25th May 2022 and **recommended** the proposal for grant of Environmental clearance with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

SPECIFIC CONDITIONS

i. In borrow pits, the depth of the pit shall be regulated such that the sides of the excavation will have a slope not steeper than 1:2, from the edge of the final section of bank. Soil

erosion checking measures shall be carried out. Details for Borrow area operation and rehabilitation given in Chapter 4 and Chapter 9 of the EIA report shall be followed.

ii. Quarry areas shall be barricaded during mining operations. The abandoned quarry shall be developed as water reservoirs with proper fencing around quarry area. Details for Quarry area operation and rehabilitation given in Chapter 4 of the EIA report shall be followed.

iii. In all the construction sites within 150m of the nearest habitation, noisy construction work such as crushing, concrete mixing will be stopped during the night time between 10.00 pm to 6.00 am. No noisy construction activities will be permitted around educational institutions/health centres (silence zones) up to a distance of 100 m from the sensitive receptors. All plants and equipments used in construction shall strictly conform to the CPCB/SPCB noise standards.

iv. Traffic Control Devices/Road Safety Devices/ Roadside Furniture including various types of cautionary, informatory, regulatory as mandatory signboards, road markers, studs, etc. shall be provided at appropriate locations all along the project stretch in accordance with the specifications laid down in Manual of Specifications and Standards for Expressways (IRC: SP:99-2013) and IRC:8, IRC:25, IRC:26, IRC:35, IRC:67, IRC:79, IRC:103 and Section 800 of MORTH Specifications.

v. All the major, minor bridges and culverts should not affect the drainage systems. Flood plains of the rivers/ drainage systems are not to be disturbed.

vi. About 15721 nos. of trees are likely to be felled along the proposed alignment after obtaining permission from the competent authorities. Afforestation using compensatory plantation in the ratio of 1:10 shall be carried out. Native tree species shall be provided as per the IRC Guidelines on Landscaping and Tree Plantation (IRC:SP:21-2009). Effort should be made to plant native trees and Ficus species on both sides of the alignment. Special attention shall be given for protecting giant trees, and locally important trees (having cultural importance).

vii. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent shall abide by all the commitments made by them to address the concerns raised during the public consultation. The project proponent shall initiate the activities proposed by them, based on the commitment made in the public hearing. All other activities including pollution control, environmental protection and conservation, R&R, wildlife and forest conservation/protection measures including the NPV, Compensatory afforestation etc., either proposed by the project proponent based on the social impact assessment and R&R action plan carried out during the preparation of EIA report or prescribed by EAC, shall also become part of EMP and shall be implemented.

viii. Proponent shall keep the finish road level sufficiently elevated from ground level with provision of railing on both sides to restrict animal crossing in order to avoid the possibility of wildlife injury/death. Major water bodies have been observed in the vicinity of the proposed road alignment & may be potential human elephant conflict points, appropriate nos of animal safe passages as per the guideline framed by the Wildlife

Institute of India.

ix. No Ground water shall be extracted and used. Approval/permission of concerned authority shall be obtained before drawing surface water from canal or any other sources.

x. Rain water harvesting pit shall be at least 3 - 5 m above the highest ground water table.

Agenda No. 3.7

"Multi Product SEZ" at Mundra, District Kutch, Gujarat by M/s Adani Ports and SEZ Limited – Further consideration for amendment in specific conditions of Environmental and CRZ Clearance [Proposal No. IA/GJ/NCP/261191/2022 and File No. 10-138/2008-IA.III]

3.7.1 The proposal was considered in the 294th meeting of EAC held during 11th – 12th April 2022. The EAC deferred the proposal as the matter was under examination by the Ministry.

3.7.2 It is noted that while granting EC&CRZ clearance by the Ministry, certain conditions were stipulated by the Ministry based on the recommendations of the EAC. The PP has proposed to amend the Specific Condition No. (x) & (xi) regarding restriction of Industrial activity in CRZ area other than port related activities and No Development Zone till mangrove/creek plan finalization.

3.7.3 It has been informed that, as Mangrove Conservation Action Plan is now approved, PP has fully complied with the specific condition no. (xi) under EC & CRZ clearance dated 15th July, 2014 and therefore condition of CRZ area of SEZ as "No Development Zone" needs revision. Moreover, these CRZ area can be used for carrying out permissible activities either by APSEZ or any Industry through specific permissions and therefore the specific condition no. (x) under EC & CRZ clearance dated 15th July, 2014 on "No allotment of plots in CRZ area to Industries" needs revision.

In view of the above, PP has requested for following amendments:

Specific condition no.	Specific condition	Proposed amendment	Remarks
(x)	PP shall demarcate the CRZ area on land with GPS coordinates in consultation with GCZMA the agency which has done the HTL/LTL demarcation for the area. There shall be no allotment of plot/s in CRZ area to industries. No industrial activity within CRZ area except the port and harbor & the foreshore facilities shall be allowed as committed	CRZ area can be used for carrying out permissible activities either by APSEZ or any Industry through specific permissions and therefore the specific condition no. (x) under EC & CRZ clearance dated 15th July, 2014 on "No allotment of plots in CRZ area to Industries" needs revision.	● APSEZ has set up multiproduct SEZ to facilitate Industrial Development by utilizing its area optimally. APSEZ to carry out permissible activities & allot plots to individual industries to carry out permissible activities within CRZ area of SEZ in line with CRZ Notification, 2011 and its amendment till date. ● Individual
(xi)	Till the approval of action plan for conservation and protection of	As Mangrove Conservation Action Plan is now approved, so APSEZ has	

	creeks/mangrove area, the CRZ area within SEZ shall be demarcated as "No Development Zone". PP shall not allow/ undertake any development in CRZ area of SEZ.	fully complied with the specific condition no. (xi) under EC & CRZ clearance dated 15th July, 2014 and therefore condition of CRZ area of SEZ as "No Development Zone" needs revision.	industries will obtain CRZ clearance from concerned authorities to carry out permissible activities within CRZ area.

3.7.4 The EAC, taking into account the clarification provided by the Ministry and submissions made by the PP had a detailed deliberation in its 297th meeting during 24th – 25th May, 2022 and **recommended** the proposal for the amendment in Environmental and CRZ Clearance as mentioned above in the para 3.7.3 issued by the Ministry to M/s Adani Ports and SEZ Limited, vide F. No. 10-138/2008-IA.III and dated 15th July 2014 with following conditions:

i. CRZ area within the project boundary can be used for carrying out permissible activities either by APSEZ or any Industry through specific permission. However, if activities other than those recommended by the GCZMA earlier is proposed, fresh recommendations need to be obtained.
ii. Individual industries/APSEZ will obtain CRZ clearance afresh from concerned authorities to carry out permissible activities within CRZ area.
iii. All the recommendations stipulated in the Mangrove Conservation Plan to be implemented in totality
iv. All other conditions mentioned in the letter No. 10-138/2008-IA.III and dated 15th July 2014 shall remain unchanged.

Agenda No. 3.7

Expansion of an operating notified SEZ, with an additional land of 45.86 acre, for Multi-Sectoral Chemical manufacturing facilities located at Plot 5, Vilayat GIDC Estate, Taluka Vagra, Dist Bharuch, Gujarat by M/s Jubilant Infrastructure Limited – Amendment in Environmental Clearance [Proposal No. IA/GJ/NCP/260879/2022 and File No. 10/24/2021-IA.III]

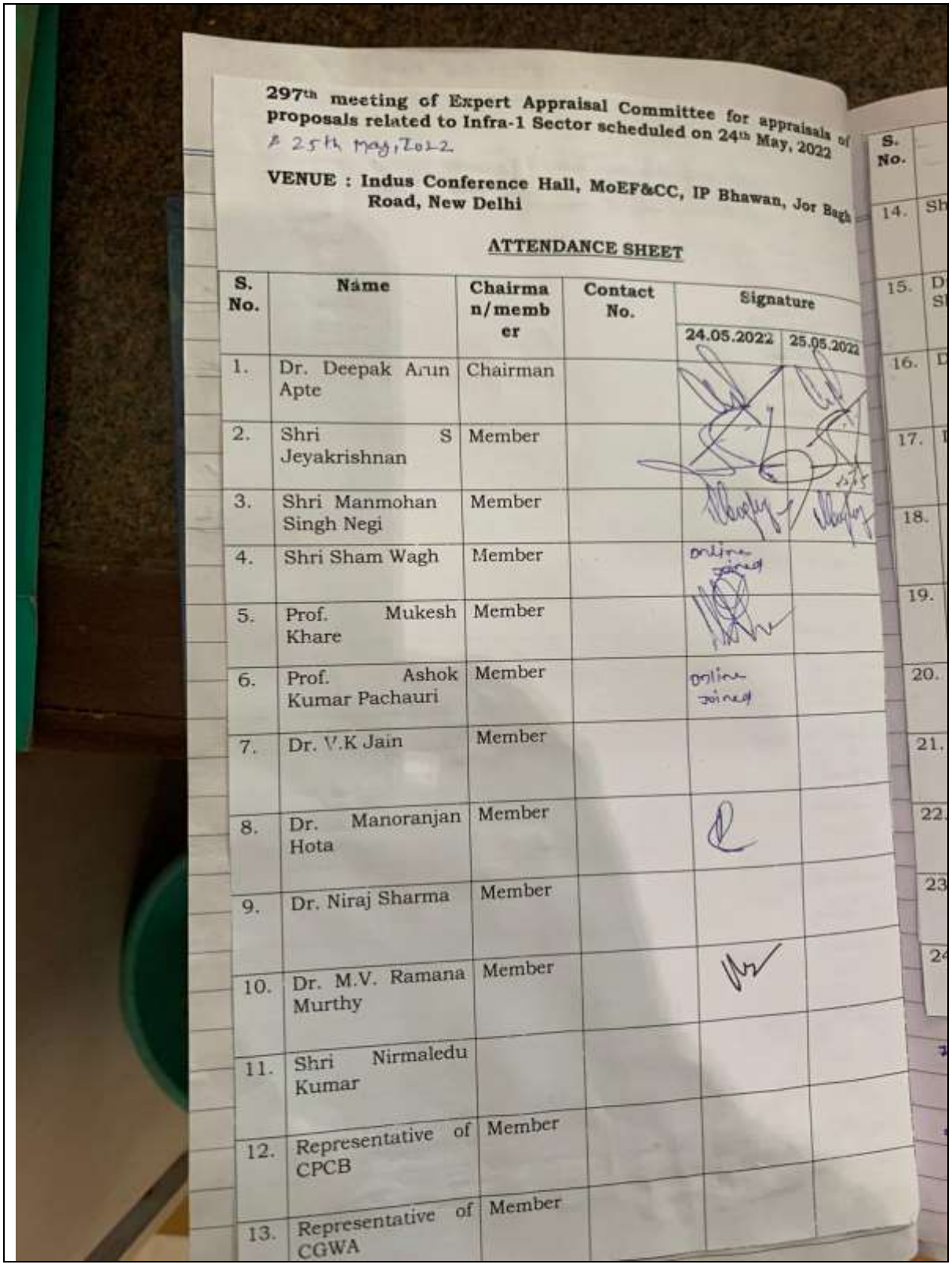
3.7.1 The proposal was considered in the 294th meeting of EAC held during 11th – 12th April 2022 and the EAC recommended the proposal for the amendment in Environmental and CRZ Clearance under clause 7(ii) of EIA Notification, 2006, as amended, issued by the Ministry in favor of M/s Jubilant Infrastructure Limited, vide letter no. EC22A031GJ117822 and File No. 10/24/2021-IA.III dated 14.02.2022 for "setting up of SEZ for chemicals in Vilayat GIDC in Taluka Vegra, district Bharuch along with captive power plant common ETP, TSDF".

3.7.2 The PP vide email requested for amendment in the MOM as para 3.6.9 of 294th meeting mentions "Final configuration after amendment is as following", however, PP clarified that para 3.6.8 is also part final amendment and that should also reflect in the amendment letter.

3.7.3 The EAC noted the request made by the PP and recommended the Ministry to take necessary action as mentioned above.

Annexure-A

Following members were present during the 297th EAC(Infra-1) meeting held on 24th – 25th May, 2022.



297th meeting of Expert Appraisal Committee for appraisals of proposals related to Infra-1 Sector scheduled on 24th May, 2022
& 25th May, 2022

VENUE : Indus Conference Hall, MoEF&CC, IP Bhawan, Jor Bagh Road, New Delhi

ATTENDANCE SHEET

S. No.	Name	Chairman/member	Contact No.	Signature 24.05.2022	Signature 25.05.2022
1.	Dr. Deepak Arun Apte	Chairman			
2.	Shri S Jeyakrishnan	Member			
3.	Shri Manmohan Singh Negi	Member			
4.	Shri Sham Wagh	Member		online joined	
5.	Prof. Mukesh Khare	Member			
6.	Prof. Ashok Kumar Pachauri	Member		online joined	
7.	Dr. V.K Jain	Member			
8.	Dr. Manoranjan Hota	Member			
9.	Dr. Niraj Sharma	Member			
10.	Dr. M.V. Ramana Murthy	Member			
11.	Shri Nirmaledu Kumar				
12.	Representative of CPCB	Member			
13.	Representative of CGWA	Member			

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lay, 2022

n, Jor Bagh

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25.05.2022

S. No.	Name	Chairman/member	Contact No.	Signature 24.05.2022	Signature 25.05.2022
14.	Shri V. Suresh	Member (Infra-2) Special Invitee	9818513344		
15.	Dr. H. C. Sharatchandra	Member (Infra-2) Special Invitee			
16.	Dr. Nandini N	Member (Thermal) Special Invitee	9880839109		
17.	Dr. Santosh Kumar	Member (Thermal) Special Invitee	8217201935		
18.	Shri Inderaj Singh	Member (NDS) Special Invitee	9441595891		
19.	Dr. Ajay Sood	Member (NDS) Special Invitee		online joined	
20.	Shri Amardeep Raju	Member Secretary (Infra-1)	8900575187		
21.	Dr. Ashish Kumar	Member Secretary (Infra-2)	9560029496		
22.	Shri Y.P. Singh	Member Secretary (Thermal)			
23.	Dr. Shruti Rai Bhardwaj	Member Secretary (NDS)			
24.	Dr. H. Kharkwal	Member Secretary (CRZ)	20819371		

~~25. Dr. S Prash Kumar~~

26. Dr Saurabh Upadhyay Sc-C IA-Thermal Div 20819401

27. A. Nobi E.P S.S(CRZ) 4352

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