

BEFORE THE NATIONAL GREEN TRIBUNAL (SZ) CHENNAI
APPEAL NO.15 OF 2025

Karvali Menugarar Karmika Sanga

...Appellant

Vs

State Environment Impact Assessment Authority
(SEIAA), Karnataka and Anr

...Respondent

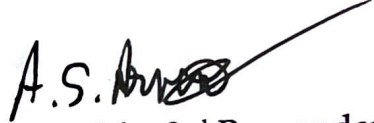
REPLY FILED BY THE 2ND RESPONDENT

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Dated at Chennai on this the 30th day of April, 2025


 Counsel for 2nd Respondent

BEFORE THE NATIONAL GREEN TRIBUNAL (SZ) CHENNAI
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Karvali Menugarar Karmika Sanga

...Appellant

Vs

State Environment Impact Assessment Authority
(SEIAA), Karnataka and Anr

...Respondent

REPLY FILED ON BEHALF OF THE 2ND RESPONDENT

MOST RESPECTFULLY SHOWETH:

1. The address for service of notice and process on the 2nd Respondent is that of its counsel M/s. Ramasubramaniam Raja, Arvind A.S, D. Thanigaivel, R.R. Kirtida Advocates at Pent House, 4th Floor, Corddel Apartments, 29, Dr. S.S Badrinath Road, Nungambakkam, Chennai- 600006. Email: ram@ramlawchambers.com Phone: 9500082400
2. The present Appeal filed under Section 16(h) read with Section 18(1) of the National Green Tribunal Act, 2010 is neither maintainable in law or in facts. It is submitted that the present Appeal has been filed challenging the EC dated 31.12.2024 granted in favour of the 2nd Respondent. A similar appeal challenging the very same EC is pending before this Hon'ble Tribunal in Appeal No. 7 of 2025. It is submitted that the Appellant herein as acting in collusion with the Appellant in Appeal No. 7 of 2025 with malafide intention of stalling the construction of the port. It is submitted that allegations made in the present Appeal are similar to the allegations made in Appeal No. 7 of 2025. Therefore, the reply filed in Appeal No. 7 of 2025 maybe read and part and parcel of this reply. All the allegations made in the above Appeal and denied as false and baseless.
3. It is submitted that allegations made by the Appellant can be broadly classified as following: -

a. Public Hearing



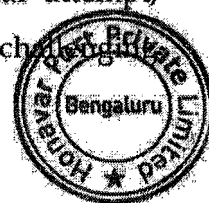
- b. EIA Report is defective
- c. The Project siting is illegal
- d. EC was obtained based on rapid EIA
- e. Non-Application of Mind by SEIAA

It is submitted that the above issues are already been raised in Appeal No. 7 of 2025 and the present Appeal is nothing but an attempt to re-agitate the same issue with a sole purpose of harassing the 2nd Respondent. The present Appeal is nothing but vexatious litigation. The Appellants are having vested interest and have in collusion with other litigations have presently filed this Appeal Appeal in order to stall the construction of the port with malafide intention. The Appellant under the guise of challenging the EC granted in favour of this Respondent, is attempting to reagitate and re-argue same issues such as turtle nesting among others that have already been decided in various proceedings including OA No. 76 of 2022 and Writ Petition No. 4039/2021 (PIL).

Under Rule 33 of the National Green Tribunal (Practice and Procedure) Rules, 2011 the language of the Tribunal shall be English. The purported registration certificate of the Applicant Sanga is Kanada. The Applicant has failed to file any translation for the said document. The purported registration certificate cannot be taken on record. The present filing of Appeal without the registration certificate is defective and non-est in law. Furthermore, the said Rajesh Govind Tandel and Applications in Appeal No. 7 of 2025, 2025, challenging the same impugned EC and the Applicants in previous litigations are working in tandem with a mala fide intention to stall the project. The involvement of the said Rajesh Govind Tandel being part of the earlier litigation and also parallel litigation is clear from Photos filed by the Appellant in Appeal No. 7 of 2025 and O.A No. 76 of 2022. It is submitted that the earlier EC expired due various litigations, interim orders and hindrances created by such individuals and bodies with vested interest. The present Appeal is also a similar attempt, working in tandem with the Appellants in Appeal No. 7 of 2025, challenging the



C. Rajesh Reddy



the same impugned EC. In fact one of the main subjects of the documentary relied on by the Appellant in Appeal No. 7 of 2025 as Annexure A13 is Mr. Rajesh Govind Tandel himself. Similarly in Photos filed in at Pg 227 of OA No. 76 of 2022, it has been falsely projected as though the person in the photo is Kasarkod Village Volunteer for Olive Ridley Turtle Conservation with one of the Turtle Nests. On close scrutiny, it can be seen that the person in the said photo is none other than Mr. Rajesh Govind Tandel. This itself shows that the all the parties are acting tandem to stall the construction of the Port.

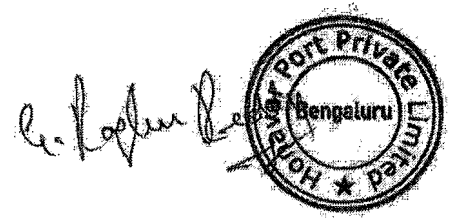
Therefore, the present Appeal is barred by the principles of res judicata and estoppel. Therefore, the present Appeal deserves to be dismissed *in limine* on the grounds of vexatious litigation and abuse of process of law.

4. REPLY TO THE ISSUE OF PUBLIC HEARING & NON-APPLICATION OF MIND BY SEIAA

4.1. With respect to averments in paragraph 1 to 6, it is submitted that the 1st Respondent based on the fact that various litigations were pending in which, they were also a party exempted de novo public hearing based on correct principles which are fair, free and in line with principles of sustainable development wherein the 1st Respondent had directed in the ToR to include the earlier public hearing into the EIA and special ToR was also issued, taking into account the observations made in the public hearing as well various concerns raised in previous litigations. No circumstances have emerged that warrants fresh public hearing. It is submitted that no prejudice is caused to the Appellants as all the concerns of the locals were addressed in the earlier public hearing and no new circumstances have emerged that warrant a fresh public hearing.



- 4.2. The 2nd Respondent lawfully applied for fresh clearance on 26.04.2024, before the expiry of previous approvals, ensuring compliance with the EIA Notification, 2006, and CRZ Notification, 2019. The Terms of Reference were issued after due regulatory scrutiny, ensuring a thorough environmental impact assessment before granting clearance the proposal for issuance of Terms of Reference.
- 4.3. The 2nd Respondent's request for ToR was reviewed in multiple SEAC meetings namely 310th, 312th, and 321st meeting. The SEAC identified key environmental aspects requiring study, specification of data collection and impact assessment requirements, incorporation of mitigation measures for environmental sustainability and thereafter the ToR was issued based on expert recommendation. This ensured that all relevant environmental concerns were studied before clearance was granted.
- 4.4. The SEAC meeting held on 9.05.2024. The deliberation in the said meeting was that the existing EC issued on 21.09.2012 for the project was validly extended till 20.09.2024 and the committee was informed that there was a delay in execution of the ports due to the reasons mentioned therein which are various litigation. They presented the M/s. Mumbai Port Trust case which issue TOR by incorporating the earlier public hearing conducted.
- 4.5. The Committee after detailed discussion deferred the proposal to take suitable decision in the upcoming meeting.
- 4.6. In the SEAC meeting held on 6.06.2024, The SEAC had deliberated the earlier deferred proposal and also considered that there is no change in pollution load and the EC accorded to Mumbai Port Trust dated 11.07.2017 to consider the earlier public hearing conducted in 2005 in a similar case.



- 4.7. It is based on the detailed deliberation and discussions on the above issues viz a viz 1) the non-completion due to various litigation 2) no change in the original proposal in the EC 3) No change in pollution load 4) MOEF & CC had accorded EC to Mumbai Port Trust to incorporate the earlier public hearing conducted in 2005 in similar case.
- 4.8. Taking into account all these and after detailed deliberation has decided to recommend the proposal to SEIAA to issue standard TOR along with additional TOR to conduct EIA studies by including a chapter on queries and comments raised by the participants during the earlier public hearing suitably documented in the form of Managerial Plan drawn to address their concerns expressed. The SEAC has given standard TOR and specific TOR.
- 4.9. The SEIAA held meeting on 9.07.2024 wherein the 1st Respondent had taken the following factors i.e., 1) no change in the original proposal in the EC 2) No change in pollution load 3) MOEF & CC had accorded EC to Mumbai Port Trust to incorporate the earlier public hearing conducted in 2005 in similar case 4) Various litigation disposed by Hon'ble Court in favour of the Project Proponent and no litigation is pending, decided to grant TOR by incorporating the public hearing by suitably documenting in the form of Managerial Plan drawn to address their concerns expressed.. The SEAC after discussion and deliberation decided to issue standard TOR along with additional TOR as recommended by SEAC for conduct EIA. Therefore, the decision of SEAC and SEIAA in incorporating the earlier public hearing in the current EC has to be tested on the grounds of arbitrariness. There is no arbitrary decision and it is a well-considered deliberated before issuance of TOR.

R. Raghun Reddy



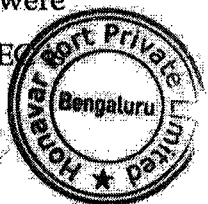
4.10. The various litigation is a matter of fact and that there is no change in status or pollution load is also a matter of fact. The 1st Respondent has considered the TOR issued to Mumbai Port Trust. Therefore, there is no error or arbitrariness in the direction to incorporate the previous public hearing. The EIA clause 7 (III) (5) also provides for situations where it is not possible to conduct public hearing owing to a local situation, the authorities need not include public hearing.

4.11. It is submitted that Public Hearing was already conducted on 27.1 2012 at Project Site, all the opinions, objections, demands were heard after detailed enquiry to serve the interest of Public. With respect to the contention that notification issued by MoEF & CC does not allow exemption to Public Hearing unless at least 50% of the project has been undertaken during the validity of the previous EC, it is submitted that the project could not be completed account of litigation and not because of any fault of 2nd Respondent. It is submitted that act of court shall not prejudice any party. In the present case the project could not be completed on account of various interim orders passed by various courts and tribunals. Further the 50% condition should not stall bona fide project proponent such as the 2nd Respondent herein.

5. The averments in paragraph 7 and 8 are matter of record and does not warrant any reply. The averments in paragraph 9 are false and vexatious. It is submitted that the purported meeting at the Kasarkod Gram Panchayat is nothing but a self-serving document. The purported meeting is nothing but act of fringe elements, who are instigation local people, especially the Mr. Rajesh Tandel, who happens to be the president and also the person mentioned in the meeting who read out the alleged reasons to protest the construction of port. This nexus would itself prove that the purported issues discussed in the Gram Sabha were merely done for the purpose of the case. It is submitted that the present EC



R. Lakshmi Reddy



nothing but a revalidation of an already existing EC. There is no change in the original proposal in the EC or no change in pollution load. Therefore, the purported lack of clarity or dissatisfaction is fanciful, whimsical and vexatious. All the points raised there are merely an afterthought and an mere attempt stall the project.

6. The averments in paragraph 10 to 13 are denied as false and vexatious. The issue of public hearing is already address herein above. The allegation that the earlier PH was attended by ten people and the project was rejected is baseless. The PH was attended by large number of people. The alleged reference to 10 members is the number of people who raised issued at the PH. This would not mean only 10 attended and all 10 rejected. First, there was no rejected as alleged. None of the people who attended or raised issued had challenged the EC. Secondly, apart from the locals, the Gram Panchayat Member, Honnavar, Society Chairman, Honnvar and MLA of Honnavar were present and raised issues, which were responded by the 2nd Respondent. Thus, all the public were provided PH and the issues raised have been adequately addressed and the present EC is merely a revalidation of the existing EC.

7. The averments in paragraph 14 and 15 are denied as false and vexatious. The contention that at the time of public hearing conducted on 27.1.2012, several attendees had raised the issue that notice regarding the conduct of the PH was inadequate and failed to attract attention of majority people affected by the project is denied as false and vexatious. It is submitted that the Appellants had not challenged the said public hearing for so long and as a mere afterthought raised such vexatious pleas. It is further submitted that the earlier EC was challenged in WP No. 4039/2021 (PIL) before the Hon'ble High Court of Karnataka by Honnavar Taluka Hasi Meenu Vyaparasthara Sangha. The Hon'ble Karnataka High Court vide its order dated 24.11.2021 was pleased to dismiss the Writ Petition and upload the validity of the EC. Therefore,



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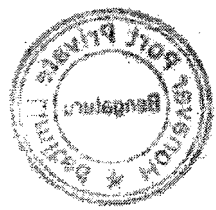


Appellants cannot now agitate that the public hearing was not properly conducted.

8. The averments in paragraph 16 to 20 are denied as false and vexatious. The issue of Public Hearing has already been answered above. It is submitted that Public Hearing was already conducted on 27.1.2012 at Project Site, all the opinions, objections, demands were heard after detailed enquiry to serve the interest of Public. With respect to the contention that notification issued by MoEF & CC does not allow exemption to Public Hearing unless at least 50% of the project has been undertaken during the validity of the previous EC, it is submitted that the project could not be completed account of litigation and not because of any fault of 2nd Respondent. It is submitted that act of court shall not prejudice any party. In the present case the project could not be completed on account of various interim orders passed by various courts and tribunals. Further the 50% condition should not stall bona fide project proponent such as the 2nd Respondent herein. There is arbitrariness in the decision.

9. REPLY TO EIA REPORT DEFECTIVE:-

9.1. The averments in paragraph 21 and 22 are denied as false and vexatious. It is submitted that the Appellant is merely knit picking the EIA report and the same is without any merit. The EIA report does consider the socio-economic impact of the proposed port on nearby fishing communities, including Tonka village. The report mentions that Kasarkod Tonka village is within the project's influence area, and socio-economic measures have been outlined to mitigate any potential disruptions. Clause 3.11.2 of EIA report at page 3-59 of the EIA report lists Kasarkod, that too as SNo.1, within 0-1 Km. The contention that there is omission of Kasarkod village from the list of fishing villages to be impacted by the project is false and vexatious.



C. Raghuraj Reddy



10. The averments in paragraph 23 to 27 are denied as false and vexatious. The contention that proposed road and railway is aligned through the coastal village of Kasarkod which is inhabited by 752 fisherfolk families and has a total population of 3,736 individuals is and they were granted land by the Government of Karnataka in 1979 and since then they have inhabited the land and are paying taxes and levies are denied as false and vexatious. It is submitted that the Road and Rail is falling within the port limits i.e. 50 Mts from the HTL as per the GO No. PWD 107 PSP 2013 dated 09/12/2013. The EIA report in Clause 4.2.1 which deal with Potential Impact due to Project Location has in Clause 4.2.1.2 clearly stipulates that the Road and Rail connectivity are proposed in port layout.

11. Reply to Project sitting - High Eroding Coastline.

11.1. The averments in paragraph 28 to 31 are denied as false and vexatious It is submitted that the Office Memorandum dated 3.11.2009 was Prior to CRZ Notification of 2011 and 2019. The said OM itself clearly states that it shall be effective only until a National policy on setting up of new projects.

11.2. It is submitted that CRZ notification 2011 and 2019 having come into force, by necessary implication the OM is rendered inapplicable. Notwithstanding the same, Office Memorandum does not mention any high erosion stretches.

11.3. With respect to NCCR report, it is submitted that it was prepared for the period 1990-2018 shows merely a small pocket of area near the Estuary in Red i.e. "High Erosion". This small pocket of area cannot be equated to "High Eroding Stretches Of The Coast" as referred to Clause 4 (vii) of CRZ Notification, 2019. The entire coast is not an high eroding coast and it is merely an insignificant part which is mentioned as High Erosion which cannot be equated to "High Eroding Stretches of the Coast".



Le. K. S. Reddy



contention that EIA report has suppressed vital information from SEIAA on sitting the proposed port project on high erosion zone and the project site is already experiencing environmental damage and is susceptible to more in the form of coastal erosion is denied as false and vexatious. In fact the NCCR map and NCSCM map is filed as part of EIA and the 1st Respondent duly considered it and granted EC. The NCSCM map which is more recent until March, 2024 does not indicate any "High Erosion".

12. Reply to Rapid EIA:-

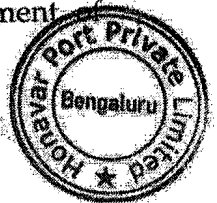
12.1 The averments in paragraph 32 to 34 are denied as false and vexatious. It is submitted even though the Applicant has applied for fresh EC, in effect the present EC is a continuous of earlier EC. Under the earlier EC itself the 2nd Respondent has been constantly monitoring environmental changes. It is submitted that as per the baseline Environmental Management Programme in the previous EIA, Project environmental monitoring was formulated for the barge/vessel loading facility and presented. As per the Environmental Management Programme, the following data was periodically monitored even during the construction phase.

- a. Air Quality
- b. Noise Levels
- c. Water Quality
- d. Soil
- e. Marine Water Quality
- f. Plankton and Benthic Communities
- g. Sediment Quality

12.2. It is pertinent to note that data collected in Environmental Management Programme covers the same parameters as baseline data. The said data was periodically done by Vison Agency from the date of commencement



C. Kalyan Reddy



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construction i.e., July 2019 till March, 2024 The last Environmental Data Generation Report was conducted in march, 2024. Even in March, 2024 the following data was monitored.

- a. Air Quality
- b. Noise Levels
- c. Water Quality
- d. Soil
- e. Marine Water Quality
- f. Plankton and Benthic Communities
- g. Sediment Quality

12.3 The said report was periodically uploaded in the Parivesh Portal and was available with MoEF/SIEAA. The Monitoring Report prepared by MoEF also acknowledges that the Reports have been filed with SEIAA Karnataka and MoEF Bangalore. Therefore, there has been constant monitoring of data collection that is pari materia with the baseline data with the most recent data being in March, 2024. The constant monitoring ensured that the all the relevant data on environment that fulfils the objective of having a comprehensive EIA was available with the SIEAA and separate compressive EIA is not essential for the said project. A rapid EIA was conducted Terrestrial baseline environment data was generated for one season (October to December, 2023) and marine baseline data was carried out during pre-monsoon (April 2024 is sufficient. As the project is on-going, comprehensive EIA for 3 seasons, would bring the on-going project to standstill for 1 year. Further the EIA provides for Mitigation measures for addressing the Shoreline Changes-Erosion/ Accretion. The continuous monitoring of shoreline with the help of high-resolution satellite imageries shall be carried out, during operation phase and validated with ground truthing/Shoreline surveys.

13. Reply to Non-Application of mind by SEIAA Karnataka:-



C. Raghuram Reddy
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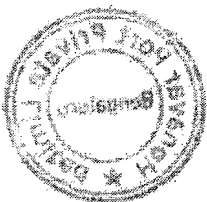
13.1. The averments in paragraph 35 to 38 are denied as false and vexatious The Respondent has already dealt with same herein above.

14. Reply to Olive Ridley Turtle Nesting:-

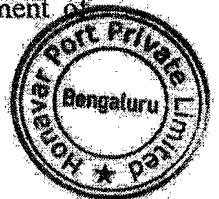
14.1. The averments in paragraph 39 and 40 are denied as false and vexatious. The issue of whether the projects falls in a Turtle Nesting has been subject to various previous litigations. At the outset, Solitary Nesting is witnessed sporadically along the entire coast of India. In Karnataka there is Sporadic Nesting only. There are 179 Turtle Nesting Grounds located in the mainland and island coast of India, out of which the state of Karnataka is not part of the Nesting Grounds as per NCSCM report on Turtle Nesting Grounds.

14.2. Kasarkod beach is only a potential or occasional nesting site and not a Turtle Nesting Ground (ESA). The NCSCM report and the the Hon'ble High Court of Karantaka Order in W.P. No. 4039 of 2021 has held that there is no nest, turtle or dead characters found during the survey of the Port (45 ha) and held that *"it is for the concerning authority to ensure that no damage is caused to the nesting of turtles"*. The Karnataka Forest Department is actively ensuring that no damage is caused to the nesting of Turtles. It is submitted that the conduct of the Appellants are nothing but abuse of judicial process and forum shopping. Further the present Appeal is hit by principles of res judicata.

14.3. It is submitted that PCCF-Wildlife has already approved the Mitigation Plan vide letter No. PCCE/WL/D/CR-78/2020-21. It is submitted that the based on the mitigation plan as approved, the 2nd Respondent was making payments. It is submitted that, when the Port approached for CRZ for 4 lane, it has proposed for enhancement of budget for mitigation measures for turtle nesting from chainages 1500 meters to 2491 meters vide letter dated 08/02/2023. The Government of



C. Raghav Reddy

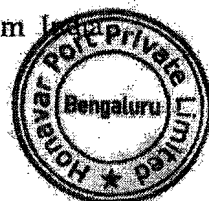


Karnataka has requested the 2nd Respondent to contact Forest Department to get account details for making the payment of Rs. 8 lakhs. The 2nd Respondent inturn issued letter to forest department for account details for making additional mitigating measures.

- 14.4. Furthermore, as per the Letter dated 28/06/2023 issued by the conservator of Forest to Karnataka Biodiversity in connection with the area not suitable for declaration of Heritage Biodiversity area, it is submitted it is clearly stated that "Forest Department undertakes the work of in-situ conservation of turtle eggs and release of hatchlings into the sea since 2012-2023 till date". Thus, the Karnataka Forest Department is undertaking the work of in-situ conservation of turtle eggs when found in the area and releasing the hatchling into the sea. Therefore there is no damage is caused to the nesting of Turtles
- 14.5. It is submitted that certain miscreant locals in the region, in an urgency to oppose/and desperately stall the port project, have planted Turtle eggs in the beaches of the Kasarkod. The same was brought to the notice of the district administration and the concerned regulatory authorities vide **letter dated: 08/02/2023** by M/s. HPPL.
- 14.6. Further, the issue of Turtle Nesting Grounds was considere in the O.A. No. 76 of 2022(SZ) and necessary directions were issued. It is to be noted that, the earlier CZMP map prepared by NCSM Chennai which has been finalized as per CRZ Notification 2019, the High Tide Line (HTL) and Low Tide Line (LTL) is clearly marked. It is clear from the CZMP map that the proposed four-lane road alignment passes through a small patch of turtle nesting area for which PCCF-Wildlife has already approved the Mitigation Plan vide letter No. PCCF/WL/D/CR-78/2020-21.
- 14.7. Further, As per the **TOR issued by SEIAA-Karnataka** vide File No: **SEIAA 02 IND 2024, Dated: 12/08/2024**, it is stipulated to prepare an Olive Ridley Turtle **Conservation Plan** and the same has been prepared by M/s. Assystem



C. Kapur Reddy



Limited, Hyderabad and submitted to SEIAA - Karnataka vide letter No. HPPL /EC /2024 /0085, Dated: 09/12/2014.

14.8. In addition to the above, it is observed that as per the data obtained vide letter No. MEF/02/2024-25, Dated: 11/07/2024 from the Deputy Director Fisheries, Fishing Harbor Project, Honnavar (U.K) that there are a total of 580 boats (including Purse-seine Boats/Trawlers Boats/Traditional Boats).

14.9. It is submitted that the Marine Turtle Conversation Plan was prepared by Assystem India Limited and was submitted to SEIAA. In fact the EIA itself provides for various mitigation measures for addressing sea turtle conversation. The following are measures provided in the EIA:-

- a) Significant habitats of turtles lying outside the protected areas should not be disturbed.
- b) Low sound producing equipment may be used for the purpose of dredging and other such activities.
- c) Care should be taken in ship movements with regard to turtle conservation

Even the EC contains specific condition to have additional safety measures for safety of marine creatures during construction and operation phase.

15. The averments in paragraph 40- 43 are denied as false and vexatious. The contention that the Mitigation Plan approved by PCCF (Wildlife) and Chief Wildlife Warden of Karnataka was not available before SEAC and SEIAA is denied as false and vexatious. M/s. HPPL has been asked to pay a sum of Rs. 4 lakhs on annual basis, which is already been credited to the respective account of the Forest Department. The Port Director had submitted to the authorities that the project proponent is willing to enhance the budget for turtle

C. Kalyan Reddy



nesting from Rs.4.00 lakhs to Rs.8.00 lakhs. The contention that the wildlife mitigation plan is highly inadequate is false and vexatious

16. The grounds raised in A to H are false, vexatious, fanciful and without any merit. The same is a reiteration of already stated facts which have already been dealt with hereinabove and the same is not repeated for the sake of brevity.

In light of above, it is humbly prayed that this Hon'ble Tribunal maybe pleased to dismiss the above Appeal with exemplary cost and thus render justice.

C. Raju Reddy

Signature of the 2nd Respondent



BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONAL BENCH, CHENNAI

APPEAL NO. 15 OF 2025

IN THE MATTER OF:
Karvali Menugarar Karmika Sanga

... Applicant



VERSUS

SEIAA, Karnataka & Another

... Respondents

AFFIDAVIT

I, Mr. Raghavendra Reddy So/o G Krishna Reddy aged about 45 years Execution Director of Honnavar Port Private Limited, having office at No. 103, Lalzehzar Apartments, 45/1-2, Palace Road, Bengaluru- 5600001, having now come down to Chennai do hereby solemnly affirm and declare as under:-

1. That I am the Execution Director of the 2nd Respondent in the above titled Appeal and I am conversant with the facts and circumstances of the case and I am competent to swear this Affidavit.
2. That contents of the Reply filed by the 2nd Respondent is true and correct to the best of my knowledge and drafted on my instructions and nothing material has been concealed therefrom.

C. Raghav Reddy
DEPONENT



Verification

Verified on this the 30th day of April, 2025 that the contents of the above affidavit are true and correct and nothing material has been concealed therefrom.

C. Raju Reddy
DEPONENT



ASSESSMENT OF COASTAL AND MARINE ECOSYSTEM GOODS AND SERVICES — LINKING COASTAL ZONE MANAGEMENT TO ECOSYSTEM SERVICES IN INDIA

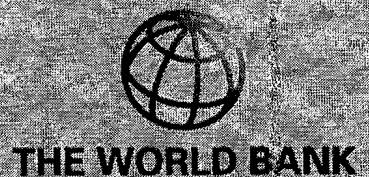
————— FINAL REPORT —————

TURTLE NESTING GROUNDS

ISE DIVISION

National Centre for Sustainable Coastal Management
Ministry of Environment, Forest & Climate Change

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Chennai



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**ASSESSMENT OF COASTAL AND MARINE
ECOSYSTEM GOODS AND SERVICES - LINKING
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TURTLE NESTING GROUNDS

by

**Integrated Social Sciences and Economics (ISE) Division
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SUMMARY

Sea turtles are ancient reptiles that have changed little over their 150 million year history on Earth. Sea turtles migrate hundreds or even thousands of kilometres between established feeding and breeding sites. All sea turtle species lay their eggs on land, typically on sandy beaches. Turtle nesting grounds are on land, and they are typically sandy beaches. Turtles have various ecological roles, including: nutrient cycling, which is crucial for the coastal ecosystem; and maintenance of sea grass beds, coral reefs and beach dunes. Aside from the obvious ecological services, sea turtles contribute to tourism activities, due to their charismatic nature, yielding great economic benefits.

Turtle nesting grounds have been distributed in 179 sites covering 17,872 ha are located in mainland and island coast of India. In turtle nesting areas, regulation, cultural and supporting services generate economic value than consumptive use. Turtle nesting beaches protect the coastal communities from storm surges, and cyclones. In addition, it acts as an aquifer and source of freshwater to the coastal communities of India. Turtle products such as oil, calipee (cartilage), skin, viscera, shell, and curios are popular among the coastal communities of the world illegal market and it is protected in India. Though marine turtle are protected from consumption in India, to estimate the value of turtle's international market, value of meat and eggs used by coastal communities have been used to value the turtle nesting grounds.

In general, the survival of sea turtle has been threatened by loss of their habitat. Sustainability of turtle population has been pressurized by various anthropogenic activities in turtle nesting sites. It is widely observed that, the turtle population and its nesting beaches are declining due to manmade activities and sea level rise. Quantification of the economic consequences of marine turtle use and conservation could contribute significantly to our understanding of use options and their ecological impacts, and hence further the process of defining adequate management policies. Expressing the economic value of various uses and benefits of turtle nesting grounds shall be a tool to raise awareness and convey its (relative) importance to general public and policy makers.

The use and non-use values of the turtle nesting ground has been estimated at Rs. 45,68,358 /- yr. /ha. Out of which recreation function shares Rs. 29,81,237/- yr. /ha. Disturbance regulation and water storage function of turtle nesting ground was estimated at Rs. 1,17,866/yr./ha, and Rs. 12,61,326/yr./ha respectively. In addition, consumptive value of Rs.2,07,929/ ha, has been incorporated in this study though there is no consumption in India but, it has international market value. The Total Economic Value of turtle nesting ground of India is Rs.7997 Crore. Out of the total benefit from turtle nesting grounds, Andaman and Nicobar islands share Rs.5826 crore followed by Andhra Pradesh Rs. 601 crore. Economic contributions of various States and UTs have been described below.

1. INTRODUCTION

Sea turtles are ancient reptiles that have changed little over their 150 million year history on Earth (Fugazzatto and Behera, 1999). Sea turtles are air-breathing reptiles spending most of their lives at sea. During the breeding/nesting seasons, both sexes typically aggregate in the waters close to the nesting beaches (Hamann et al., 2003). Sea turtles migrate hundreds or even thousands of kilometers between established feeding and breeding sites (Plotkin., 2003). All sea turtle species lay their eggs on land, typically on sandy beaches. The location at which sea turtles lay their eggs is called turtle nesting grounds. Turtles nesting are happening in narrow beaches where it can lay eggs and suitable environment for hatching of young ones. Costa Rica, Nicaragua, Panama, Mexico, Surinam and India are the popular beaches for turtle nesting (National Marine Fisheries Services/US Fish And Wildlife Service., 1996).

Turtle nesting grounds are on land, and they are typically sandy beaches (<http://www.biodiversitya-z.org/content/turtle-nesting-site.pdf>). The seven different species of sea turtles occupy different, although often overlapping, geographic ranges. In general, sea turtles occupy a wide range of oceanic habitats and will travel widely in their lifetimes (Hawkes et al., 2009). Turtles have various ecological roles, including: nutrient cycling, which is crucial for the coastal ecosystem; and maintenance of sea grass beds, coral reefs and beach dunes (Moran and Bjorndal, 2005, Hannan et al. 2007). Aside from the obvious ecological services, sea turtles contribute to tourism, due to their charismatic nature, yielding great economic benefits (Clevo and Clem, 2001). Marine turtles are highly migratory and represent an open-access resource. Many countries recognize the need to reduce marine turtle mortality from human sources and have provided partial or total legal protection for marine



Rushikulva, Odisha, India

turtles. However, attempts to exclude users and reduce human impacts have met limited success, particularly in countries where funds to enforce restrictive legislation are scarce (Troeng and Drews, 2004).

In general, the survival of sea turtle has been threatened by loss of their habitat. It is widely observed that, the turtle population and its nesting beaches are declining due to manmade activities and sea level rise (Fish et al., 2008). IUCN has classified the marine turtle species under red list, endangered and vulnerable species. In India, many turtle species have been protected under Schedule 1 of the Indian Wild Life (Protection) Act, 1972. Party to CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), ratified the

Convention on Biological Diversity (CBD) and related treaties, implementing National Biodiversity Act. Areas of turtle nesting site have been classified under sanctuaries and National marine parks. Appendix I include over 820 plant and animal species, including all seven marine turtle species that are threatened with extinction and are or may be affected by trade (CITES, 2000). International trade in these species is subject to particularly strict regulation in order to avoid further endangering their survival. International commercial trade in Appendix I species of CITES and its products are prohibited. Non-commercial trade may be authorized in exceptional circumstances, such as for specimens acquired before the Convention entered into force, for personal or household effects, or for specimens bred in captivity, according to definitions adopted by the Conference of the Parties. Schedule I items of CITES shall possess export documents to the standard format recognized for international trade with non-CITES Parties. Irrespective of the prohibition of international trade on a commercial scale, marine turtles continue to be taken incidentally or opportunistically for domestic use and turtle products are traded illegally within the region and exported illegally (Elizabeth H. Fleming., 2001). Each shipment must be authorized and accompanied by an export permit from the country of origin, or re-export certificate from the country of re-export, as well as an import permit issued by the importing country.

To protect the turtles and their population, India is implementing many initiatives including banning of fishing turtle breeding season around nesting sites; practice of using Turtle Excluding Device (TEDs) in fishing nets to avoid by-catch of turtles, awareness campaign etc. Turtle nesting grounds have been classified as Ecologically Sensitive Area (ESA) under CRZ 2011 and the activities in turtle nesting area have been prohibited and regulated.

Sustainability of turtle population has been pressurized by various anthropogenic activities in turtle nesting sites. Though, trafficking of sea turtle products is illegal, poverty of the third world countries or developing countries are driving the market (Didiher Chacon., 2002). In recent decades, there has been increased recognition that economic factors are behind many human activities that cause declines in habitats and species (Troeng and Drews, 2004).

Quantification of the economic consequences of marine turtle use and conservation contributes significantly to our understanding of use options and their ecological impacts, and hence further the process of defining adequate management policies. Expressing the economic value of various uses and benefits of turtle nesting grounds shall be a tool to raise awareness and convey its (relative) importance to general public and policy makers. These values shall help to make decisions about allocation of resources between competing uses (Farley, 2008). Accordingly, in this chapter, various goods and services of turtle nesting ground were identified and economic values of the above services have been fixed using benefit cost transfer method and other valuation methods. Application of economic value to turtle nesting grounds of India for policy decisions has been discussed.

Turtle nesting in beaches shall have the following main environmental variables for oviposition they include; fine sands, moderate slopes, good humidity and drainage, are. Turtles nesting grounds are the specific places where turtle population can be increased. To protect the turtle population, nesting grounds shall be essentially protected. Consumptive and non-consumptive economic valuation studies on turtle nesting sites shall provide an opportunity to create markets for conservation of turtle nesting grounds and to analyse the impacts of externalities. This shall lead to enhance our knowledge on total flow of benefits from turtle nesting ground. In view of the above, economic valuation of turtle nesting ground covers turtles and it's nesting beaches.

2. TURTLE NESTING GROUNDS IN INDIA - VALUATION

Turtle nesting grounds are distributed in 179 sites in the mainland coast and island coast of India. Total areas of nesting grounds distribution in India are 17872 ha. Andaman and Nicobar Islands have the highest number (102) of turtle nesting grounds covering 13344 ha area. In the mainland the coastal States viz., Maharashtra has 14 turtle nesting grounds followed by Gujarat and Andhra Pradesh. The above turtle nesting grounds are covering an area of 202 ha, 399 ha and 1375 ha respectively. Turtle nesting grounds of various coastal States and UTs of India has been given in chart Fig 1. It was estimated that up to one million sea turtles have nested in Odisha (873 ha) during a single year during the mid-1980's (Venkatraman and John Milton., 2003). Accordingly, one hectare of turtle nesting ground shall support 1145 turtles to lay eggs per year and the total nesting grounds of India support 211,67,615 number of turtles to lay eggs in 179 turtle nesting grounds. List of various turtle nesting grounds around India are given in table 2.1.

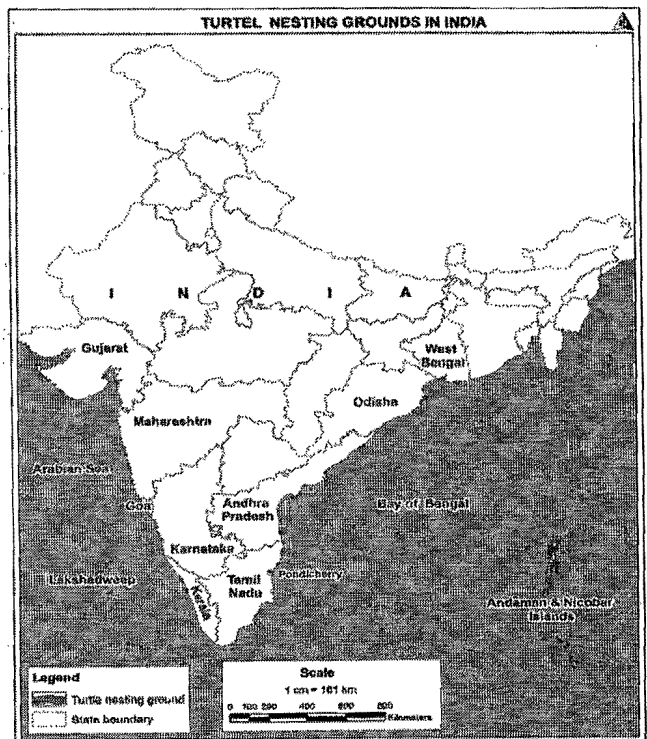


Fig 1

Table 2.1 Turtle nesting grounds in India				
S.No	States	No of sites	Area (ha)	Common sp.
1.	Gujarat	13	399.51	Olive ridley, Green turtle
2.	Maharashtra	14	202.20	Olive ridley
3.	Goa	6	25.54	Olive ridley
4.	Kerala	4	116.61	Olive ridley
5.	Lakshadweep	5	992.15	Olive ridley, Green turtle and Hawksbill
6.	Tamil Nadu	6	263.08	Olive ridley
7.	Pondicherry	2	15.79	Olive ridley
8.	Andhra Pradesh	12	1374.69	Olive ridley
9.	Odisha	11	872.93	Olive ridley
10.	West Bengal	4	265.48	Olive ridley
11.	Andaman & Nicobar	102	13344.06	Olive ridley, Green turtle, Hawksbill and Leatherback
	Total	179	17,872.05	Olive ridley, Green turtle, Hawksbill and Leatherback

Source: ESAs of India NCSCM report, 2015; <http://morjimhermitagegoa.com/oliveridleyturtles.html>

Table 2.2 Turtle Nesting Grounds – Indian Coastal Districts						
Sl. No	State / Union Territory	District	Patches in coastal areas	Turtle Nesting Grounds (ha)	Turtle density	Common sp.
1.	Gujarat	Devbhumi Dwarka	Lamba-Sethala Mata Mandir	32.55	31	Olive ridley, Green turtle
2.			Mithapur-Mojap	12.57	24	
3.			Sethala Mata Mandir-Harshad Mata Mandir	13.99	33	
4.			Okhamadhi-Kharakhatar	33.41	16	
5.			Mojap-Shivrajpur	13.14	32	
6.			Kharakhatar-Kuranga	25.57	20	
7.			Navadra-Lamba	40.44	34	
8.			Nearby Shivrajpur Beach	6.98	NA	
9.		Junagadh	Shil-Lohej	50.82	42	Olive ridley, Green turtle
10.			Mangrol-Mangrol Bara	20.57	37	
11.		Porbandar	Ratadi-Kantela	47.43	29	Olive ridley, Green turtle
12.			Kantela-Kuchhadi	50.55	37	
13.			Navibandar-Rativa	51.52	15	
Sub Total			13	399.51	350	Olive ridley, Green turtle
14.	Maharashtra	Ratnagiri	Kolthare	5.09	2	Olive ridley
15.			Sandkhoh	4.32	NA	
16.			Velas	8.59	7	
17.			Guhagar	48.91	1	
18.			Kelashi	17.00	0.33	
19.			Dabhol	6.00	2	
20.			Bankot Fort	1.52	NA	
21.		Baag beach, Guhagar	6.64	NA		
22.		Raygad	Murud Janjira	2.79	NA	Olive ridley
23.			Diveagar	73.70	1	
24.			Harihareshwar	13.04	1	
25.			Maral	7.16	NA	
26.			Shining Sands Beach	0.08	NA	
27.			Vela's Beach	7.37	NA	
Sub Total			14	202.20	14	Olive ridley

28.	Goa	North Goa	Mandrem (Nearby Junos Vaddo village)	2.28	NA	Olive ridley
29.			Morjim (Morjim South)	3.11	NA	
30.			Mandrem	2.46	1	
31.			Morjim (Morjim North)	0.86	2	
32.		South Goa	Agonda	11.90	3	Olive ridley
33.			Galgibaga	4.92	3	
Sub Total			6	25.54	9	Olive ridley
34.	Kerala	Kozhikode	Kolavipalam	70.86	NA	Olive ridley
35.		Malappuram	Alungal	9.25	NA	
36.		Kasargod	Thaikkadappuram	20.32	NA	
37.		Kasargod	Hosdurg Beach	16.18	NA	
Sub Total			4	116.61	NA	Olive ridley
38.	Lakshadweep	Lakshadweep	Suheli Valliakara	58.33	NA	Green turtle
39.			Karingikuppu	24.20	NA	Green turtle
40.			Tinnakara	52.36	NA	Green turtle
41.			Minicoy group	513.16	NA	Olive ridley, Green turtle
42.			Agatti	344.10	NA	Olive ridley, Green turtle and Hawks bill
Sub Total			5	992	NA	Green turtle Olive ridley & Hawks bill
43.	Tamil Nadu	Chennai	Marina Neelankarai (Urrur kuppam-kaveri Nagar)	67.69	8	Olive ridley
44.			Marina Neelankarai (Marina - Srinivasa Puram)	86.06	8	
45.			Pattinapakkam	13.46	NA	
46.		Cuddalore	(Nearby Mandalpattu village)	3.95	NA	Olive ridley
47.		Kanchipuram	Alikuppam	44.17	NA	Olive ridley
48.		kanchipuram	Neelankarai Uthandi	47.74	1	Olive ridley
Sub Total			6	263.08	17	Olive ridley
49.	Pondicherry	Pondicherry	Nearby village Nallavadu	3.46	NA	Olive ridley
50.			Nearby village Panithittu	12.34	NA	
Sub Total			2	15.79	NA	Olive ridley

51.	Andhra Pradesh	East godavari	Gautami Godavari - Nilarevu	360.94	68	Olive ridley	
52.			Hope Island	61.72	7		
53.			Sacramento Island	74.36	373		
54.		Guntur	Krishna Lankavanidibba	172.53	10	Olive ridley	
55.		Krishna	Elichetladibba	346.96	31	Olive ridley	
56.		Nellore	Pennaru - Mypadu	63.30	7	Olive ridley	
57.			Sriharikota - Durgarajupatnam	88.67	8	Olive ridley	
58.		Srikakulam	Bahuda Kapaskuddi	85.24	40	Olive ridley	
59.			Vamsadhara Bandaruvanipeta	37.39	55		
60.			Rajaram Puram Beach	10.03	NA		
61.			Kunduvanipeta - Nagavali	46.83	50		
62.		Vishakapatnam	Muthiyavanipalem	26.70	32	Olive ridley	
Sub Total			12	1374.69	681	Olive ridley	
63.		Odisha	Baleshwar	Digha (Nearby Digha village)	14.89	NA	Olive ridley
64.	Ganjam		Rushikulya	121.93	16667	Olive ridley	
65.			Bahuda Kapaskuddi	72.69	55	Olive ridley	
66.	Jagathsinghpur		Akashdia Island (Devi)	314.45	10000	Olive ridley	
67.	Kendrapara		Gahirmatha (Wheeler, Ekakula, Habalikati)	154.11	33333	Olive ridley	
68.			Agarnasi	127.88	NA		
69.			Pentha	66.99	NA		
Sub Total			11	873	60,055	Olive ridley	
70.	West Bengal	Purba Midnapore	Dadanpatra	51.10	NA	Olive ridley	
71.			Junput	146.88	NA	Olive ridley	
72.			Digha (Jagai Basan-Digha)	50.14	NA	Olive ridley	
73.			Shankarpur	17.36	NA	Olive ridley	
Sub Total			4	265.48	NA	Olive ridley	
74.	Andaman & Nicobar	Andaman & Nicobar	Andaman & Nicobar	13344	8,026	Olive ridley, Green turtle, Hawksbill and Leatherback	
Sub Total			102	13344	8,026	Olive ridley, Green turtle, Hawksbill & Leatherback	
Total			179	17872.05	69152	Olive ridley, Green turtle, Hawksbill & Leatherback	

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3. VALUATION OF GOODS AND SERVICES OF TURTLE NESTING GROUNDS

Goods and services provided by marine turtles to the global community are economically valued by societies around the world (Daily et al. 2000). The economic values are significant for expressing utilitarian and non-consumptive values of sea turtles. In turtle nesting areas, regulation, cultural and supporting services generate gross revenue than consumptive use. It has been estimated that, the average gross revenue was 2.9 times higher at sites where marine turtles are a major tourist attraction than the average gross revenue of consumptive use sites (Troëng and Drews, 2004).

Under consumptive value of turtles, traditionally, all of their body parts have been used for specific purposes. Marine turtle meat and eggs have long provided a supplemental source of protein for coastal communities. Its eggs are often sought today for their supposed aphrodisiac qualities. Turtle products such as oil, calipee (cartilage), skin, viscera, shell, and curios are popular for coastal communities of the world (Elizabeth H. Fleming., 2001). According to Parsons (1972), antiquity information on the use of sea turtles products are available in Egyptians, Asians and Europe scripts. During colonial times, marine turtle utilization increased for use as food by ships' crews and for export to European countries. In 1950s and 1960s, international markets for shell from hawksbill turtles expanded, and markets developed and grew for green and olive ridley turtle shell and leather. The United States, Europe, and Japan were the major markets until domestic legislation and international regulations closed the legal trade to the United States and Europe (Elizabeth H. Fleming., 2001). It is clear that a culture and its folklore will not be lost by reducing or even stopping completely the use of sea turtles and their products. The sea turtle products have been continuously used locally and nationally. In the global market, turtle products have been illegally at least in lesser scale exported to demanding Nations. Japanese market is one of the most important consumers of sea turtle products, such as hawksbill shell (Didiher Chacón., 2002).

Turtle nesting site is a capital that provides opportunities including revenue generation using various incentives in cultural and supporting services. Turtle nesting beaches are protecting the coastal communities from storm surges, and cyclones. In addition, it acts as an aquifer and source of freshwater to the coastal communities of India. Developing countries have realized the benefit out of turtle nesting grounds service and conserve it by sustainable management. Countries promote tourism in the coastal areas to create awareness and educate the people about the goods and services of the turtle nesting areas. Costa Rica, Sri Lanka, Indonesia Malaysia and India are promoting sea turtle-based tourism. This tourism promotes insitu and exsitu conservations by marketing sea turtle nesting and hatcheries development. Sea turtle viewing has also been encouraged in India similar to Australia, South Africa, USA, and Israel. Furthermore, the turtle nesting

grounds provide supporting services such as biodiversity maintenance, and are a source of scientific knowledge about land ocean interaction and migration. Turtle nesting sites goods and services have been influenced by many externalities. The goods and services of turtle nesting grounds, economic values, and application for policy values for sustainable management of turtle nesting grounds have been discussed in the following chapters.

4. META ANALYSIS (ACCOUNTING) TURTLE NESTING GROUNDS - GOODS AND SERVICES

A meta-analysis is defined as the study of studies (Melina Barrio, Maria L. Loureiro., 2010). Meta-analysis of turtle nesting ground was conducted by studying about 250 research studies. In the turtle nesting grounds, turtles are the key stone species and the nesting area has the qualities of general beaches hence it provides different services.

Based on the research studies, the turtle fleshes have been consumed and its body parts have been used for ornamental purposes. The turtle nesting grounds have rare earth mineral deposits which has huge potential in the international market. The turtle nesting grounds also protect the coastal communities from hazards and thus increase real estate value. In addition, the turtle nesting grounds are a source of freshwater and minerals to the coastal communities. More than above, in Hindu mythology, turtles are second incarnation of lord Vishnu and have great spiritual and cultural value for coastal communities. In addition, the turtle nesting ground support the fishermen to land their boats, dry their

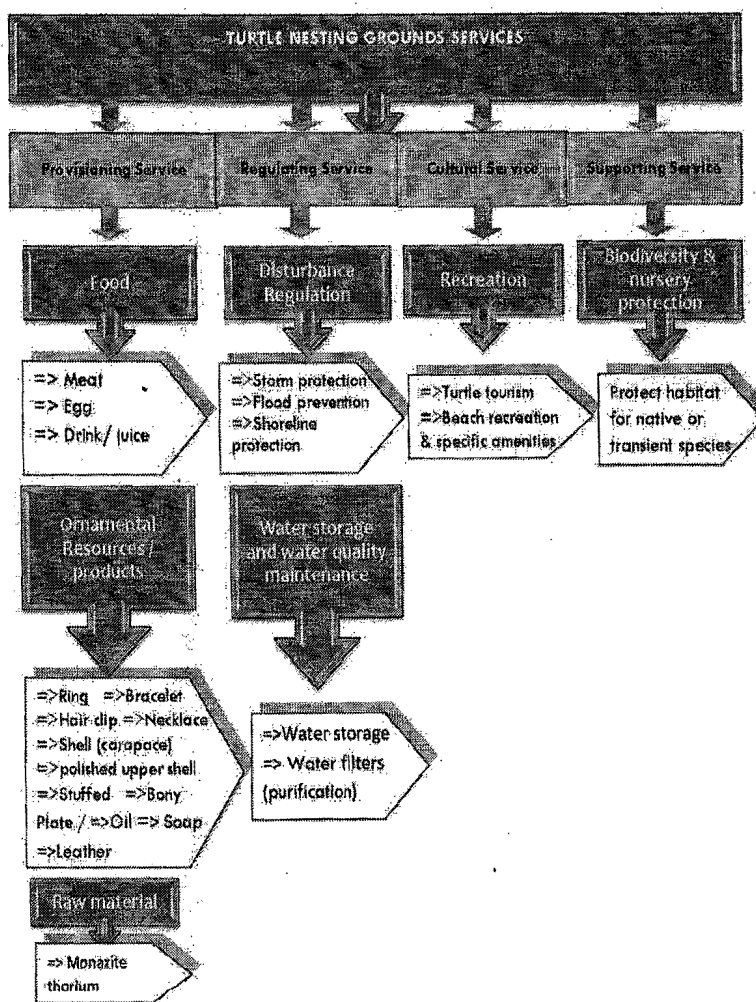


Fig2

harvests and it also acts as a market place. The turtle eggs and carcass are food for many vertebrates and invertebrates food web and are very significant to biodiversity and has significant scientific value. The scientific studies and research reports on turtle nesting grounds opened much information of the services provided by turtle nesting grounds. The services have been classified as (i) provisional service (ii) regulation services (iii) cultural services and (iv) supporting services following the Millennium Ecosystem Assessment (2005). The following chapters exhibits the various services and functions of turtle nesting grounds and the estimated value for various services. The list of studies which have been referred and used for valuation of various turtle nesting ground services and functions have been given in Annexure 1.

4.1. Provisioning services of turtle nesting grounds

Provisioning services of the turtle nesting grounds are the goods that can be used for human requirements. Turtle nesting grounds provide turtles, which are the key stone parameter of the Ecologically Sensitive Area (ESA). Marine turtles provides eggs, meat, shell, oil, leather or other products since at least 5000 BC (Frazier 2003). In India, it was observed that during the dynasty of Kanika, people were paying "Anda Kara" (revenue for the eggs) and were collecting boatload of eggs from the Gahirmatha rookery (Venkatraman, K. and M.C. John Milton., 2003).

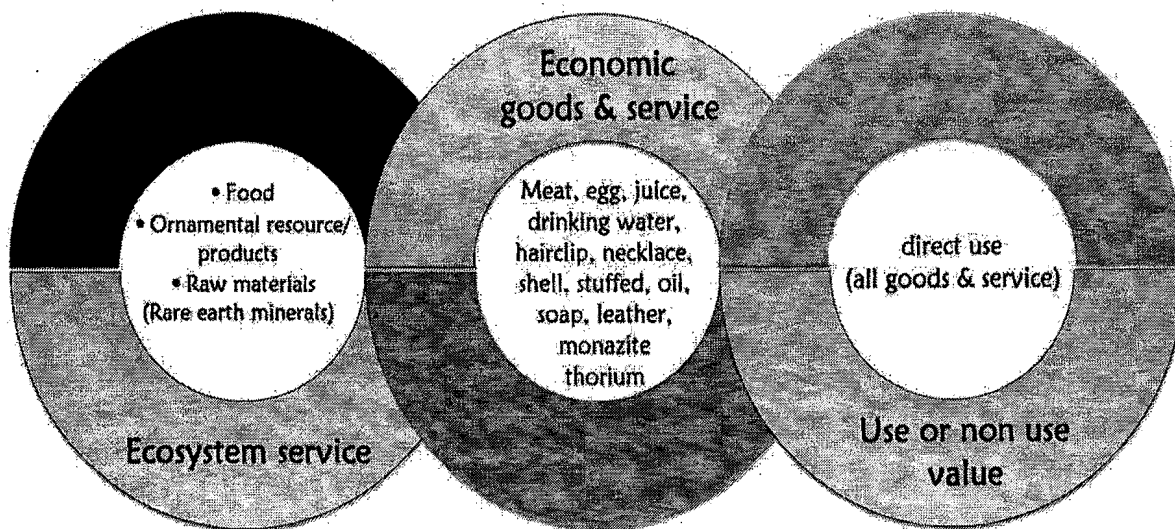


Fig 3

Hair clips, combs, rings, frames for glasses and other items, made from marine turtle are attractive ornamental uses of turtle in various countries. Central American countries have a use of olive ridley turtle oil for respiratory ailments for cold. The oil has strong smell and taste, and it also has a different colour and viscosity hence, it has been used for indigenous soap making (Didiher Chacon,

2002). During colonial times, marine turtle utilization increased for use as food by ships' crews and for export to European countries (Jackson 1997). Due to such trade, the green turtle was once called "...the world's most valuable reptile..." (Parsons 1962). In addition the turtle nesting beach sands provide varieties of economically important minerals. The raw materials in the form of sand has been mined for centuries for multiple uses, including extraction of minerals such silica and feldspar for glass and ceramic production, infill for development, amendments for agriculture, and base material for construction products (Edward B. Barbier et al., 2011).

4.1.1. Consumptive value

Turtle meat has been used for various purposes in India. Globally, turtle meat has been used for consumption purpose and has a consumptive value. Didiher Chacón (2002) has reported that there is no species wise variation in consumption due to taste. All turtles taste the same and the flavour depends on how it is cooked. In Caribbean countries, wild turtle meat can fetch up to US\$19.25-US\$27.50/kilogram. A turtle farm sold turtle meat for US\$13.20/kg. Cooked turtle meat dishes cost US\$12-15 per dish (Elizabeth H. Fleming., 2001).



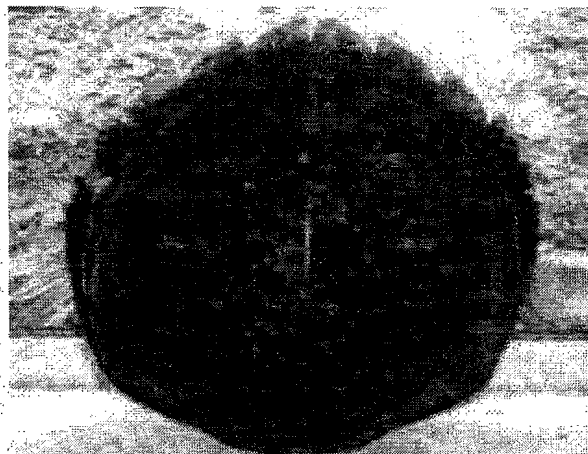
However the turtle meat rate is very low in Livingston, Guatemala, where one kilogram of turtle meat sells for US\$1.32 (Didiher Chacón., 2002). In India, out of the seven species of living sea turtles, juveniles and adults of three species are heavily exploited for commercial trade. The green sea turtle is taken for its much-favoured meat. Its belly, neck and tail bones are used for ingredient of turtle soup. In Andaman Islands all species except the leatherback was hunted for meat. The tribes of Andaman consume turtle meat minced with coconut. In Lakshadweep turtle meat is used as shark bait. Turtle fat was used to waterproof the boats in Lakshadweep islands. It was reported that during between 1963 and 1974, India exported 102,022 kg of sea turtle products valued at roughly \$ 100,800. The products included sea turtle meat, oil and shell (Venkataraman, K. and M.C. John Milton., 2003).

Sánchez et al. (2002) reported that the average price per dozen eggs was \$2.89 only. Generally, in Guatemala, raw turtle eggs are mixed with orange juice and consumed as a revitalizing drink in the morning. Normally this drink is sold for US\$2-\$3 per glass by street vendors along the sidewalks (Didiher Chacón., 2002). Eggs are thought to have aphrodisiac properties; they are mixed with wine, brandy, and beer to make "punch," which is sometimes called "front end lifter"

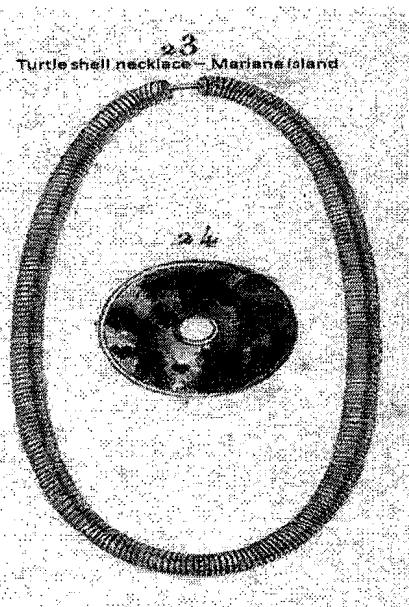
(Haynes-Sutton et al., 1995). The lower part of the body (plastron), which is salted and smoked over the hearth is consumed in soup approximately two or three months later; i.e., during the months when there are no fish (Didiher Chacon., 2002).

4.1.2. Non consumptive value

Hawksbill shell products, sold for very good price say a ring costs US\$17.50, and bracelet cost US\$25. Hawksbill scutes (bony plate made as handicrafts) to Belize City was sold for US\$ 25.00 per pound (Didiher Chacón., 2002). The turtle parts are combined with other metals to make jewels. The costs of these ornamental goods in Caribbean countries is valued for US\$18.00 (Didiher Chacón., 2002). In Honduras, necklace made of hawksbill and black coral, priced at US\$ 18.60 (Didiher Chacón., 2002). A hair clip that is possibly equal to the one found with a value of US\$50 (Didiher Chacón., 2002). Accordingly, value of turtle shell covering a size of 10 cm² curved to develop a US\$ 20 (Avg.). The sizes coming to the breeding for nesting ground is 182 Kgs (Avg) for Leatherback turtle which have a curved carapace length CCL 140-200 cm (170 cm) curved carapace width CCW of 106 cm (Avg.). In Anguo wholesale market, around 9 kg of Hawksbill shell was observed in eight stalls. The price was significantly lower than that in Qingping. The average price was USD46 per kg, and the price range was USD37–59 per kg. (Timothy lam 2012, In India, due to thickness and colour of hawksbill sea turtle, it is used for jewellery, ornaments, or as delicate inlays and veneer on furniture. Most of the tortoise shell trade is believed to be from the hawksbill sea turtle (Venkataraman, K. and M.C. John Milton., 2003).



Stuffed turtles are marketed from US\$ 32.50 to \$62.50 Avg. at various sales points from fishermen to shop owners in Central America (Didiher Chacón., 2002). It has been reported that eight carapaces that were marketed after polish were priced from US\$165 to US\$220 each (Elizabeth H. Fleming., 2001). Ottenwalder (1996) reported that large sized stuffed hawksbill turtles were sold for US\$550. The Central American countries use olive ridley turtle oil for respiratory ailments and colds. The oil has strong smell and taste, and it also has

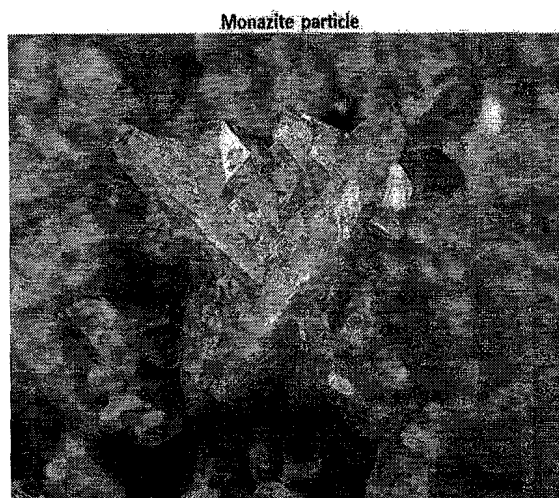


a different colour and viscosity. In Dangriga, Belize, a vendor was selling sea turtle oil cream for skin protection and nourishment and the cream cost US\$ 2.50 each / 100 grams (Didiher Chacón., 2002). A single turtle can provide the right quantity of oil (i.e. between 10 and 20 liters of oil) for coating an entire pirogue (Tripathy and Choudhury 2007). Most turtle oil creams made in the 1930s contained less than 10 per cent of the oil (0.5 g) with many creams being less than 5 per cent (deNavarre & Ruszkowski, 1933, p. 17). Soaps have also been made from oils sea turtles, and the soap was priced from \$1.20/unit (200 gms) in Guatemala (Didiher Chacón., 2002). In addition turtle leather has been used for various purposes. It has been reported that poachers sell turtle leather for \$15 US/turtle (Héctor Trinidad and James Wilson., 2000).

4.1.3. Rare earth minerals

In addition, minerals including silica of beach sands of turtle nesting grounds have significant value. Some minerals are important for National economy, strategic significance and military security. They are non-renewable and are more difficult to find, inventory and develop. Indian resources constitute about 35% of world resources of ilmenite, 10% of rutile, 14% of zircon, and 71.4% of monazite. India meets about 10% of the world requirement of garnet (Rajamanickam et.al., 2004). The minerals do not exist in natural form but it exists as Monazite oar. The monazite with other heavy minerals in the beach sand deposits along the coastal tracts is the major resource for rare earths in India.

Atomic Minerals Directorate for Exploration and Research (AMDER), a constituent unit under the DEA has estimated that the 11.93 million tonnes of monazite resources are present in the beach sand mineral placer deposits along the coastal tracts of India. It has been reported that the grade of monazite falls between 1% and 5%. In the coastal States, the monazite distribution in selected beaches of Odisha, Andhra Pradesh, Tamil Nadu, Kerala and West Bengal are 2.41, 3.72, 2.48 and 1.90 and 1.22 tonnes respectively (Lok Sabha unstarred question No.328; answered on 22/07/2015). The list of beaches has been identified by AMDER (http://www.unece.org/fileadmin/DAM/energy/se/pp/unfc/UNFC_ws_India_Oct2013/5b.2_Parihar.pdf visited on 11/11/2016). Out of 30 turtle nesting grounds in India, placer sand are deposited in 2 locations of Andhra Pradesh beaches viz., (1) Vamsadhara (R) – Bandaruvanipeta (2) Bahuda (R) – Kapaskuddi. The highest thorium reserves have been witnessed in Andhra Pradesh (3.74 Million Tonnes) in the country. US Department of Energy, office of Science,



prices and certificate price list indicates the value of Monazite sand silica mixture (1%Th) costs \$680/50g

(<http://science.energy.gov/nbl/certified-reference-materials/prices-and-certificates/uranium-thorium-ores-price-list/> pages visited on 11/11/2016).

The demand for monazite sand in the United States was limited to the incandescent gas mantle and the pyrophoric-alloy industries, according to the United States Bureau of Mines. During the war, the price of monazite sand delivered to New York, exclusive of the duty of \$80 a ton, varied from \$25 to \$40 per unit (1 per cent per short ton) of thorium or from \$ 150 to \$240 per ton. Immediately after the war the price was quoted (November, 1919) at \$27 per unit, or about \$162 per ton of the 6 percent (thorium) sand, plus duty. Before the end of 1925 the price had dropped to \$ 120 per ton. After increasing slightly during the latter part of 1928 to \$ 130 per ton, the price dropped in 1929 to \$60 a ton, the lowest figure so far recorded (Ind. Eng. Chem., 1930, 22 (12), pp 1407-1407)

Thorium metal cost \$5000 - \$5300 per Kg (\$150/oz). That's around \$5 million per tonne and that pegs the value of this scam to \$ 974.5 Billion to \$1035 Billion. Current values are as high as \$5,000/kg, because the demand for the refined metal is very low. Projections are that thorium prices will drop to as low as \$10/kg. Once thorium reactors move into production, prices will rise as demand grows (<http://defenceforumindia.com/>).

4.2. Regulation services

Sea turtles can emerge onto the beaches to deposit several batches of eggs during the course of a nesting season (Miller, 1997). Sea turtle species reproductive success depends mainly on the availability of terrestrial habitat to lay eggs. Geomorphology of the coastal area, slope of the beach, wave action, storms and the grain size of the sand are the essential characteristics of selection of turtle nesting ground in reproduction (Bird, 1996). For centuries, due to their unique position between ocean and land, the turtle nesting beaches and dunes have provided humans with important services such as raw materials, coastal protection, erosion control, water catchment and purification, maintenance of wildlife, carbon sequestration, and tourism, recreation, education, and research (Edward B. Barbier et al., 2011). Coastal protection is arguably one of the most valuable services provided by sand shore ecosystems especially in the face of extreme storms, tsunamis, and sea level rise. Turtle nesting grounds are the beaches that provide disturbance regulation (protection) function, water quality maintenance function and climate regulation function (Baird and Dann, 2003; Lastra et al., 2010). The turtle nesting ground of the natural beaches protect the life and livelihood of coastal communities from storm and flood damage. The turtle nesting ground beaches protect coastal wetlands by buffering the shorelines. It buffers the coastal wetland from erosion; reduce floodwaters impacts during cyclone and storms impacts. Details of disturbance regulation (protection) function of turtle nesting grounds have been explained in chapter 4.2.1.

Aquifers in lowland and coastal plains are the most important available source of renewable freshwater. Turtle nesting ground are potential source of renewable of freshwater. The turtle nesting ground acts as a buffer to renew the freshwater in the coastal aquifer and limits seawater intrusion into the coastal plains. The turtle nesting grounds acts as a freshwater reservoir and supply water to local communities during drought season. Freshwater stored in coastal aquifers is particularly vulnerable to degradation due to its close proximity to seawater, and the significant water demand associated with coastal areas whereby groundwater is often the main source of drinking water (Giada Felisa et al., 2013). Saltwater intrusion into coastal aquifers is one of the most significant global challenges coastal water resource managers, industries, and agriculture face (Ferguson and Gleeson 2012). Saltwater intrusion shall contaminate the potential water reservoirs of municipal, industrial, and agricultural water resources supplies (Barlow and Reichard 2010). The water storing, replenishing and water quality maintenance function of the turtle nesting ground are given in para 4.2.2.

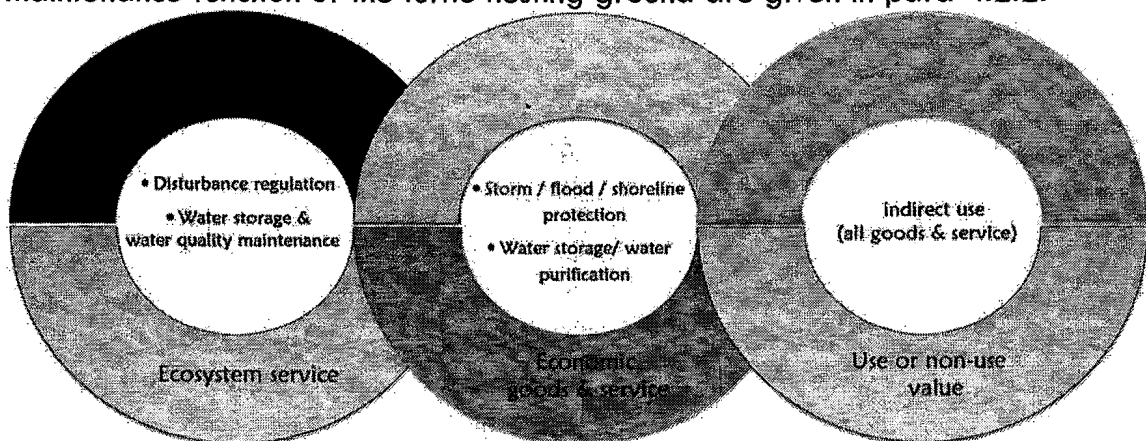


Fig 4

4.2.1. Disturbance regulation function

Turtle nesting grounds are located in high-energy coastlines where the regional coastal slope is low and vulnerable to sea level rise, and flood damage hence the location is very important in coastal protection function (Jeffrey Pompe and Jennifer Haluska., 2011). As waves reach the shoreline of the turtle nesting grounds, they are attenuated by the beach slope and also by the fore dune, a structure immediately behind the beach where sand accumulates in hills or ridges parallel to the shoreline. Beaches vary in their ability to attenuate waves depending on a continuum in their morphology (Edward B. Barbier et al., 2011). Wider beaches provide protection from flooding during storms and high tides to oceanfront property as well as to homes and lots farther removed from the beach. Additionally, wider beaches also enhance the value of recreational activities such as strolling on the beach, sunbathing, and picnicking. Therefore, the expectation is that a wider beach increases the market price of property, since property values capture the flood control and recreational gains associated with a wider beach

(Pompe, J., and J. Rinehart., 1999). Serious erosion of beaches endangers oceanfront property and, in extreme cases, leads to houses toppling into the ocean. Therefore, the expectation is that a wider beach increases the market price of property, since property values capture the flood control and recreational gains associated with a wider beach.

By protecting the impacts from erosion and storm, the property values near to the turtle nesting grounds and beaches have been increased. Landry et al. (2003) found that, for one meter increase of beach width, property values increased by \$233 on Tybee Island in the U.S. state of Georgia. Using hedonic pricing method, Pompe and Rinehart (1995) found that an additional foot of beach for two coastal communities in South Carolina increases the value of developed and undeveloped oceanfront lots by \$554 and \$754, respectively (Pompe, J., and J. Rinehart. 1995). Costanza et al., (1989) used WTP method to estimate storm reduction function of wetlands for \$452/acre/year (in 2009 dollars) which shall be equivalent to beach protection function. Other than the above estimate, hurricane protection function of coastal wetlands range between USD 250 to USD 51 000 ha¹ yr¹, with a mean of USD 8240 ha¹ yr¹ (median ¼ USD 3230 ha¹ yr¹) applicable for turtle nesting grounds. By applying damage avoided cost, Costanza et al (2008) has estimated storm protection services of Louisiana coast at (USD) 1700 ha⁻¹ yr (Robert Costanza et al., 2008).

4.2.2. Water storage and water quality maintenance function

In the coastal aquifers including beaches, gentle to nearly flat ground water table and semi-confined conditions fresh water occurs in shallow depths in discontinuous patches with deeper zones generally saline. Maximum thickness of 600 m and yield 3 - 38 lps (litre per second) from the coastal aquifers in coastal areas of India have been reported by Central Ground Water Board, India (CGWB., 2014). However, considering replenishable and water storing capacity of turtle nesting based on the average annual rainfall of 1200 mm. yr/ ha. 12000 m³ of water / year can be sustainably used. Managed Aquifer Recharge (MAR) and water banking are of increasing importance to water resources management. MAR can be used to buffer against drought and changing or variable climate, as well as provide water to meet demand growth, by making use of excess surface water supplies and recycled waters (Sharon and Dillon. 2015). Contamination of freshwater bodies caused by saltwater intrusion (SI) is a global issue, affecting water quality, vegetation, and soil conditions along coastal lines. Deterioration of this freshwater resource threatens the sustainability of the water supply of coastal communities and their economic development.

A popular approach among practitioners to assess the benefits of groundwater protection is the avoidance-cost method (Abdalla 1994; Rinaudo et al. 2005). It consists of assessing the cost of actions undertaken by economic agents to cope with groundwater degradation, and pollution in particular. Typical avoidance

costs are those related to the closure and displacement of contaminated drinking water wells (public or private), the installation of sophisticated water treatment units (municipal or domestic) or the purchase of bottled water when groundwater can no longer be used as a safe source of drinking water (Cecile Herivaux and Jean-Daniel Rinaudo., 2016). Other than avoidance cost method, CVM/WTP method has been applied by Belloumi and Matoussi (2002) to estimate the value for preserving groundwater quality from saline intrusion in the Tunisian coastal areas. Accordingly the ground water protection value in the coastal aquifer is 41€/hh/year (currency value of 2013). In New Zealand, economic value of groundwater for abstractive users in the Waimea Plains, Nelson, New Zealand have estimated the ground water value of the plain to be \$ 250 million, and the Waimea Plains 7500 ha area., accordingly, 1 ha ground water economic value is \$33333/ha, and the mean willingness to pay \$1.2 million to maintain groundwater, to keep springs and river flowing and prevent salt water intrusion (White et al., 2001). Because of the importance of this water source, the Meijendel dune (Netherlands) covering an area of 2000 ha has been managed as a nature reserve that serves both drinking water and recreation needs. In 1999, the cost of management was \$3.8 million/year, while the yearly income of the reserve was \$99.2 million/year (Edward B. Barbier et al., 2011). The cost of management of the water source area can be applied apart from Replacement cost method for valuation of water resources in the beaches. Also the economic valuations of in-situ groundwater resource in the Waimea Plains, Nelson, New Zealand were estimated \$ 1.2 million; Groundwater left in-situ would maintain spring flow, maintain groundwater quality and prevent saltwater intrusion into groundwater system. In Lebanon, a CVM method was applied to value the ground water resources for agriculture process and the farmer's willingness to pay estimated that the value is about \$ 134.3 ha. /Yr. (Daniel EL CHAMI et al., 2008).

4.3. Cultural services

Turtles are playing an important cultural, traditional, social and economic role in India. Turtle nesting grounds are sandy beaches that are the place for recreation and relaxation. It is a popular place for peacefulness, nature appreciation and play games and sports. Along with the turtle tourism, beach recreation increases the economic value of turtle nesting ground beaches. Turtles have spiritual value in Hindu mythology. According to Hindu mythology, the Indian deity Vishnu was

reincarnated as "Kachhapa" – a turtle, holding the burden of the world on its back (Liz McLellan et al., 2005). In Hinduism, Kurma (Sanskrit: कूर्म; Kurma, lit. turtle) is the second avatar of Vishnu. Three temples in India have special spiritual relationship with turtles and they are popular pilgrimage sites. The temples dedicated to Kurma are located in Kurmai in Chittoor district, Andhra Pradesh, Srikurmam in Srikakulam District, Andhra Pradesh and Gavirangapur in Chitradurg District of Karnataka. In addition the nesting areas offer recreation function (Klein et al., 2004; Noriega et al., 2012).



Kurma Avatar of Vishnu, below Mount Mandara, with Vasuki wrapped around it, churning the ocean of milk during Samudra Manthan. ca 1870.

Among the cultural services, turtle nesting grounds providing recreation function and spiritual function.

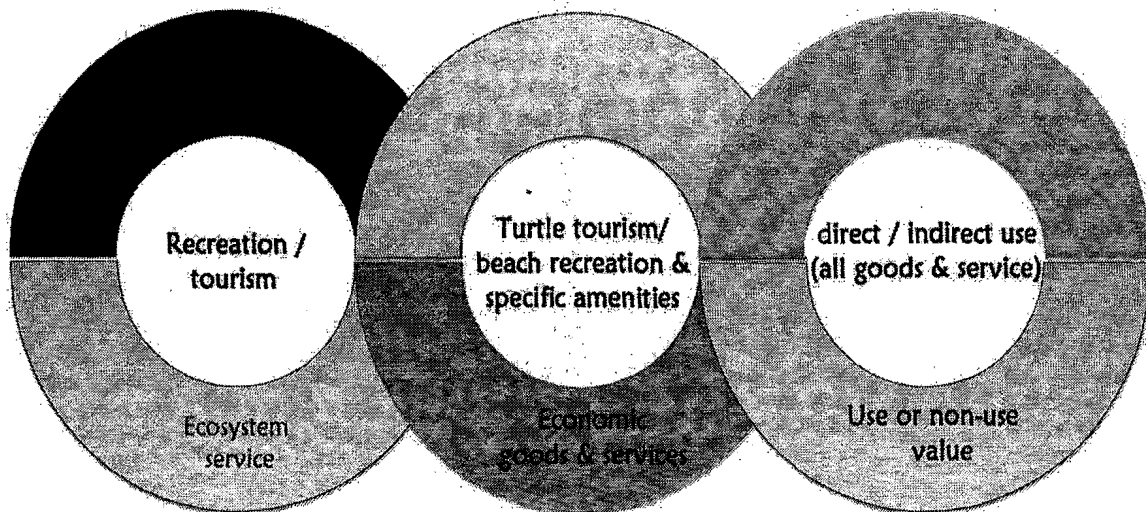


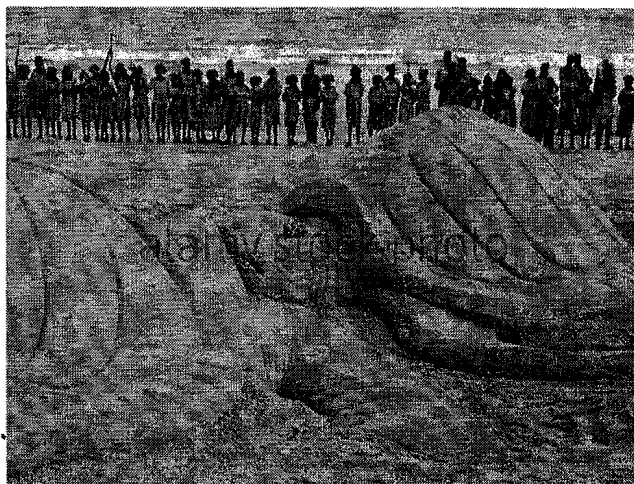
Fig 5

4.3.1. Recreation function

It has been estimated that, all over the world 175,000 tourists / year are participating marine turtle tours (Troëng and Drews, 2004). "It has been estimated that turtle-based tourism activities in Tortuguero, Costa Rica, generated more than US\$6.5 million through tourism services, along the 22 miles (35 km) long "beach-resting turtles (tortugas) was estimated by travel cost method (benefit transfer) souvenir sales and national park fees, in 2002 alone (Liz McLellan et al., 2005)."

Expenditures for turtle tourism in international market are 26 times higher than whale watching (Hoyt 2001).

Time spent for travelling to and from the turtle nesting area (beaches) is time that could be spent in another productive activity, such as in another leisure activity or at work, and thus represents a real cost that must be accounted for in the price paid by the user in going to the turtle nesting ground. These time costs can be translated into money terms by multiplying time units by the shadow value of leisure time (SVLT), which is a measure of the opportunity cost of a unit of time spent in non-work activities. Using the estimated model, the mean (median) value of a beach day (turtle nesting ground) across the sample is \$28.27 with a standard error of \$5.55 /day (Daniel K. Lew, and Douglas M. Larson., 2005).



School Girls watch sand artists, Puri, Orissa, India

It has been estimated that, gross revenue for nine case studies, where non-consumptive use of marine turtles, such as tourism, is a major revenue generator range from US\$41,147 to US\$6,714,483 yr⁻¹ per site with an average of US\$1,659,250 yr⁻¹. Gross revenue at four sites where marine turtles are one of many attractions varies between US\$3,387-US\$105,997 yr⁻¹



Marine turtles play an important role in Australian aboriginal culture. This contemporary design is drawn by Karen Puruntatameri

with an average of US\$40,791 yr⁻¹ (Troeng and Drews, 2004). Entire beach and adjacent land of Playa Grande Dominican Republic, covering an area of 379 ha annual gross revenue from turtle tourism was estimated at US\$900,460 in 1993 (Gutic 1994). A capitalized commercial value of US\$ 8,002,820 and a capitalized recreational value of US\$ 31,269,296 were estimated for the turtles and estuary resources, which adds up to a present total annual capitalized economic value of US\$ 39,272,116 for these resources. Based on the estimated total economic value, a capitalized economic value of US\$ 13,090,705 was determined for the Tamarindo estuary and a capitalized value of US\$ 34,910 was set for every leatherback turtle which nested at Playa Grande during the 1992 - 1993 season. The capitalized economic value for the whole (local) leatherback turtle population was set at US\$ 26,181,411 for the same season

(Jorge Gutic M., 1994). It has been estimated that Vela's beach Ratnagiri (Maharashtra) has 59 ha of turtle nesting grounds. Respondents were asked about their willingness to pay (WTP) for entry fee for recreational access along with turtle nesting habit were randomly offered 20 Rs per visit, Vela's to host almost 3,000 tourists during Turtle Festival seasons, annually 1016 Rs / ha /yr WTP (Pranab mukhopadhyay et.al 2016).

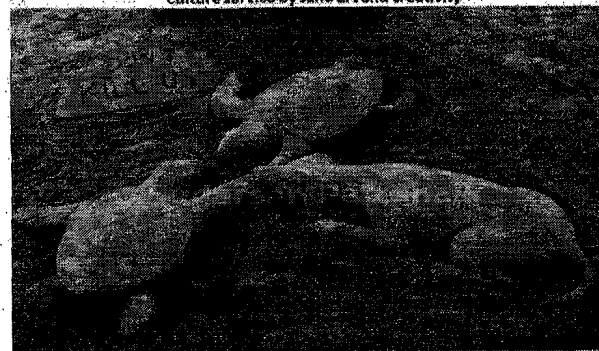
Nice views are important to property owners, ocean front and ocean view property is highly valued than the inland properties (Edwards 1989). In an Island of South Carolina, during 1989, an average plot size of 25993 (SQFT) which are located in the oceanfront are varied between \$22,718 and \$36,373 based on development. The ocean view (not oceanfront) properties located in developed areas were between \$12,780



Puri, Odisha, India

and \$33,016 however, the inland areas property values have been varied between \$8,081 and \$5,915 (1989\$ estimate) respectively \$143/foot, \$343/foot, \$103/foot and \$549/foot altogether average of 285 \$/ foot (Jwffrey, J. Pompe and James R. Rinehart., 1999). However, Hobbs (1980) used historical erosion rates to evaluate the impact of coastal erosion on shoreline property along the Chesapeake Bay. They found that the value of dwelling decreases by \$0.24 for each square foot of shoreline lost and by \$8.24 per foot of distance lost. Property owners value additional beach width differently, based on the state of development of the property, and the proximity to the beach. The value of an additional foot of beach is \$58.19 for vacant lots and \$80.98 for developed lots. Price differentials exist for property at different locations. An additional foot of beach adds \$194.09 and \$310.84, respectively, to developed and undeveloped oceanfront property (1989\$ estimate) (Jwffrey, J. Pompe and James R. Rinehart., 1999).

The turtle nesting ground such as beaches and dunes supply important recreational benefits such as boating, fishing, swimming, scuba diving, walking, beachcombing, collecting seashells, walking, jogging, viewing birds and sunbathing among the numerous recreational and scenic opportunities that are provided by beach and dune access (Edward B.



Culture service by sand art and creativity

Barbier et al., 2011). Values, estimated using both travel cost and contingent valuation methods, range from a low of just \$0.07/trip in Delaware, Maryland, and New Jersey to highs of well over \$70/activity day in California and Florida.

Linwood H. Pendleton (2006) estimated the economic use value of beach recreation at California beaches of 1,100 miles (1770 km) for \$1.5 billion and \$7.5 billion annually and the value of beach recreation in Florida (coastline were 700 miles (1,126 km) was between \$886 million and just under \$9 billion annually.

In addition, turtles provide spiritual service. Daily religious practices bring out the cultural value of a temple, church and mosque (Klamer, Arjo., 1996). Turtle temples support spiritual tourism of coastal regions. Since there is no macro analysis conducted for spiritual tourism of turtles, CVM will be applied to estimate the values of spiritual tourism benefits.

4.4. Supporting service

Supporting services of turtle nesting grounds does not necessarily have direct economic benefit but shall provide for ecosystem functioning, processes, maintenance of integrity, resilience, and so the delivery of other benefits, including soil, mineral, gas formation and water recycling. It is also an essential habitat for plants and invertebrates such as shellfish, birds, rodents, and ungulates (Carter 1990, Pye and Tsoar 1990; Baird and Dann, 2003; Lastra et al., (2010). The turtle species of Olive ridley nesting at Orissa is genetically distinct from other populations, and may even be the ancestral stock of other olive ridley turtle populations in other oceans (Liz McLellan et al., 2005). Hence, the olive ridley population reaching Orissa coast has special biological and scientific importance. Bjorndal and Jackson (2003) reported the presence of green turtles contributes to healthy seagrass beds. The sea turtles' grazing activity in sea grass beds control and stabilize the distribution and diversity of sea grasses and disburses nutrition to other organisms and ecosystems (Thayer & Engel 1982, Thayer et al. 1984). Nesting females are important food for many vertebrates living at the shore. The sea turtles have been attacked and eaten by jaguars, tigers and hyenas. The high protein eggs are an important food for several animals including jackals, mongooses, foxes, opossums, vultures, crows, lizards, snakes, crabs, and ants (Bjorndal & Jackson 2003). The turtle eggs directly influence the growth of vegetation's of beaches by supplying a concentrated source of high-quality nutrients in the sand (Bouchard, S.S. and Bjorndal, K.A. 2000). Limited nutrients in dune ecosystems, such as nitrogen, phosphorus and potassium, are partially provided to the ecosystem by un-hatched sea turtle eggs. These vital nutrients allow for the continued growth of vegetation and subsequent stabilization of beach dunes (Hannan, et al., 2007).

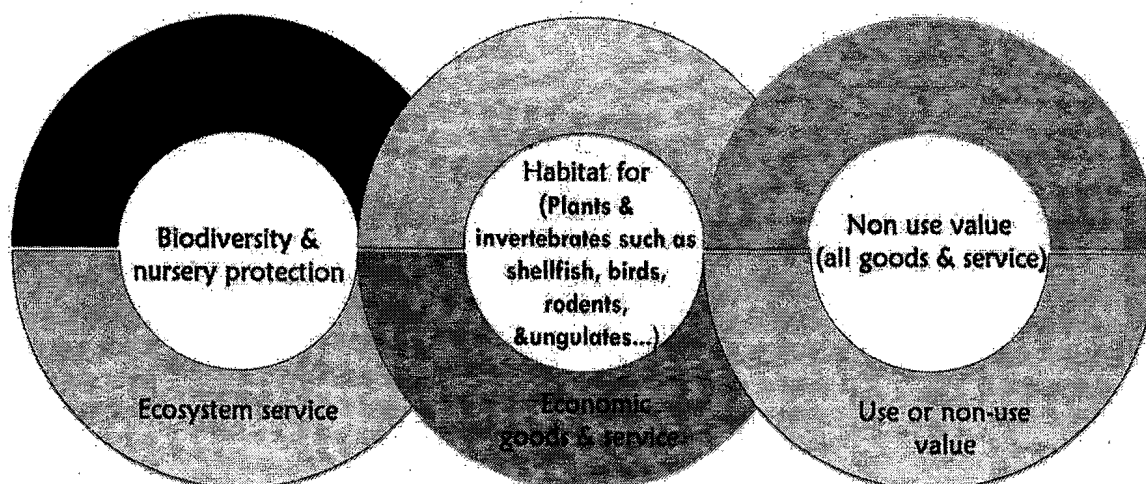


Fig 6

As the turtle nesting grounds have ecological and habitat significance by supporting the sustenance of large number of biological organisms, its existence and protection value is worth to incorporate under supportive service. It was estimated that an average weekly willingness to pay to protect sea turtles in Australia range between Aus \$ 1.97 - 2.67 that the visitors to Mon Repos for the 2000 season would be prepared to pay at least Aus \$250,000 per year to protect sea turtles in Australia for 9 mile (14 km) (Clevo Wilson and Clem Tisdell, 2002). Though, estimation of submissive values of turtle nesting services is difficult to measure in currency. Using CVM, a study in North Carolina in 1991 suggested that respondents would be willing to pay on average US\$33.2 per year to conserve loggerhead turtles (Whitehead 1992). Turtles at Rekawa are under threat due to ongoing illegal activities. Mean willingness to pay (WTP) as an entrance fee to protect at Rekawa sanctuary and two national parks close to Rekawa sanctuary (i.e. Bundala and Yala as the offsite study sites) were (SLR) 106.05 and SLR 145.47. Annual revenue increases under these scenarios respectively to SLR 4.96 million and SLR 7.40 million, across the Rekawa beach of approximately 4 km. (Wasantha Rathnayake 2014). Respondents were asked about their willingness to pay (WTP) for beach nourishment that would result in a wider beach head for improved recreational access along with turtle nesting habit randomly offered \$2.12 per visit, for a total of 1587 visitors surveyed and 3364\$ willingness to pay on the time of survey for the total 5.1 mile (Manoj P. Shivlani, 2003). Using benefit transfer method, S'Abanell beach habitat valued 106 \$/ha/yr (Lozoya et.al 2011).

5. Benefit Transfer and meta-analysis of turtle nesting grounds

The use and non-use values of the turtle nesting ground have been estimated at Rs. 45, 68,358/- yr. (Avg.). Out of which recreation function shares Rs. 29, 81,237/- yr. Disturbance regulation and water storage function of turtle nesting ground were estimated at Rs, 1, 17,866/ yr., and Rs. 12, 61,326/- yr., respectively. In addition, consumptive value of Rs. 2,07,929/ ha- was incorporated though there is no consumption value in India but, it has international market value. This value has been applied to the turtle nesting areas of India in relation to the composition of turtle species recorded by various scientific studies. The Total Economic Value from the turtle nesting ground is Rs.7997 Crore. Out of the total benefit from turtle nesting grounds, Andaman and Nicobar islands share Rs.5826 crore followed by Andhra Pradesh Rs. 601 crore.

Table 5.1 Turtle nesting grounds services values - ha / Yr.								
Sl. No	Goods & services	Valuation Methods	Value estimation study	Year & Value	Value given US \$	Value US \$ 2011	Value in Rs. 2011	Avg. TEV value
I Provisioning service								
I.1 Food (consumptive value)								
a.	Meat	Market Pricing	Didiher chacon	2002	23.3	28.3	1391	757/ kg
				23.3 \$ /kg				
b.	Meat	Market Pricing	Elizabeth H. fleming	2001	13.2	16.2	800	
				13.20\$/kg				
c.	Meat	Market Pricing	Didiher chacon	2002	1.32	1.60	79	
				1.32 \$/ kg				
d.	Egg	Market Pricing	Sanchez Et. al	2002	2.89	3.51	172	172/ dozen
				2.89 \$ / dozen				
I.2 Ornamental resource / Products (non - consumptive value)								
a.	Ring (scutes)	Market Pricing	Didiher chacon	2002	17.5	21.2	1044	9396/9 rings
				17.50 \$/ ring				
b.	Bracelet (scutes)	Market Pricing	Didiher chacon	2002	25	30.3	1492	74600/ 50 bracelet
				25 \$/ bracelet				
c.	Necklace (scutes)	Market Pricing	Didiher chacon	2002	18	21.8	1074	6552 /6 necklace
				18 \$/ ornament				

d.	Necklace (scutes)	Market Pricing	Didiher chacon	2002	18.60	22.60	1110	
				18.60 \$/ ornament				
e.	Hair clip (scutes)	Market Pricing	Didiher chacon	2002	50	60.7	2984	11936/ 4 hair clip
				50 \$/ clip				
f.	Shell	Market Pricing	Didiher chacon	2002	20	24.3	1194	
				20 \$/ clip				
g.	Shell	Market Pricing	Timothy lam et. al	2012	46	46	2260	
				46 \$/ shell				
h.	Polished shell	Market Pricing	Elizabeth H. fleming	2001	24	29.6	1458	1601 / shell
				24 \$/ shell				
i.	Bony Plate	Market Pricing	Didiher chacon	2002	25	30	1492	
				25 \$/ 1 kg of bony plate				
J.	Stuffed	Market Pricing	Didiher chacon	2002	47.50	58	2835	19612 / turtle
				47.50 \$/ stuffed				
k.	Stuffed	Market Pricing	Ottenwal der	1996	550	741	36390	
				550 \$/ stuffed				
l.	Oil (fat)	Market Pricing	Didiher chacon	2002	2.79	137	27400	41800 / turtle
				2.50 US\$ / 100 gm				
m.	soap(fat)	Market Pricing	Didiher chacon	2002	1.46	72	14400	
				1.20 \$/ 200 gm				
n.	Leather	Market Pricing	Trinidad & James wilson	2000	15	18.9	930	930/ turtle
				15 \$/turtle				
II Regulating service								
II.1 Disturbance regulation function								
a.	Storm protection	CVM	Costanza et. al.	2009	452 \$/ acre	467	56662	117866/ ha
				452 \$/ acre				
b.				2008			86949	

		Damage avoided cost	Costanza et.al.	1700\$/ha	1700\$ / ha	1,770		
c.		Damage avoided cost	Costanza et. al.	2009 3230\$/ha	3230 \$/ ha	3,337	163927	
II.2 Water storage and water quality maintenance function								
a.	Water quality	CVM	Belloumi & Matoussi	2013 41€/ ha	32 \$/ ha	31	1523	1261326 / ha
b.	Water quality	CVM	White et.al.	2001 160\$/ha	160\$/ ha	197	9677	
c.	Water quality	CVM	Daniel El Chami et.al.	2008 134.3 \$/ ha	134.3 \$/ ha	139	6828	
d.	Water quality/ storage	Replacement cost	Edward B. Barbier et.al.	1999 3.8 million \$/ 2000 ha	1900 \$/ ha	2452	120452	
e.	Water storage	CVM	White et.al.	2001 33333\$/ha	33333 \$/ ha	41116	2019782	
f.	Water storage	Market pricing	Edward B. Barbier et.al.	2000 95.4 million \$/2000 ha	47700 \$/ ha	60180	2956282	
III Cultural services								
III.1 Recreation function								
a.	Turtle tourism	CVM	Gutic	1993 900,460\$ / 379 ha	2376 \$/ ha	3398	166923	2981237 / ha
b.	Recreation	CVM	Gutic (general)	1993 31,269,296\$ / 379 ha	82505 \$/ ha	117978	5795551	

Table 5.2 Turtle nesting ground service value – minimum, maximum, average ha/yr./Rs.			
Service	Minimum value / ha	Maximum value / ha	Average value / ha
I. Provisioning service(Consumptive value)			
Consumption + commercial value (Ornamental resource (bracelet, ring, necklace, hairclip, oil, soap, shell, stuffed)	0 Kerala, West Bengal...	2227434 (Odisha)	207929
II. Regulating service(non- consumptive value)			
Disturbance regulation function	56662	163927	117866
Water storage and water quality maintenance function	1523	2956282	1261326
III. Cultural services			
Recreation function	166923	5795551	2981237
Total Economic value / ha			4568358 (Forty Six Lakh)

Table 5.3 Total economic value of turtle nesting grounds services Rs/ Yr.			
S.No	State / Union Territories	Turtle nesting distribution - ha	Total Value of Turtle nesting grounds
1.	Gujarat	399.51	1751596647
2.	Maharashtra	202.20	882154337
3.	Goa	25.54	111672599
4.	Kerala	116.61	508455859
5.	Lakshadweep	992.15	4326197888
6.	Tamil Nadu	263.08	1147441668
7.	Pondicherry	15.79	68870225
8.	Andhra Pradesh	1374.69	6013858517
9.	Odisha	872.93	5750762983
10.	West Bengal	265.48	1157610090
11.	Andaman & Nicobar	13344.06	58261309277
Total		17872.05	79979930092 (7997Crore)

6 Conclusion

Turtle nesting grounds are on land, and they are typically sandy beaches. Turtles have various ecological roles, sea turtles contribute to tourism activities, due to their charismatic nature, yielding great economic benefits. Quantification of the economic consequences of marine turtle use value and conservation could contribute significantly to our understanding of use options and their ecological impacts, and hence further the process of defining adequate management policies. Expressing the economic value of various uses and benefits of turtle nesting grounds shall be a tool to raise awareness and convey its (relative) importance to general public and policy makers.

The use and non-use values of the turtle nesting ground has been estimated at Rs. 45, 68,358 /- yr. /ha. Out of which consumptive value shares of Rs2, 07,929/ ha, has been incorporated in this study though there is no consumption in India but, it has international market value. The Total Economic Value of turtle nesting ground of India is Rs.7997 Crore. Out of the total benefit from turtle nesting grounds, Andaman and Nicobar islands share Rs.5826 crore followed by Andhra Pradesh Rs. 601 crore. The monetary values could be used in National, State and regional policies to integrate environment and economics.

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Annexure – 1

Turtle nesting grounds – Services, Functions & Methods							
Sl. No	Year	Value estimation study	Location	Ecosystem Service & Sub-Service		Methods	
1	2002	Didiher chacon	Caribbean (Grand Cayman island)	Provisioning service	Food	Meat	Market Pricing
2	2001	Elizabeth H. fleming	British Virgin Islands			Meat	Market Pricing
3	2002	Didiher chacon	Guatemala (Livingston)			Meat	Market Pricing
4	2002	Sanchez et al	Guatemala			Egg	Market Pricing
5	2002	Didiher chacon	Guatemala			Drink/ juice	Market Pricing
6	2002	Didiher chacon	Belize (Dangriga)		Ornamental resource / Products	Ring (scutes)	Market Pricing
7	2002	Didiher chacon	Margarita Island, Venezuela			Bracelet (scutes)	Market Pricing
8	2002	Didiher chacon	Belize City			Bony Plate (scutes)	Market Pricing
9	2002	Didiher chacon	Caribbean			Ornament (scutes)	Market Pricing
10	2002	Didiher chacon	Honduras			Ornament (scutes)	Market Pricing
11	2002	Didiher chacon	Panama			Hair clip (scutes)	Market Pricing
12	2012	Timothy lam et. al	China (Anguo, Hebei)			Shell (carapace)	Market Pricing

13	2001	Elizabeth H. Fleming	Central America			Polished shell (carapace)	Market Pricing
14	2002	Didiher chacon	Caribbean			Stuffed	Market Pricing
15	1996	Ottenwalder	Caribbean			Stuffed	Market Pricing
16	2002	Didiher chacon	Dangriga, Belize			Oil (fat)	Market Pricing
17	2002	Didiher chacon	Guatemala			soap(fat)	Market Pricing
18	2000	Trinidad & James Wilson	Mexico			Leather	Market Pricing
19	2003	Landry et.al.	U.S. state of Georgia (Tybee Island)	Disturbance Regulation	Storm protection	Hedonic pricing	
20	1995	Pompe & Rinehart	South Carolina		Storm protection	Hedonic pricing	
21	2009	Costanza et. al.	Global		Storm protection	Contingent valuation	
22	2009	Costanza et. al.	Global		Hurricane protection	Damage avoided cost	
23	2008	Costanza et.al.	Louisiana coast		storm protection	Damage avoided cost	
24	2013	Belloumi & Matoussi	Central Eastern Tunisia	Water storage & water quality maintenance	Water quality	Contingent valuation	
25	2001	White et.al.	Waimea plains nelson		Water quality	Contingent valuation	
26	2008	Daniel El Chami et.al.	Lebanon		Water quality	Contingent valuation	
27	1999	Edward B. Barbier et.al.	Netherlands (Meijendel dune)		Water quality	Replacement cost	
28	2001	White et.al.	Waimea plains nelson		Water storage	Contingent valuation	
29	2000	Edward B. Barbier et.al.	Netherlands (Meijendel dune)		Water storage	Market pricing	

30	1993	Gutic	Costa Rica (Tamarindo)	Cultural	Recreation	Turtle tourism	Contingent valuation
31	1993	Gutic	Costa Rica (Tamarindo)			Recreation	Contingent valuation

Annexure - 2

Turtle nesting grounds Total Economic Value service & patch wise valuation						
Sl. No	Patches in coastal areas	Turtle Nesting Grounds -ha.	Provisional Service	Regulating Service	Cultural Service	Total Economic Value
1	Lamba Sethala Mata Mandir	32.55	829660	44887147	97027262	142744069
2	Mithapur Mojap	12.57	657697	17332868	37466422	55456987
3	Sethala Mata Mandir Harshad	13.99	885678	19288065	41692739	61866482
4	Okhamadhi Kharakhetar	33.41	444046	46076819	99598837	146119702
5	Mojap Shivraipur	13.14	859623	18124237	39177030	58160891
6	Kharakhetar Kuranga	25.57	563899	35260804	76219128	112043832
7	Navadra Lamba	40.44	923458	55772227	120556259	177251945
8	Shil Lohej	50.82	1135284	70089847	151504972	222730105
9	Mangrol Mangrol Bara	20.57	1011003	28370671	61325539	90707213
10	Maktupur Mangrol	6.98	0	9623578	20802156	30425734
11	Ratadi-Kantela	47.43	800999	65410729	141390674	207602402
12	Kantela Kuchhadi	50.55	1011003	69714095	150692754	221417852
13	Navibandar Ratiya	51.52	428413	71053352	153587667	225069432
	Gujarat	399.51	9550763	551004442	1191041443	1751596647
14.	Kolthare	5.09	64754	7024007	15182968	22271729
15.	Sandkhol	4.32	0	5955759	12873864	18829624

16.	Velas	8.59	226639	11853009	25621255	37700903
17.	Guhagar	48.91	45328	67454039	145807456	213306823
18.	Kelashi	17.00	10684	23443598	50675266	74129549
19.	Dabhol	6.00	64754	8268391	17872808	26205953
20.	Murud Janjira	2.79	0	3848443	8318726	12167169
21.	Diveagar	73.70	32376	101643769	219711371	321387517
22	Harihareshwar	13.04	32377	17984171	38874266	56890814
23	Maral	7.16	0	9871220	21337455	31208675
24		1.52	0	2096229	4531171	6627400
25		6.64	0	9156821	19793221	28950042
26		0.08	0	108018	233489	341507
27		7.37	0	10164730	21971901	32136631
	Maharashtra	202.20	476912	278872205	602805220	882154337
28	Mandrem (Nearby Junos Vaddo village)	2.28	0	3149344	6807567	9956912
29	Morjim (Morjim South)	3.11	0	4295191	9284409	13579601
30	Mandrem	2.46	48565	3392651	7333493	10774709
31	Morjim (Morjim North)	0.86	64754	1192420	2577514	3834688
32	Agonda	11.90	97131	16406975	35465027	51969133
33	Galgibaga	4.92	107815	6784495	14665244	21557554
	Goa	25.54	318266	35221077	76133256	111672399
34	Kolavipalam	70.86	0	97726504	211243879	308970383
35	Alungal	9.25	0	12756349	27573899	40330249
36	Thaikkadappu ram	20.32	0	28022601	60573158	88595759
37		16.18	0	22317770	48241697	70559468
	Kerala	116.61	0	160823225	347632634	508455859
38	Suheli Valliakara	58.33	0	80446890	173892573	254339463
39	Karingikuppu	24.20	0	33378239	72149811	105528050
40	Tinnakara	52.36	0	72220561	156110687	228331248
41	Minicoy group	513.16	0	707739684	1529837567	2237577252
42	Agatti	344.10	0	474579415	1025842459	1500421875

	Lakshadweep	992.15	0	1368364791	2957833097	4326197888
43	Marina - Neelankarai (Urrur kuppam-kaveri Nagar)	67.69	123153	93360970	201807419	295291541
44	Marina - Neelankarai (Marina - Srinivasa Puram)	86.06	156572	118695379	256569828	375421779
45	(Nearby Mandalpattu village)	3.95	0	5451590	11784061	17235651
46	Alikuppam	44.17	0	60916932	131676960	192593892
47	Neelankarai - Uthandi	47.74	19426	65844891	142329150	208193467
48	Marina - Neelankarai Kuppam)	13.46	0	18568341	40136997	58705337
	Tamil Nadu	263.08	299151	362838102	784304415	1147441668
49	Nearby village Nallavadu	12.34	0	17017092	36783844	53800936
50	Nearby village Panithittu	3.46	0	4766376	10302913	15069289
	Pondicherry	15.79	0	21783467	47086758	68870225
51	Gautami Godavari - Nilarevu	360.94	0	497805506	1076047565	1573853071
52	Hope Island	61.72	0	85126714	184008397	269135110
53	Sacrement Island	74.36	12076620	102559440	221690668	336326728
54	Krishna - Lankavanidib	172.53	337368	237957824	514365419	752660611
55	Elicheeladibba	346.96	991704	478529034	1034379886	1513900625
56	Pennaru - Mypadu	63.30	215954	87308129	188723705	276247788
57	Sriharikota - Durgarajapat	88.67	259016	122299330	264360066	386918412
58	Bahuda - Kapaskuddi	85.24	1295079	117558446	254112255	372965781
59	Vamsadhara -	37.39	1780735	51564761	111461474	164806970

60		10.03	0	13838872	29913860	43752732
61	Kunduvanipeta - Nagavali	46.83	1618850	64588646	139613674	205821170
62	Muthiyavanipalem	26.70	1036064	36827589	79605864	117469517
	Andhra Pradesh	1374.69	19611391	1895964292	4098282834	6013858517
63	Digha (Nearby Digha village)	14.89	0	20532820	44383381	64916202
64	Rushikulya	121.93	539616774	168167102	363507030	1071290907
65	Bahuda - Kapaskuddi	72.69	1780734	100248611	216695621	318724966
66	Akashdia Island (Devi)	314.45	323769984	433680844	937436831	1694887658
67	Gahirmatha (Wheeler, Ekakula, Habalikati)	154.11	1079233345	212546963	459437751	1751218059
68	Agarnasi	127.88	0	176373960	381246828	557620788
69	Pentha	66.99	0	92391839	199712564	292104403
	Odisha	872.93	1944400837	1203942140	2602420006	5750762983
70	Dadanpatra	51.10	0	70476589	152340948	222817537
71	Junput	146.88	0	202572979	437878165	640451144
72	Digha (Jagai Basan-Digha)	50.14	0	69149960	149473328	218623288
73	Shankarpur	17.36	0	23949438	51768682	75718121
	West Bengal	265.48	0	366148967	791461123	1157610090
74	Andaman & Nicobar	13344.06	75480895	18404021489	39781806893	58261309277
	Andaman & Nicobar	13344.06	75480895	18404021489	39781806893	58261309277
	Total TNG value	17872.05	2050138215	24648984198	53280807679	79979930092

Annexure - 3

State wise Total economic value of turtle nesting grounds services					
Sl.No	State / Union Territories	Provisioning Service value	Regulating Service value	Cultural Service value	Total economic value
1.	Gujarat	9550763	551004442	1191041443	1751596647

2.	Maharashtra	476912	278872205	602805220	882154337
3.	Goa	318265	35221077	76133256	111672599
4.	Kerala	0	160823225	347632634	508455859
	Lakshadweep	0	1368364791	2957833097	4326197888
5.	Tamil Nadu	299150.8078	362838102	784304415	1147441668
6.	Pondicherry	0	21783467	47086758	68870225
7.	Andhra Pradesh	19611391	1895964292	4098282834	6013858517
8.	Odisha	1944400837	1203942140	2602420006	5750762983
9.	West Bengal	0	366148967	791461123	1157610090
10.	Andaman & Nicobar	75480895	18404021489	39781806893	58261309277
	Total	2050138215	24648984198	53280807679	79979930092

Annexure - 4

Provisioning Service (Function)	Average value 2011Rs	Utilization pattern of turtle
Meat	757/ kg	Olive ridley, green turtle, hawksbill turtle, leather back
Fat (oil, soap)	41800 / turtle	Olive ridley, green turtle, hawksbill turtle
Stuffed	19614/ turtle	Olive ridley, green turtle, hawksbill turtle
Egg	172/ dozen	Olive ridley, green turtle, hawksbill turtle, leather back
Shell (carapace)	1601/ turtle	Olive ridley, green turtle, hawksbill turtle
Shell - Ornamental resource (bracelet, ring, necklace, hairclip)	102484/ turtle	hawksbill turtle
Skin (Leather)	930/ turtle	leather back

Note: average weight and eggs / year: Olive ridley - 36 kg /204 eggs; Green turtle - 136 kg/ 300 eggs, Hawksbill - 55 kg/ 216 eggs; Leatherback - 499 kg/ 276 eggs (Fisheries Department); meat- 75% weight taken in account, fat - 15 litre / turtle converted to approximate amount used in soap and oil.

Turtle	Average value / turtle 2011Rs	Function includes in Average value / turtle
Olive ridley	32377	livelihood consumption (meat, egg) + commercial value (oil, soap, shell, stuffed)
Green turtle	52110	livelihood consumption (meat, egg)+ commercial value (oil, soap, shell, stuffed)
Hawksbill turtle	86348	livelihood consumption (meat, egg) +

#3

		commercial value(Ornamental resource (bracelet, ring, necklace, hairclip), oil, soap, shell, stuffed)
Leather back	288193	livelihood consumption (meat, egg) + commercial value (leather)

Survey of 45 hectares area at Kasarkod Tonka in Honnavar Taluk of Uttar Kannada district of Karnataka on the issue of Turtle nesting ground

Introduction

Honnavar is small coastal town located at Uttara Kannada district in Karnataka and is popular amongst tourists due to its scenic beauty and the coastal lifestyle. It is located along the banks of rivers Sharavati and Badagani before the joining the Arabian Sea in the west coast of India. Honnavar is located approximately 165 kilometers from Goa and 460 km from the State Capital, Bengaluru.

The Government of Karnataka proposed to develop the Honnavar Port in the land at Kasarkod Tonka in Honnavar Taluk of Uttar Kannada District. The proposed port at is situated on the left bank of river Sharavati at the confluence of both Sharavati and Badagani with the Arabian Sea.

Present Issue

The Government of Karnataka has proposed to develop Honnavar Port in the port land at Kasarkod Tonka in Honnavar Taluk of Uttar Kannada District. In this regard, M/s Honnavar Port Pvt. Ltd. (HPPL), Bengaluru were sanctioned 40,000 sqm of port land in the 1st phase and 93 acres of port land was reserved for the project in 2010. Work commenced at the site in 2019 by the company after obtaining necessary statutory clearances. Honnavar Taluka Hasi Meenu Vyaparasthara Sangha filed a W.P. No. 4039/2021 (PIL) in Hon'ble High Court of Karnataka, Bengaluru, praying for stoppage of construction of the port. According to the petitioner, the entire area of 45 hectares on which the project is to come up is a turtle nesting ground.

On 13.07.2021, upon hearing the Hon'ble High Court of Karnataka issued a Daily Order directing NCSCM to carry out a survey of the 45 hectares area at Kasarkod Tonka in Honnavar Taluk of Uttar Kannada District of Karnataka to verify the issue of turtle nesting ground. A report has to be submitted in this regard by NCSCM before the next hearing which is on 19th August, 2021.

Marine turtles in India

Turtles are both freshwater and marine reptiles and capable of amphibious life (Both on land and water) although, marine turtles come to land only for laying eggs in the nests created on sandy shores. India reports 5 species of marine turtles that inhabit the coastal waters. In order of their abundance, the listed species are

1. Olive Ridley - *Lepidochelys olivacea*
2. Green turtle - *Chelonia mydas*
3. Hawksbill - *Eretmochelys imbricata*

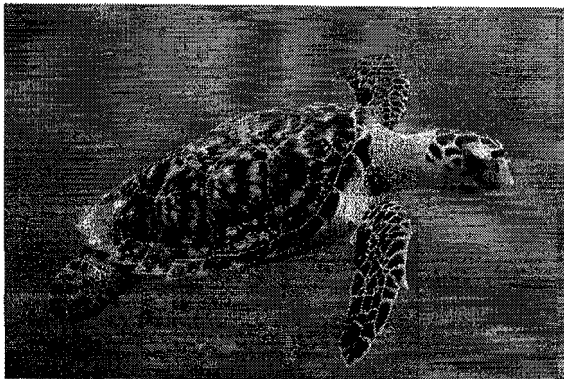
- 4. Loggerhead - *Caretta caretta*
- 5. Leatherback - *Dermochelys coriacea*



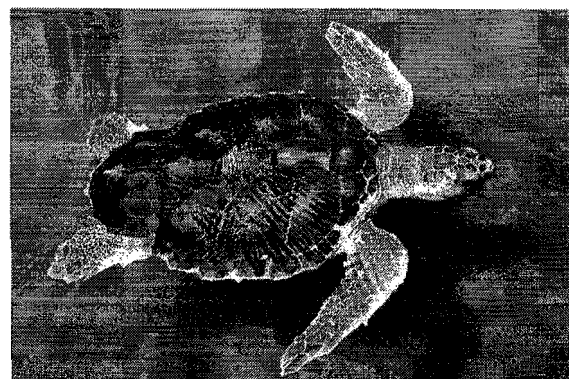
Olive Ridley Turtle



Green Turtle



Hawksbill Turtle



Loggerhead Turtle



Leatherback Turtle

Fig. 1. Marine turtles of India (Image courtesy: Wikimedia commons)

Types of Turtle Nesting

There are two types of nesting in turtles i) Mass nesting and ii) sporadic nesting. The mass nesting of turtles is termed "arribadas" (Spanish for arrival). Arribadas are also referred to as rookeries. **The Olive Ridley species have a unique social behavior in that they have communal/ mass nesting or arribada.**

During the nesting seasons, there are a number of arribada beaches where thousands of females congregate on sandy beaches that are 2-6 km long on three or four continuous

evenings¹. In India, the arribadas are located at Gahirmatha and Rushikulya in Odisha with an estimated over 100,000 nests per year and, more recently, a new mass nesting site was discovered in the Andaman Islands, with more than 5,000 nests reported in a season². Solitary nesting is witnessed sporadically along the entire coast of India.

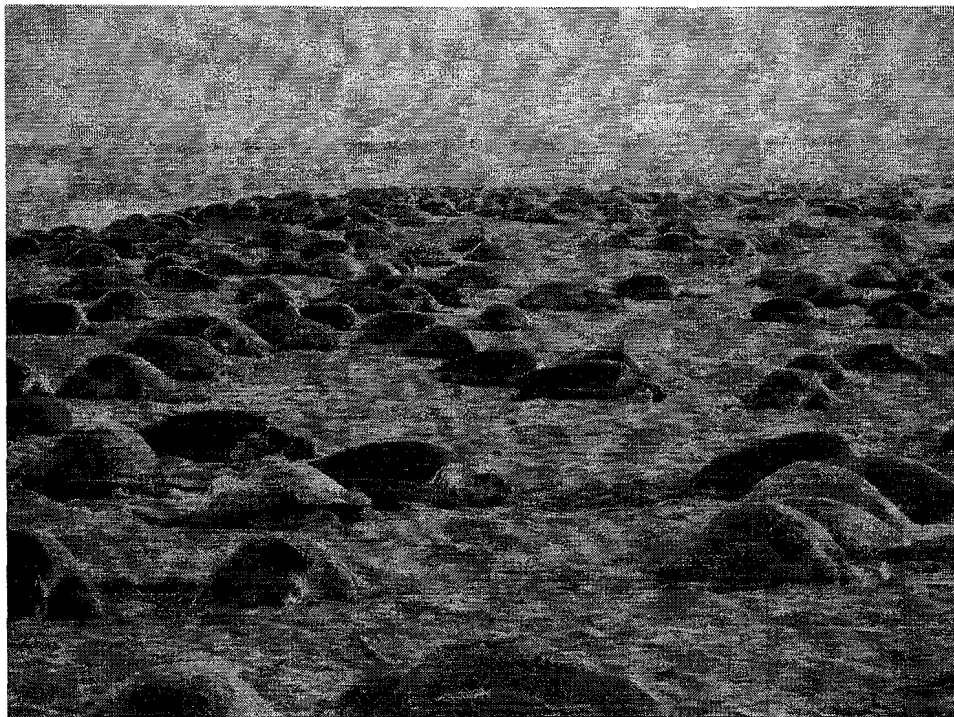


Fig. 2. Mass nesting of turtles at Gahirmatha marine sanctuary, Odisha
(Image courtesy: Bijay Kumar)

Nesting Beaches in Coastal Karnataka

Sporadic nesting of Olive Ridley turtles is reported from the coast of Karnataka. The oldest comprehensive study dates back to 2002, a study jointly undertaken by Government of India (GoI) and UNDP where, a baseline was prepared for the nesting beaches along the coast of Karnataka.

(a) GOI – UNDP Sea Turtle Project³

The report has located major turtle nesting sites but no geocoordinates is available pertaining to the exact locations. Out of 13 sites identified in the Uttara Kannada District, Kasarkod beach was designated as an "**occasional nesting site**". The report highlights unequivocally that mass nesting in rookeries (arribadas) like those in Odisha does not occur in Karnataka. The nesting season was observed to be from September to January.

¹ Paladino, F.V., and Morreale, S.J. (2001). Sea Turtles in Encyclopedia of Ocean Sciences (Second Edition)

² NOAA. 2021. Olive Ridley Turtle. <https://www.fisheries.noaa.gov/species/olive-ridley-turtle> accessed on 11 August 2021

³ Sharath B.K. (2002) Marine turtle nesting along the coast of Karnataka – a status survey. GOI – UNDP Sea turtle project, 25 p.

(b) WWF - India Report⁴

The WWF 2013 report has provided an overview of the status of sea turtle nesting in Karnataka. It has mentioned Kasarkod as a potential nesting site with new nesting areas (the co-ordinates 14.26028 N, 74.43256 E). The report highlighted the decrease in turtle nesting over the years and the need for a detailed research to create a database on nesting. Fourteen beaches were identified from Uttara Kannada, thirteen from Udupi and six from Dakshina Kannada as potential nesting sites with new nesting areas (Table 1).

Table. 1. List of Potential Nesting Sites in Dakshin Kannada with New Nesting Areas (WWF-India Report, 2013)

S. No.	Name of nesting the beach	Beach Type	Co-ordinates
1.	Tilmati	Small black sand	N14.90019; E74.09111
2.	Devbag	Long sandy beach	N14.84525; E74.11454
3.	Amdalli (S)	Sandy	N14.75938; E74.17922
4.	Belekeri	Long sandy beach	N14.70572; E74.26435
5.	Kini	Sandy	N14.70579; E74.26435
6.	Manjaguni	Sandy	N14.60259; E74.29021
7.	Gangavali	Sandy	N14.59030; E74.29435
8.	Kagal	Sandy	N14.49140; E74.36355
9.	Dhareshwara	Sandy	N14.37469; E74.40492
10.	Haldipur	Sandy	N14.34576; E74.43485
11.	Kasarkod	Sandy	N14.26028; E74.43256
12.	Talmakki	Sandy	N14.12745; E74.48281
13.	Bailoor	Sandy	N14.05862; E74.49700
14.	Bengre (Bhatkal)	Sandy	N14.05865; E74.49699

(c) Dakshin - EMPRI Report⁵

The Dakshin-EMPRI Report of 2016 is a comprehensive document concerning sea turtle breeding along the Karnataka coast. According to the report, Olive Ridley nests are observed to be along the entire coastline of Honnavar Division and seven major nesting beaches (Figure 3) have been identified. These beaches are mostly sandy with small rocky patches. The seven nesting beaches are located at Gangavali, Kagal, Dhareshwara, Haldipur, Kasarkod, Talmakki, and Bengre (Bhatkal). According to the report, the nesting season begins as early as October and lasts till April every year. The peak nesting season in Honnavar is for three months beginning from December to February. The report has also provided beach profiles of Haldipur, Kasarkod and Manki beaches.

⁴ Ravi Pandit and Rakesh Soans (2013) Marine Turtle Habitats and Nesting Status in Karnataka. In. Annie Kurian (Ed.) (2013) Marine Turtles Along the Indian Coast - Distribution, Status, Threats and Management Implications, WWF-India, pp. 113-126

⁵ Anon (2016) Establishing a baseline for monitoring sea turtle nesting sites on the Karnataka coast through coastline mapping. Final Report. Dakshin & EMPRI, 93 p.

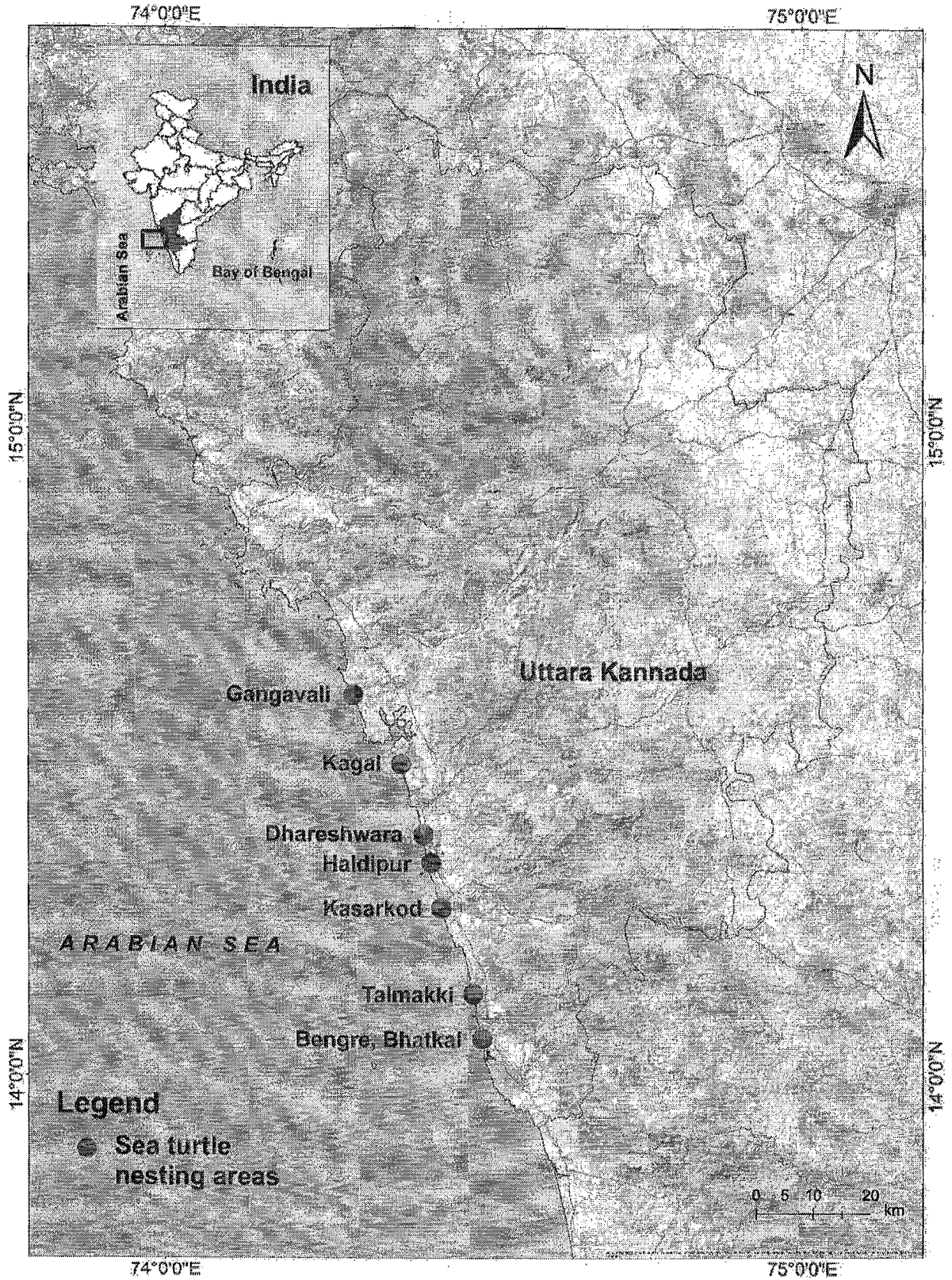


Fig. 3. Turtle nesting beaches in Uttara Kannada District (redrawn from Dakshin-EMPRI Report, 2016)

(d) Sritharan et al. (2017)⁶ – Report submitted to NCSCM

As a part of the delineation and demarcation of Ecologically Sensitive Areas (ESA) and Critically Vulnerable Coastal Areas (CVCA), the Indian Institute of Sciences (IISc), Bangalore was identified as the partner agency to identify turtle nesting sites along the coast of India. IISc Bangalore submitted the nesting sites for the entire coast of India and for the Karnataka coast, 28 nesting beaches of Olive Ridley turtles were reported. The report also clearly points out that there is no secondary data available for any of these nesting sites.

All available turtle nesting records were used to classify nesting as 'High' or 'Medium' to qualify the area as an ESA. For beach stretches with no past reports on nesting numbers, the nesting abundance of the 2 nearest nesting beaches were used to interpolate the approximate nesting abundance for the region. According to the study, certain states such as Kerala had just a few reports of high-intensity sea turtle nesting. No mass nesting sites were observed along the Karnataka coast, despite the availability of several point records of turtle nesting.

(e) Data from Forest Department, Honnavar Range, Karnataka⁷

Turtle nesting data was collected from Forest Department, Honnavar Range and the compiled data was analyzed. Based on the list, Kasarkod beach has been mentioned 5 times for turtle nesting from 2015 to 2021. Pavinakurve, Haldipur and Taribagilu have far more nesting records compared to Kasarkod since 2015. The details of the geo-tagged locations taken from the Forest Department records is given in Figure 4 and 5. The nesting frequency of each location is provided in Figure 6 and the details are placed at Annex 2). In Kasarakod, 582 turtle eggs were collected between 2016 and 2021.

All the GPS points recorded in the list provided by the Forest Department were falling in the ocean and one site in the land area. None of the GPS points that have been documented were on the beach. This probably might be due to the use of mobile smart phones with GPS facility or because of improper calibration of the GPS device.

The map with actual geo-tagged locations is provided in Figure 4. The entire Forest Department data which was documented in Kannada has been translated into English and as is attached with this document as Annex 2.

From the records of the Forest Department, it was observed that the southern tip of the proposed HPPL project site had one nesting in the year 2020 (marked as No. 5 in the maps 4, 5 and 6). The actual geolocation in the document falls 3 km in the land area from the shore. A straight line drawn from this location westward to the coast falls in the southern tip of the proposed port area.

⁶ Sritharan S., Muralidharan M. and Shanker K (2017) Mapping of Important Sea Turtle Nesting Sites in India, Project Completion Report. Submitted to: National Centre for Sustainable Coastal Management (NCSCM). Centre for Ecological Sciences, Indian Institute of Science, Bangalore, 5 p.

⁷ List of turtle nesting from the Honnavar Subdivision, Provided by the Range Forest Office, Honnavar Range, Honnavar - 581334

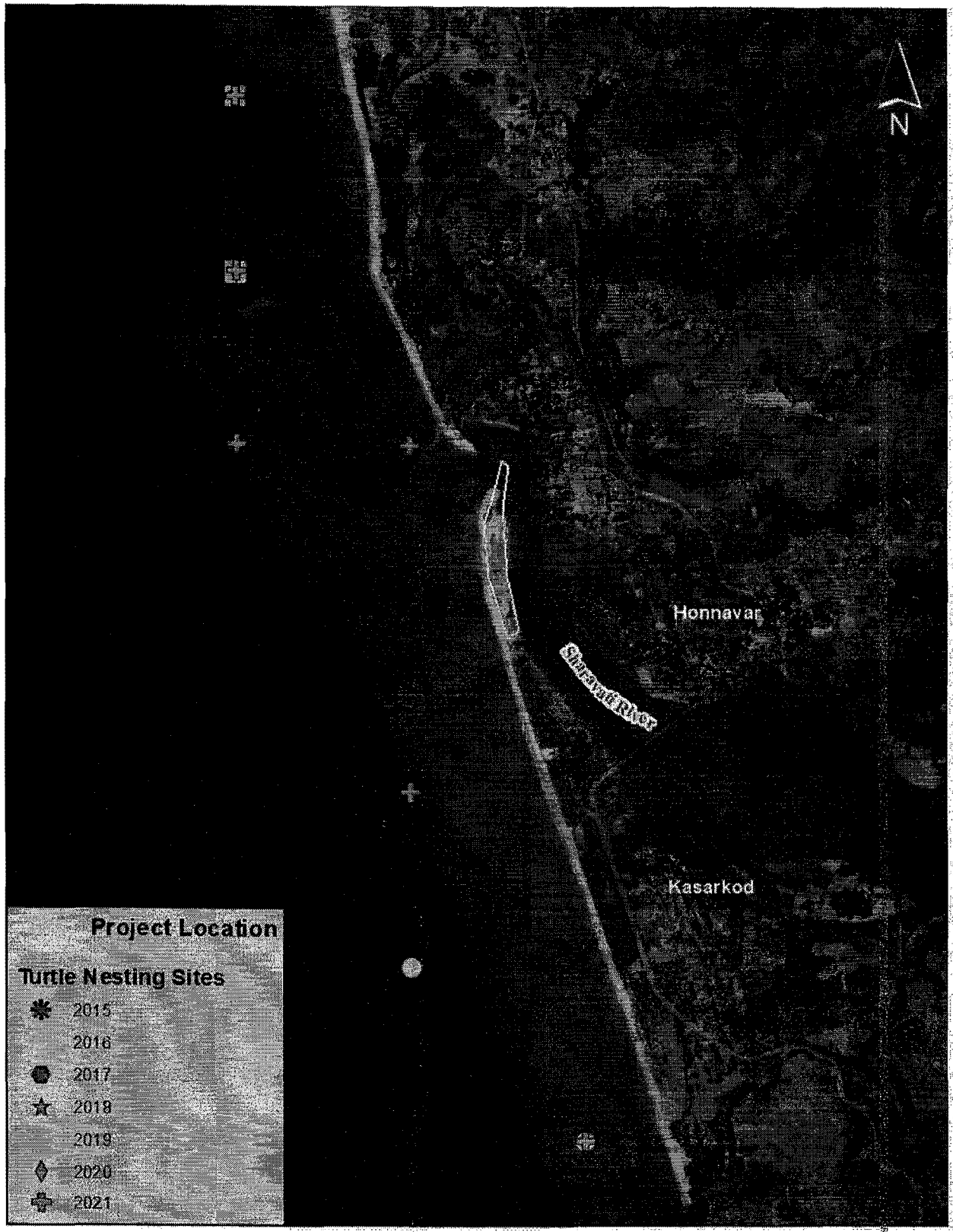


Fig. 4. Geolocation of Turtle nesting sites – Data source: Forest Division, Honnavar.
Note: None of the locations are on the beach

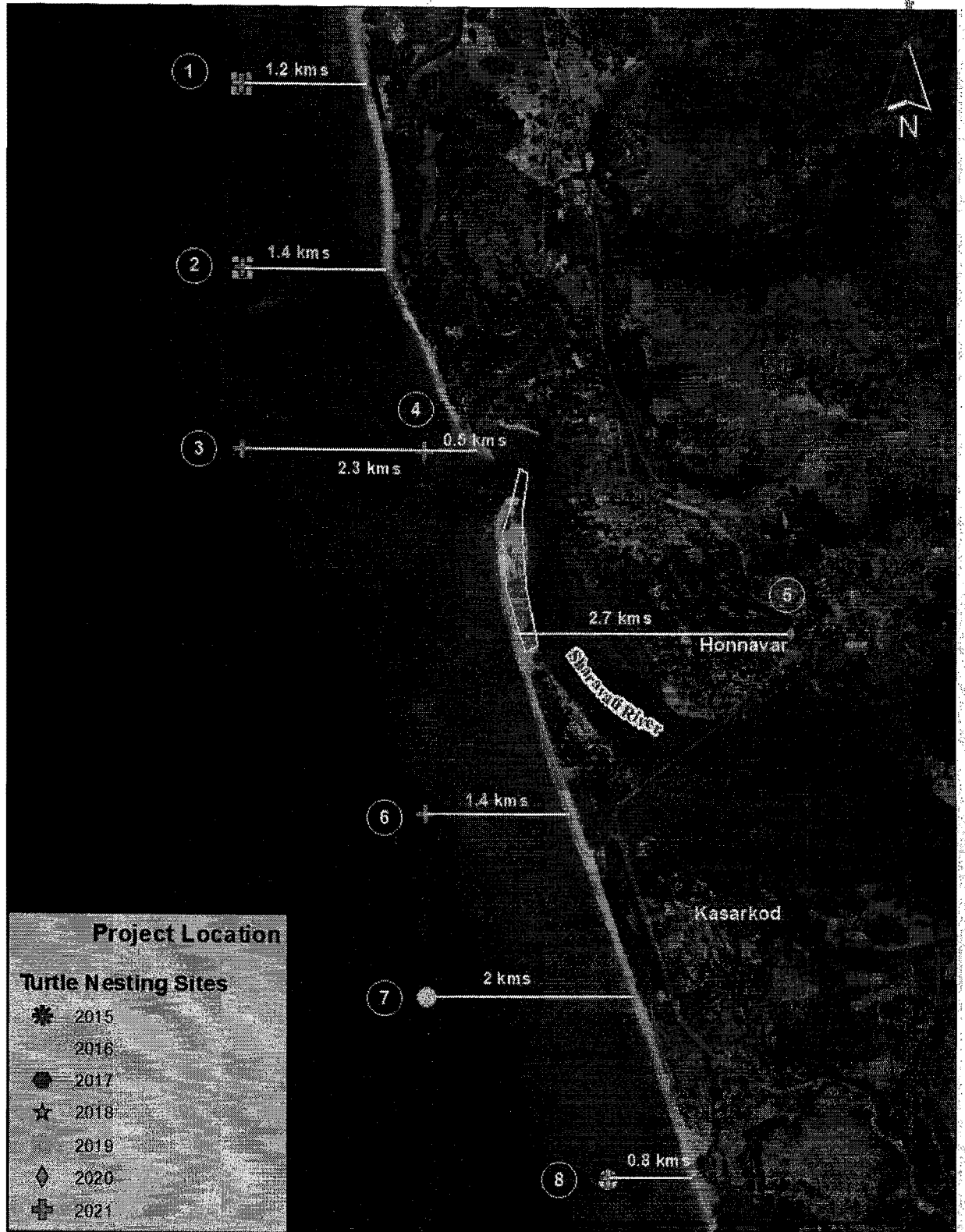


Fig. 5. Geolocation of Turtle nesting sites drawn parallel to the shore – Data source: Forest Division, Honnavar

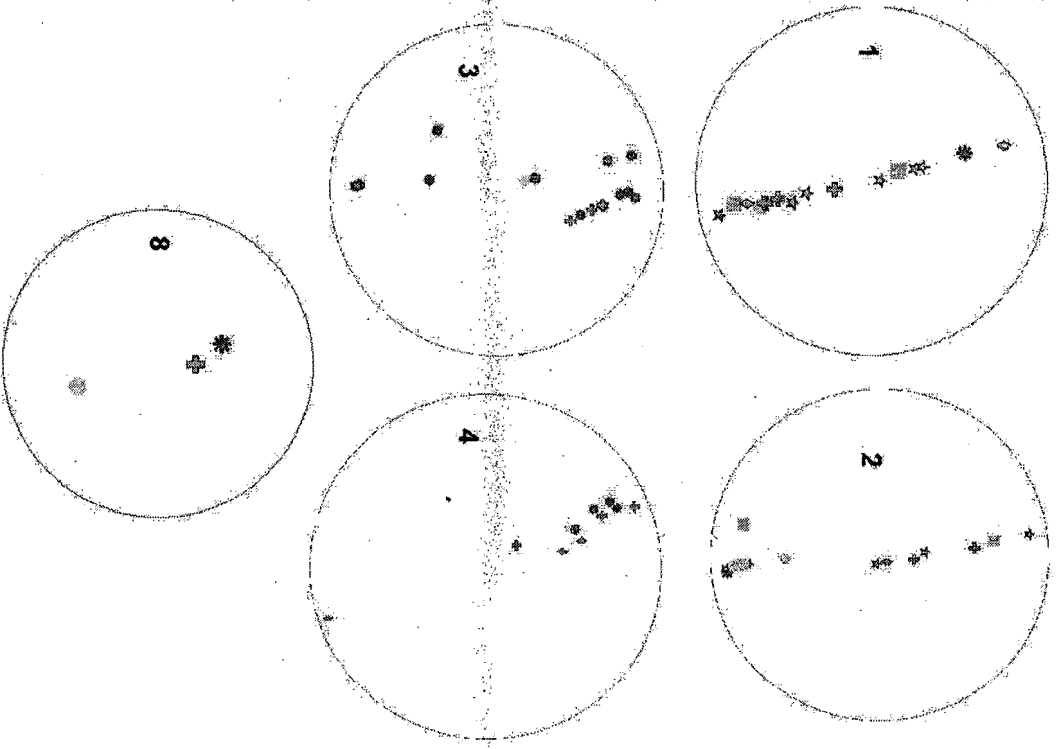
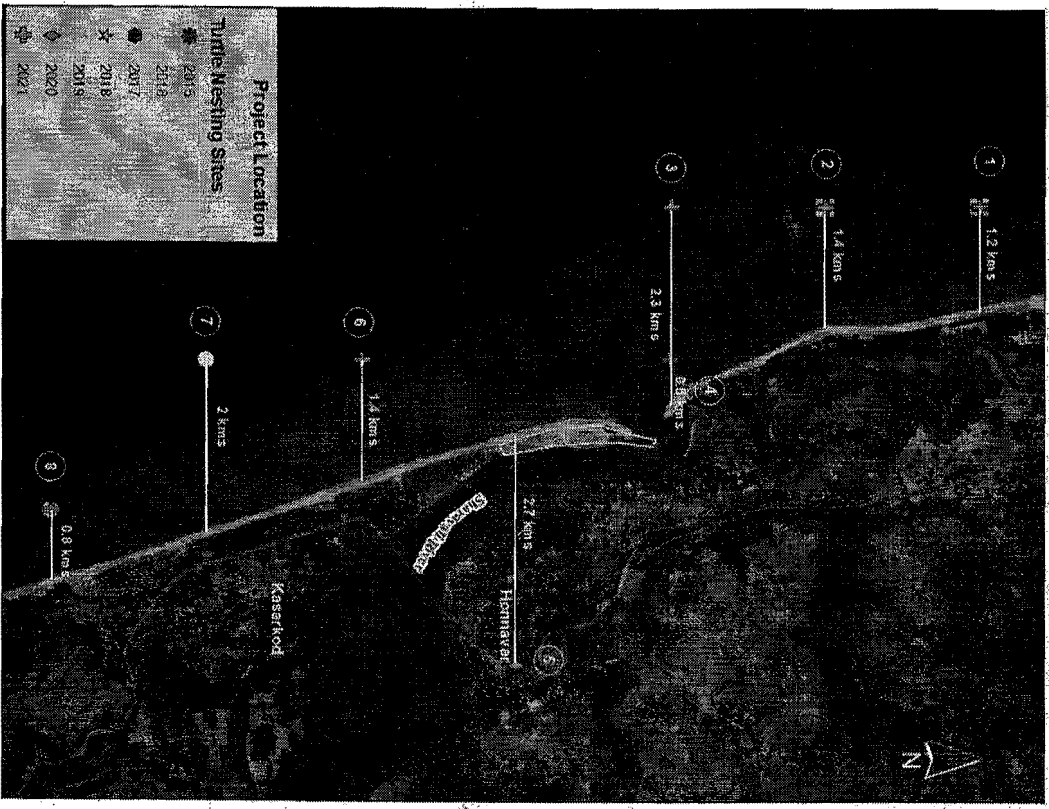


Fig. 6. Nesting locations and number of nests (Indicated in circles) – Data source: Forest Division, Honnavar

Turtle nesting ground (ESA) – CRZ 2019 Notification

The Coastal Regulation Zone Notification (CRZ 2019) in para 2.1.1 constitutes 11 Ecologically Sensitive Areas (ESA) and the geomorphological features which play a role in maintaining the integrity of the coast.

- (i) Mangroves (in case mangrove area is more than 1000 square meters, a buffer of 50 meters along the mangroves shall be provided and such area shall also constitute CRZ-I A)
- (ii) Corals and coral reef
- (iii) Sand dunes
- (iv) Biologically active mudflats
- (v) National parks, marine parks, sanctuaries, reserve forests, wildlife habitats and other protected areas under the provisions of Wild Life (Protection) Act, 1972 (53 of 1972), Forest (Conservation) Act, 1980 (69 of 1980) or Environment (Protection) Act, 1986 (29 Of 1986), including Biosphere Reserves
- (vi) Salt marshes
- (vii) **Turtle nesting grounds**
- (viii) Horse shoe crabs' habitats
- (ix) Sea grass beds
- (x) Nesting grounds of birds
- (xi) Areas or structures of archaeological importance and heritage sites.

The ESA for the entire coast of India was demarcated and delineated by NCSCM and has been approved by the respective State/ UT Governments and have been integrated in Coastal Zone Management Plans (CZMP).

The CZMP of Karnataka (based on CRZ Notification 2011) was approved on 18.07.2018 based on the recommendation made by the National Coastal Zone Management Authority (NCZMA) in its 34th meeting (Annex 1 - F.No.12-1/2018-1A-III)

CZMP Map⁸

As per CZMP Map No.: KA 25, the proposed port area is categorized into under three CRZ areas – CRZ – I (IB) intertidal area, CRZ – II and CRZ – III (No Development Zone). There is no reported ESA (CRZ 1A) in the proposed site of the Honnavar Port as per approved CZMP maps of Honnavar. A closer view of the CZMP map covering the port area and the entire CZMP map (KA 25) is provided as Figures 7 & 8. Mangroves are present in the estuarine area of Sharavathi river.

⁸ As per CZMP map prepared by NCSCM, Chennai and Forest, Ecology & Environment, Government of Karnataka

NCSCM Site Survey

The Hon'ble High Court of Karnataka in the Daily Order to the Infrastructure Development, Ports and Inland Water Transport Department, Government of Karnataka, had proposed to appoint NCSCM working under the Ministry of Environment, Forest and Climate Change, Government of India to survey the 45 hectares of land covered by the HPPL project with a view to ascertain whether any part of the said area is a turtle nesting ground or the entire area in the turtle nesting ground.

NCSCM team surveyed the proposed port area and the surroundings around Kasarkod on 2nd and 3rd August 2021 as per the directive of the Hon'ble High Court of Karnataka. It is to be noted that the month of August is not the nesting season for sea turtles. Usually the nesting occurs during late October to April every year. Identification of nests, turtles or dead carcass were not recorded during NCSCM's site visit. Based on the published works on turtle nesting sites in Honnavar, the locations were visited and correlated with CZMP maps which indicate if any ESA (including turtle nesting sites) have been demarcated. The GPS locations of the sites visited by NCSCM is provided in Table 2.

Table 2. GPS Points of the sites visited inside the proposed port area

No.	Latitude	Longitude
1	14.282254°	74.427078°
2	14.283611°	74.426667°
3	14.289034°	74.425702°
4	14.295769°	74.425800°
5	14.296203°	74.424595°
6	14.292135°	74.423815°
7	14.286925°	74.424371°
8	14.281852°	74.425779°

The following are the observations

- No nests, turtles or dead carcass of turtles were observed in the entire 45 ha area of the proposed site during the survey
- Erosion was observed along the road from current port entry road until the estuarine mouth (Fig. 10 a and b)
- Limited port construction activity has begun along the eastern boundary of the proposed port (Fig. 10 c)
- For coastal defense along the eroding road, tetrapods have been deployed on the banks.
- Mangroves are present along the north right bank of the River Sharavati.
- The northwestern boundary of the port has a flat beach, which is usually not conducive for nesting (Fig. 10d)

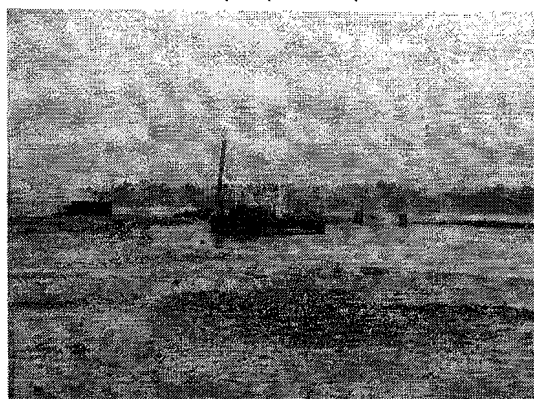
- An abandoned turtle hatchery was observed (Fig. 11) established by the Forest Department in the Apsarkonda Beach, suggesting possible turtle nesting in the past. This abandoned hatchery is located 1 to 2km from the southern tip of the port area (i.e. beyond the 45ha area).



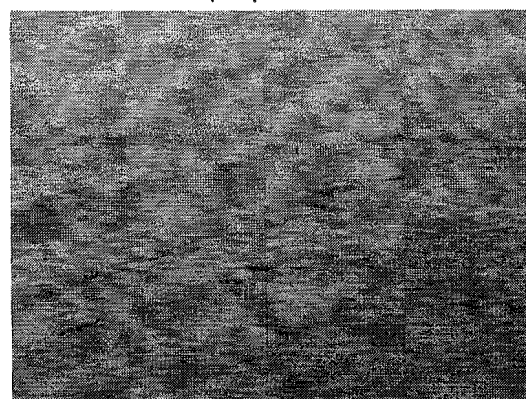
a. Eroding road leading to the entry gate of the proposed port



b. Erosion along the eastern boundary of the proposed site



c. Construction activity along the eastern boundary of the port



d. Flat north-western boundary of the port

Fig. 10. Major coastal features at the port site

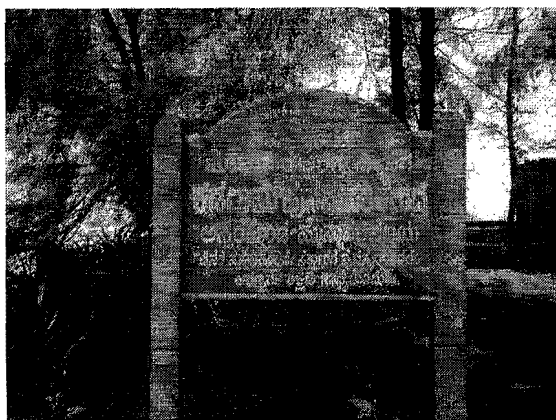
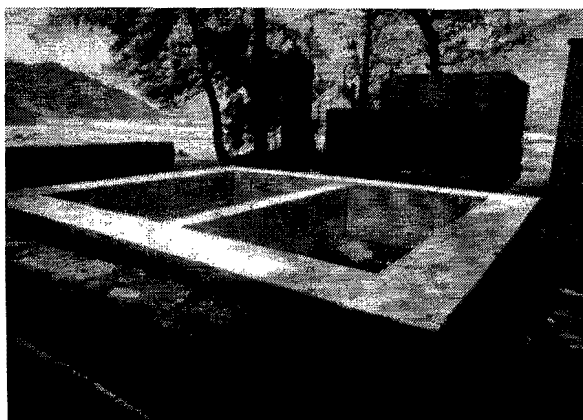


Fig. 11. Abandoned turtle hatchery of the Forest Department at Apsarkonda Beach

Summary

- On the basis of one-time field survey, no nesting of sea turtles was observed in the 45 ha area for the following reasons:
 - The present survey was undertaken during non-nesting season of turtles. Hence, no nesting could be recorded during the survey, undertaken in August 2021.
 - No nests or dead turtles or carcasses were observed during the survey of the 45 ha area

- Based on the records received from the Forest Department, Honnavar Range, one site landward of the beach at the southernmost tip of the proposed port area was indicated (Figs. 5 and 6)

- The approved Coastal Zone Management Plan (CZMP) was also referred to for the presence of turtle nesting sites in the 45 ha area (CZMP Map No. 25), indicating **ABSENCE** of any Ecologically Sensitive Area in the 45 ha area under survey (i.e. CRZ IA, which also includes ESA such as turtle nesting grounds).



F. No. 12-1/2018-1A-III
Government of India
Ministry of Environment, Forest & Climate Change

Telephone: 011-24695340
e-mail: arvind.nautiyal@gov.in
Indira Paryavaran Bhavan, Jor Bagh,
Lodi Road, New Delhi-110003.
Dated: 07/08/2018

10479
2018/2/12

To: The Member Secretary
Karnataka Coastal Zone Management Authority,
Department of Forest, Ecology & Environment
Secretariat, 7th Floor, 4th Gate,
M.S. Building, Dr. B.R. Ambedkar Veedhi
Bengaluru - 5560 001

Sub: Coastal Zone Management Plan of Karnataka - reg.

Sir,
This has reference to your letter nos. FEE 289 CRZ 2017 P-1, dated 28.04.2018 and 18.07.2018, furnishing therein the Coastal Zone Management Plan (CZMP) of Karnataka, drawn as per the provisions of the Coastal Regulation Zone Notification, 2011.

SNV
2018

2. In this regard, it is to state that based on the recommendation made by the National Coastal Zone Management Authority in its 34th Meeting held on 18.07.2018, the Ministry of Environment, Forest and Climate Change conveys its approval of the CZMP for the State of Karnataka.

This issues with the approval of the Competent Authority.

Arvind Nautiyal
Director

Yours faithfully,

Arvind Nautiyal
(Arvind Nautiyal)
Director

Copy to:

1. The Secretary (Environment and Ecology), Forest, Environment and Ecology Department, Government of Karnataka, Secretariat, Room No. 709, 7th Floor, Gate No. 4, M. S. Building, Bangalore-560001
2. The APCCF (C), MoEF&CC Regional Office (SZ), Kendriya Sadan, 4th Floor, E&F Wings, 17th Main Road, Koramangala, Bengaluru - 560034.
3. The Director, National Centre For Sustainable Coastal Management, Anna University Campus, Chennai - 600025, Tamil Nadu
4. Guard File.

Arvind Nautiyal
(Arvind Nautiyal)
Director

Details of Turtles nesting, numbers, hatchlings released data from Honnavar Forest Range Office

Sl. No	Name and Address of the person who found the Turtle Eggs	Place	Latitude/Longitude	Date	No. of Eggs Found	Number of Hatchlings		Total Hatchlings	Hatchlings released date
						Date	No		
1	Thimmappa Mesta, Pavinakurve, Haladipura	Pavinakurve, Haladipura	14 18.565 N, 74 25.022 E	17.04.2015	82	04.06.2015	53	53	05.06.2015
2	Mabla Rama Kharvi	Pavinakurve, Haladipura	14 18.516 N, 74 25.047 E	06.10.2015	145	25.11.2015	90	90	
3	Chaudu Sankoosa Harikantra	Soranagadde	14 20.730 N, 74 24.518 E	16.12.2015	85	08.02.2016	8	8	
4	Ganapathi N Kharvi	Kharvikeri, Apsarakonda	14 14.824 N, 74 26.211 E	21.12.2015	76	-	-	-	
5	Vittala K Mesta	Karki		23.12.2015	32	15.02.2016	3	3	15.02.2016
							3	3	15.02.2016
6	Venkatesh Harikantra	Horabaga, Haladipura	14 19.049 N, 74 24.805 E	27.12.2015	95	17.02.2016	34	46	17.02.2016
						18.02.2016	12		18.02.2016
7	Nagaraj Keshav Kharvi	taribagila, Haladipura	14 19.002 N, 74 24.830 E	29.12.2015	67		35		
1	Ganapathi N Kharvi	Kharvikeri, Apsarakonda	14 14.749 N, 74 26.234 E	11.01.2016	129	29.02.2016	67	67	
2	Sebastian Saaver Lopic	Kasarakoda		21.01.2016	96				
3	Sebastian Saaver Lopic	Kasarakoda		21.01.2016	132	10.03.2016	16	16	
4	Ishwara Kharvi	Apsarakonda		28.01.2016	83				

90

Annex 2

Details of Turtles nesting, numbers, hatchlings released data from Honnavar Forest Range Office

Sl. No	Name and Address of the person who found the Turtle Eggs	Place	Latitude/Longitude	Date	No. of Eggs Found	Number of Hatchlings		Total Hatchlings	Hatchlings released date
						Date	No		
5	Krishna Birappa Ambiga	Kadle, Kumata		28.01.2016	120				
6	Madevi Ishwara Mesta	Haladipura	14 20.155 N, 74 24.671 E	03.02.2016	115	23.03.2016	25	25	
7	Ishwara Kharvi	Apsarakonda	14 15.756 N, 74 25.911 E	05.02.2016	76				
8	Ishwara Kharvi	Apsarakonda		11.02.2016	100				
9	Thimmappa Mesta	Haladipura	14 19.190 N, 74 24.785 E	27.02.2016	105	17.04.2016	30		
10	Thimmappa Mesta	Haladipura	14 20.257 N, 74 24.785 E	02.03.2016	113	21.04.2016	48		
11	Kanna Budavantha Harikantha	Haladipura	14 18.598 N, 74 24.796 E	19.12.2016	151				
1	Ganapathi Kanna Harikantha	Taribagila	14 18.557 N, 74 25.014 E	24.01.2017	91	12.03.2017	27	50	
						13.03.2017	11		
						14.03.2017	12		
2	Kanna Budavantha Harikantha	Haladipura	14 18.632 N, 74 24.788 E	05.02.2017	130	22.03.2017	47	51	23.03.2017
						22.03.2017	2		

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Annex 2

Details of Turtles nesting, numbers, hatchlings released data from Honnavar Forest Range Office

Sl. No	Name and Address of the person who found the Turtle Eggs	Place	Latitude/Longitude	Date	No. of Eggs Found	Number of Hatchlings		Total Hatchlings	Hatchlings released date	
						Date	No			
						25.03.2017	2			
3	Krishna Pandu Kharvi	Pavinakurve	14 18.538 N, 74 25.023 E	05.02.2017	103	22.03.2017	2	75	24.03.2017	
						23.03.2017	69			
						25.03.2017	4			
4	Narayana Harikanta	Taribagila	14 18.021 N, 74 24.816 E	07.02.2017	128	23.03.2017	4		24.03.2017	
5	Ganapathi Kanna Harikantha	Taribagilu	14 18.027 N, 74 24.816 E	07.02.2017	107					
6	Thimayya Gidda Harikanta	Taribagilu	14 18.035 N, 74 24.813 E	07.02.2017	59					
7	Kanna Budavantha Harikanta	Haladipura	14 18.881 N, 74 24.725 E	08.02.2017	135	28.03.2017	26	35		
						29.03.2017	7			
						30.03.2017	2			
8	Nagappa Yenkappa Harikanta	Taribagilu	14 18.789 N, 74 24.913 E	15.02.2017	128			47		
9	Anantha Kharvi	Taribagilu	14 18.866 N, 74 24.880 E	16.02.2017	106	03.04.2017	64	78		
						04.04.2017	14			

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Annex 2

Details of Turtles nesting, numbers, hatchlings released data from Honnavar Forest Range Office

Sl. No	Name and Address of the person who found the Turtle Eggs	Place	Latitude/Longitude	Date	No. of Eggs Found	Number of Hatchlings		Total Hatchlings	Hatchlings released date
						Date	No		
10	Kanna Budavantha Harikantha	Haladipura	14 18.963 N, 74 24.708 E	19.02. 2017	130				
11	Ramesha Annappa Harikantha	Taribagilu	14 18.925 N, 74 24.842 E	07.03. 2017	117				
12	Kanna Budavantha Harikantha	Haladipura	14 18.951 N, 74 24.833 E	08.03. 2017	150	20.04. 2017	5	76	
						21.04. 2017	46		
						22.04. 2017	12		
						24.04. 2017	13		
13	Mahadeva Siddha Harikantha	Haladipura	14 18.301 N, 74 24.626 E	11.03. 2017	120	23.04. 2017	47	85	
						24.04. 2017	38		
14	Rama Bira Harikantha	Taribagilu	14 18.274 N, 74 24.796 E	03.04. 2017	127	17.05. 2017	54		
						18.05. 2017	12		
15	Narasimha Harikantha	Taribagilu	14 18.975 N, 74 24.855 E	15.12. 2017	126	07.02. 2018		101	
1	Nagappa Yenappa Harikanta	Haladipura	14 20.248 N, 74 24.659 E	16.01. 2018	129	12.03. 2018		96	

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Annex 2

Details of Turtles nesting, numbers, hatchlings released data from Honnavar Forest Range Office

Sl. No	Name and Address of the person who found the Turtle Eggs	Place	Latitude/Longitude	Date	No. of Eggs Found	Number of Hatchlings		Total Hatchlings	Hatchlings released date
						Date	No		
2	Madhukara Harikantha	Horabaga, Haladipura	14 20.492 N, 74 24.598 E	16.01. 2018	54	11.03. 2018		12	
3	Venkatramana Nagappa Harikantha	Haladipura	14 20.613 N, 74 24.558 E	22.01. 2018	101	15.03. 2018		74	
4	Rama Narayana Harikantha	Haladipura	14 20.591 N, 74 24.565 E	24.01. 2018	86	18.03. 2018		58	
5	Nagappa Durga Harikantha	Haladipura	14 19.978 N, 74 24.705 E	29.01. 2018	122	23.03. 2018		98	
6	Kanna Budavantha Harikantha	Haladipura	14 20.285 N, 74 24.634 E	29.01. 2018	143	23.03. 2018		108	
7	Thimmayya Narayana Harikantha	Haladipura	14 19.074 N, 74 24.804 E	02.02. 2018	127	27.03. 2018		98	
8	Ravi Mestu Kharvi	Pavinakurve	14 20.042 N, 74 24.695 E	08.02. 2018	96	31.03. 2018		61	
9	Pursu Rama Harikantha	Haladipura	14 19.486 N, 74 24.803 E	08.02. 2018	110	31.03. 2018		81	
10	Kanna Budavantha Harikantha	Haladipura	14 19.644 N, 74 24.765 E	12.02. 2018	130	04.04. 2018		118	
11	Thimmappa Mestu Kharvi	Haladipura		14.02. 2018	113	08.04. 2018		91	
12	Manjunatha Nagappa Harikantha	Haladipura		14.02. 2018	101	08.04. 2018		79	
13	Manjunatha Nagappa Harikantha	Haladipura		18.02. 2018	93	10.04. 2018		57	
14	Thimmappa Mestu Kharvi	Pavinakurve		20.02. 2018	63	12.04. 2018		35	

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Annex 2

Details of Turtles nesting, numbers, hatchlings released data from Honnavar Forest Range Office

Sl. No	Name and Address of the person who found the Turtle Eggs	Place	Latitude/Longitude	Date	No. of Eggs Found	Number of Hatchlings		Total Hatching s	Hatchlings released date
						Date	No		
15	Hanumantha Kariyana Harikantha	Pavinakurve		23.02.2018	119	14.04.2018		68	
16	Kanna Budavantha Harikantha	Haladipura		24.02.2018	71	15.04.2018		45	
17	Kanna Budavantha Harikantha	Thimmappa Mestu Kharvi		27.02.2018	119	16.04.2018		55	
18	Thimmappa Mesta Kharvi	Pavinakurve		24.03.2018	111	10.05.2018	41		
19	Thimmappa Mestu Kharvi	Thimmappa Mestu Kharvi		13.04.2018	68				
20	Thimmappa Mesta Kharvi	Pavinakurve	14 19.000 N, 74 24.817 E	07.12.2018	115	28.06.2019		46	
1	Mohana, Sandesha, Jagadisha, Shankara, Vinayaka Tandel	Chonka, Kasarkod		02.01.2019	138	25.02.2019		63	
2	Manjunatha Nagappa Harikantha	Swarna Gadde	14 20.543 N, 74 24.572 E	21.01.2019	101				
3	Vittala Narayana Harikantha	Taribagilu	14 19.055 N, 74 24.803 E	30.01.2019	135	24.03.2019		81	
4	Thimmappa Mesta Kharvi	Pavinakurve	14 19.028 N, 74 24.810 E	07.02.2019	121	31.03.2019		31	
5	Santhosha Mesta	Chonka, Kasarkod		01.03.2019	90	20.04.2019	30	30	
6	Manjunatha Thimmappa Harikantha	Taribagilu	14 20.079 N, 74 24.665 E	03.03.2019	130	21.04.2019		91	

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Annex 2

Details of Turtles nesting, numbers, hatchlings released data from Honnavar Forest Range Office

Sl. No	Name and Address of the person who found the Turtle Eggs	Place	Latitude/Longitude	Date	No. of Eggs Found	Number of Hatchlings		Total Hatchlings	Hatchlings released date
						Date	No		
7	Ravi Keshava Kharvi	Taribagilu	14 19.867 N, 74 24.726 E	14.03. 2019	135			12	
8	Ravi Keshava Kharvi	Taribagilu	14 19.056 N, 74 24.675 E	14.03. 2019	138	01.05. 2019	76	76	
9	Manjunatha Narayana Harikantha	Haladipura		27.03. 2019	101		56	56	
1	Pursayya Kharvi	Pavinakurve	14 17.832 N, 74 27.071 E	16.01. 2020	128	09.03. 2020		63	
2	Niranjana Manjunatha Harikantha	Haladipura	14 20.839 N, 74 24.497 E	24.01. 2020	135	17.03. 2020		87	
3	Nagappa Harikantha Haladipura	Pavinakurve	14 18.501 N, 74 25.073 E	30.01. 2020	118	22.03. 2020		66	
4	Manjunatha Narayana Harikantha	Haladipura	14 20.116 N, 74 24.663 E	07.02. 2020	120	29.03. 2020		83	
5	Nagappa Harikantha	Haladipura	14 19.518 N, 74 24.796 E	18.02. 2020	124	09.03. 2020		92	
6	Pursayya Kharvi	Pavinakurve	14 18.523 N, 74 25.060 E	22.02. 2020	99			70	
7	Thimmappa Venkatesha Mesta	Pavinakurve, Haladipura	14 18.226 N, 74 25.154 E	21.12. 2020	101	13.02. 2021		30	14.02.2021
1	Krishna Pandu Kharvi	Pavinakurve, Haladipura	14 18.547 N, 74 25.031 E	03.01. 2021	118	26.02. 2021	102		27.02.2021
						27.02. 2021	1	103	28.02.2021

Details of Turtles nesting, numbers, hatchlings released data from Honnavar Forest Range Office

Sl. No	Name and Address of the person who found the Turtle Eggs	Place	Latitude/Longitude	Date	No. of Eggs Found	Number of Hatchlings		Total Hatching s	Hatchlings released date
						Date	No		
2	Krishna Pandu Kharvi	Pavinakurve, Haladipura	14 18.585 N, 74 25.020 E	10.01.2021	87	05.03.2021	72	72	06.03.2021
3	Pandu Mari Harikantha	Pavinakurve, Haladipura	14 18.753 N, 74 24.933 E	13.01.2021	144	07.03.2021	118	118	08.03.2021
4	Ravi Keshava Kharvi	Taribagilu, Haladipura	14 19.802 N, 74 24.749 E	19.01.2021	124	14.03.2021	3	3	15.03.2021
5	Roshan Michel Fernandes	Kelaginoor	14 14.810 N, 74 26.222 E	25.01.2021	134				
6	Manjunatha Harikantha	Haladipura		31.01.2021	90	26.03.2021	55	55	27.03.2021
7	Ishwara S Harikantha	Pavinakurve	14 18.825 N, 74 24.895 E	12.02.2021	In situ Conservation				
8	Ravi Keshava Kharvi	Taribagilu	14 19.605 N, 74 24.789 E	12.02.2021	40	05.04.2021	5	5	06.04.2021
9	Kumara Shanthappa Kharvi	Chonka, Kasarakod	14 16.937 N, 74 25.541 E	15.02.2021	126				
10	Ramakrishna Babu Harikantha	Pavinakurve	14 18.755 N,	15.02.2021	90	06.04.2021	10	10	07.04.2021
11	Venkatramana Manjunatha Harikantha	Haladipura		15.02.2021	95	06.04.2021	20	20	07.04.2021
12	Manjunatha Narayana Harikantha	Haladipura	14 20.169 N, 74 24.660 E	22.02.2021	42	12.04.21	29	29	13.04.2021
13	Hanumantha Kariyanna Haikantha	Haladipura	14 20.165 N, 74 24.660 E	23.02.2021	64	12.04.2021	45	45	13.04.2021

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Details of Turtles nesting, numbers, hatchlings released data from Honnavar Forest Range Office

Annex 2

Sl. No	Name and Address of the person who found the Turtle Eggs	Place	Latitude/Longitude	Date	No. of Eggs Found	Number of Hatchlings		Total Hatchlings	Hatchlings released date
						Date	No		
14	Ganapathi Manjunatha Harikantha	Haladipura	14 20.203 N, 74 24.648 E	23.02.2021	58	12.04.2021	36	36	13.04.2021
15	Manjunatha Narayana Harikantha	Haladipura	14 20.364 N, 74 24.622 E	28.02.2021	116				
16	Krishna Pandu Kharvi	Pavinakurve	14 18.447 N, 74 25.066 E	09.03.2021	97				
17	Annappa Kanna Harikantha	Pavinakurve	14 18.862 N, 74 24.879 E	13.03.2021	62				

Principal Chief Conservator of Forests
(Wildlife) & Chief Wildlife Warden,
Karnataka.



Office : 080-23341993
Fax : 080-23346389
E-mail: pccfwl@gmail.com
Aranya Bhavan, 2nd Floor,
18th Cross, Malleswaram,
Bangalore-560 003
Date: 22-06-2020

No. PCCF/WL/D/CR-78/2020-21

To,
The Assistant Executive Engineer,
Port Sub Division,
Honnavar.

Sir,

Sub: Diversion of 0.76 ha. Of forest land in Kasarkod Village F.Sy No. 233 & 237, Manki Hobli, Honnavar Taluk, Uttara Kannada Dist for Approach Road from NH-66 to Kasarakod side of Honnavar Port in favour of the Assistant Executive Engineer, Port Dept. Honnavar.

- Ref:** 1 Letter No. KFD/HOFF/A52K(GFL)/47/2019FC dated: 17.06.2021 of the Principal Chief Conservator of Forests (Forest Conservation), Bengaluru.
- 2 Letter No. B2/GFL/FCA/Approach Road/CR-29/2020-21 dated: 05.06.2021 of the Chief Conservator of Forests, Canara Circle, Sirsi.
- 3 Letter No. B2/GFL/FC/CR-20/2020-21 dated: 21.05.2021 of The Deputy Conservator of Forests, Honnavar Division, Honnavar.

* * *

Adverting to the letter cited under referance on the subject, the Wildlife Mitigation Measures in respect of the above project prepared by the Assistant Executive Engineer, Port Dept. Honnavar, in consultation with Deputy Conservator of Forests, Honnavar Division has been recommended and submitted through the Chief Conservator of Forests, Canara Circle, Sirsi. The said Wildlife Mitigation Measures is reviewed and approved as under.

Mitigation Measures

Sl No	Particulars	Amount (in lakhs)
1	one underpass at chainage 2272 mtr for ensure safe and smooth movment/passage of animals	The execution and cost of the work to be borne by the user agency.
2	Box culvert at chainage 2491	
3	Either side rtaining wall from chainage 2272 m to 2491.	
Additional Mitigation Measures (On Annual basis)		
4	Protection of turtle nesting area i.e. to build barricades around the nesting area during breeding season.	2.00
5	Watch and Ward (02 person) during breeding season.	2.00
Total		4.00

Wildlife Mitigation Plan for Rs. 4,00,000 (Four Lakhs only) has been approved & conditions imposed above also be executed by user agency. Designs of proposed structures should be approved by the Deputy Conservator of Forests, Honnavar Division has been recommended and submitted through the Chief Conservator of Forests, Canara Circle, Sirsi. A copy of Wildlife Mitigation Plan is enclosed for necessary action.

Your's faithfully,

[Signature] 22/6/21
Principal Chief Conservator of Forests,
(Wildlife), & Chief Wildlife Warden,
Bangalore.



सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
समन्वित क्षेत्रीय कार्यालय
INTEGRATED REGIONAL OFFICE
Kendriya Sadan, IVth Floor, E& F Wings, 17th Main Road,
Hind Block, Koramangala, Bangalore - 560 034.
Tel.No.080-25635912, E.Mail: ros2.bng-mef@nic.in

Annexure R8



BY SPEED POST

F.No.4-KRB1275/2021-BAN/
Dated the 20th January, 2022

1298

To

The Additional Chief Secretary to Government of Karnataka,
Forest, Ecology & Environment Department,
M.S Building, Dr.Ambedkar Veedhi,
Bangalore - 560 001.

Subject:

Diversion of 0.76 ha. of forest land in F.Sy .No 233 and 237 of Kasarkod village, Manki Hobli, Honnavar Taluk, Uttara Kannada District (Honnavara Forest Division) for Approach Road from NH 66 to Kasarkod side of Honnavar Port in favour of the Assistant Executive Engineer, Port & Inland Water Transport Department, Port Sub Division, Honnavara -reg.

Sir,

I am directed to refer to the State Government's letter No. FEE 90 FLL 2020 (e) dated 05/01/2021 and 06/01/2022 seeking prior approval of the Central Government under Section'2' of the Forest (Conservation) Act, 1980 for the above project.

After careful examination of the proposal of the State Government, in-principle approval /Stage-I clearance of the Central Government is hereby granted for diversion of 0.76 ha. of forest land in F.Sy .No 233 and 237 of Kasarkod village, Manki Hobli, Honnavar Taluk, Uttara Kannada District (Honnavara Forest Division) for Approach Road from NH 66 to Kasarkod side of Honnavar Port in favour of the Assistant Executive Engineer, Port & Inland Water Transport Department, Port Sub Division, Honnavara, subject to the following conditions:-

A: Conditions which need to be complied prior to handing over of forest land by the State Forest Department.

1. The User Agency shall transfer online, the Net Present Value (NPV) of the forest land being diverted under this proposal, as per the guideline issued by Ministry vide letter No.5-3/2011-FC (Vol-I) dated 06/01/2022. The requisite funds shall be transferred through online portal into CAMPA account of the State Concerned.
2. Cost of raising plantation (including ten years maintenance) of ten times number of trees to be felled shall be realized from user agency towards compensatory afforestation.
3. Location of the area (map with DGPS coordinates) identified for raising the plantations shall be furnished along with compliance report.
4. The Wildlife Mitigation Plan as approved by the PCCF, Wildlife and Chief Wildlife Warden shall be implemented at the cost of User Agency.

- 10/17
5. All the funds received from the user agency under the project shall be transferred/deposited in CAMPA account only through e-portal (<https://parivesh.nic.in/>). Amount deposited through other mode will not be accepted as compliance of the Stage-I clearance.
 6. The KML file of the area diverted and CA plantation (ten times no. of trees to be felled) shall be uploaded on the e-green watch portal with all requisite details and same shall be submitted along with compliance report.
 7. The compliance report shall be uploaded on e-portal (<https://parivesh.nic.in/>).
 8. The State Government shall complete settlement of rights, in term of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, if any, on the forest land to be diverted and submit the documentary evidence as prescribed by this Ministry in it's letter No. 11-9/1998-FC dated 3rd August 2009 read with 05.07.2013 with necessary enclosures, in support thereof.
 9. The boundary of the diverted forest land shall be suitably demarcated on ground at the project cost as per the directions of concerned Divisional Forest Officer.
 10. Violation of any of these conditions will amount to violation of Forest (Conservation) Act, 1980 and action would be taken as prescribed in para 1.21 of Chapter 1 of the Handbook of comprehensive guidelines of Forest (Conservation) Act, 1980 as issued by this Ministry's letter No. 5-2/2017-FC dated 28.03.2019.

B: Conditions which need to be strictly complied on field after handing over of forest land to the user agency by the State Forest Department but the compliance in form of undertaking shall be submitted prior to Stage-II approval:

1. Legal status of the diverted forest land shall remain unchanged.
2. At the time of payment of the Net Present Value (NPV) at the then prevailing rate, the User Agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India.
3. Tree felling shall be restricted to the barest minimum possible and under confirmation from the local forest officials.
4. The period of diversion under this approval shall be co-terminus with the period of lease to be granted in favour of the user agency or the project life, whichever is less.
5. The total forest area utilized for the project shall not exceed 0.76 ha.
6. No labour camp shall be established on the forest land.
7. No additional or new path will be constructed inside the forest area for transportation of construction materials for execution of the project work.
8. The forest land shall not be used for any purpose other than that specified in the project proposal.

- 9. The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government.
- 10. No damage to the flora and fauna of the adjoining area shall be caused.
- 11. The layout plan of the proposal shall not be changed without the prior approval of the Central Government.
- 12. The concerned Divisional Forest Officer, will monitor and take necessary mitigative measures to ensure that there is no adverse impact on the forests in the surrounding area.
- 13. The User Agency shall submit the annual self-compliance report in respect of the above stated conditions to the State Government and Integrated Regional Office, Bangalore by the end of March every year and
- 14. The user agency shall comply all the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project.

After receipt of compliance report on fulfilment of the conditions mentioned above, the proposal shall be considered for final approval under Section-2 of the Forest (Conservation) Act, 1980. Transfer of forest land shall not be effected till final approval is granted by the Central Government in this regard.

Further, it may also be noted that this in-principle approval shall be valid for a period of 5 years from the date of issue of this letter. In the event of non-compliance of the above conditions, this in-principle approval shall be revoked after 5 years.

Yours faithfully,



(B.N. Anjan Kumar)

Assistant Inspector General of Forests (Central)




Copy to:-

- 1. The Principal Chief Conservator of Forests (HoFF), Forests Department, Govt. of Karnataka, Aranya Bhavan, 18th Cross, Malleswaram, Bangalore – 560 003.
- 2. The Principal Chief Conservator of Forests (FC) /Nodal Officer (FCA), Office of the Principal Chief Conservator of Forests, Forests Department, Govt. of Karnataka, Aranya Bhavan, 18th Cross, Malleswaram, Bangalore – 560 003.
- 3. The Assistant Executive Engineer, Port & Inland Water Transport Department, Port Sub Division, Honnavara, Uttara Kannada -581 334.
- 4. Guard file.



(B.N. Anjan Kumar)

Assistant Inspector General of Forests (Central)

SNo.	Proposal Detail	Application No.	Application No (New)	Date of IM PRINCIPLE	Amount to be Paid / Amount Paid (in Rs.)	Payment Status	Payment Detail	Demand Letter
1	FP/KA/ROAD/41625/2019 Connectivity Road from NH 56 to Kasarkod side of Honnavar Port.	ROAD-416252019953	6141625953	20 Jan 2022	CA: 0/- PCA: 0/- Safety Zones: 0/- NPV: 0/- Other Charges1: 0/- Other Charges2: 0/- Other Charges3: 0/- Total: 400009/-	 Paid	Fund Demand Verified by :24 Jul 2024 Nodal Officer On :Union Bank Of India Bank Name :NEFT/RTGS (Challan) Mode of Payment :25 Jul 2024 Challan Generated On :16 Aug 2024 Transaction Date	Demand Letter :Generated Challan
2	FP/KA/ROAD/41625/2019 Connectivity Road from NH 56 to Kasarkod side of Honnavar Port.	ROAD-416252019715	6141625215	20 Jan 2022	CA: 0/- PCA: 0/- Safety Zones: 0/- NPV: 0/- Other Charges1: 0/- Other Charges2: 0/- Other Charges3: 0/- Total: 841335/-	 Paid	Fund Demand Verified by :11 Mar 2024 Nodal Officer On :Union Bank Of India Bank Name :NEFT/RTGS (Challan) Mode of Payment :11 Mar 2024 Challan Generated On :14 Mar 2024 Transaction Date	Demand Letter :Generated Challan
3	FP/KA/ROAD/41625/2019 Connectivity Road from NH 56 to Kasarkod side of Honnavar Port.	ROAD-416252019781	6141625781	20 Jan 2022	CA: 0/- PCA: 0/- Safety Zones: 0/- NPV: 1212800/- Other Charges1: 0/- Other Charges2: 0/- Other Charges3: 0/- Total: 10221800/-	 Paid	Fund Demand Verified by :05 Mar 2022 Nodal Officer On :Union Bank Of India Bank Name :NEFT/RTGS (Challan) Mode of Payment :18 Apr 2022 Challan Generated On :22 Apr 2022 Transaction Date	Demand Letter :Generated Challan



GOVERNMENT OF KARNATAKA
INFRASTRUCTURE DEVELOPMENT, PORTS & INLAND
WATER TRANSPORT DEPARTMENT,
KARNATAKA MARITIME BOARD



No.KMB-22/Dev-11/2022

Office of the Director Ports and Member
(Maritime & IWT Operations)
Karnataka Maritime Board
Karwar-581302
Dated:08.02.2023

To,

The Member Secretary,
Karnataka State Coastal Zone Management Authority,
Room No.710, 7th Floor, IV Gate,
M. S. Building,
Bangalore - 560 001

Sir,

Sub:- Request for issue of CRZ clearance for four laning Port connectivity road to Honnavar Port from NH - 66 (FEE 78 CRZ 2023) for development of Honnavar Port by HPPL- Submission of additional information/clarification - regarding.

Ref:- 1. CRZ Application No: 1A/KA/CRZ/4/04527/2022 (Online in the Parivesh Portal of MoEFCC for Four lane port road connectivity).
2. 39th KSCZMA meeting held on 06.02.2023

In the 39th meeting of KSCZMA held on 06.02.2023, **Agenda - 39.2.3 - Request for issue of CRZ clearance for four laning of Honnavar Port Connectivity road from 0.00Km (Kasarkod side of Honnavar port) to 2.580Km (towards NH - 66) connecting Honnavar Port with NH - 66 at Km 195.986 and to improve NH - 66 from 195.00 Km to 197.00 Km to integrate port connectivity on EPC Mode under Bharatmala Phase I in Kasarkod village of Honnavar Taluk of Uttar Kannada District by Assistant Executive Engineer, Port Sub-Division Honnavar (FEE 78 CRZ 2023) new proposal pertaining to road connectivity for development of Honnavar Port by HPPL was considered.**

As instructed in the meeting, additional information/clarification pertaining to the above-mentioned proposal is most respectfully submitted for kind consideration.

1. It is submitted that the existing Kachha road that runs parallel to the beach from NH - 66 at Kasarkod upto the proposed port area in CRZ - III (road with gravel mixture) was developed while forming the construction of seawalls for protection from sea erosion. This fact has been elucidated in the site inspection report of Regional Director (Environment) Karwar which has been taken on record by the Hon'ble NGT South Zone, Chennai in its interim order dated: 21.10.2022(Annexure-1).

The proposal of four laning Port connectivity road to Honnavar Port from NH - 66 for development of Honnavar Port by HPPL at Kasarkod village for development of Honnavar Port for issue of CRZ clearance was considered in the DCZMC meeting held on 12.01.2023. This proposal was recommended to the KSCZMA by the Regional Director (Environment) Karwar on 19.01.2023(Annexure - 2).

F

However, at present this road is being used by the local inhabitants as an access road to their houses. This fact has been agreed by the petitioner himself. Therefore, it is clear that the road was not formed originally for the local inhabitants but was formed for transportation of construction materials like boulders, granite stones and other materials to the construction site for formation of seawalls.

- 2. The port limits of the Honnavar Port have been notified by the Government of Karnataka vide Notification No: PWD. 107 PSP 2013, Dated: 09.12.2013 as per the powers conferred by Section 5 of the Indian Ports Act 1908(Annexure-3). The Anchorage map showing the Honnavar Port limits is enclosed as Annexure - 4.

In the said Notification, the limits on the eastern side is Stated as Seashore of Honnavar 50mtrs above High Water Mark between North and South boundary mark.

- 3. The CRZ maps indicating HTL, LTL demarcation and project layout superimposed have been prepared by NCSCM, Chennai. In the report it is clearly stated that "The proposed four lane NHAI road connectivity and improvement of NH - 66 along the beach and the proposed Kachha road (service road for four lane NHAI road) completely falls within Port Limit as per the approved CZMP maps prepared as per CRZ Notification 2019. And as per CRZ notification 2019, Land area up to 50 mtrs from HTL, or width of the creek whichever is less, along the tidal influenced water bodies in the CRZ - III, shall also be earmarked as the NDZ in CRZ - III. The NDZ shall not be applicable in the areas falling within notified port limits" (Refer CRZ Notification 2019 under section 2.3.3). The three CRZ maps and the report of NCSCM is enclosed as Annexure - 5. Thus it is evident and clear that there is no violation of CRZ for the proposed project.
- 4. The proposed area to be used for the construction of four lane connectivity from NH - 66 has been surveyed by the Assistant Director of Land Records, Honnavar. The map showing the patta lands with Survey number is enclosed herewith as Annexure - 6. This map is superimposed on the CRZ map (Annexure -7). These maps clearly show that there is no patta land coming in the proposed four lane connectivity road.
- 5. Two underpasses are proposed along the beach in order to provide free access to seashore for the local inhabitants and for the movement of catamarans of the local fishermen.
- 6. A bridge is proposed where the four lane connectivity road passes through small portion of the sand dune for turtle nesting.
- 7. A Writ Petition No 4039 of 2021(GM - POL) PIL was filed in the Honorable High Court of Karnataka in Bengaluru by Honnavar Taluk Hasimeenu Vyaparastara Sangha (Registered), Tonka - Kasarkod, Honnavar Versus HPPL and others - State of Karnataka praying to issue a writ of mandamus directing the respondents not to continue with the construction of the Port on the beaches of Kasarkod, Mallukurva, Pavinkurve, Karki and Honnavar in Honnavar Taluka.

The Honorable Chief Justice disposed of this WP with judgment on 24.11.2021 after an in-depth consideration of various issues. The issues of Forest land in the said beaches, Turtle nesting ground and violations of various constitutional provisions have been examined in detail by the Honorable High Court. As per the court order

dated: 13.07.2021, the NCSCM has carried out the survey with regard to turtle nesting and in its report it has been stated that no nests, turtles or dead carcass of turtles have been observed in the entire 45 hectares of the proposed site during the survey. The report of NCSCM is enclosed as **Annexure - 8**.

8. It is submitted that along the beach of Kasarkod where the proposed four lane road is proposed sporadic incidents of turtles laying eggs is noticed. This is evident from the data provided by the local forest department from 2015 to 2021. It is found that in January 2016 total 3 nesting in a span of four days was found and the next nesting took place in the year 2019 which shows that the turtle nesting is not regular but fluctuating. Therefore it cannot be considered as Turtle nesting area.

It is also submitted that some persons are indulging in placing the turtle eggs physically above the alignment of proposed road. One such incident which occurred on 07.02.2023 is captured in the CC camera installed in the port site and the same has been brought to the notice of the Deputy Conservator of Forest, Honnavar on 08.02.2023 requesting necessary action (**Annexure - 9**). Thus it is amply clear that some persons are resorting to such type of illegal activities just to highlight that the area is a turtle nesting ground.

However, mitigation measures would be undertaken as approved by the forest department. Copy of the letter of the Forest Department is enclosed as **Annexure 10**. During the meeting the Hon'ble KSCZMA has suggested to earmark more budgets for the turtle nesting and accordingly revised the budget as shown below:

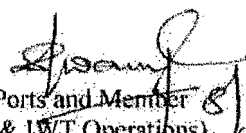
Sl. No.	Particulars	Amount in (lakhs)
1	Two underpasses to ensure safe and smooth movement/passage of animals	The execution and cost of the work to be borne by the proponent
2	Box culvert at chainage 2491	
3	Either side retaining wall from chainage 2272 meter to 2491	
Additional mitigation measures (on annual basis)		
4	Protection for turtle nesting area i.e, to build barricades around the nesting area during breeding season further extending the barricades towards north from chainage 1500 meter to 2491 meters	5.00
5	Watch and ward (04 person) during breeding season	3.00
Total		8.00

It is clear from the Table above that the budget is increased from Rupees 4 lakhs to 8 lakhs.

Therefore, it is kindly requested to issue CRZ clearance for construction of four lane Port connectivity road to Honnavar Port from NH - 66 (FEE 78 CRZ 2023) for development of Honnavar Port by HPPPL.

Enc. As above:

Yours faithfully,


Director Ports and Member
(Maritime & IWT Operations),
Karnataka Maritime Board



HONNAVAR PORT (P) LTD.

108
o/c

No. HPPL/PORT/2024/0057

Date:23/05/2024

To,
The Deputy Conservator of Forest,
Honnavar Division,
Honnavar.

Sir,

Sub: Compliance to directions in the Judgement dated 26/09/2023 of the Hon'ble NGT, South Zone Chennai in OA No.76/2022 -reg.

- Ref: 1. Extension of the validity of the Environment Clearance of M/s. Honnavar Port (P) Ltd by the State Level Environment Impact Assessment Authority – Karnataka – vide its letter No. SEIAA 22 IND 2011 dated: 20/09/2023.**
- 2. NOC for Usage of Kachha road along the seashore for Development of Honnavar Port (CRZ) Karnataka State Coastal Zone Management Authority – vide its letter No. FEE 264 ENV 2022 dated: 04/03/2023.**
- 3. NOC for Black topping of existing kachha road by KSCZMA, Letter No. FEE 264 ENV 2022 Dated 05.12.2023 from Member Secretary, Karnataka State Coastal Zone Management Authority addressed to The Director of Ports and Member (Maritime & IWT Operations), Karnataka Maritime Board, Karwar.**
- 4. Approved Wildlife Mitigation Plan vide letter No. PCCF/WL/D/CR-78/2020-21, Dated 22.06.2022 from the Principal Chief Conservator of Forests (Wildlife)& Chief Wildlife Warden, Karnataka addressed to the Assistant Executive Engineer, Port Sub Division, Honnavar.**
- 5. Enhanced budget allocation for Wildlife Mitigation Plan vide Letter No.KMB-22/Dev-11/2022 of the Director, Ports & Member (IWT & Maritime Operations), Karnataka Maritime Board, dated: 08/02/2023 addressed to the Member Secretary, Karnataka State Coastal Zone Management Authority, Bengaluru.**
- 6. Exemption of EC for four lane road connectivity vide Letter No. SEIAA 25 MISC 2023 Dated 28.03.2023 from the Member Secretary, SEIAA Karnataka addressed to The Director of Ports and Member (Maritime & IWT Operations), Karnataka Maritime Board, Karwar.**

An Original Application No.76/2022 was filed in the Hon'ble NGT, South Zone, Chennai alleging the four lane road construction through CRZ I & III on NDZ on the landward side of Kasarkod Beach without obtaining prior CRZ Clearance which is a violation of the CRZ Notification, 2011.

The Hon'ble NGT in its Judgement delivered on 26/09/2023 has rejected the application with the direction

Port Office : Kasarkod Tonka, Honnavar Taluk, Uttar Kannada District, Karnataka - 581 342.

Regd. Office : #103, Lalehzar Apartments, 45/1-2, Palace Road, Bangalore - 560 001, Karnataka, India.
Ph : +91-80-2235 3670, 4149 4960 Fax : +91-80-2235 3671 Email : info@honnavarport.com



HONNAVAR PORT (P) LTD.

109.

that the SEIAA Karnataka and KSCZMA are directed to consider the question of using the Kachha Road while considering the renewal of EC. It is submitted that SEIAA Karnataka has renewed the validity of EC up to 20/09/2024 vide letter under reference (1) above. Further, it is also submitted that KSCZMA has granted permission to use the Kachha Road in 'as is where is basis' vide letter under reference (2) above. However, the specific condition No.39 of EC stipulates that all approach roads should be black topped and internal roads and major overhaul roads shall be black topped or concreted and swept regularly with mechanical sweepers. Therefore, in accordance with this condition KCZMA has exempted the project proponent from obtaining CRZ clearance for Black topping of the Kachha road along the sea shore at Kasarkod village which is falling under CRZ III NDZ area, vide letter under reference (3) above.


With regard to the four lane road connectivity proposal we had approached SEIAA Karnataka and KCZMA for permission as per the directions of Hon'ble NGT. KSCZMA had recommended the proposal to MoEF & CC, New Delhi as per para 4 (ii) (f) of CRZ Notification 2011, with a condition that adequate mitigation measures need to be taken to protect Olive Ridley turtles nesting within port limits. It is brought to your kind notice that the Principal Chief Conservator of Forests (Wildlife & Chief Wildlife Warden), Karnataka had reviewed the Wild Life Mitigation Measures and approved the plan for Rs.4 Lakhs on annual basis vide letter under reference (4) above. During the 39th meeting of KSCZMA held on 06/02/2023, it was suggested to earmark more budget for taking up mitigation measures for turtle nesting. Accordingly, HPPL has agreed to pay Rs. 8 Lakhs on annual basis for taking up mitigation measures by the Forest Department for Turtle nesting vide letter by the Director of Ports to the Member Secretary, KSCZMA under reference (5) above.

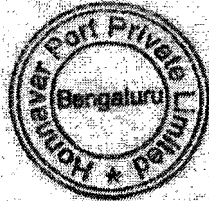
Therefore, it is kindly requested to furnish the account details for making payment of Rs. 8 Lakh for the year 2024-25.

Further, SEIAA Karnataka has observed that the four lane road connectivity does not fall in screening and scoping by SEIAA as it is not covered under EIA Notification, 2006 issued by MoEF & CC, vide S.O. No. 1533 dated 14th September 2006 vide letter under reference (6) above.

This is submitted for your kind perusal and further needful in the matter.

Yours faithfully,


Executive Director
Honnavar Port (P) Ltd
Honnavar.



Enclosures: As above.

Copy submitted with compliments for favour of kind information and necessary action to:

Port Office : Kasarkod Tonka, Honnavar Taluk, Uttar Kannada District, Karnataka - 581 342
Regd. Office : #103, Lalehzar Apartments, 45/1-2, Palace Road, Bangalore - 560 001, Karnataka, India.
Ph : +91-80-2235 3670, 4149 4960 Fax : +91-80-2235 3671 Email : info@honnavarport.com

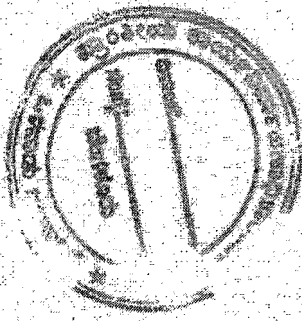


HONNAVAR PORT (P) LTD.

ಸಿಬ್ಬಂದಿ ಸಹಾಯಕರು
 ಅಧ್ಯಕ್ಷರು
 24/05/24
 ಹೊನ್ನಾವರ-1

10
 29/5/24

1. The Additional Chief Secretary, FEE, MS Building, Bengaluru
2. The Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden, Karnataka, Bengaluru
3. The Chief Executive Officer, Karnataka Maritime Board, Bengaluru
4. The Director, Ports & Member (IWT & Maritime Operations), Karnataka Maritime Board, Karwar
5. The Chief Conservator of Forest, Canara Circle, Sirsi
6. The Port Officer, Honnavar





ಕರ್ನಾಟಕ ಸರ್ಕಾರ

ಸಂಖ್ಯೆ: ಅಪಜೀ 264 ಇ ಎನ್ ವಿ 2022

ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ಸಚಿವಾಲಯ,
ಬಹುಮಹಡಿಗಳ ಕಟ್ಟಡ,
ಬೆಂಗಳೂರು, ದಿನಾಂಕ: 21.09.2024.

ಇಂದ,

ಸರ್ಕಾರದ ಪ್ರಧಾನ ಕಾರ್ಯದರ್ಶಿ,
(ಜೀವಿಪರಿಸ್ಥಿತಿ ಮತ್ತು ಪರಿಸರ),
ಅರಣ್ಯ, ಜೀವಿಪರಿಸ್ಥಿತಿ ಮತ್ತು ಪರಿಸರ ಇಲಾಖೆ,
ಬಹುಮಹಡಿ ಕಟ್ಟಡ,
ಬೆಂಗಳೂರು.

ನೆನಪೋಲೆ

ಇವರಿಗೆ,

ಕಾರ್ಯಕಾರಿ ನಿರ್ದೇಶಕರು,
ಮೆ|| ಹೊನ್ನಾವರ ಪೋರ್ಟ್ (ಪ್ರೈವೇಟ್) ಲಿಮಿಟೆಡ್.
ಕಾಸರಕೋಡ್ ಟೊಂಕ, ಹೊನ್ನಾವರ ತಾಲ್ಲೂಕು,
ಉತ್ತರ ಕನ್ನಡ ಜಿಲ್ಲೆ - 581342.

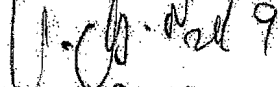
ಮಾನ್ಯರೆ,

ವಿಷಯ:- ಆಲೀವ್ ರಿಡ್ಡಿ ಕಡಲಾಮೆಗಳ ಸಂರಕ್ಷಣೆ ಕುರಿತು

ಉಲ್ಲೇಖ:- ತಮ್ಮ ಪತ್ರ ಸಂಖ್ಯೆ: HPPL/PORT/2024/0057,
ದಿನಾಂಕ:23.05.2024.

ಮೇಲ್ಕಂಡ ವಿಷಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ, ಆಲೀವ್ ರಿಡ್ಡಿ ಕಡಲಾಮೆಗಳ Nesting ಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಅರಣ್ಯ ಇಲಾಖೆಯ ಅಧಿಕಾರಿಗಳನ್ನು ನೇರವಾಗಿ ಸಂಪರ್ಕಿಸಿ Wild life Mitigation plan ಗಾಗಿ ಬ್ಯಾಂಕ್ ಖಾತೆಗಳ ವಿವರ ಪಡೆದು ವಾರ್ಷಿಕ ರೂ.8.00 ಲಕ್ಷ ರೂಪಾಯಿಗಳನ್ನು ಪಾವತಿಸಲು ಪೂರಕ ಕ್ರಮ ವಹಿಸುವಂತೆ ತಮ್ಮನ್ನು ಕೋರಲು ನಿರ್ದೇಶಿಸಲ್ಪಟ್ಟಿದ್ದೇನೆ.

ತಮ್ಮ ನಂಬುಗೆಯ,


(ಬಿ.ಎನ್. ಪ್ರವೀಣ್)

ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿ
ಅರಣ್ಯ, ಜೀವಿಪರಿಸ್ಥಿತಿ ಮತ್ತು ಪರಿಸರ ಇಲಾಖೆ
(ಜೀವಿಪರಿಸ್ಥಿತಿ ಮತ್ತು ಪರಿಸರ)

112

Government of Karnataka

No.FEE 264 ENV 2022

Karnataka Government Secretariat
Multi-storeyed Building
Bengaluru, dated:21-09-2024

From

Principal Secretary to Government
(Ecology & Environment)
Forest, Ecology & Environment Department
Multi storeyed Building
Bengaluru

To

Executive Director
M/s Honnavar Port (Private) Limited
Kasarkod Tonka, Honnavar Taluka
Uttara Kannada District 581342

Sir,

Sub : Olive Ridley Turtles Conservation – Reg

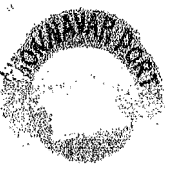
Ref : Your letter No. HPPL/PORT/2024/0057 Dated:23-05-2024

With reference to the above subject regarding Olive Ridley Turtle Nesting, I am directed to inform you to contact Forest Department Officers to obtain bank account details of Wild life Mitigation Plan to make a payment of Rs.8.00 lakhs on annual basis.

Yours faithfully,

Sd/-

Under Secretary to Government
Forest, Ecology & Environment Department
(Ecology & Environment)



HONNAVAR PORT (P) LTD.

113
9/c

No. HPPL/FD/2024/0074

Date:05/10/2024

To,
The Deputy Conservator of Forest,
Honnavar Division,
Honnavar.

Sir,

Sub: Payment of additional amount towards mitigation measures for Turtle Nesting - reg.

Ref: 1. Wildlife Mitigation Measures approved by the PCCF, (Wildlife) & Chief Wildlife Warden, Karnataka vide letter No. PCCF/WL/D/CR-78/2020-21 Dated:22/06/2020.

2. Director, Ports and Member, (Maritime & IWT Operations), Karnataka Maritime Board letter No.KMB-22/Dev/2022, Dated: 08/02/2023 addressed to the Member Secretary, KSCZMA.

3. Your letter No. B2/GFL/FC/CR-20/2020-21 Dated:05/06/2024.

4. The Principal Secretary, Ecology & Environment, M.S. Building, Bengaluru letter No. A.PA.JI 264 E.N.V 2022 Dated: 21/09/2024.

Adverting to above, it is submitted that PCCF (Wildlife) & Chief Wildlife Warden, Karnataka had approved the Wildlife Mitigation Measures vide letter under ref (1) above, in which Rs. 4 Lakhs is to be paid on annual basis towards additional mitigation measures which include Rs.2 lakhs for protection of turtle nesting area, i.e., to build barricades around the nesting area during breeding season and Rs.2 lakhs for watch and ward (02 person) during breeding season. Further, as per the suggestion of KSCZMA to allocate more budget for taking additional mitigation measures for turtle nesting, the Director Ports and Member (Maritime & IWT Operations), Karnataka Maritime Board, Karwar had proposed to enhance the budget to Rs. 8 lakhs per annum, vide letter under reference (2) above.

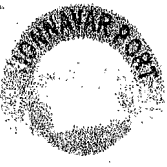
Meanwhile, as per your letter under reference:(3) above, an amount of Rs. 4 lakhs is already paid for the current year to the account of the Karnataka Campa Account No. 150736141625953 through the Karnataka Maritime Board. This payment of Rs. 4 Lakh is reflected in the Parivesh Portal of MoEF & CC. Copy of the payment details reflected in this Portal is attached herewith for your kind reference.

Now, the Principal Secretary, Ecology & Environment, vide letter under reference (4) above has

Port Office : Kasarkod Tonka, Honnavar Taluk, Uttar Kannada District, Karnataka - 581 342.

Regd. Office : #103, Lalehzar Apartments, 45/1-2, Palace Road, Bangalore - 560 001, Karnataka, India.

Ph : +91-80-2235 3670, 4149 4960 Fax : +91-80-2235 3671 Email : info@honnavarport.com



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HONNAVAR PORT (P) LTD.

directed to pay Rs. 8.00 lakhs annually. Copy of this letter is attached herewith for your kind perusal. Therefore, it is kindly requested to issue a demand letter furnishing the account details for making payment of balance amount of Rs. 4 Lakhs for this year.

This is submitted for your kind information and further needful in the matter.

Thanking You,

Yours faithfully,

[Signature]
Executive Director,
Honnavar Port (P) Ltd.



Enclosures: As above.

Copy submitted for kind information to:

1. The Chief Executive Officer, Karnataka Maritime Board, 3rd Floor, West Wing, Khanija Bhavan, Race Course Road, Bengaluru
2. The Director Ports and Member (Maritime & IWT Operations), Karnataka Maritime Board, Karwar
3. The Port Officer, Port Office, Bunder, Honnavar
4. The Assistant Executive Engineer, Port Sub Division, Honnavar

ಸ್ವೀಕರಿಸಲಾಗಿದೆ

?

ಉ.ತ.ಸಂ. ಕಛೇರಿ, ಕೊಪ್ಪಳ
ದಿನಾಂಕ: 08-10-2024.

[Signature]
ಸ್ವೀಕರಿಸಿದೆ
ಪಾಂಡು ಕಾರ್ತಿಕೇಯನವರ ಕಛೇರಿ
ಬಂದರು ಕಛೇರಿ - ಸ್ಪಾನ, ಕೊಪ್ಪಳ

ಸ್ವೀಕರಿಸಿದೆ
09/10/2024
ಬಂದರು ಕಛೇರಿ
ಕೊಪ್ಪಳ

Mangroves: The following measures shall be adopted to conserve mangroves:

- Awareness will be given to workers in the port about the importance of mangroves and their conservation
- Discharge of waste/wastewater during the construction and operation without treatment in mangrove areas would not be allowed
- Illegal cutting of mangroves for firewood by workers during the construction and operation phases of port would be strictly prevented
- Fuelling stations, petroleum products and hazardous material storage units must be located at minimum 50m distance away from the northern mangrove areas
- Necessary steps should be taken in case of any oil spill or leakage of any hazardous substances in the port area to minimize its impact as per contingency plan.

10.4.2 Mangrove Plantation

The port authorities could contemplate taking up mangrove plantation or rehabilitation activities in appropriate areas with assistance of forest department or reputed institutes. The following fish bone model can be suggested for the restoration of mangroves.

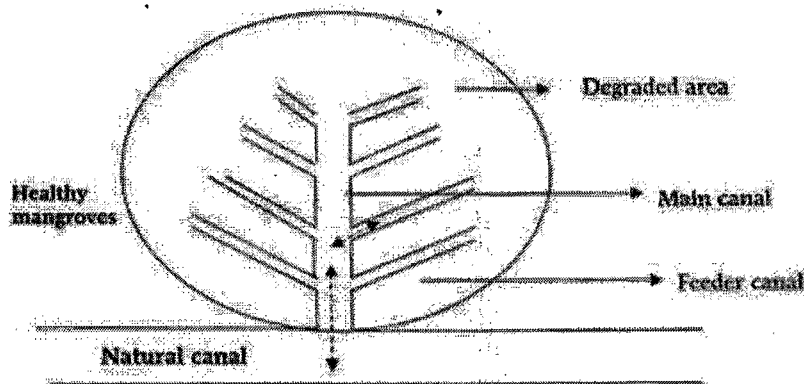


Figure 10-4: Fish Bone diagram of Mangrove plantation

Protected Faunal Species (species in IUCN and Wildlife Protection Act): The following measures shall be adopted for the protected species.

- Monitoring of occurrence of protected species and their habitat
- Habitat protection
- Awareness among common people
- Conservation of mangrove patches existing near the project are in support with forest department

The respective government department will take care of the protected faunal species and HPPL will provide the necessary support for the conservation.

10.4.3 Sea Turtle Conservation

The olive ridley sea turtle is the only species of sea turtle known to nest along the coast of Karnataka (Kar and Bhaskar 1982). Uttara Kannada has a coastline of about 170 km between Karwar to the north and Bhatkal to the south. All along this coast, the beach is divided by hillocks that reach the sea. The main nesting season is from October to January.

It should be noted that manmade protected turtle hatcheries recorded from the study area during field visit. The following measures are provided based on the secondary data information:

- Significant habitats of turtles lying outside the protected areas should not be disturbed.
- Low sound producing equipment may be used for the purpose of dredging and other such activities.
- Care should be taken in ship movements with regard to turtle conservation.

10.4.3.1 Nesting Site Protection

The beaches that serve as important nesting places in the port vicinity for female sea turtles should be identified and protected. Take steps to ensure that no port activity poses a concern during nesting seasons in order to avoid disruptions and guarantee successful nesting.

10.4.3.2 Dredging Management

The channel area is well away from the turtle congregation area and hence there is no regular movement of turtle into the channel area to avoid accidental take, HPPL followed the dredging protocol which may be continued.

10.4.3.3 Protection of Eggs

Ensure that the turtle nesting grounds are protected and free from predators, poaching, and natural threats. Especially, stray dogs in the turtle nesting beaches pose major threats to nesting sites.

10.4.3.4 Lighting Management

The glare of the port complex lighting system is likely to cause adverse impacts on the Nocturnal fauna and marine creatures. During the hatching of eggs laid by Olive Ridely turtle, the glare of light may destruct their movement to landward side causing desiccations and death. Considering these ecological issues, HPPL shall adopt DARK SKY LIGHTING SYSTEM an exemplary activity for the coastal eco system.

Lighting Mitigation Efforts

- All outdoor lighting, roadway lighting, wharf lighting, and lighting mounted on masts or other elevated structures will be of the minimum lamp wattage to achieve required safety within the lighted area.
- No area lighting or any lighting mounted on masts or other elevated structures will include fluorescent lamps, mercury vapour (MV) lamps, metal halide (MH) lamps, or other broad-spectrum high-intensity discharge lamp types.
- No lighting of grounds, building walls, signs, cranes, or other elevated structures will employ flood lighting, up-lighting, or other forms of directional lighting aimed above the horizon.
- Wherever possible, use low-pressure sodium vapour lamps or other light sources that exclude wavelengths less than 520 nm.

10.4.3.5 Bycatch Reduction

- Work with forest and fisheries department to enforce the use of Turtle Excluder Devices (TEDs) in fishing gear to prevent accidental capture of sea turtles.
- Organize awareness programs and educate fishermen about responsible fishing practices.

- Research and Monitoring
- Support studies on sea turtle behaviour, migration patterns, and population dynamics. This research study should mainly focus on nesting site monitoring, tracking sea turtle migration and threats posed to them particularly in the port vicinity.

10.4.3.6 Marine Debris Reduction

Organize to conduct coastal clean-ups to remove plastic and other debris that can entangle or harm sea turtles. Raise awareness about reducing plastic use to keep beaches and oceans clean.

10.4.3.7 Wildlife Including Turtle Conservation Awareness Programme

The HPPL will implement the project in a manner that will not have significant adverse impact on the wildlife exists within the study area. The company strives for ecologically sustainable development and has adopted the improved practices to ensure continual improvement of its environmental preferences. It is required to create awareness among the employees of HPPL and the local community regarding importance of wildlife in sustenance of life on earth and to be responsible for conservation of nature.

10.4.3.8 Budgetary Provisions

HPPL has submitted the turtle conservation plan in consultation with Deputy Conservator of Forests, Honnavar Division and same has been recommended and submitted through the Chief Conservator of Forests, Canara Circle, Sirsi.

An amount Rs. 4.00 lakhs on annual basis were allocated towards protection of turtle nesting associating with forest department, Honnavar division proposed conservation activities includes build barricades around the nesting area during breeding season, watch and ward during breeding season and conservation awareness programmes. Approval from forest department for Turtle conservation was given as **Appendix Q**.

10.5 Conservation Strategies for Terrestrial Biodiversity

10.5.1 Conservation Plan for IUCN & IWPA Scheduled I Fauna recorded in the 15 km buffer area

Wildlife management is the application of scientific knowledge and technical skills to protect, conserve, limit, enhance, or conserve the existing wildlife habitat. Wildlife management also includes implementing laws regulating wildlife management tools to the area of interest.

Conservation strategies for the species of importance

- General distribution studies
- Habit and habitat assessment
- Population status assessment
- Identification of major threats
- Identification of Stress Factors
- Mitigation and management planning
- Implementation of conservation strategies
 - Habitat improvement programme
 - Water availability
 - Awareness programmes (community and school level)

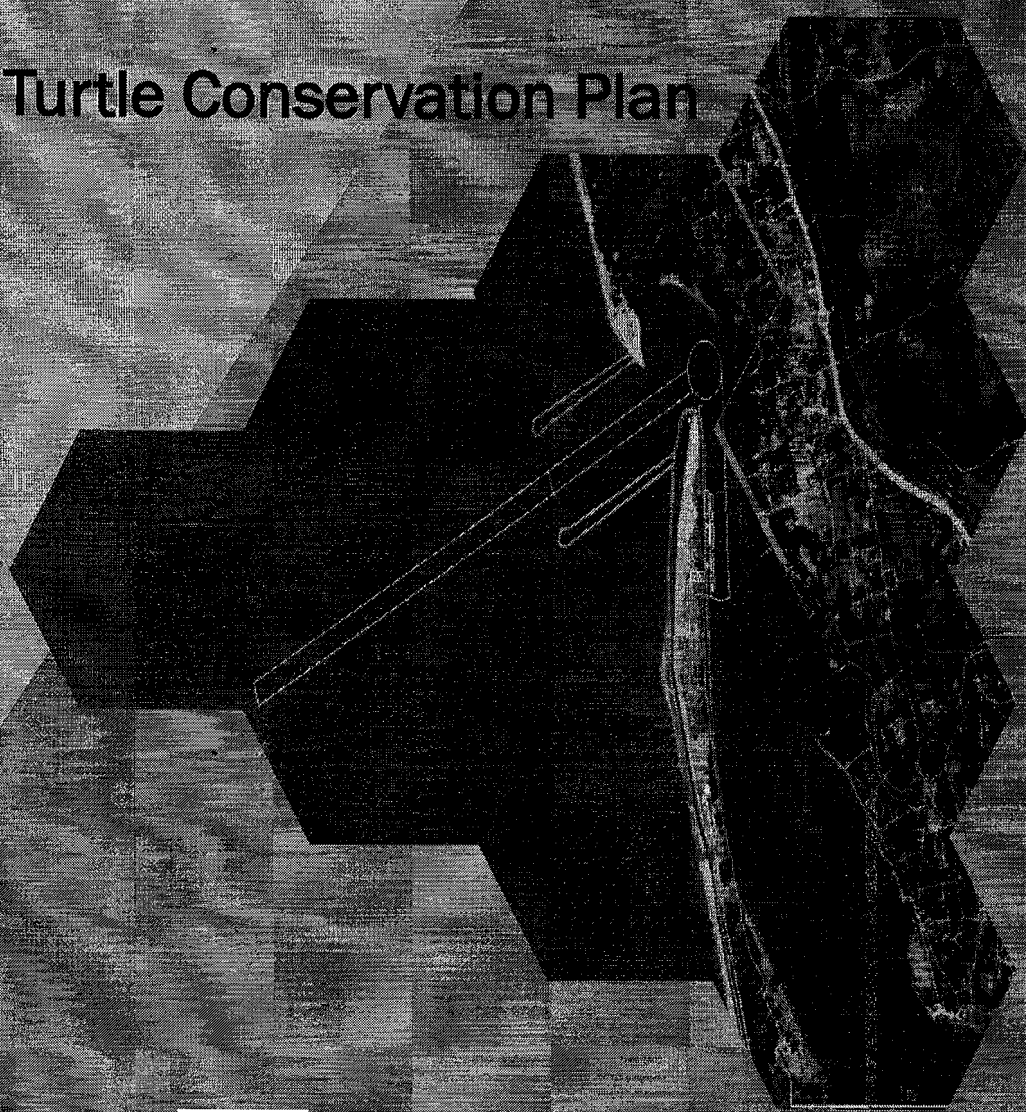
Birds: The following measures shall be adopted for birds.



HONNAVAR PORT PRIVATE LIMITED (HPPL)

**Environment and CRZ Clearance for Development of
Barge/Vessel Loading Facility for 4.9 MTPA at
Honnavar Port**

Marine Turtle Conservation Plan



Assystem India Limited
NABET/EIA/2326/ RA 0299 (Rev.02)

Marine Turtle Conservation Plan

1 Background

Marine biodiversity refers to the variety of life in our ocean. It includes all animals, plants and microorganisms living in our ocean, from barnacles to whales to coral reefs. The term is also used to describe the abundance of species living in an area.

Marine biodiversity allows nature in our ocean to be productive, resilient and adaptable to environmental changes. Marine biodiversity can prevent one species' extinction from causing wider negative impacts on a marine ecosystem.

We say an ecological system is resilient if it keeps functioning even when the population of a species declines, or a species becomes extinct. A functioning ecosystem means the natural processes are working effectively, including those providing goods and services to humans, such as storing carbon or filtering water.

Each species in the ocean has a particular role to play, whether that is marine worms converting organic material into carbon dioxide for marine plants to photosynthesise or sharks controlling prey populations. Some species play similar roles in an ecosystem, so if one species becomes extinct, another will be able to carry out the same function or 'service'.

In order to conserve marine species, Government of India has notified 130 Marine Protected Areas across the Coastal States and Islands; in addition, 106 coastal and marine sites have been identified and prioritized as Important Coastal and Marine Biodiversity Areas (ICMBAs) to take care of marine species conservation.

The Biological Diversity Act of India, 2002, as amended and the Biological Diversity Rules 2004, and the guidelines thereof ensure the protection and conservation of biodiversity (including the marine species), sustainable use and equitable sharing of its components, Intellectual Property Rights, etc..

The Coastal Regulation Zone (CRZ) Notification, 2019, promulgated under Environment (Protection) Act 1986, has specific focus on conservation and management plans of Ecologically Sensitive Areas (ESAs), like Mangroves, Seagrasses, Sand dunes, Corals and Coral reefs, Biologically active mudflats, Turtle nesting grounds, and Horse shoe crabs' habitats and prohibit developmental activities and disposal of wastes in the fragile coastal ecosystems.

Marine turtles have a major influence on the structure and function of marine biodiversity and play an important role in shaping the behaviour and life history traits of prey species and predators that is critical for the sustainability of fisheries in the region. Factors like climate change, unsustainable resource use, marine litter and pollution affect marine turtles and their habitats.

Marine turtles play a variety of ecological roles for maintaining healthy marine habitats like controlling prey populations, supporting coastal vegetation through their hatchlings etc. Their presence is an indicator of healthy marine ecosystems and provide a source of revenue for local communities through tourism. Marine turtles thus present themselves as a key indicator of healthy marine habitats and an opportunity for conservation of associated species.

The Ministry of Environment, Forest and Climate Change (MoEF&CC) has released a National Marine Turtle Action Plan (2021-2026) with the aim to conserve marine turtles and their habitats in India².

¹ <https://www.msc.org/en-au/what-we-are-doing/oceans-at-risk/marine-biodiversity#:~:text=The%20importance%20of%20marine%20biodiversity,same%20function%20or%20'service'>

²² <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1987749>

The Indian coastal waters supports five species of sea turtles found worldwide. These are the Olive ridley (*Lepidochelys olivacea*), Green (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*), Leatherback (*Dermochelys coriacea*) and Loggerhead (*Caretta caretta*). These five species of sea turtles that occur in Indian coastal waters are protected under Schedule I of the Wildlife (Protection) Act, 2002.

The olive ridley sea turtle is the only species of sea turtle known to nest along the coast of Karnataka (Kar and Bhaskar 1982). The nesting of olive ridleys is sporadic along the Karnataka coast (Madhyastha et al 1986)³.

1.1 Possible Threats to Marine Turtle

Numerous direct and indirect pressures arising from various factors adversely impact marine turtle populations and their habitat. This also includes natural disasters such as tsunamis, cyclones, hurricanes and storms⁴.

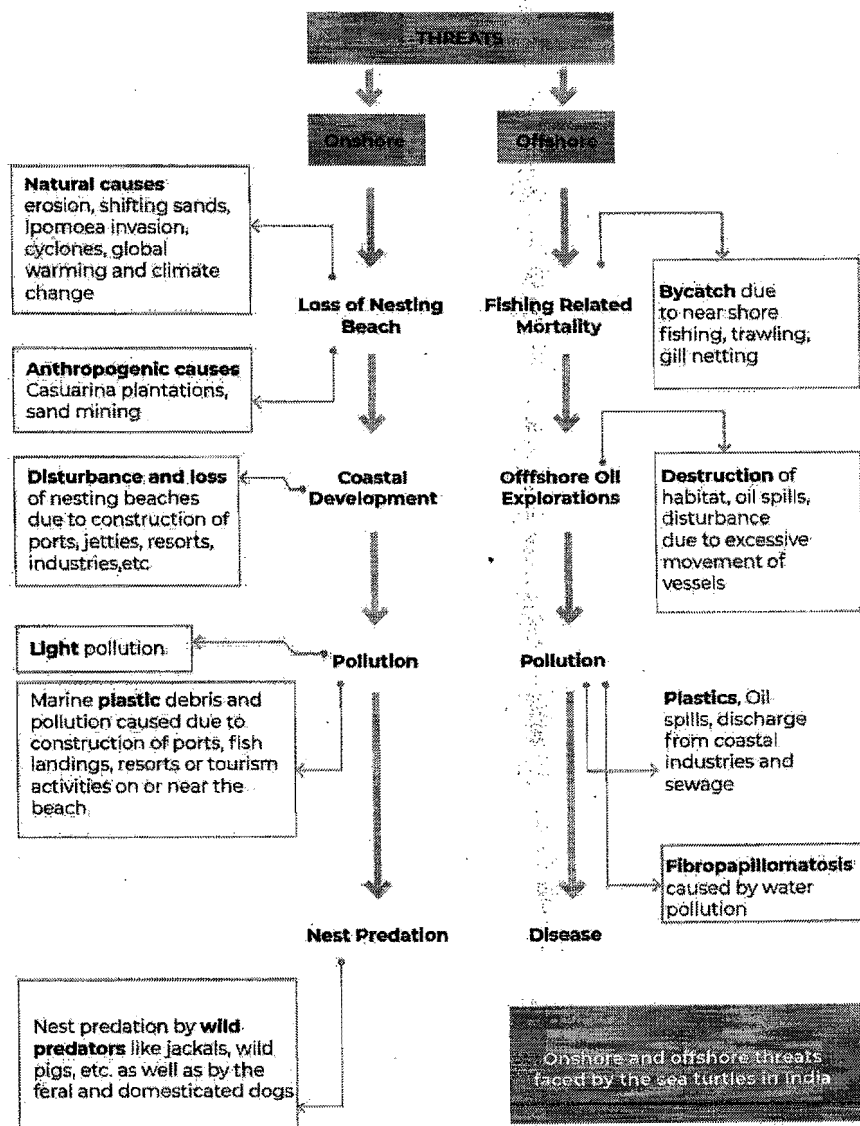


Figure 1: The Possible Threats to Marine Turtle Populations and their Habitats

³ https://www.seaturtlesofindia.org/wp-content/uploads/2017/04/Sharath-B.K.-2006.-Sea-turtles-along-the-Karnataka-coast.-In-Marine-turtles-of-the-Indian-subcontinent-Eds.-Shanker-K.-B.C.-Choudhury.Pp_-141-146..pdf

⁴ National Marine Turtle Action Plan (2021-2026), Ministry of Environment, Forest & Climate Change, Government of India

2 Objective

- Conducting primary survey covering project area plus 5 km on either side of the project area during sea turtle nesting season
- Collection of sea turtle nesting data from secondary information and forest department
- Mapping of such collected past year(s) data with actual filed locations on discussion with forest department / hatchery centre / egg collectors.
- Status and species identification (Olive Ridley) as possible in and around Project site.
- Collection of other field data including seabed sediment profile and other data as required for the impact assessment / study
- Assessment of impact of project development / coastal facilities on sea turtle nesting status
- Prepare Conservation plan thereof related to nesting status

3 Proposed Development Details

3.1 Study Area

The proposed site for development of Barge/ Vessel loading facility is located near mouth of Sharavati River in Honnavar Taluk of Uttara Kannada district in Karnataka. It is at a distance of about 90 km from Karwar, the district headquarter and about 400 km from Bengaluru.

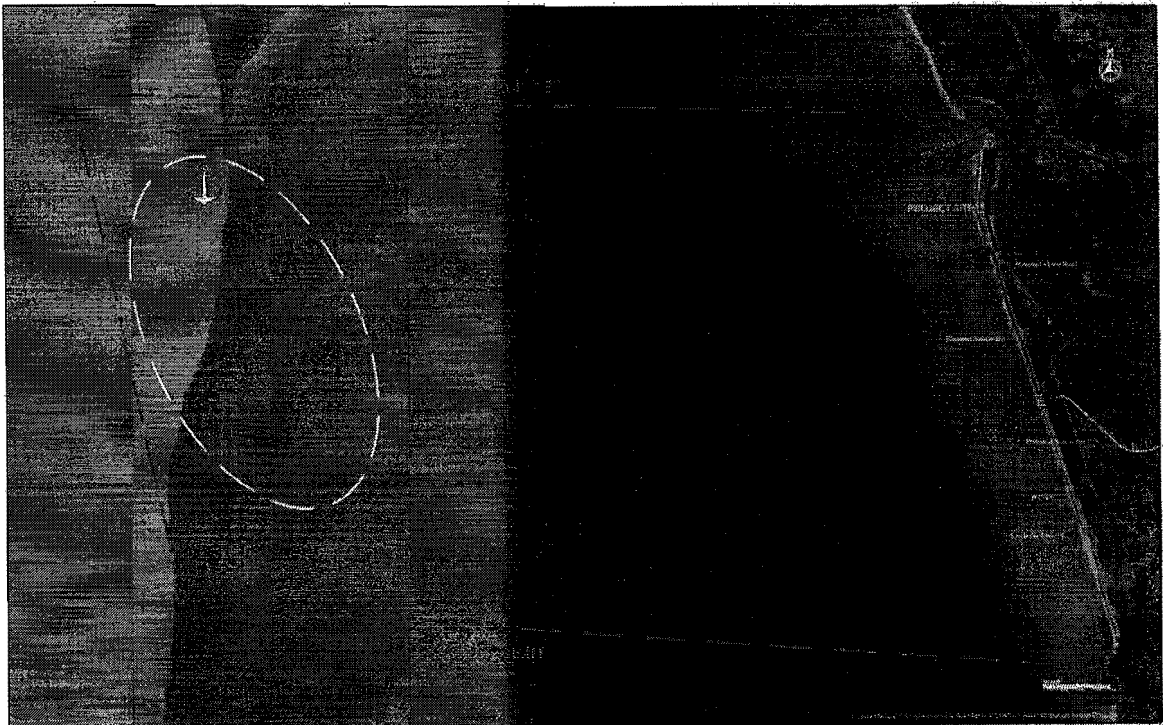


Figure 2: The Project Site

3.2 Proposed Development

As per the EC&CRZ clearance M/S. Honnavar Port Pvt. Ltd. (HPPL), have proposed for development of a barge / vessel loading facility at Coastal Sand Spit, Kasarkod Tonka Village, Honnavar Taluk, Uttara Kannada District. Total land requirement for the proposed facility is 44 Ha.

Total capacity of cargo handling is 4.9 MTPA of which Coal (2.70 MTPA), Iron Ore (1.00 MTPA), General Cargo (1.20 MTPA i.e. Granite - 0.16 MTPA; Fertilizer - 0.2 MTPA; Molasses with Agro products - 0.15

MTPA; Steel Products- 0.40 MTPA and Sugar - 0.29 MTPA. In order to maintain tranquillity in the harbour basin, two break waters are proposed (Southern Break Water: 865 m and northern break water: 820 m). Berth of 440m long and 30m wide with backup area of 44 Hectares, dredging, approach channel: (length of approach channel inner: 1395m & outer 2280m, width of the channel 100m and depth of the channel: (-)10 m), Turning circle (diameter of the turning circle -250m, dredged to a depth of (-) 10 m), Estimated dredging quantity 3.9 million cum, Estimated quantity proposed to be used for reclamation 1 million cum.

3.3 Project Status/Existing Development

HPPL initiated the construction work after completing the financial closure formalities and after getting the clearances from Honourable courts. Mobilization and material procurement activities were initiated and following activities are fully/partially completed

- Approach Trestle No. 1 (Completed)
- Approach Trestle No.2 (Partially completed 5 out of 17 piles)
- Internal earthen road work for construction materials transportation (Completed)
- Black topping of existing Kachha road for a length of 2.10 Km along the seashore of Kasarkod village (Partially Completed)

4 Methodology

Rapid survey was carried out in the impact zone area, a site identified for port, coal storage, breakwater, connectivity to port to ascertain nesting of sea turtles. Interviews with local fisherman were conducted to document the local knowledge about sea turtle species and their nesting at proposed site and adjacent areas within 5km stretch on each side. Interviews were also conducted with forest department personals who are engaged in collection of sea turtle eggs from the study site to know the exact location of nests and species.

Table 1: GPS Points of the sites visited inside the proposed port area

S. No.	Latitude	Longitude	S. No.	Latitude	Longitude
1	14.282254°	74.427078°	5	14.296203°	74.424595°
2	14.283611°	74.426667°	6	14.292135°	74.423815°
3	14.289034°	74.425702°	7	14.286925°	74.424371°
4	14.295769°	74.425800°	8	14.281852°	74.425779°

4.1 Nesting Reports in Study Area

Sporadic nesting of Olive Ridley turtles is reported from the coast of Karnataka. The oldest comprehensive study dates back to 2002, a study jointly undertaken by Government of India (GoI) and UNDP where, a baseline was prepared for the nesting beaches along the coast of Karnataka⁵.

(a) GOI – UNDP Sea Turtle Project

The report has located major turtle nesting sites but no geocoordinates is available pertaining to the exact locations. Out of 13 sites identified in the Uttara Kannada District, Kasarkod beach was designated as an "occasional nesting site". The nesting season was observed to be from September to January⁶.

(b) WWF - India Report

⁵ Report on Survey of 45 hectares area at Kasarkod Tonka in Honnavar Taluk of Uttar Kannada district of Karnataka on the issue of Turtle nesting ground, NCSCM.

⁶ Sharath B.K. (2002) Marine turtle nesting along the coast of Karnataka – a status survey. GOI – UNDP Sea turtle project, 25 p.

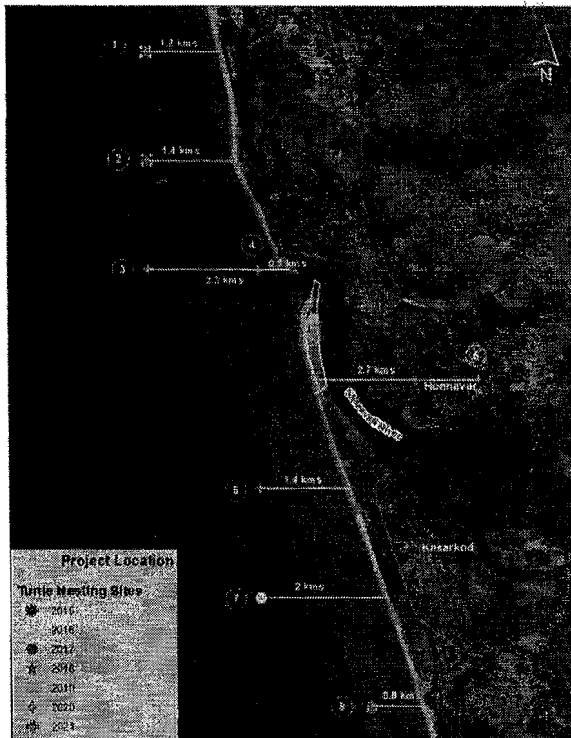
The WWF 2013 report has provided an overview of the status of sea turtle nesting in Karnataka. It has mentioned Kasarkod as a potential nesting site with new nesting areas (the co-ordinates 14.26028 N, 74.43256 E). The report highlighted the decrease in turtle nesting over the years and the need for detailed research to create a database on nesting.

(c) Dakshin - EMPRI Report

The Dakshin-EMPRI Report of 2016 is a comprehensive document concerning sea turtle breeding along the Karnataka coast. According to the report, Olive Ridley nests are observed to be along the entire coastline of Honnavar Division and seven major nesting beaches have been identified. These beaches are mostly sandy with small rocky patches. The seven nesting beaches are located at Gangavali, Kagal, Dhareshwara, Haldipur, Kasarkod, Talmakki, and Bengre (Bhatkal)⁷.

(d) Data from Forest Department, Honnavar Range, Karnataka

Turtle nesting data was collected from Forest Department, Honnavar Range and the compiled data was analyzed. Based on the list, Kasarkod beach has been mentioned 5 times for turtle nesting from 2015 to 2021. Pavinakurve, Haldipur and Taribagilu have far more nesting records compared to Kasarkod since 2015. The details of the geo-tagged locations taken from the Forest Department records is given below. In Kasarakod, 582 turtle eggs were collected between 2016 and 2021. From the records of the Forest Department, it was observed that the southern tip of the proposed HPPL project site had one nesting in the year 2020.



Data source: Forest Division, Honnavar

Figure 3: Geolocation of Turtle nesting sites drawn parallel to the shore

(d) Approved CZMP Map

As per CZMP Map No.: KA 25, the proposed port area is categorized into under three CRZ areas – CRZ – I (IB) intertidal area, CRZ – II and CRZ – III (No Development Zone). There is no reported ESA (CRZ 1A) in the proposed site of the Honnavar Port as per approved CZMP maps of Honnavar. A closer view

⁷ Anon (2016) Establishing a baseline for monitoring sea turtle nesting sites on the Karnataka coast through coastline mapping. Final Report. Dakshin & EMPRI, 93 p.

of the CZMP map covering the port area and the entire CZMP map (KA 25) is provided below. Mangroves are present in the estuarine area of Sharavathi river.

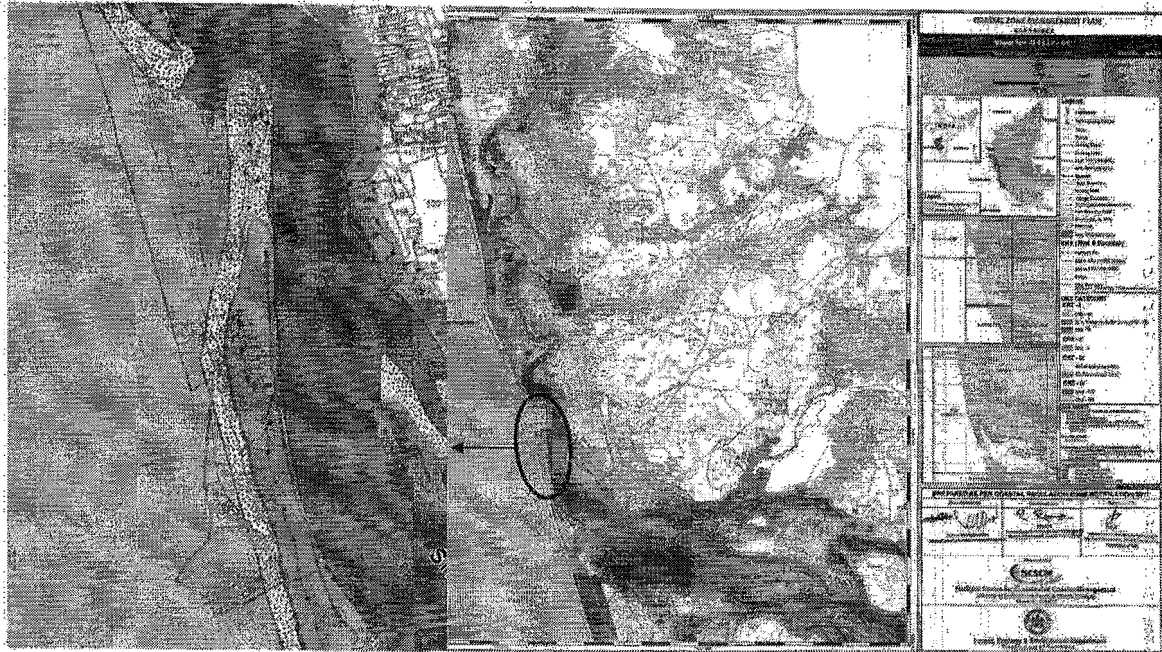


Figure 4: CZMP of KA 25 approved by KCZMA indicating the surveyed Port area in insert (e) NCSCM Site Survey

The Hon'ble High Court of Karnataka in the Daily Order to the Infrastructure Development, Ports and Inland Water Transport Department, Government of Karnataka, had proposed to appoint NCSCM working under the Ministry of Environment, Forest and Climate Change, Government of India to survey the 45 hectares of land covered by the HPPL project with a view to ascertain whether any part of the said area is a turtle nesting ground or the entire area in the turtle nesting ground. NCSCM team surveyed the proposed port area and the surroundings around Kasarkod on 2nd and 3rd August 2021 as per the directive of the Hon'ble High Court of Karnataka.

The following are the observations

- No nests, turtles or dead carcasses of turtles were observed in the entire 45 ha area of the proposed site during the survey
- Erosion was observed along the road from the current port entry road until the estuarine mouth
- Limited port construction activity has begun along the eastern boundary of the proposed port
- For coastal defense along the eroding road, tetrapods have been deployed on the banks.
- Mangroves are present along the north right bank of the River Sharavati.
- The northwestern boundary of the port has a flat beach, which is usually not conducive for nesting

<p>Eroding road leading to the entry gate of the proposed port</p>	<p>Erosion along the eastern boundary of the proposed site</p>
<p>Construction activity along the eastern boundary of the port</p>	<p>Approach Trestle 1</p>

4.1.1 Marine Environmental Status

Marine Water:

- **Temperature:** The water temperature was recorded from 30.16°C to 31.88°C,
- **Salinity:** The salinity varied from 4.52 PSU to 35.39 PSU
- **Turbidity:** The turbidity ranged from 0.84 NTU to 8.97 NTU
- **Dissolved Oxygen:** The dissolved oxygen varied from 4.43 to 8.34 mg/l
- **Biochemical oxygen demand:** The BOD varied from 1.08 mg/l to 2.86 mg/l
- **Nitrate:** Concentration of Nitrate ranged between 0 to 0.32 µmol/l
- **Nitrite:** Concentration of Nitrite ranged between 0.01 to 0.06 µmol/l
- **Total Phosphate:** Concentration of total phosphate ranged between 0.14 to 0.45 µmol/l
- **Silicate:** Concentration of Silicates ranged between 17.96 to 111.72 µmol/l
- **Ammonia:** Concentration of Ammonia ranged between 0.71 to 2.07 µmol/l

Sediment:

- The sand fraction ranged from 0.02 to 97.44%, silt fraction ranged from 2.16% to 99.32 and clay fraction ranged from 0.08 to 1.69%
- **Aluminium:** Concentration of Al ranged 7.27 to 14.43 %
- **Calcium:** Concentration of Ca ranged 0.36 to 2.26 %
- **Iron:** Concentration of Fe ranged 0.6 to 6.35 %
- **Magnesium:** Concentration of Mg ranged 0.03 to 2.38
- **Mercury:** Concentration of Hg ranged upto 0.05 µg/g
- **Chromium:** Concentration of Cr ranged 14.55 to 217.65 µg/g
- **Zinc:** Concentration of Zn ranged 21.8 to 115.9 µg/g
- **Nickel:** Concentration of Ni ranged 18.33 to 98.2 µg/g

- **Copper:** Concentration of Cu ranged 9.45 to 53.37 µg/g
- **Cobalt:** Concentration of Co ranged 0.78 to 22.38 µg/g
- **Lead:** Concentration of Pb ranged 3.14 to 19.75 µg/g
- **Arsenic:** Concentration of As ranged 4.18 to 29.52 µg/g
- **Cadmium:** Concentration of As ranged 4.18 to 29.52 µg/g
- **Manganese:** Concentration of As ranged 4.18 to 29.52 µg/g

Marine Biology:

- Total viable count of bacteria varied between 3 x 10³ CFU 100mL⁻¹ and 4 x 10⁴ CFU 100mL⁻¹
- Total E. coli count of bacteria varied between 1 x 10¹ CFU 100mL⁻¹ and 2 x 10¹ CFU 100mL⁻¹.
- Other coliforms count varied between 3 x 10¹ CFU 100mL⁻¹ and 8.2 x 10² CFU 100mL⁻¹
- Total faecal coliforms count varied between 1 x 10¹ CFU 100mL⁻¹ and 7 x 10¹ CFU 100mL⁻¹
- Total Vibrio count varied between 1x10¹ CFU 100mL⁻¹ and 5.2x10³ CFU100 mL⁻¹
- *Salmonella* growth was observed only at six marine sampling locations.
- Total *Shigella* count varied between 1 x 10¹ CFU 100mL⁻¹ and 1.36 x 10³ CFU 100mL⁻¹.
- The zooplankton abundance varied from 852 Nos./m³ to 15537 Nos./m³

4.1.2 Court Cases Details pertaining to Turtle Nesting in Project Site

Various Writ Appeal (WA) / Want of Prosecution or Writ Petition (WP) / Public Interest Litigation (PIL) / Appeals / Applications were filed from the year 2016 to 2022 against the accorded approvals related to GO's issued by the Port Officer, Honnavar, Appeal against the court order, Appeal against ownership of the land, Challenged the Environment Clearance granted on September 21, 2012 and the extension granted on July 01, 2019, on turtle nesting grounds in project area, on the dedicated road corridor to provide road connectivity from the Honnavar Port Project to the National Highway – 66.

All the court cases pertaining to turtle nesting grounds in project area, connectivity corridor and land ownership with Honourable Karnataka State High Court, Dharwad branch, Karnataka; Honourable Court of Deputy Commissioner, Uttara Kannada, Karwar, Karnataka; Honourable Karnataka State High Court, Bengaluru; Honourable Court of the PRL. District & Sessions Judge, Uttara Kannada, Karwar, Karnataka; Honourable the National Green Tribunal, Southern Zone, Chennai; were Dismissed/ Disposed in favour of Govt. of Karnataka and Project Proponent HPPL.

5 Conservation and Mitigation Plan

The Action Plan aims to conserve marine turtles and their habitats for maintaining a healthy marine ecosystem.

5.1 Conservation Strategies

Broad Strategies of Turtle conservation Plan include

Objective	Plan of Action	Activity	Responsible Agency
Reduce direct and indirect causes of marine turtle mortality	Identify and document the threats to marine turtle populations and their habitats	<ul style="list-style-type: none"> • Collate and organise existing data on threats to marine turtle populations • Establish baseline data collection and monitoring programmes to gather information on the nature and magnitude of threats • Determine those populations affected by incidental capture in fisheries, and other sources of mortality 	Contractors/ HPPL/Forest Department
	Determine and apply best practice approaches to minimising those threats to marine		

Objective	Plan of Action	Activity	Responsible Agency
<p>Protect, conserve and rehabilitate marine turtle habitats</p>	<p>turtle populations and their habitats</p> <p>Establish necessary measures to protect and conserve marine turtle habitats</p>	<ul style="list-style-type: none"> Identify areas of critical habitat such as migratory corridors, nesting beaches, inter-nesting and feeding areas. Designate and manage protected/conservation areas, sanctuaries or temporary exclusion zones in areas of critical habitat, or take other measures (e.g. modification of fishing gear, restrictions on vessel traffic) to remove threats to such areas Undertake assessments of the environmental impact of marine and coastal development and other human activities that may affect marine turtle populations and their habitats Manage and regulate within each jurisdiction the use of beaches and coastal dunes, for example location and design of buildings, use of artificial lighting, and transit of vehicles in nesting areas Monitor and promote the protection of water quality from land-based and maritime pollution, including marine debris, that may adversely affect marine turtles Mainstream the turtles and their habitats conservation into the production sectors with active participations of industrial sectors including financial supports from their CSR Fund. 	<p>HPPL/Forest Department/Fishermen Organisations</p>
<p>Improve understanding of marine turtle ecology and populations through research, monitoring and information exchange</p>	<p>Conduct studies on marine turtles and their habitats targeted to their conservation and management</p>	<ul style="list-style-type: none"> Conduct baseline studies or gather secondary information on marine turtle populations and their habitats Initiate and/or continue long term monitoring of priority marine turtle populations in order to assess conservation status Carry out studies on marine turtle population dynamics and survival rates Conduct research on the frequency and pathology of diseases of marine turtles Promote the use of traditional ecological knowledge in research studies Review periodically and evaluate research and monitoring activities 	<p>HPPL/Forest Department</p>
	<p>Conduct collaborative research and monitoring</p>	<p>Conduct collaborative studies and monitoring on genetic identity, conservation status, migrations, and</p>	

Objective	Plan of Action	Activity	Responsible Agency
		<p>other biological and ecological aspects of marine turtles</p> <ul style="list-style-type: none"> • Prioritise populations for conservation actions • Identify population trends • Use research results to improve management, mitigate threats and assess the efficacy of conservation activities (e.g. hatchery management practices, habitat loss, etc.) 	
<p>Increase public awareness of the threats to marine turtles and their habitats, and enhance public participation in conservation activities</p>	<p>Establish public education, awareness and information programmes</p>	<ul style="list-style-type: none"> • Setting up of turtle clubs at taluk • Collect, develop and disseminate education materials • Establish community learning /information centres • Develop and implement accurate mass media information programmes • Develop and conduct focused education and awareness programmes for target groups (e.g. policy makers, teachers, schools, fishing communities, media) • Organise special events related to marine turtle conservation and biology (e.g. Turtle Day, Year of the Turtle, symposia, Track-a-turtle) 	<p>HPPL/Forest Department</p>
	<p>Develop alternative Livelihood opportunities for local communities to encourage their active participation in conservation efforts</p>	<p>Identify and facilitate alternative livelihoods (including income generating activities) that are not detrimental to marine turtles and their habitats, in consultation with local communities and other stakeholders. Undertaking turtle based tourism programme like Turtle Festival</p>	<p>HPPL</p>
	<p>Promote public participation</p>	<ul style="list-style-type: none"> • Involve stakeholders, and local communities in particular, in planning and implementation of conservation and management measures • Encourage the participation of Government institutions, nongovernmental organisations, the private sector and the general community (e.g. students, volunteers, fishing communities, local communities) in research and conservation efforts • Implement, where appropriate, incentive schemes to encourage public participation (e.g. T-shirts for tag returns, public acknowledgement, certificates) 	<p>HPPL/Forest Department</p>

5.1.1 Illumination Policy

The glare of the port complex lighting system is likely to cause adverse impacts on the Nocturnal fauna and marine creatures. During the hatching of eggs laid by Olive Ridely turtle, the glare of light may destruct their movement to landward side causing desiccations and death. Considering these ecological issues, HPPL shall adopt DARK SKY LIGHTING SYSTEM an exemplary activity for the coastal eco system.

Lighting Mitigation Efforts

- All outdoor lighting, roadway lighting, wharf lighting, and lighting mounted on masts or other elevated structures will be of the minimum lamp wattage to achieve required safety within the lighted area.
- No area lighting or any lighting mounted on masts or other elevated structures will include fluorescent lamps, mercury vapour (MV) lamps, metal halide (MH) lamps, or other broad-spectrum high-intensity discharge lamp types.
- No lighting of grounds, building walls, signs, cranes, or other elevated structures will employ flood lighting, up-lighting, or other forms of directional lighting aimed above the horizon.
- Wherever possible, use low-pressure sodium vapour lamps or other light sources that exclude wavelengths less than 520 nm.

5.1.2 Monitoring Predator Population

Predators play an important role in success of sea turtle nesting and hatching and ghost crabs are one of the most common predators of it. Besides this domestic dogs, jackals and crows also predate on juvenile sea turtles. Predation pressure has affected sea turtle populations throughout their evolution; with both prey and predators adapting to coexist and survive under natural conditions. A periodic monitoring of predators especially human induced predators is thus recommended. Monitoring is advised only from nesting to hatching period.

5.1.3 Avoid destruction of Sand Dunes

Sand dunes are natural barriers between sea and land. Low lying sand dunes also ideal nesting habitats for sea turtles. In the project area there are no sand dunes. In the study area of 15km sand dunes are reported.

5.1.4 Beach Erosion Related Measures

It is difficult to suggest remedies to contain or mitigate the erosion related issues at this stage. It will depend on the sites and level of erosion/accretion. Thus, mitigation measures for erosion related issues will be provided after assessing the impacts post project operational phase. Beach nourishment is one way to mitigate erosion.

5.1.5 Nesting Site Protection

The beaches that serve as important nesting places in the port vicinity for female sea turtles should be identified and protected. Take steps to ensure that no port activity poses a concern during nesting seasons in order to avoid disruptions and guarantee successful nesting.

5.1.6 Dredging Management

The channel area is well away from the turtle congregation area and hence there is no regular movement of turtle into the channel area to avoid accidental take, HPPL followed the dredging protocol which may be continued.

5.1.7 Protection of Eggs

Ensure that the turtle nesting grounds are protected and free from predators, poaching, and natural threats. Especially, stray dogs in the turtle nesting beaches pose major threats to nesting sites.

- **Location of the hatchery:** The best location for a hatchery is at a site that is as similar as possible to the habitat of the nesting site of the turtles. Hence, hatcheries should be located on the nesting beach, and if the beach is sufficiently long, several hatcheries should be established.
- **Buried mesh and caging:** The hatchery can be enclosed by chain link fence or wire mesh. Inexpensive wooden poles, cane and bamboo or slats can also be used. To prevent the entry of crabs and other burrowing predators, chicken wire mesh (or any small mesh material) can be buried to a depth of 0.5 metres along the inside of the fence.
- **Collection and transport:** Sea turtles are very sensitive and may return to the sea without nesting if they are disturbed while stranding or excavating the nest. During this period, workers should be very careful not to disturb the turtle with lights or movement.
- **Nest enclosures in the hatchery:** Some hatcheries use mesh enclosures for each nest to restrain hatchlings after they emerge to facilitate data collection and release.
- **Hatchling release:** Hatchery personnel should anticipate hatching for each nest. Expected dates of hatchling emergence can be estimated from date of collection (and will vary depending on species and time of year), and can also be predicted by the caving in of sand surface above the nest when hatching begins

5.1.8 Bycatch Reduction

- Work with forest and fisheries department to enforce the use of Turtle Excluder Devices (TEDs) in fishing gear to prevent accidental capture of sea turtles.
- Organize awareness programs and educate fishermen about responsible fishing practices.
- Research and Monitoring
- Support studies on sea turtle behaviour, migration patterns, and population dynamics. This research study should mainly focus on nesting site monitoring, tracking sea turtle migration and threats posed to them particularly in the port vicinity.

5.1.9 Marine Debris Reduction

Organize to conduct coastal clean-ups to remove plastic and other debris that can entangle or harm sea turtles. Raise awareness about reducing plastic use to keep beaches and oceans clean.

5.1.10 Management of Pollution

- Prohibit discharge of crude oil, pesticides, heavy waters, heavy metals and other poisonous effluents to estuaries and coastal areas and near turtle nesting beaches.
- Prohibit discarding fishing lines, nets, plastic bags and other trash into the water or on the beach which results in ghost fishing and incidental mortality of sea turtles.
- Introduce organized clean-up of beaches and near shore waters by local forest and fisheries departments and other governmental agencies in collaboration with nongovernmental organisations, coastal communities, and school and college students.

5.1.11 Continuous Sea Turtle Monitoring

Continuous long term sea turtle monitoring must be undertaken (minimum 10 years including). This is essentially important considering the area as a low-density nesting area and there is no pattern in nesting. Monitoring programme will be for both nesting surveys as well as systematic transect counts in

offshore (up to 5km) and nearshore waters (up to 2km) to enumerate species composition and abundance. Nesting surveys will be confined from actual nesting period to hatchlings.

The monitoring programs should always include gathering and collating information through

- Assessment of marine turtle mortality related to fishery
- Assessment of marine turtle distribution at sea from information provided by fishers and
- Assess sea turtles nesting along the coastline
- Beach monitoring to assess the status of the nesting beach
- Assessment of the feasibility of tracking entangled turtles after release to determine survivorship and migratory paths.

5.1.12 Environmental Education

Awareness programmes for local fisher population, company labourers, local people and employees should be undertaken to highlight sea turtle conservation. Awareness regarding fisheries related issues is also necessary among fishing community.

5.1.13 Setting aside corpus fund for sea turtle conservation and other conservation measures

HPPL has submitted the turtle conservation plan in consultation with Deputy Conservator of Forests, Honnavar Division and same has been recommended and submitted through the Chief Conservator of Forests, Canara Circle, Sirsi.

An amount **Rs. 8.00 lakhs** on annual basis were allocated towards protection of turtle nesting associating with forest department, Honnavar division proposed conservation activities includes build barricades around the nesting area during breeding season, watch and ward during breeding season and conservation awareness programmes.

5.1.14 Establish Monitoring Committee

Formation of a monitoring committee is advised to oversee the implementation of specific recommendation stated in the conservation plan. The Committee should comprise of representatives of the Company, representatives of local conservation organisations and representatives of state forest department.

Communication Address



Assystem India Limited

**(Formerly Known as L&T Infrastructure Engineering Limited)
6-3-348, Midtown Complex, Road No. 1, Banjara Hills, Hyderabad-
500034**

- viii. Oil spill contingency plan shall be prepared and part of DMP to tackle emergencies. The equipment and recovery of oil from a spill would be assessed. Guidelines given in MARPOL and Shipping Acts for oil spill management would be followed. Mechanism for integration of terminals oil contingency plan with the overall area contingency plan under the co-ordination of Coast should be covered

VII. Green Belt

- i. Green belt shall be developed in area as provided in project details with a native tree species in accordance with CPCB guidelines. The greenbelt shall inter alia cover the entire periphery of the plant.
- ii. Top soil shall be separately stored and used in the development of green belt.

VIII. Marine Ecology

- i. Dredging shall not be carried out during the fish breeding and spawning seasons.
- ii. Dredging, etc shall be carried out in the confined manner to reduce the impacts on marine environment.
- iii. The dredging schedule shall be so planned that the turbidity developed is dispersed soon enough to prevent any stress on the fish population.
- iv. While carrying out dredging, an independent monitoring shall be carried out through a Government Agency/Institute to assess the impact and necessary measures shall be taken on priority basis if any adverse impact is observed.
- v. A detailed marine biodiversity management plan shall be prepared through the NIOS or any other institute of repute on marine, brackish water and fresh water ecology and biodiversity and submitted to and implemented to the satisfaction of the State Biodiversity Board and the CRZ authority. The report shall be based on a study of the impact of the project activities on the intertidal biotopes, corals and coral communities, molluscs, sea grasses, sea weeds, sub-tidal habitats, fishes, other marine and aquatic micro, macro and mega flora and fauna including benthos, plankton, turtles, birds etc. as also the productivity. The data collection and impact assessment shall be as per standards survey methods and include underwater photography.
- vi. Marine ecology shall be monitored regularly also in terms of sea weeds, sea grasses, mudflats, sand dunes, fisheries, echinoderms, shrimps, turtles, corals, coastal vegetation, mangroves and other marine biodiversity components including all micro, macro and mega floral and faunal components of marine biodiversity.
- vii. The project proponent shall ensure that water traffic does not impact the aquatic wildlife sanctuaries that fall along the stretch of the river.

IX. Public hearing and Human health issues

- i. The work space shall be maintained as per international standards for occupational health and safety with provision of fresh air respirators, blowers, and fans to prevent any accumulation and inhalation of undesirable levels of pollutants including VOCs.
- ii. Workers shall be strictly enforced to wear personal protective equipments like dust

Additional Condition:

1. The PP shall abide by the reply given to the opinion/request of public expressed in the Public hearing.
2. The PP shall have provision in the proposed project for the welfare measures of fisherman.
3. The PP shall carry out shoreline protection works.
4. The PP shall have additional safety measures for safety of marine creatures during and construction and operation phases.

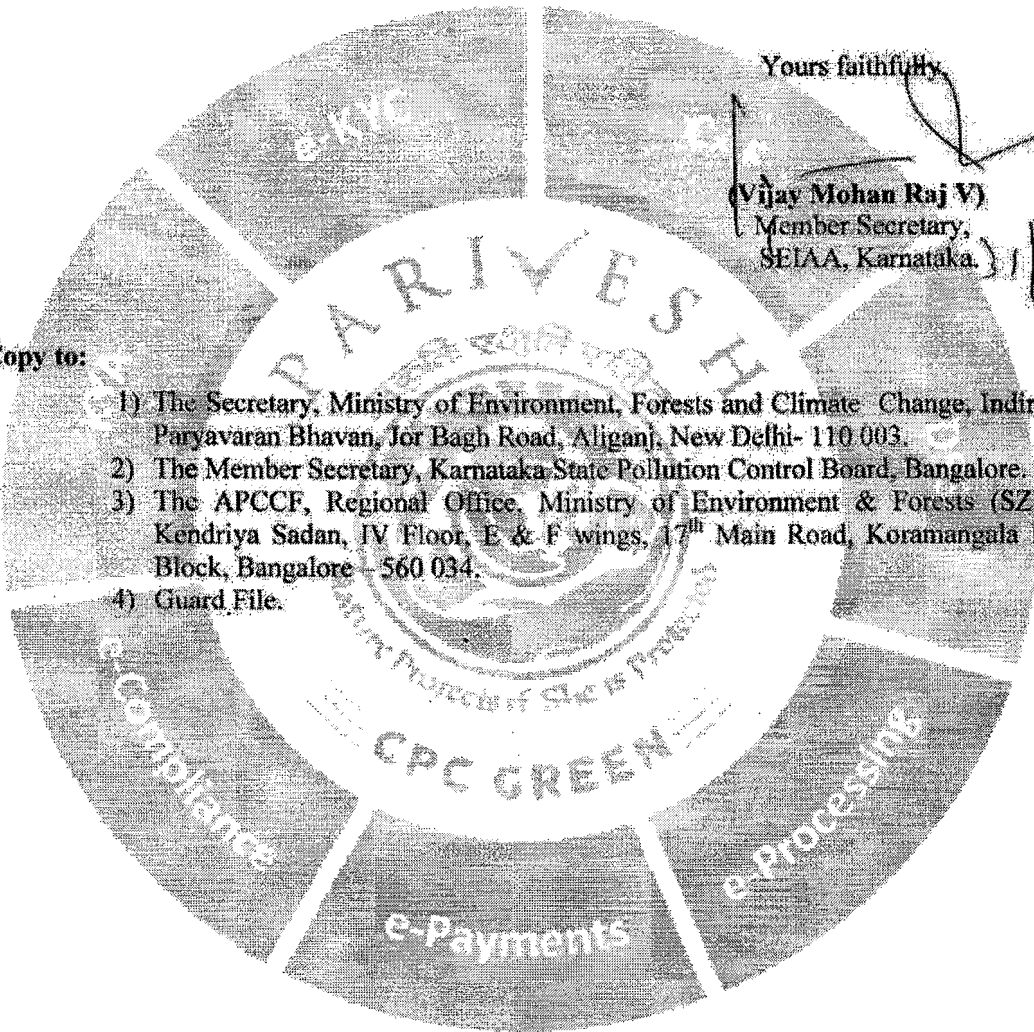
Yours faithfully

(Signature)
 (Vijay Mohan Raj V)
 Member Secretary,
 SELAA, Karnataka.

31/12/24

Copy to:

- 1) The Secretary, Ministry of Environment, Forests and Climate Change, Indra Paryavaran Bhavan, Jor Bagh Road, Aliganj, New Delhi- 110 003.
- 2) The Member Secretary, Karnataka State Pollution Control Board, Bangalore.
- 3) The APCCF, Regional Office, Ministry of Environment & Forests (SZ), Kendriya Sadan, IV Floor, E & F wings, 17th Main Road, Koramangala II Block, Bangalore - 560 034.
- 4) Guard File.



Home › India › Karnataka ›

Ghost nets, the scourge of Olive Ridley turtles

Last year, a marine wing was added to the Karnataka Forest Department to protect its sea treasures



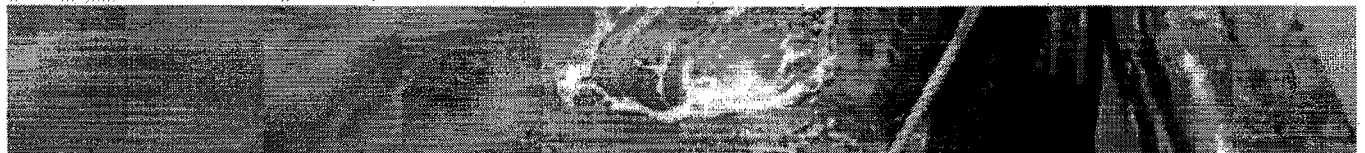
Pavan Kumar H | DHNS



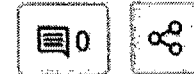
DHNS

Last Updated : 06 April 2022, 11:38 IST

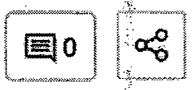
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A video grab of Ravi Ambiga rescuing a turtle from a ghost net near Dhareshwar beach in Honnavar taluk. Credit: Special Arrangement

Ravi Ambiga (32) did not hesitate to jump into the Arabian Sea, some 25 nautical miles off Dhareshwar beach in Honnavar taluk of Uttara Kannada district, recently. He was trying to rescue an Olive Ridley sea turtle, whose flippers were entangled in a ghost net and its neck stuck in a plastic can.

"Had I not dived into the sea, the animal I worship would have died of starvation," he said. Honnavar is among the few Olive Ridley turtle breeding sites in the country. While a large number of turtles arrive at Odisha's Rushikulya beach, experts have also recorded the nests of these turtles, classified as critically endangered by the IUCN, in Maharashtra and Karnataka.

While the video of Ravi and his team of Aditya Karvi and Ashok rescuing the turtle has been winning the hearts of conversationalists and fishermen, the incident has also brought into focus the menace of discarded plastic nets.

Experts say that ghost nets, a term used to refer to the discarded portion of the gill net that litters the sea, have been resulting in the death of a large number of marine creatures.

Fishermen use the gill net for targeted fishing in the deep sea.

However, due to strong currents or ageing, these nets snap and escape into the sea. Sometimes, fishermen too cut off these tangled nets and discard them in the sea.

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Marine researcher Prakash Mesta said: "Ghost nets are one of the main reasons for the death of marine creatures, especially Olive Ridley turtles. Marine animals entangled in ghost nets are unable to hunt and eventually die of starvation."

Jagannath L Rathod, chairman of the Department of Marine, Karnatak University, Dharwad, said ghost nets kill thousands of sea creatures every year. Most of the time red-listed creatures get entangled in sinkers of the ghost nets on the ocean beds.

He lamented that while Karnataka has regulations and policies for sustainable utilisation and management of marine resources along its 320 km coast, implementation is lax.

Last year, a marine wing was added to the Karnataka Forest Department to protect its sea treasures.

The Fisheries Department, which has been tasked with creating awareness against the misuse of gill nets, it is hampered by staff shortage.

Karwar Fisheries Department deputy director P Nagaraju said, "We have been creating awareness

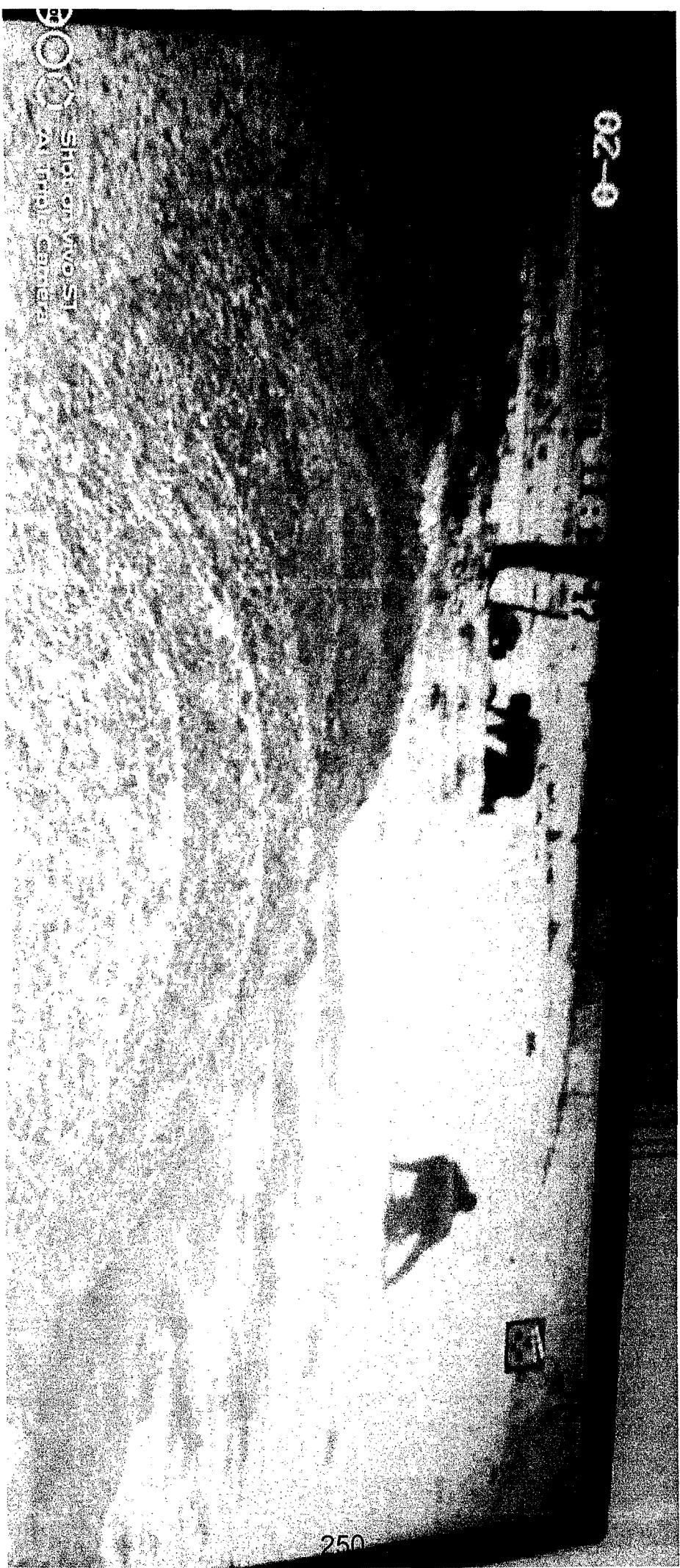
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The Fisheries Department, which has been tasked with creating awareness against the misuse of gill nets, it is hampered by staff shortage.

Karwar Fisheries Department deputy director P Nagaraju said, "We have been creating awareness among the fishermen not to leave behind ghost nets or any plastic waste in the sea. But changes are not taking place at the required pace."

Rathod said fishermen should be given incentives to dispose of used nets with civic bodies to prevent their ending up in the sea. Between January and February this year, carcasses of seven Olive Ridley turtles were washed ashore in Honnavar. Experts say a majority of them died due to accidents, including being caught in ghost nets.



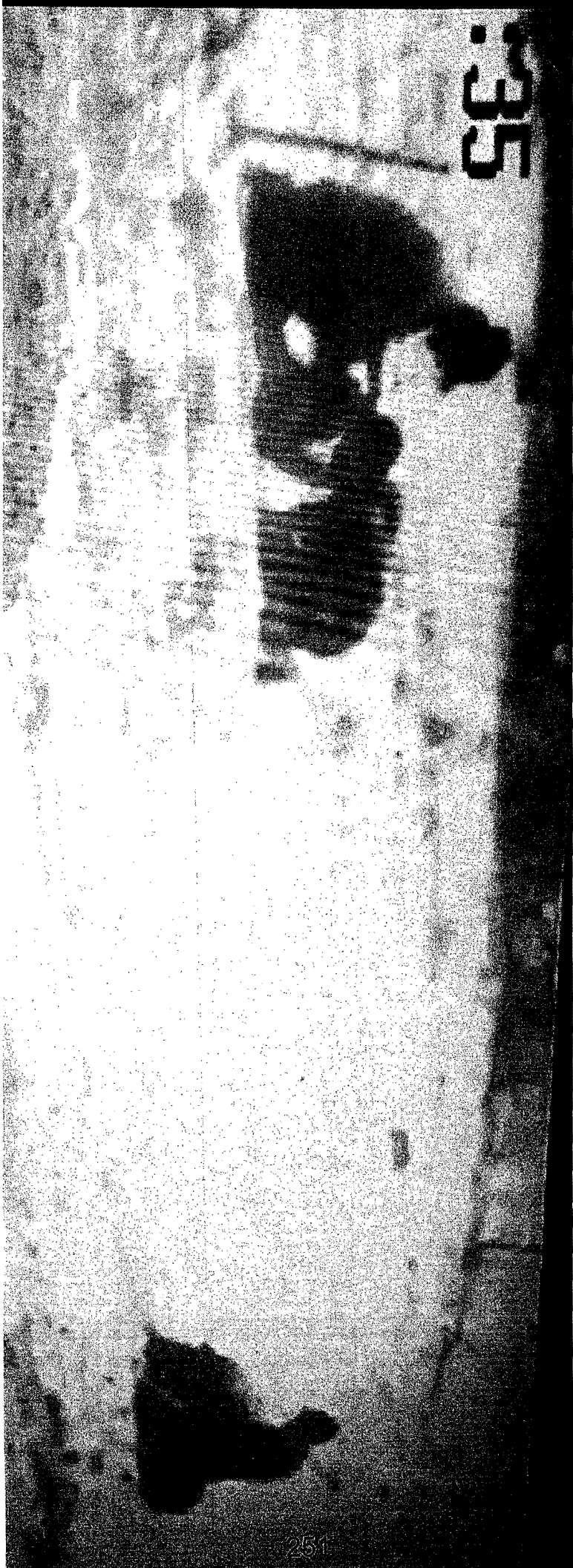
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HONNAVAR PORT (P) LTD.

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To,
Deputy Conservator of Forest,
Honnavar Division,
Honnavar Taluk,
Uttar Kannada District.

Date: 08/02/2023

Sir,
Sub: Placing of turtle eggs - regarding.

With respect to the above subject cited, I would like to inform your kind self that yesterday on 07.02.2023 at around IST 10.00 hrs, a group of approx six men entered into the port premises at Kasarkod side of Honnavar Port area leased out to M/s. Honnavar Port (P) Ltd. The said men were roaming inside the port premises suspiciously.

However later, on examining into the incident with our port security personnel, it was learnt that the said men entered inside the project premises from the beach area and placed turtle eggs within the proposed National Highway alignment from NH-66 to Project premises. The footage of the entire incident of placing the turtle eggs within the project location is captured in the CC camera installed in the port site (video footage enclosed). This type of illegal activities are regular, going to stop the projects.

Therefore, this act of placing the turtle eggs in the project premises has to be seriously taken into consideration from the concerned authorities and action has to be taken under the Wild Life Protection Act.

This is for your kind information and needful action in the matter.

Thanking You.

Yours faithfully,



Security Head,

For Honnavar Port (P) Ltd.

Copy transmitted to:

- 1. The Deputy Commissioner, Uttar Kannada District, Karwar for favour of information and necessary action.
- 2. The Director, Ports & Inland Water Transport Department, Bajjihal, Karwar for favour of information and necessary action.
- 3. Assistant Commissioner Bhatkal Sub Division, Bhatkal for favour of information and necessary action.
- 4. The Range Forest Officer, Honnavar for favor of information and necessary action.
- 5. The Circle Police Inspector, Police Station Honnavar for favor of information and necessary action.
- 6. The Port Officer, Honnavar for favor of information and necessary action.

Enclosure: As above.

ಶು.ಉ.ನಂ. ೪೪೨೨ / ೨೦೨೩

Port Office : Honnavar Taluk, Uttar Kannada District, Karnataka - 581 342.

Regd. Office : #103, Lalehzar Apartments, 45/1-2, Palace Road, Bangalore - 560 001, Karnataka, India.

ಪೂನ್ಯವರ (ಉ.ಉ.) : 91-80-2285 3670, 4149 4960 Fax : +91-80-2285 3671 Email : info@honnavarport.com

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ರಿಗೆ.

ಮಾನ್ಯ ಜಿಲ್ಲಾಧಿಕಾರಿಗಳು.

ಉತ್ತರ ಕನ್ನಡ ಜಿಲ್ಲೆ.

ಕಾರವಾರ.

ಇಂದ.

ಊರ ಸಾಗರಿಕರು.

ಟೊಂಕ-1, ಟೊಂಕ- II.

ಹಿರೇಮಠ, ಕಾಸರಗೋಡೆ

ತಾ. ಹೊನ್ನಾವರ, ಜಿಲ್ಲೆ ಉತ್ತರ ಕನ್ನಡ.

ಮಾನ್ಯರೇ.

ವಿಷಯ: ಸುಮಾರು 548 ಪರ್ಷೆಗಳ ಹಿಂದೆ ಮುಳುಗಿ ಹೋದ ಮಲ್ಲುಕುರ್ವಾ ಗ್ರಾಮ ಹಾಗೂ ಇನ್ನಿತರೇ ಕಡೆಗಳಿಂದ ಇಲ್ಲಿಗೆ ಬಂದು ನೆಲೆಸಿದ ನಮಗೆ ಪಹಣಿ ಪತ್ರಿಕೆ ನೀಡಿ, ಅದನ್ನು ಬೇಗ ಕರಾವಳಿ ಅಳಿವೆಗೆ ಹೊಳೆತ್ತಿ ಬ್ರೇಕ್, ವಾಟರ್ ನಿರ್ಮಿಸಿ ಕೊಡುವ ಕುರಿತು.

ಮೇಲ್ಕಾಣಿಸಿದ ಊರಿನವರಾದ ನಾವು ಸುಮಾರು 53 ಪರ್ಷೆಗಳ ಹಿಂದೆ ಸಮುದ್ರದಲ್ಲಿ ಮುಳುಗಡೆಯಾಗಿ ಹೋದ ಮಲ್ಲುಕುರ್ವಾ ಎಂಬ ಗ್ರಾಮದಿಂದ ಹಾಗೂ ಇನ್ನಿತರೇ ಕಡೆಗಳಿಂದ ಇಲ್ಲಿಗೆ ಬಂದು ಮೀನುಗಾರಿಕೆ ವೃತ್ತಿಯನ್ನು ಮಾಡುತ್ತಾ ನಮ್ಮ ಬಾಳ ನೌಕೆಯನ್ನು ಸಾಗಿಸಿಕೊಂಡು ಬಂದಿದ್ದೇವೆ. ಅನ್ನ ಅರಸಿ ಸಮುದ್ರದಲ್ಲಿ ಬಂದ ಕೆಲಸದೊಂದು ಜೀವನ ಸಾಗಿಸುತ್ತಿರುವ ಕಾರಣ ಜೀವಿಸಿಕೊಂಡ ನಮಗೆ ನಾವು ನೆಲೆನಿಂತ ನೆಲವೇ ನಮ್ಮ ದಲ್ಲವೆನ್ನುವ ಕೊರಗು ನಮ್ಮ ಬೇವವನ್ನೇ ಹಿಂದುತ್ತಿದೆ. ಈ ಕೊರಗಿನಲ್ಲಿಯೇ ನಮ್ಮ ಅನೇಕ ಹಿರಿಯರು ಅಹಲೋಕ ಲ್ಲಾಪಿಸಿದ್ದಾರೆ. ಆದರೂ ನಮ್ಮ ಭೂಮಿ ನಮ್ಮದಾಗಿಲ್ಲ. ಜೀವಂತ ಇದ್ದ ನಮಗಾದರೂ ನಮ್ಮ ನೆಲದ ಪಹಣಿ ಪತ್ರಿಕೆ ಪೂರೈಕೆ ಮಾಡಿಕೊಡಿ ಎಂದು ಕಮ್ಮರಿ ಪ್ರಾರ್ಥನೆ ಸಲ್ಲಿಸುತ್ತಿದ್ದೇವೆ.

ನಮ್ಮಲ್ಲಿ ಕೆಲವರಿಗೆ 30x40 ಚ.ಅಡಿ (ಒಂದು ಕಾಲು ಗುಂಟೆ) ಬಿಮೀನಿನ ಹೆಚ್ಚು ನೀಡಲಾಗಿದೆ. ಇನ್ನು ಅನೇಕರಿಗೆ ಹೆಚ್ಚು ನೀಡಿಲ್ಲ. ನಾವು ಇಲ್ಲಿಗೆ ಬಂದು ನೆಲೆ ನಿಂತಾಗ ಇದ್ದ ಒಂದು ಕುಟುಂಬ ಈಗ 2-3 (ಎರಡು-ಮೂರು) ಕುಟುಂಬಗಳಾಗಿವೆ. ಈ ಹೆಚ್ಚುವರಿ ಕುಟುಂಬಗಳಿಗೆ ಮನೆ ಕಟ್ಟಿಕೊಳ್ಳಲು ಹಾಗೂ ಇನ್ನಿತರೇ ನೌಕರರ ಪಡೆಯಲು ಸಾಧ್ಯವಾಗುತ್ತಿಲ್ಲ. ಪಹಣಿ ಪತ್ರಿಕೆ ಇಲ್ಲದೇ ಇರುವುದರಿಂದ ಸರ್ಕಾರ ನೀಡುವ ಆಶ್ರಯ ಯೋಜನೆ ಮನೆಗಳು ಕೊಡ ದೊರೆಯುತ್ತಿಲ್ಲ.

(2)

ಹಾಗೆ ಸರ್ಕಾರದ ಹತ್ತಿರ ಬೇರೆ ಜಮೀನು ನೀಡಿ ಅಂತ ಕೂಡ ನಾವು ಬೇಡುತ್ತಿಲ್ಲ ಅರಿವಿನಲ್ಲಿಯೇ ನಮಗೆ ಜಮೀನು ಇದೆ. ನಮ್ಮ ಕಟ್ಟಡದಲ್ಲಿಯೇ ಇದ್ದ ಜಮೀನನ್ನೇ ಮೋಜನೆ ಮಾಡಿಸಿ ಪಕ್ಕನೆ ಪತ್ತಿರ ಮಾಡಿಸಿ ಕೂಡಬೇಕೆಂದು ನಾವು ತಮ್ಮಲ್ಲಿ ವಿನಂತಿಸಿಕೊಳ್ಳುತ್ತಿದ್ದೇವೆ.

ನಮ್ಮ ಊರಿನಲ್ಲಿ ಕೆಲವು ಜಾಣ್ಣು ಬಂದರು ನಿರ್ಮಿಸಲು ಸರ್ಕಾರದ ಸಹಭಾಗಿತ್ವದಲ್ಲಿ ಹೊನ್ನಾವರ ಪೋರ್ಟ್ ಟ್ರಸ್ಟ್ ಲಿಮಿಟೆಡ್ ಕಂಪನಿಗೆ ಶರಾವತಿ ಅಳಿವೆ ಹತ್ತಿರ ೨೩ ಎಕ್ರೆ ಜಾಗ ನೀಡಲಾಗಿದೆ. ಈ ಜಾಗದ ಕಂಪನಿಯು ಬಂದರು ನಿರ್ಮಾಣದ ಕಾರ್ಯವೆಸಗುವ ಕೂಡ ಪ್ರಾರಂಭಿಸಿದೆ. ಆದರೆ ಯೋಜನೆಯಿಂದ ಸ್ಥಳೀಯರನ್ನು ಒತ್ತಿಲೆಬ್ಬಿಸಬಹುದು ಎಂಬ ಸಂಶಯ ಹಾಗೂ ಭೀತಿ ನಮಗೆ ಕಾಡುತ್ತಿದೆ. ಹಾಗಾಗಿ ಸರ್ಕಾರದ ಮುತ್ತುಪರ್ಜೆ ಪಹಿಸಿ ನಮ್ಮ ಜಮೀನಿಗೆ ಪಕ್ಕನೆ ಪತ್ತಿರ ನೀಡಿದರೆ ಸರ್ಕಾರದ ಮೇಲಿದ್ದ ಸಂಶಯ ಕೂಡ ದೂರವಾಗಿ ನಾವು ಭಯಮುಕ್ತರಾಗಬಹುದಾಗಿದ್ದು, ಯಾವುದೇ ಕಾರಣಕ್ಕೂ ಬಡ ಮೀನುಗಾರರಾದ ಸ್ಥಳೀಯರನ್ನು ಒತ್ತಿಲೆಬ್ಬಿಸುವುದಿಲ್ಲ ಎಂದು ಸರ್ಕಾರ ಭರವಸೆ ನೀಡಬೇಕಾಗಿದೆ.

ಸನ್ಮಾನ್ಯ ಜಿಲ್ಲಾಧಿಕಾರಿಗಳು ಈ ದಿಶೆಯಲ್ಲಿ ತಕ್ಷಣ ಕಾರ್ಯ ಪ್ರವೃತ್ತರಾಗಿ, ಅಗತ್ಯ ದಾಖಲೆಗಳನ್ನು ಕ್ರಮಿಸಿ ಕೊಡಲು ಸಂಬಂಧಪಟ್ಟ ಕೆಳಹಂತದ ಅಧಿಕಾರಿಗಳಿಗೆ ಸೂಕ್ತ ನಿರ್ದೇಶನ ನೀಡಿ ಈ ವಿಚಾರದಲ್ಲಿ ಅವನುಭವಿಯಾಗಿರುವ ಬಡ ಮೀನುಗಾರರಾದ ನಮಗೆ ಮಹದ್ವಯವಾಗಿ ಮಾಡಬೇಕೆಂದು ಕಳಕಳಿಯಿಂದ ಪ್ರಾರ್ಥಿಸುತ್ತೇವೆ.

ಮೀನುಗಾರಿಕೆ ನಮ್ಮ ಉದ್ಯೋಗವೆಷ್ಟೆ ಅಲ್ಲ ನಮ್ಮ ಜೀವನವಾಗಿದೆ. ಶಾರದಾಪುರ ಪುತ್ರಿಯನ್ನು ನಿರ್ವಹಿಸಿಕೊಂಡು ಬಂದ ಅನೇಕ ಸಮುದಾಯಗಳು ತಮ್ಮ ಮೂಲ ಕಸುಬಿನಿಂದ ಹೊರಳಿಕೊಂಡರೂ ನಾವು ನೋಡುತ್ತಿ ಮೀನುಗಾರಿಕೆಯಲ್ಲಿ ನಮ್ಮ ಕಟ್ಟುಬಟ್ಟೆಯ ಸಂಬಂಧವನ್ನು ಮುಂದುವರಿಸಿಕೊಂಡು ಏದುಸುಟ್ಟಿರುವ ನಮಗೆ ಕೆಳದಿ ೨೩ ವರ್ಷಗಳಿಂದ ಶರಾವತಿ ಅಳಿವೆ ಮಹಾಮಾರಿಯಂತೆ ಕಾಡುತ್ತಿದೆ. ದುರ್ಗಾಪುರಮೇಲ್ಮೈ ಎಂಬ ಓಂದೇ ಬೋಟೆಯಲ್ಲಿ ೨ ಮೀನುಗಾರರನ್ನು ಇದೇ ಅಳಿವೆಯಲ್ಲಿ ಕಳೆದುಕೊಂಡು ನಾವು ಇಲ್ಲಿಯವರೆಗೆ ಲೆಕ್ಕವಿಲ್ಲದಷ್ಟು ಬಂಧುಗಳು ನಮ್ಮ ಎದುರ ಶವವಾಗಿ ಹೋಗಿದ್ದಾರೆ. ಹಲವಾರು ಬೋಟುಗಳು, ಪೋಟೆಗಳು ನಮ್ಮೆದುರ ಮುಳುಗಿ ನಾಶವಾಗಿದ್ದು ಇದರಿಂದ ಕೆಲವು ಮೀನುಗಾರರು ನಿಗತಿಯಾಗಿದ್ದಾರೆ. ಈ ಸಮಸ್ಯೆಯನ್ನು ಹೋಗಲಾಡಿಸಲು ಇಲ್ಲಿಯವರೆಗೆ ನಮ್ಮನ್ನಾಳಿರುವ ಎಲ್ಲಾ ಸರ್ಕಾರಗಳನ್ನು ಬೇಡುತ್ತಲೇ ಬಂದಿದ್ದೇವೆ. ಎಲ್ಲಾ ದೀತಿಯ ಹರತಾಳಗಳನ್ನು ಮಾಡಿ ಸಂಬಂಧಪಟ್ಟ ಇಲಾಖೆಗಳ ಜನಪ್ರತಿನಿಧಿಗಳ ಗಮನ ಸೆಳೆಯುತ್ತಲೇ ಬಂದಿದ್ದೇವೆ. ಆದರೆ ಪರಿಹಾರ ಮಾತ್ರ ಶೂನ್ಯ. ಬಡಮೀನುಗಾರರಾದ ನಮ್ಮ ಗೋಳು ಕೇಳುವವರೇ ಇಲ್ಲದಂತಾಗಿದೆ. ದಯವಿಟ್ಟು ನಮ್ಮ ಬದುಕನ್ನೇ ಕುಸಿದುಕೊಳ್ಳುತ್ತಿರುವ ಶರಾವತಿ ಅಳಿವೆಗೆ ಅತೀ ಕಿಟ್ಟದರಿ

(...)

(21)

ಬ್ರೇಕ್, ವಾಟರ್ ನಿರ್ಮಿಸಿಕೊಟ್ಟು ಮೀನುಗಾರರ ಬಹುದೊಡ್ಡ ಕನಸೊಂದನ್ನು ಆದಷ್ಟು ಬೇಗ ನನಸುಗೊಳಿಸಬೇಕಾಗಿ ವಿನಂತಿ ಪೂರ್ವಕವಾಗಿ ವಿನಂತಿ ಪೂರ್ವಕವಾಗಿ ಪ್ರಾರ್ಥಿಸಿಕೊಳ್ಳುತ್ತೇವೆ.

ಜೊತೆದಲ್ಲಿ ಹೊನ್ನಾವರ ಪೋರ್ಟ್ ವೈವಲ್ ಕಂಪನಿ ನಿರ್ಮಿಸುತ್ತಿರುವ ವಾಣಿಜ್ಯ ಬಂದರನ್ನು ವರೋಧಿಸುವ ಭರದಲ್ಲಿ ಕೆಲವರು ನಿರಾಶಾಂಕರಾಗಿ "ಅಮೆಯನ್ನು ಬಳಸಿಕೊಳ್ಳುತ್ತಿದ್ದು, ಕೆಲವು ಅಮೆಗಳು ಅಪರೂಪಕ್ಕೆ ಬಂದು ಜೊತೆ ಕಾಸರಕೋಡ ತೀರದಲ್ಲಿ ಮೊಟ್ಟೆ ಇರುವ ವಿದ್ಯಮಾನವನ್ನೇ ದೊರ್ದದಾಗಿ ಬಿಂಬಿಸಿ ಜೊತೆ ಕಾಸರಕೋಡ ಭೂಪ್ರವೇಶವನ್ನು ಅಮೆಗಳ ಆವಾಸಸ್ಥಾನ ಎಂದು ಘೋಷಿಸಿಬೇಕೆಂದು ಸರಕಾರದ ಮೇಲೆ ಒತ್ತಾಡ ಹಾಕಲು ಆವಶ್ಯಕವಾಗಿದೆ. ಹಾಗೇನಾದರೂ ಘೋಷಣೆ ಅದರಲ್ಲಿ ಇದು ಹೊನ್ನಾವರದ ಮೀನುಗಾರರ ಪಾಲಿಗೆ ಮರಣ ಶಾಸನವಾಗಲಿದೆ. ಕಾರಣ ಈ ಘೋಷಣೆಯಿಂದ ನಾವು ಸುಮಾರು 7 ತಿಂಗಳಿಗಿಳವರೆಗೆ ಮೀನುಗಾರಿಕಾ ನಿಷೇಧಕ್ಕೆ ಒಳಗಾಗಬೇಕಾಗುತ್ತದೆ. ಅಲ್ಲದೇ ಸುಮಾರು 5 ಕೀ.ಮೀ. ವ್ಯಾಪ್ತಿಗೆ ಒಳಪಟ್ಟ ತೀರ ಪ್ರದೇಶದಲ್ಲಿ ನಾವು ಮೀನುಗಾರಿಕೆ ಮಾಡುವಂತಿಲ್ಲ. ಹಾಗೂ ಸರಕಾರ ಅಥವಾ ನ್ಯಾಯಾಲಯದ ನಿರ್ದೇಶನದಿಲ್ಲದೆ ನಮ್ಮ ಮೀನುಗಾರಿಕಾ ಬೋರ್ಡುಗಳಿಗೆ ಹಲವಾರು ರೀತಿಯ ಮಾರ್ಪಾಡು ಮಾಡಬೇಕಾದ ಅನಿವಾರ್ಯತೆಗೆ ನಾವು ಒಳಗೊಳ್ಳಬೇಕಾಗುತ್ತದೆ. "ಅಮೆಗಳ ಆವಾಸಸ್ಥಾನ" ಎಂದು ಘೋಷಣೆಯಾದ ಅರಿಸ್ತಾದ ದಾಮ್ರಾ ದೇವಿ ಮತ್ತು ಖುಷಿಪುಲ್ ಪ್ರದೇಶದಲ್ಲಿ ಈ ಘೋಷಣೆಯಿಂದ ಸುಮಾರು 26,000 ರಷ್ಟು ಮೀನುಗಾರರು ತೊಂದರೆಯನ್ನು ಅನುಭವಿಸುತ್ತಿದ್ದಾರೆ. (ಹರಿನ್ಯಾ ನ್ಯಾಯಾಲಯ ಹಾಗೂ ಸರಕಾರದ ಆದೇಶದ ಪ್ರತಿಯನ್ನು ಈ ಆರ್ಡಿಯೊಂದಿಗೆ ಲಗತ್ತಿ ಕರಿವಲಾಗಿಲಿ) ಹಾಗಾಗಿ ದಯವಿಟ್ಟು ಯಾವುದೇ ಕಾರಣಕ್ಕೂ ನಮ್ಮ ಕಾಸರಕೋಡಿನ ಕಡಲತೀರವನ್ನು ಅಮೆಗಳ ಆವಾಸಸ್ಥಾನ ಎಂದು ಘೋಷಣೆ ಮಾಡಬಾರದಾಗಿ ಭವಿಷ್ಯದ ಕೂಟವಿರುವ ಸಮಗ್ರ ಮೀನುಗಾರರ ಹಿತವೃದ್ಧಿಯಿಂದ ನಾವು ಪ್ರಾರ್ಥಿಸಾ ಪೂರ್ವಕವಾಗಿ ಮನವಿ ಮಾಡಿಕೊಳ್ಳುತ್ತಿದ್ದೇವೆ.

ಅದರನೇಯ ಪಂದನಗೊಂದಿಗೆ,

ಸ್ಥಳ ಕಾಸರಕೋಡ

ತಮ್ಮ ವಿಶ್ವಾಸಿಗಳು

ದಿನಾಂಕ : 12-01-2022

- Ashok Kasarkod - *[Signature]*
- 9916772772
- Hannant Tandel - *[Signature]*
- 9676163128
- Govind Tandel - *[Signature]*
- 8147528588
- Hannan H. Custon - *[Signature]*
- 9980110600
- mahmud k I hokar

22

Enforce Prohibition on Fishing Around Turtle Nesting Sites, HC Tells Odisha

14/01/2017



An olive ridley sea turtle. Photo: Pinku Halder/Wikimedia Commons

Cuttack: The Orissa high court has directed the state government to enforce a prohibition on fishing activities by trawlers near the mouth of Devi river and along the coast to protect olive ridley turtles.

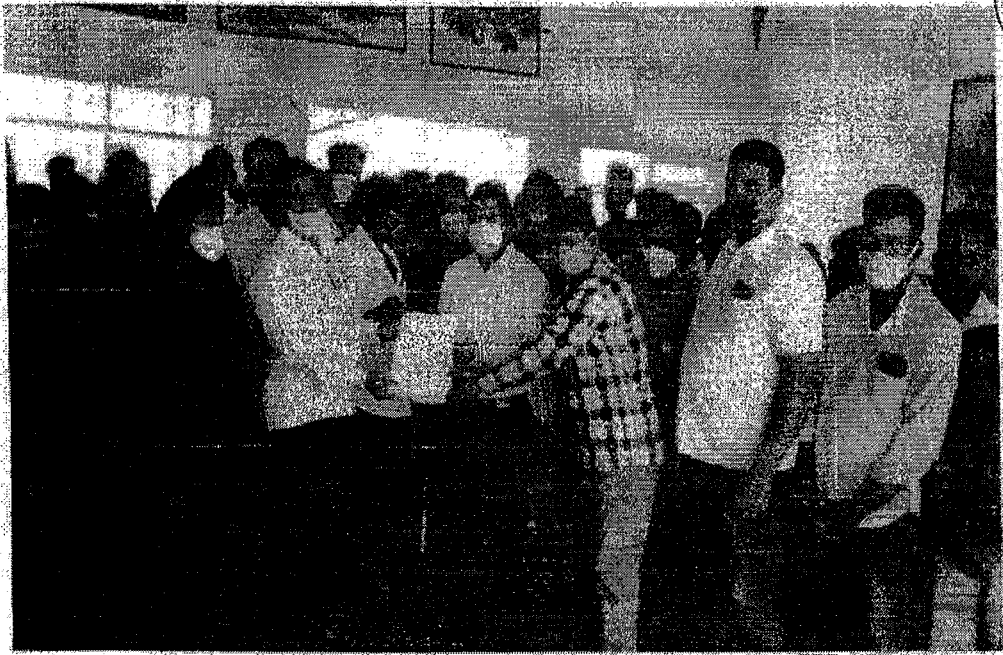
Based on a report submitted by a committee appointed by the high court, a division bench headed by chief justice S.Muralidhar on Tuesday observed that there is incidental killing of turtles due to "suffocation in fishing nets of trawlers or by injuries inflicted by the propellers of the trawlers".

The court directed the government to enforce the fishing ban with the help of local marine police stations and to seek cooperation of the Centre to engage the coast guard for the purpose.

The state fisheries and animal resources development department had issued a notification in November 2014, prohibiting fishing activities by trawlers in the protected area under the Gahirmatha marine sanctuary.

Despite the ban, fishing activities by trawlers in these areas continue.

151



147



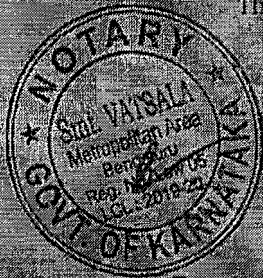
From
Citizens of Village,
Tonka-I, Tonka-II,
Hremath, Kasarakod,
Honnavara Taluk,
Uttara Kannada District

To
The Deputy Commissioner,
Uttara Kannada,
Karwar

In the Guess of opposing the Commercial Port being constructed by Honnavara Port Private Limited in Tonka some are using tortoise, some are trying to give pressure to declare the land area of Tonka, Kasarkod by highlighting the act of laying Eggs in the Tonka Kasarakod Sea Shore by some rare Tortoise by the Government. If declared like that, it will become death Will of the Fishermen of Honnavara. Hence from this declaration we have to undergo banning of Fisheries for about 07 months. Also, we cannot do the Fishing in the Sea Shore under the limits of about 5 KMs and as per the direction of the Government or the Court, we have to go for inhabitability to make several type of modifications to our Fishing Boats. In Dambra of Odisha and Kushikulla area declared as living area of tortoise from this declaration for about 26,000 Fishermen are facing problem. (Copy of the order of Odisha Court and the Government are enclosed along with this Petition). Therefore, we pray that not to declare the Government living area of Seashore of our Kasarkod, in the interest of all the Fishermen of Honnavara.

Thanking you.

Yours faithfully,



Sd/- Ashok Kasarkod Mob : 9916772772
Sd/- Hanumant Tandel Mob : 7676169128
Sd/- Govind Tandel Mob : 8147528566
Sd/- Hareesh H Custom Haroon Mob : 9980110600

Translated from Kannada to English

AVINASH
Translator
No. 11, Y Block,
E.P. West,
BANGALORE-560020

"ATTESTED BY ME"

Vatsala
Smt. VATSALA, B.A.L.L.B.,
ADVOCATE & NOTARY PUBLIC
GOVT. OF KARNATAKA
10, 2nd Main, 13th C Cross
Agarahara Dasarahalli
BENGALURU - 560 076

21 APR 2023

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

SOUTHERN ZONE, AT CHENNAI

LA No. 116 of 2022 (SZ)

In

ORIGINAL APPLICATION NO. 76 OF 2022 (SZ)

IN THE MATTER OF:

DAMAYANTI SUBRAY MESTA

..... APPLICANT

VERSUS

**DEPARTMENT OF PUBLIC WORKS, PORTS &
INLAND WATER TRANSPORT,
GOVERNMENT OF KARNATAKA & OTHERS**

..... RESPONDENTS

Additional Affidavit filed by the 2nd Respondent

I, Raghavendra Reddy G, Executive Director of Honnavar Port Private Limited, Hindu aged about 43 years, having office at 103, Lalehzar Apartments, 45/1-2, Palace Road, Bangalore- 5600001, do hereby solemnly affirm and sincerely state that:

G. Raghav Reddy

1. I am the Executive Director of the 2nd Respondent Company and I am duly authorized to file the present affidavit on behalf of the Applicant. I am well aware of the facts and circumstances of the present dispute.

2. The present additional affidavit is filed to bring on record certain additional facts. As a brief background to the pending litigation before this Hon'ble Tribunal, the above Original Application No. 76 of 2022 was filed by Damayanti Subray Mesta on 11/07/2022. The crux of the Application is that the Port Department is undertaking construction of the dedicated 4 lane, 4km, 25 m wide road for connectivity of the Port in "No Development Zone" of CRZ III area (within 200m from HTL) and on CRZ - I - A and I - B area on forest land in violation of CRZ Notification, 2011.

3. At the outset, no construction of the dedicated 4 lane, 4 km, 25 mtr wide road was undertaken by the port department. The road which the Applicant is referring to in the Application is the Kachha Road, which was developed by the Port Department for the purpose of construction of sea wall. The 2nd Respondent has already filed various documents to establish that existence of the Kaccha Road which are detailed herein below, the existence of the road can be established from the following among other site inspections: -
 - a. Shore protection works carried out by the Port & Inland Water Transport Department at Kasarkod village all along the seashore for protection from sea erosion during the year 2010 to 2015.
 - b. Road work and Street light works carried out by the Kasarkod Gram Panchayat during the financial year 2017-18.
 - c. Copy of the details of the sea erosion work bills from the Port Department.

G. Raju Reddy

- 4. Initially at the time of the Project proposal, as mentioned in the EIA report under chapter 2.6.15.1 - Road connectivity -It was stated that "the site has good road connectivity, NH 17 passes through Honnavar towards East of project site at a distance of about 1 km. The site is connected to Bellary through NH 63 and NH 17. NH 17 meets NH 63 near Ankola at about 45 km from the site. Presently the site can be approached from a single lane black topped road that runs in continuation to NH 17 and then lies parallel to shoreline".
- 5. The EIA report in Chapter 5 provides for 'Anticipated Environmental Impact and Mitigation Measures', under which, there is a topic in Clause 5.1.2. regarding 'Potential Impact during Construction' and in Clause 5.1.2.1. deal with 'Impact on Local Infrastructure" (Page 189 of Vol -1 of the 2nd Respondent's Type Set of Documents). The said EIA clearly provides mitigation measures which clearly stipulates as follows:-

"To mitigate impact from transportation of stones and construction materials, existing roads will be strengthened and widened to enable movement of dumpers. Hence, Impacts would not be significant as quarries are accessible".

Further under 5.1.2.2. It is clearly stipulated as follows:-

- The dedicated road corridor will be utilised for the transportation of construction material and usage of public roads will be minimised.
- Temporary approach roads may be developed with prior permission from competent authority.

- 6. In the Public Hearing conducted on 27/01/2012 (Document reference - In EIA report - Under Chapter 7 - In additional Studies - Public Hearing - Pg. No. 7-1) objections were raised against the use of single lane blacktop road which passes

G. Raylu Reddy

through the village. In the Public Hearing repose refers to the Proposed Road as well as Anticipated Potential impact and mitigation measures which are extracted hereunder.

Name of the speaker	Issues Raised	Response of HPPL
<p>Sl. No 6.</p> <p>Shri Niveel Fernandes, Secretary Pershian Boat Honnavar</p>	<p>He pointed out that project proponent has not given a clear picture of vehicular movement and proposed route for the project area and proposed mitigation methods to avoid nuisance created due to movement of heavy vehicles during development and operational phase -</p>	<p>Proposed road connectivity starts from NH 17 at Kasarkod. This road will then run south east for some distance and then aligns parallel to the shoreline till it reaches the proposed project site. This will be parallel to the existing single lane road at an offset distance of 100 m. The total length of this road from NH 17 to the proposed site is 4.0 km. This road connectivity will have a width of 25 m.</p> <p>Proposed railway line will take off from the existing railway station at Manki. The new railway line will have to be laid for a distance of 14.6 km from Manki railway station to the proposed project site. Proposed railway line will run parallel to existing railway line for a length of about 8 km and then will take a turn towards sea coast which will then run</p>

C. Rajan Reddy

		<p>parallel to the sea coast till the proposed project site for the remaining 6.6 km.</p> <p>Anticipated Potential impacts due to the proposed Rail/Road alignment and respective mitigation measures are provided in the EIA report. (Pg. No - 7-16).</p>
<p>Sl. No 8. Shri Badsha Ahmed Patel, Gram. Panchayat Member, Honnavar</p>	<p>He also informed that school, masjid, temples and residential area are situated on the way to the proposed project as well as the proposed road and railway track. He also informed that the school, religious places and residential areas will be affected if the project is allowed to come up. He objected to the development of road and railway track as it will affect local ecosystem.</p>	<p>Proposed road connectivity starts from NH 17 at Kasarkod. This road will then run south east for some distance and then aligns parallel to the shoreline till it reaches the proposed project site. This will be parallel to the existing single lane road at an offset distance of 100 m. The total length of this road from NH 17 to the proposed site is 4.0 km. This road connectivity will have a width of 25 m.</p> <p>Proposed railway line will take off from the existing railway station at Manki. The new railway line will have to be laid for a distance of 14.6 km from Manki railway station to the proposed project site. Proposed</p>

G. Rajan Reddy

		<p>railway line will run parallel to existing railway line for a length of about 8 km and then will take a turn towards sea coast which will then run parallel to the sea coast till the proposed project site for the remaining 6.6 km.</p> <p>Anticipated Potential impacts due to the proposed Rail/Road alignment and respective mitigation measures are provided in the EIA report. (Pg. No. - 7-19).</p>
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7. Thus, the EIA report, provided and took note of the Potential Impact during construction and provided for mitigating measures " Temporary approach roads may be developed with prior permission from competent authority"

8. The said Kachha road falls within the declared notified Port Limits and transportation of construction materials for port development works for a port project can be carried out by using this Kachha Road as the road was well formed during the construction of sea wall (for protection from sea erosion) by the Port Department. As Port is the owner of the road and as per report given by ADLR (Assistant Director Land records) no patta land falls in the existing Kachha road area. It is clear as per CRZ notification that port construction can be carried out as

C. Rajan Reddy

the proposed area falls in notified port limits where NDZ is not applicable in such area, falling within notified port limits.

- 9. The Project Proponent, i.e., the Port Department had formed the kachha road during 2010 -2015 for construction of seawall for protection from sea erosion along the Kasarkod seashore and the said road falls within the limits of Port Department. Further upon submission of EIA report to SEIAA, the State Expert Appraisal Committee (SEAC) of SEIAA had approved as mentioned in the EIA Notification 2006. As the SEAC team members have conducted a site visit on 31/03/2012 and in Point 11 of the observations made about the road it was asked to conduct impact studies for proposed road and railway line on local environment. (5.1.2, 5.7.2.6, 5.8 of the EIA Report includes Impact and mitigation measures)

In compliance to this observation on 10-MAY-2012 HPPL had submitted clarifications as under:-

"11. Impact studies for proposed Road and Railway Line on Local Environment needs to be undertaken (5.1.2 and 5.7.2.6 of the EIA Report includes Impact and mitigation measures) -11.1 Road Connectivity - In order to avoid the congestion to the existing road and to ensure quick traffic movement from/to the port, it is proposed to develop a dedicated road corridor with a Right of Way (RoW) of 25m. The total length of road corridor is about 4 km, which connects proposed barge/vessel loading facility and NH 17 near Kasarkod. The land requirement for the road corridor is 10 ha. Chainage marked in the google imagery is presented in the figure 11-1. The existing land use pattern of proposed road alignment is given in Table 11-1.

G. Raghur Reddy

10. Based on the submission made by HPPL on 10th May 2012, as per the proceedings of the 83rd meeting held on 25th & 26th May 2012, the State Level Expert Appraisal Committee had finally recommended the proposal to SEIAA for grant of Environment Clearance for the project which in turn has issued EC vide letter No SEIAA: 22: IND: 2011, dated: 21/09/2012. In the EC issued, Sl. No. 39 of Specific Condition states that all approach roads shall be black topped and internal roads and major haul roads shall be black topped or concreted and swept regularly with mechanical sweepers.

11. The additional documents filed to establish that the kaccha road was in existence is filed hereunder.

Additional documents filed on 11.09.2022.

S. No.	Particulars	Page No.
1.	Google Maps showing existence of Road between 2003 to 2022	1.
2.	Works carried out in Kasarkod Tonka Village of Honnavar Taluk, Uttara Kannada along with Translated Copy	8
3.	Letter to Remove Illegal Encroachment along with Translated Copy	13
4.	Objections to the labelled Photographed filed by the Applicant	17.
5.	First Information Report dated 09/11/2021 along with Translated Copy	26

Additional documents filed on 13.09.2022:

S. No.	Particulars	Page No.

C. Rajan Reddy

1.	Existing Road Layout of Kasarkod Village, Honnavar Taluk, prepared by Port Department	1
2.	Working Plan Grant for the year 2017-2018 by the Gram Panchayat Kasargodu Village Pancharath, Taluk, Honnavar Taluk along with Translated Copy	2
3.	Photos of Existing Road	10

Additional documents filed on 24/09/2022:

S. No.	Particulars	Page No.
1	Letter from Honnavar Taluk Fresh Fish Trade Association, Kasarkoda-Tonka Honnavara to Assistant Director of Fishers Grade -1, Kasarkoda- Tonka dated 11.07.2019 along with translated Copy	1
2	Letter from Trawler Boat Owners Association to Assistant Director of Fishers Grade -1, Kasarkoda- Tonka dated 15.07.2019 along with Translated Copy	3
3	Letter from Honnavar Taluka Persian Boat Owners Union to Assistant Director of Fishers Grade -1, Kasarkoda- Tonka dated 16.07.2019 along with Translated Copy	5
4	Letter from Government of Karnataka, Fisheries Department to Port Officer, Honnavar dated 19-07-2019 along with Translated Copy	10
5	Letter to Assistant Commissioner, Bhatkal, Uttara Kannada to Honnavar Port Pvt Ltd. from the residents of Tonka Village along with Translated Copy	16
6	Letter from Office of Assistant Commissioner, Bhatkal, Uttara Kannada District to Honnavar Port Pvt Ltd dated 24.01.2020 along with Translated Copy	29

G. Rajan Reddy
4

7	Letter from National Highways Authority of India to the Director Port & Inland Water Transport, Baithkol, Karward	32
8	Port Limits in Anchorage Map	36
9	Port Limits in CRZ Map	37
1	Corrigendum Letter sent by Honnavar Port Pvt Ltd to member Secretary SEIAA	38

Additional documents filed on 28/03/2023:

S. No.	Date	Particulars	Page No.
1.	3.10.2022	Report Regarding Road Connecting to Honnavar Port Area submitted that Office of Regional Director (Env.) (Forest Ecology and Environment)	1
2.	21.10.2022	Order of Hon'ble NGT in OA 76 of 2022 (SZ) & LA. No. 116, 144, 146 of 2022 (SZ)	3
3.	4.04.2023	Letter from KSCZMA permitting the 2nd Respondent to use the Kacha Road	10
4.	28.03.2023	Letter from State Level Environment Impact Assessment Authority regarding Four Laning of Honnavar Port connectivity Road	13
5	28.03.2023	Letter from State Level Environment Impact Assessment Authority for usage of the existing road for development	15
6	24.03.2023	Letter from Principal Secretary recommending to MOFF	17

A. Rajan Reddy

12. In addition, the site inspection report dated 03/10/2022 filed by the Regional Director (Env) before this Hon'ble Tribunal to give a clear picture about the road availability by way of a report after spot inspection, it is found that "Kaccha road (Road with Gravels Mixture) runs parallel to the beach from NH-17 (Currently NH66) at Kasarakod up to the proposed port area in CRZ-III No Development Zone and as per the information from port department the said Kaccha road was formed during the construction of sea wall (for protection from sea erosion) by the Port Department along the Kasarakod seashore, as the said road falls within the limit of the Port Department".

13. The Hon'ble NGT vide its order dated 21.10.2022 taking note of the above letter dated 03/10/2022 recorded that the appropriate authority shall take a call on the use of road and pass appropriate order. Liberty was granted to approach the SCMZA for usage of existing kaccha road. Pursuant to the said orders, Port Department has filed application to KSCZMA to use of existing kaccha road - Beach Road.

14. It is humbly submitted that for the CRZ clearance for usage of Kaccha road along the Sea Shore as connection to Kasarkod village for development of Honnavar Port was deliberated by the KSCZMA. In the said meeting the legal representative of the Applicant was allowed to participate. Once again the issue of Existence of Kacha Road was deliberated and after hearing, KSCZMA "decided to exempt the use of the existing Kacha Road in as in where is basis only, as the proposed area falls in notified port limits were NDZ is not applicable in such area, falling within notified port limits".

15. Further, SEIAA has stated that prior Environment Clearance for usage of Kachha road does not come under the ambit of scheduled activities listed in the EIA Notification 2006 and its amendment

A. Rajan Reddy

16. It is an admitted position that the Kaccha Road falls within the Notified Port Limit. NDZ shall not be applicable within the notified port limited. The KSCZMA has also deliberated and decided to permit use of existing Kaccha Road in as is where is basis. Therefore, there is no impediment in using the existing Kaccha Road which is purely used for port purpose only.

17. The 2nd Respondent would have to use the road in as is where is basis only, without any impact till the above complaint is decided. It is not out of place to mention that public are using the said kaccha raod, which is falling within the Port Limits and restraining the Port department to use the Kaccha Road for Port purposes is unreasonable. The objections of the counsel for the Applicant was also considered by the KSCZMA before granting permission to use the road within the portal limits is permissible.

18. It is not out of place to mention that NCSCM, Chennai has given the maps and their report for consideration of the proposal seeking CRZ clearance for the dedicated 4 lane, 4Km, 25 mtr road. The report of NCSCM clearly delineates the Kaccha Raod which is within the notified port limits and in NDZ limits. Thus, there is no impediments in using the existing kaccha raod for port purposes.

19. Lastly, it is to be submitted that the existing Kachha road is within the port limit and is the only approach road that is available as on date to access the proposed port project site as the Village Road is narrow with ninety - degree angles at certain points which made the maneuvering of the heavy vehicles very difficult.

G. Rayan Reddy

20. Therefore, as it is well within the declared and Notified Port Limits, as mentioned in the NCSCM maps/report and Inspection report of the Regional Director (Env), Karwar. The SCZMA has recommended for construction of 4 lane dedicated road corridor to Government of India and the clearance is awaited. It is humbly submitted to allow the use of the existing Kachha road within the port limits as a temporary measure.

21. Applicant has also argued that the beach area of Kasarkod village is the turtle nesting area. This averment is totally baseless and the 2nd Respondent's counter maybe read part of this affidavit. The Applicants are indulging in acts of planting turtle eggs along the proposed dedicated road way and inside the project site as well. The Applicant is attempting to stall the project by wrongly setting up eggs to project as though the area is a turtle nesting ground. The videography which is filed in the pen drive would establish that the Applicant's men are indulged in such unethical and immoral activities. The 2nd Respondent has issued a letter of this incident to the District Collector. The same is also enclosed herein. The same was also submitted to the Karnataka State Coastal Zone Management Authority and displayed the video and the letter to the Authorities.

22. Applicant has also argued that the beach area of Kasarkod village is the turtle nesting area. This averment is totally biased as there is a designated Honnavar Fishery Harbour on the left bank of river Sharavati within 500 mtr from the proposed port project site. This averment is made to stall the development of port and not for any development related to fisheries. Port Director has ensured to undertake adequate mitigation measures to protect turtles nesting within the port limits vide letter addressed to the Member Secretary, Karnataka State Coastal Zone Management Authority. Also, The Principal Chief Conservator of Forests, (Wildlife), & Chief Wildlife Warden, Bangalore has approved the Wildlife Mitigation Plan to be executed by the Ports Department. Declaration of turtle

G. Raylu Reddy

nesting zone may attract legal regulations which may adversely affect the local fishing activities, for which the local fishermen had raised their concerns.

23. The local fishermen will be greatly benefitted by this port project as two breakwaters will be constructed by M/s HPPL at the existing gut in order to stabilize the tidal inlet. Dredging will also be undertaken to 10 m depth and free access to fishing vessels would be provided 24x7. This will be undertaken by HPPL at its own cost. This will help the fishermen in safe and smooth navigation of mechanised fishing vessels (MFVs) and ensure more active time for fishing activities as presently they have to wait for the high tide to venture in to the Arabian sea and return back to fishery harbour safely with the fish catch. HPPL/Port department is committed to comply with the conditions recommended by KSCZMA for better environmental safe guards.

24. The 2nd Respondent states that they have already invested more than 200 Crores in this project. The 2nd Respondent has already commenced construction of Jetty, Berth, Procurement of stones for Breakwater and development of internal roads. The 2nd Respondent's machineries and equipment's are lying idle. The equipment's and machineries are getting damaged on account of idling. The photographs of the Plant, Equipment, Machineries which are idle are filed herewith. The entire project has come to a standstill. The local fishermen are not allowing the staff & labors of the 2nd Respondent to enter the site and are indulged in pelting stones at the workers who attempt to enter the road citing that the case is pending in NGT, Chennai. On the other hand, the raw materials (jelly stones/building stones), cement and steel which are kept at the site are being robbed by miscreants. Also, as on date, it is by no way possible to get the maintenance/service done for the machineries/equipment's placed inside the site under the said threatening conditions prevailing in the locality. Further, it is very

C. Rajan Reddy
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difficult for the 2nd respondent to enter into the port area or to get the support of the local administration until a clear order is passed in the matter by the Hon'ble NGT.

25. HPPL had intended to develop the port at Honnavar by way of making and agreement with the Government of Karnataka under BOT model and in this regards, HPPL has already invested 40% amount of the project cost. Presently, HPPL is entangled in litigation. The litigation thus far are as follows:-

- i) The unauthorized occupants were vacated from 93 acres land bearing sy. no 305 on the basis of orders of Honorable High Court of Karnataka (Dharwad Bench) order WA No: 100303/2016 & 101144-101169/2016 [GM-RES], dated: 20/09/2016 and Deputy Commissioner court order No. RB/LND-2/CR-72/12-13, dated: 29/11/2016 on 6th December 2016.
- ii) On 22.02.2021, Hasi Meenu Vyparastara Sanga filled a Writ Petition before the Honorable High Court of Karnataka, Bengaluru challenging the construction of the port by M/s Honnavar Port (P) Ltd.
- iii) Upon direction from the Hon'ble High Court of Karnataka to verify the issue of turtle nesting ground, NCSCM, Chennai has provided report on the Turtle Nesting which conclude for no nesting of turtles.
- iv) Presently, HPPL is entangled with allegation for the proposed National Highway construction, which has not at all commenced. It is developed by Govt of India under Bharathmala Pariyojana Scheme.

26. The 2nd respondent was directed to make application to SCZMA -Karnataka and SEIAA - Karnataka by the Hon'ble NGT, Chennai. On the said directions, applications were made to the authorities and obtained CRZ and SEIAA clearance for the exiting road. Thus proving the existence of the kachha road.

A. Rajan Reddy

27. The applicant time and again raises new allegations on the 2nd respondent for the clearances been obtained as per the directions of the Hon'ble NGT and thus causes delay before this Hon'ble Tribunal. These repeated act of the applicant is causing delay in execution of the project and also has lead for the escalation in the project cost. Already the cost of the project is amplified by 30%. The cost spent till date is attached herewith for ready reference.

28. The functioning of Honnavar port will not only boost the State and Nations economy with adaption of liberalization policy in Trade and Commerce but also create job opportunities in the Port project for the rural youths of the region and also bring in lot of industries thus creating a balanced economic & social growth. The GOI has taken Honnavar Port road connectivity under "PM Gati Shakti" projects which will be implemented by the NHAI under Bhartamala Pariyojana Scheme.

In the light of the above, it is humbly prayed that the permission may be granted to use existing Kaccha road for the development of the port project in the light of the clearances granted by KSCZMA and SEIAA to the Port Department as per the directions of Hon'ble NGT.

Solemnly affirmed at Chennai on this
the 23 of April and signed
his name in my presence after reading
the contents herein.

C. Rajan Reddy
BEFORE ME

S. S. Sivaraman
22/04/2006
Advocate: Chennai
MC. Govindan

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ಉಪ ಅರಣ್ಯ ಸಂರಕ್ಷಣಾಧಿಕಾರಿಗಳ ಕಚೇರಿ, ಹೊನ್ನಾವರ ವಿಭಾಗ, ಹೊನ್ನಾವರ-581334
OFFICE OF THE DEPUTY CONSERVATOR OF FORESTS, HONAVAR DIVISION, HONAVAR-581334
ದೂರವಾಣಿ ಸಂಖ್ಯೆ: 08387-295236 e-mail: dcf.honavar@gmail.com
ಕ್ರ.ಸಂ/ಬಿ2/ಜಿಎಫ್‌ಎಲ್/ಇತರೆ/2022-23 ದಿನಾಂಕ: 28-06-2023

ಇವರಿಗೆ,
ಮಾನ್ಯ ಸದಸ್ಯ ಕಾರ್ಯದರ್ಶಿಗಳು,
ಕರ್ನಾಟಕ ಜೀವವೈವಿಧ್ಯ ಮಂಡಳಿ,
ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು.

ಮಾನ್ಯರ,

- ವಿಷಯ: ಹೊನ್ನಾವರ ಅರಣ್ಯ ವಿಭಾಗದ ಕಡಲತೀರವನ್ನು ಹಾಗೂ ಶರಾವತಿ ಅಳಿವೆ ಪ್ರದೇಶದ ಅಳಿವಿನಂಚಿನಲ್ಲಿರುವ ವಿವಿಧ ಜಾತಿಯ ಕಡಲಾಮೆಗಳ ಪಾರಂಪರಿಕ ಆವಾಸ ಸ್ಥಳಗಳನ್ನು ಜೀವವೈವಿಧ್ಯ ಪಾರಂಪರಿಕ ತಾಣವೆಂದು ಘೋಷಿಸುವ ಕುರಿತು.
- ಉಲ್ಲೇಖ: 1. ತಮ್ಮ ಕಚೇರಿ ಪತ್ರ ಸಂ:ಎಡಿಎಂ/ಎಂ1/ಬಿಎಂ52/536, ದಿನಾಂಕ: 02-02-2023.
2. ಈ ಕಚೇರಿ ಪತ್ರ ಸಮ ಸಂ ದಿನಾಂಕ: 28-04-2023.

ಮೇಲ್ಕಂಡ ವಿಷಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ, ಉಲ್ಲೇಖ (2) ರ ಪತ್ರವನ್ನು ಮುಂದುವರೆಸುತ್ತಾ, ಹೊನ್ನಾವರ ಅರಣ್ಯ ವಿಭಾಗದ ಕಡಲತೀರವನ್ನು ಹಾಗೂ ಶರಾವತಿ ಅಳಿವೆ ಪ್ರದೇಶದ ಅಳಿವಿನಂಚಿನಲ್ಲಿರುವ ವಿವಿಧ ಜಾತಿಯ ಕಡಲಾಮೆಗಳ ಪಾರಂಪರಿಕ ಆವಾಸ ಸ್ಥಳಗಳನ್ನು ಜೀವವೈವಿಧ್ಯ ಪಾರಂಪರಿಕ ತಾಣವೆಂದು ಘೋಷಿಸುವ ಕುರಿತು ವರದಿ ಸಲ್ಲಿಸಲು ಉಲ್ಲೇಖ (1) ರ ಪತ್ರದಲ್ಲಿ ಸೂಚಿಸಿದಂತೆ, ಸದರ ಪ್ರದೇಶವು Coastal Regulation Zone (CRZ) ವ್ಯಾಪ್ತಿಗೆ ಒಳಪಡುತ್ತದೆ. ಈ ಪ್ರದೇಶವು ಅರಣ್ಯ ಇಲಾಖಾ ವ್ಯಾಪ್ತಿಗೆ ಒಳಪಡುವುದಿಲ್ಲ. ಅರಣ್ಯ ಇಲಾಖೆಯಿಂದ ಸನ್ 2012-13 ರಿಂದ ಆಮೆ ಮೊಟ್ಟೆಗಳನ್ನು ಸಂರಕ್ಷಿಸಿ ಮೊಟ್ಟೆಗಳಿಂದ ಹೊರ ಬಂದ ಕಡಲಾಮೆ ಮರಗಳನ್ನು ಸಮುದ್ರಕ್ಕೆ ಬಿಡುವ ಕಾರ್ಯವನ್ನು ಈವರೆಗೂ ಮಾಡಲಾಗುತ್ತಿದೆ. ಈ ಪ್ರದೇಶವನ್ನು ಸ್ಥಳೀಯ ಜನರು ಮಿನುಗಾರಿಕೆ ಚಟುವಟಿಕೆಗಳಿಗೆ ಉಪಯೋಗಿಸುತ್ತಿದ್ದು, ಒಂದು ವೇಳೆ ಪಾರಂಪರಿಕ ಸ್ಥಳವೆಂದು ಘೋಷಣೆ ಮಾಡಿದಲ್ಲಿ, ಸ್ಥಳೀಯ ಜನರ ಪ್ರತೀಕ್ಷೆಯ ಅಗುವ ಸಂಭವವಿರುತ್ತದೆ. ಆದ್ದರಿಂದ ಸದರ ಸ್ಥಳವನ್ನು ಕಡಲಾಮೆಗಳ ಪಾರಂಪರಿಕ ಆವಾಸ ಸ್ಥಳಗಳನ್ನು ಜೀವವೈವಿಧ್ಯ ಪಾರಂಪರಿಕ ತಾಣವೆಂದು ಘೋಷಣೆ ಮಾಡಲು ಸೂಕ್ತವಲ್ಲ. ಎಂಬ ವಿಷಯವನ್ನು ತಮ್ಮ ಅವಗಾಹನಗಾಗಿ ಗೌರವದೊಂದಿಗೆ ಸಲ್ಲಿಸಿದೆ.

ತಮ್ಮ ನಂಬುಗೆಯ,
ಸಹಿ/-
ಉಪ ಅರಣ್ಯ ಸಂರಕ್ಷಣಾಧಿಕಾರಿ,
ಹೊನ್ನಾವರ ವಿಭಾಗ, ಹೊನ್ನಾವರ.

ಪ್ರತಿಯನ್ನು

1. ಮಾನ್ಯ ಪ್ರಧಾನ ಮುಖ್ಯ ಅರಣ್ಯ ಸಂರಕ್ಷಣಾಧಿಕಾರಿಗಳು (ವನ್ಯಜೀವಿ) ಮತ್ತು ಮುಖ್ಯ ವನ್ಯಜೀವಿ ಪರಿಪಾಲಕರು, ಕರ್ನಾಟಕ, ಬೆಂಗಳೂರು ರವರಿಗೆ ಮಾಹಿತಿಗಾಗಿ ಗೌರವದೊಂದಿಗೆ ಸಲ್ಲಿಸಿದೆ.
2. ಮಾನ್ಯ ಅರಣ್ಯ ಸಂರಕ್ಷಣಾಧಿಕಾರಿಗಳು, ಕೆನರಾ ವೃತ್ತ, ಶಿರಸಿ ರವರಿಗೆ ಮಾಹಿತಿಗಾಗಿ ಗೌರವದೊಂದಿಗೆ ಸಲ್ಲಿಸಿದೆ.
3. ಜಿಲ್ಲಾಧಿಕಾರಿಗಳು, ಉತ್ತರ ಕನ್ನಡ, ಕಾರವಾರ ರವರಿಗೆ ಮಾಹಿತಿಗಾಗಿ ಅಭಿನಂದನಾಪೂರ್ವಕವಾಗಿ ಸಲ್ಲಿಸಿದೆ.

ರವಾನಿಸಲಾಗಿದೆ
ದಿನಾಂಕ: 28/6/2023
ಚಿಕ್ಕ ಸಹಿ

ಉಪ ಅರಣ್ಯ ಸಂರಕ್ಷಣಾಧಿಕಾರಿ,
ಹೊನ್ನಾವರ ವಿಭಾಗ, ಹೊನ್ನಾವರ

ENGLISH TRANSLATION

OFFICE OF THE CONSERVATOR OF FORESTS, HONAVAR DIVISION, HONAVAR-581334

Telephone:08387-295236

e-mail:dct.honavar@gmail.com

No./B2/GFL/Others/2022-23

Date:28-06-2023

To

The Member Secretary
Karnataka Biodiversity Board
Mallashwaram, Bengaluru

Sir,

Sub: Declaring the seashore coming under the jurisdiction of Honavar Division of the Forest Department and the area of traditional nesting of various species of sea turtles near Sharavati river estuary as Heritage Biodiversity Area- Reg.

- Ref: 1. Your office letter No. ADM/M1/BM52/536 dated:02-02-2021
- 2. This Office even letter No. dated: 28-04-2023

With reference to the above cited subject and in continuation of letter under reference (2) above, it is instructed to submit a report regarding declaring the seashore coming under the jurisdiction of Honavar Division of the Forest Department and the area of traditional nesting of various species of sea turtles near Sharavati river estuary as a Heritage Biodiversity Area vide letter under reference (1) above, it is submitted that the said area falls under the Coastal Regulation Zone (CRZ). This area does not fall under the jurisdiction of the Forest Department. However, the Forest Department undertakes the work of in-situ conservation of turtle eggs and release of hatchlings into the sea since 2012-13 till date. This area is being used by the local fishermen for fishing activities and therefore in case if this area is declared as a Heritage Biodiversity Area the it is very likely that the local people may oppose the same. Therefore, it is respectfully submitted for your kind perusal that this area is not suitable for declaring as a Heritage Biodiversity area.

Yours faithfully,
Sd/-

Deputy Conservator of Forest
Honavar Division, Honavar.



Copy respectfully submitted to:

1. Principal Chief Conservator of Forest (Wildlife) & Chief Wildlife Warden, Karnataka, Bengaluru for kind information.
2. Conservator of Forest, Kanara Circle, Sirsi for kind information.
3. Deputy Commissioner, Uttara Kannada, Karwar for kind information.

TRANSLATED BY:

K. Narayana Murthy
K. NARAYANA MURTHY
 KAR/1104/2023

Sd/-

Deputy Conservator of Forest
 Honavar Division, Honavar



TRANSLATED ATTESTED BY ME

T. Mallikarjuna
T. MALLIKARJUNA
 ADVOCATE & NOTARY PUBLIC
 GOVT. OF INDIA
 No. C-5, RAJA BHAVAN QUARTERS,
 RAJA BHAVAN, BANGALORE-560 001

01 AUG 2023

K. NARAYANA MURTHY, M.Com., LL.B.
Advocate
 No. 1534, 4th 'E' Cross, 2nd Main,
 Marayappanapalya, BANGALORE - 560 021.
 Mob : 98441 82 82
 E-mail : kramurth@gmail.com

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**Government Of Karnataka
(Department Of Fisheries)**

**Office of the Deputy Director of Fisheries, Fishing Harbour Project,
Kasarkod, Honnavar (U.K.)**

08387-295409

E-mail: adf1honavar@gmail.com

No:MEF/02/2024-25

Dt: 11-07-2024

To,

Executive Director,
Honnavar Port (P) Ltd,
Honnavar.

Sir,


Sub: Regarding Furnishing the details of fishing boat operating
at Honnavar Harbour.

Ref: Your Letter No.HPPL/PORT/2024/0066 Date: 10-07-2024.

With reference to above subject the number of boats operating at
Honnavar Harbour is as follow.

- | | | |
|-----------------------|---|-----|
| 1) Purse- seine boats | - | 75 |
| 2) Trawler boats | - | 85 |
| 3) Traditional boats | - | 420 |

Yours Faithfully


Deputy Director of Fisheries
Fishing Harbour Project
Honnavar (U.K.)

https://drive.google.com/drive/folders/1PH_mf1nXoejRoRfhfXDXj4U7P6oVw7cf?usp=share_link

FORM-1 FOR SEEKING CLEARANCE FOR PROJECT ATTRACTING CRZ NOTIFICATION, 2018

ANNEXURE-V

Project information details	Details
1. PROJECT DETAILS	
A. Project Name:	Development of Barge/vessel loading facility to handle 4.9 MTPA of cargo at
B. Survey No./ Village/ Co-ordinates:	Survey No. 305, Coastal Sand Spit, Kasarkod Tonka Village, Honnavar Taluk,
C. District:	Uttara Kannada
D. State:	Karnataka
E. Whether the proposal is for (Select relevant field)	
(i) Fresh Clearance under CRZ	Fresh
(ii) Amendment to an already issued CRZ clearance: No	NA
(iii) Extension of validity of an already issued CRZ clearance: No	NA
F. Name of the Applicant	G Raghavendra Reddy
G. Address of the Applicant:	103, Ialahzar Apartments, 45/1-2, Palace road, Bengaluru - 560001, Karnataka, India
H. Contact details (Telephone nos. and e-mail address)	9886199355
I. Cost of the project (Rs in crores)	607.03
2. BENEFITS OF THE PROJECT	
A. Details of Project Benefits	<ul style="list-style-type: none"> • Industrial Development in the Bellary-Hospet-Hubli-Gulbarga region. • Generation of both direct and indirect employment to the local people • Positive impact on the socio-economic conditions of the region • Local Community Development activities being carried out by HPPL
B. Employment Likely to be Generated (Yes/No)	Yes
If Yes	
(i) Total Manpower Requirement	650
(ii) Permanent Employment (Numbers)	60
(iii) Temporary Employment (Numbers)	500
(iv) Temporary Employment- During Construction (Numbers)	500
(v) Temporary Employment- During Operation (Numbers)	100
3. DESCRIPTION OF THE PROJECT UNDER CONSIDERATION (Select the Category of the project):	

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Project information details	Details
A. Resort / Buildings / civic amenities	NA
(i) Total area/Built-up area (in sqm.)	
(ii) Height of structure	
(iii) FSI ratio	
(iv) Name of concerned town planning authority/ Panchayat etc.	
(v) Details of provision of car parking area	
B. Coastal Roads / Roads on Stilt	NA
(i) Area of land reclamation	
(ii) Estimated quantity of muck/earth for reclamation	
(iii) Traffic carrying capacity	
(iv) Dimensions of road	
C. Pipelines from thermal power blow down	NA
(i) Length of pipeline	
(ii) Length traversing CRZ area	
(iii) Depth of excavation	
(iv) Width of excavation	
(v) Length of pipeline from seashore to deep sea	
(vi) Depth of outfall point from surface of sea water (vii) Temperature of effluent above ambient at disposal point	
D. Marine Disposal of Treated Effluent through pipelines	NA
(i) Location of intake/ outfall	
(ii) Depth of outfall point	
(iii) Length of pipeline	
(iv) Length traversing CRZ area	
(v) Depth of excavation	
(vi) Width of excavation	
(vii) Length of pipeline from shore to deep sea/creek	
(viii) Depth of outfall point from surface of water	
(ix) Depth of water at disposal point	
(x) BOD, COD, TSS, oil and grease, heavy metals in the effluent	
E. Facility for storage of goods/chemicals	NA
(i) Name of chemical	
(ii) End use of the chemical	
(iii) No. of tanks for storage	
(iv) Capacity of tanks	
F. Offshore structures	NA
(i) Exploration or development	
(ii) Depth of sea bed	
(iii) No. of rigs	

Project information details	Details
(iv) No. of platform	
(v) Details of group gathering stations	
G. Desalination Plant	NA
(i) Capacity of desalination	
(ii) Total brine generation	
(iii) Temperature of effluent above ambient at disposal point	
(iv) Ambient salinity	
(v) Disposal point	
H. Mining of atomic minerals	NA
(i) Capacity of mining	
(ii) Type of mineral to be extracted	
(iii) End use of the mineral	
(iv) Government order for mining lease/exploration and approved mining plan details	
(v) Extent of mining lease area	
I. Sewage Treatment Plants	NA
(i) Capacity	
(ii) Total area of construction	
(iii) Compliance of effluent parameters as laid down by cpcb/spcb/other authorised agency	
(iv) Whether discharge is in sea water/creek? If yes	
Distance of marine outfall point from shore/from the tidal river bank	
Depth of outfall point from sea water/river water surface	
Depth of seabed/riverbed at outfall point	
J. Lighthouse	NA
(i) Total ground area of foundation/platform	
(ii) Height of the structure	
K. Wind Mills	NA
(i) Capacity (MW)	
(ii) Height of the windmill	
(iii) Diameter of the windmill	
(iv) Length of blade	
(v) Speed of rotation	
(vi) Transmission lines (overhead or underground)	
L. Others	
(i) Please specify with salient features	Development of barge/vessel loading facility with two break waters
(ii) Upload relevant Documents (upload PDF only)	Attached as Project Brief Note

Project information details		Details			
No	Proposed Development	CRZ area Classification	Permissibility	Applicable Clause as per CRZ Notification 2019 as amended	
1.	Fuel Station, Entry gate, Internal Road, canteen, operation building, vehicle parking, substation	CRZ-III NDZ	Permissible	2.3.3	
2.	Cargo storage	CRZ-IB, CRZ-III NDZ, CRZ-IVB	Permissible	5.1.2 (i), 5.1.2 (vi), 5.1.2 (xiv), 5.3 (i), 2.3.3, 5.4 (vi), 5.4 (xii)	
3.	Approach berth	CRZ-IB, CRZ-III NDZ, CRZ-IV B	Permissible	5.1.2 (i), 5.1.2 (xiv), 5.3 (i), 2.3.3, 5.4 (ii), 5.4 (xii)	
4.	Breakwaters	CRZ-IB, CRZ-III NDZ, CRZ-IV A	Permissible	5.1.2 (i)(a), 5.1.2 (ii), 5.3 (i), 2.3.3, 5.4 (iii)	
5.	Approach Channel	CRZ-IV A	Permissible	5.4 (iii), 5.4 (xi)	
6.	Shore protection	CRZ-IB, CRZ-III NDZ	Permissible	5.1.2 (ii), 5.3 (i), 2.3.3	
7.	External Port	CRZ-IA, CRZ-III	Permissible	5.1.2 (i)(c)	

4. PROJECT LOCATION AS PER CRZ CLASSIFICATION (If project site falls in different/multiple CRZ categories the same may also be elaborated)



Project information details	Details			
		Connectivity (Road)	NDZ, CRZ-III 200m to 500m HTL	2.3.3, 5.3.(i)
5. CLAUSE OF CRZ NOTIFICATION UNDER WHICH PROJECT IS A PERMISSIBLE/REGULATED ACTIVITY	2.3.3, 5.1.2 (i, ii, vi, xiv), 5.3 (i), 5.4(iii, vi, xi, xii)			
6. MANDATORY FIELDS FOR PROJECT ASSESSMENT				
A. CRZ map in 1:4000 scale indicating HTL, LTL demarcation and distance of the nearest project boundary (in meters) from HTL to be stated	NCSM CRZ demarcation Maps and reports are attached			
(i) Upload Map (kml file)				
B. Project layout superimposed on CRZ Map 1:4000 scale with classification of project location including other notified ESAs prepared				
(i) Upload Map (kml file)				
C. CRZ map 1:25000 scale covering 7 km radius around Project site				
(i) Upload Map (kml file)				
7. PROJECT LOCATED IN (Select Type)				
(i) Non eroding Coast	Yes			
(ii) Low and Medium eroding coast	NA			
(iii) High eroding Coast	NA			
8. DETAILS OF FOREST/ MANGROVES LAND INVOLVED (YES/NO) IF YES	NA			
(i) Detail of area diverted				
(ii) Forest clearance to be submitted (Upload document)				
(iii) No. of trees to be cut under the project				
(iv) Compensatory afforestation plan to be submitted (Upload document)				
9. DISTANCE OF PROPOSED PROJECT FROM ESA/MARINE PARK/ WILDLIFE SANCTUARY	NA			
(i) Within 10-kilometer radius from the project site (Yes/No) If YES				
Permission from NBWL to be submitted (Upload document)				
10. NOC OR CONSENT TO ESTABLISH FROM STATE/UT POLLUTION CONTROL BOARDS OBTAINED (YES/NO)	NA			
If YES				
(i) Copy of NOC to be provided (Upload document)				

Project information details	Details
(ii) Conditions imposed to be stated (Upload document)	
11. Environment Impact Assessment (EIA) studies (relevant fields to be filled)	
A. Terrestrial studies:	
(i) Summary details of EIA (Terrestrial) Studies	Terrestrial monitoring for AAQ (06 locations) PM10 (22.7 to 56.9 µg/m ³), PM2.5 (11 to 27.8 µg/m ³), SO ₂ (4.3 to 9.6 µg/m ³), NO ₂ (10.8 to 22.6 µg/m ³) and other parameters are also observed to be within the NAAQ standards, Noise Quality (06 locations) Ld: (46.6 to 58.5 dB(A)), Ln: (36.5 to 46.5 dB(A)), Surface water (03 locations) results fall under classification C (CPCB), Groundwater (03 locations) results observed to be well within the permissible limits of drinking water standards IS 10500:2012 (as amended) and Soil Quality (05 locations) Sand -40-60% and Silt - 16-28%, Clay 22-35%. Ecology biodiversity surveys were conducted and no flora of conservation importance was found in the project site
(ii) Upload Recommendation made in EIAs (Upload document)	Details are presented in Section 3.8 of Chapter 3 in attached EIA report
(iii) State period of Study	Winter 2023
B. Marine Studies	
(i) Summary details of EIA (Marine) Studies	Marine sampling was carried out at offshore and inshore areas (14 locations) including the Sharavati River area. Sea water Quality (water temperature, salinity and turbidity, DO, BOD and nutrients), Sediment Quality (heavy metals and grain size), Marine Biology (plankton, benthos, marine flora and fauna and other sensitivities) were studied
(ii) Upload Recommendation made in EIAs (Upload document)	Details are presented in Section 3.9 of Chapter 3 in attached EIA report
(iii) State period of Study	Summer 2024
12. DISASTER MANAGEMENT PLAN / NATIONAL OIL SPILL DISASTER CONTINGENCY PLAN (if applicable)	Details are presented in Section 7.5 of Chapter 7 in attached EIA report
13. PROJECT INVOLVING DISCHARGE OF LIQUID EFFLUENTS:	
(i) Capacity of Sewage Treatment Plant	2.5 KLD
(ii) Quantity of effluent generated	2.5 KLD
(iii) Quantity of effluent treated	2.3 KLD
(iv) Method of treatment and disposal	SBR sewage treatment Technology
14. PROJECT INVOLVING DISCHARGE OF SOLID WASTE:	
(i) Type of solid waste	Municipal

Project information details	Details
(ii) Quantity of solid waste generated	25 kg/day
(iii) Method of disposal	Authorized Recyclers
(iv) Mode of transport	Road
15. WATER REQUIREMENT in kilo litres per day (KLD)	
(i) Quantity of water required	7
(ii) Source of water	Karnataka Rural water supply and sanitation agency
(iii) If Ground water (Upload a copy of approval from Central Ground Water Authority or other authorised body)	NA
(iv) If other Source (Upload a copy of permission from competent authority)	NA
(v) Mode of transport	Tankers
(vi) Commitment of water supply (Upload document)	-
16. DETAILS OF WATER TREATMENT AND RECYCLING (If any) (Multiple Entries Allowed)	

Type/Source	Quantity of Wastewater Generated (Kilos Litre per Day)	Treatment Capacity (Kilos Litre per Day)	Treatment Method	Mode of Disposal	Quantity of Discharged Water (Kilos Litre per Day)	Quantity of Treatment Water used in Recycling/Reuse (Kilo Litre per Day)
Port buildings	2.5	2.5	SBR	Green belt	2.3	2.3

17. DETAILS OF RAINWATER HARVESTING	
(i) No. of Storage tanks	2
(ii) Total capacity of tanks	1886 KLD
(iii) No. of Recharge Pits	2
(iv) Capacity of pits	943

18. ENERGY REQUIREMENT AND SOURCES	
(i) Total Power Requirements (kwh)	800
(ii) Source	Honnavar Substation
(iii) Upload Copy of Agreement (upload pdf only)	-
(iv) Stand by Arrangement (Details)	DG set

19. Energy Efficiency/Saving Measures	
(i) Source/Mode	Solar
(ii) Details of savings	Roof top – 0.001% of total power requirement

20. RECOMMENDATION OF STATE COASTAL ZONE MANAGEMENT AUTHORITY	Yet to be received
--	--------------------

Project information details	Details
(i) Upload Copy of CZMA recommendations (Upload pdf only)	
(ii) Compliance status of the Conditions Imposed	
21. WHETHER PROPOSAL ATTRACTS EIA NOTIFICATION, 2006. (YES/NO) IF YES,	Yes
(i) the category thereof	7 e Ports, Hourburs, Dredging/ Category B
(ii) Status of proposal for EC (as applicable)	ToR obtained from SEIAA details presented in EIA report
22. SOCIAL AND ENVIRONMENTAL ISSUES AND MITIGATIONS MEASURES SUGGESTED INCLUDING BUT NOT LIMITED TO R&R, WATER, AIR, HAZARDOUS WASTES, ECOLOGICAL ASPECTS, ETC. (BRIEF DETAILS TO BE PROVIDED)	Details are presented in Chater 4 & Chapter 7 in attached EIA report
23. DETAILS OF COURT CASES WHETHER THERE IS ANY COURT CASES PENDING AGAINST THE PROJECT AND/OR LAND IN WHICH THE PROJECT IS PROPOSED TO BE SET UP? (YES/NO)	NA
If Yes, Pending or Disposed (Select relevant)	
(i) Name of the Court (Supreme Court, High Court, National Green Tribunal)	
(ii) Case No.	
(iii) Case Details	
(iv) Orders/Directions of the court, if any and its relevance with the proposed project (Upload document)	
24. ADDITIONAL INFORMATION, IF ANY	-

UNDERTAKING: It is certified that the information given above are true to the best of my knowledge and belief and nothing contravening the provisions of CRZ Notification, 2011/2019 has been concealed therefore.

For HONNAVAR PORT PRIVATE LIMITED

C. Raghav Reddy

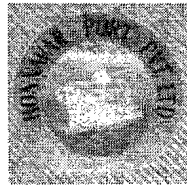
Name and Signature: Date: 12-09-24

(G. Raghavendra Reddy)

NUMERICAL MODELLING ON ESTIMATING THE CARRYING CAPACITY OF SHARAVATHI ESTUARY

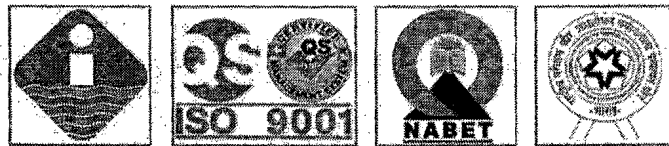
PROJECT CODE: 901072425

For



HONNAVAR PORT PRIVATE LIMITED
HONNAVAR, KARNATAKA

AUGUST 2024




INDOMER COASTAL HYDRAULICS (P) LTD.

(ISO 9001: 2015 CERTIFIED, QCI - NABET & NABL ACCREDITED)

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Client	Honnavar Port Private Limited (HPPL)				
Project Title	Numerical Modelling on Estimating the Carrying Capacity of Sharavathi Estuary				
Project Code	901072425				
Abstract	<p>Honnavar Port Private Limited (HPPL), Bangalore is carrying out Environmental Impact Assessment Study for the development of an all-weather barge/vessel loading facility at Kasarkod Tonka, Honnavar, Uttara Kannada District, Karnataka.</p> <p>HPPL has asked Indomer Coastal Hydraulics (P) Ltd., Chennai to conduct a carrying capacity study of the Sharavathi Estuary vide work order letter no. TEPL/ENV/2023-24/E108 dated 11.03.2024.</p> <p>Indomer Coastal Hydraulics (P) Ltd., Chennai is a NABET-QCI accredited EIA consultant vide NABET/EIA/23-26/ RA 0315 dt. 9.1.24. This report presents the details of modelling studies undertaken, methodology and results.</p> <p>The details of various scopes covered under the mathematical modelling studies are indicated below.</p> <ul style="list-style-type: none"> i) Hydrodynamic model using MIKE 21 HD ii) Carrying capacity of Sharavathi River Estuary 				
Foreword	The materials presented in the report carry the copy right of HPPL and INDOMER and should not be altered or distorted or copied or presented in different manner by other organizations without the written consent from HPPL and INDOMER.				
Document	Controlled				
References	HPPL/GVPREL/24-25/W.O/003				
Date	Report Type	Originator	Checked by	Approved by	Approvers sign
30.08.2024	FINAL	Ms. S. Nino	R. C. Bragath	Dr. P. Chandramohan	
1	Project Code	901072425		Text Pages	28
2	File Location	F:/2024 Projects/May 24/HPPL		Tables	04
			Figures		43



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MODELLING TEAM

Name	Qualification & Position
Dr. P. Chandramohan	Ph.D. (Ocean Engineering) Managing Director (Former scientist, CSIR-NIO, Goa)
Mr. J. Guru Prasath	B.E. (Marine Engineering), Ph. D. (Ocean Engineering) Director
Mr. R. C. Bragath	M. Tech. (Coastal Management) Assistant Director
Ms. S. Nino	M. Tech. (Coastal and Harbour Engineering) Project Officer
Mr. S. Sujith	M. Tech. (Coastal and Harbour Engineering) Project Officer
Mrs. R. V. Sukanya	M. Tech. (Coastal Management) Project Officer
Mr. S. Masilamani	M. E. (Transportation Engineering) Project Officer
Mr. H. Sabarish	B.Sc. (Nautical Science) Project Officer



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1. INTRODUCTION

Honnavar Port Private Limited (HPPL) has proposed for development of an all-weather barge / vessel loading facility at Coastal Sand Spit, Kasarkod Tonka Village, Honnavar Taluk, Uttara Kannada District.

The port of Honnavar is located at Latitude $14^{\circ} 16.30' N$ and longitude $74^{\circ} 7.10' E$ at the mouth of Sharavathi River in Uttara Kannada District. The port of Honnavar is surrounded by hills, forests and the Sharavathi River. The port is positioned such that there is no environmental threat and obtained necessary clearances from the statutory authorities. The statutory authority has in turn asked HPPL to take up a study on Carrying Capacity of Sharavathi River Estuary where the port development is proposed.

In this regard HPPL, Bangalore has asked Indomer Coastal Hydraulics (P) Ltd., Chennai to conduct necessary mathematical modelling study on estimating the carrying capacity study of Sharavathi River Estuary, as per work order letter no. HPPL/GVPREL/24-25/W.O/003 dt. 24.07.2024.

Accordingly, Indomer has taken up the necessary studies on hydrodynamic of the Sharavathi River and estimated the Carrying Capacity of Sharavathi River Estuary. Indomer Coastal Hydraulics (P) Ltd., Chennai is a NABET-QCI accredited EIA consultant vide the letter NABET/EIA/23-26/ RA 0315 dt. 09.01.2024.

This report forms as the Mathematical Modelling Studies meeting the prescribed scope of work with the details of modelling studies undertaken, methodology adopted, and the results obtained. The details of various scopes covered under the mathematical modelling studies are:

- i) Hydrodynamic modelling study using MIKE 21 HD
- ii) Carrying capacity study

The location map of the project region is shown in below **Fig. 1.1**.



FIG. 1.1. SATELLITE IMAGERY OF PROJECT LOCATION - HONNAVAR



2. SCOPE OF WORK

i) Hydrodynamic Modelling study – MIKE 21 HD

- To study the tide and wind induced flow fields over the project area using MIKE 21 HD (Hydrodynamic).

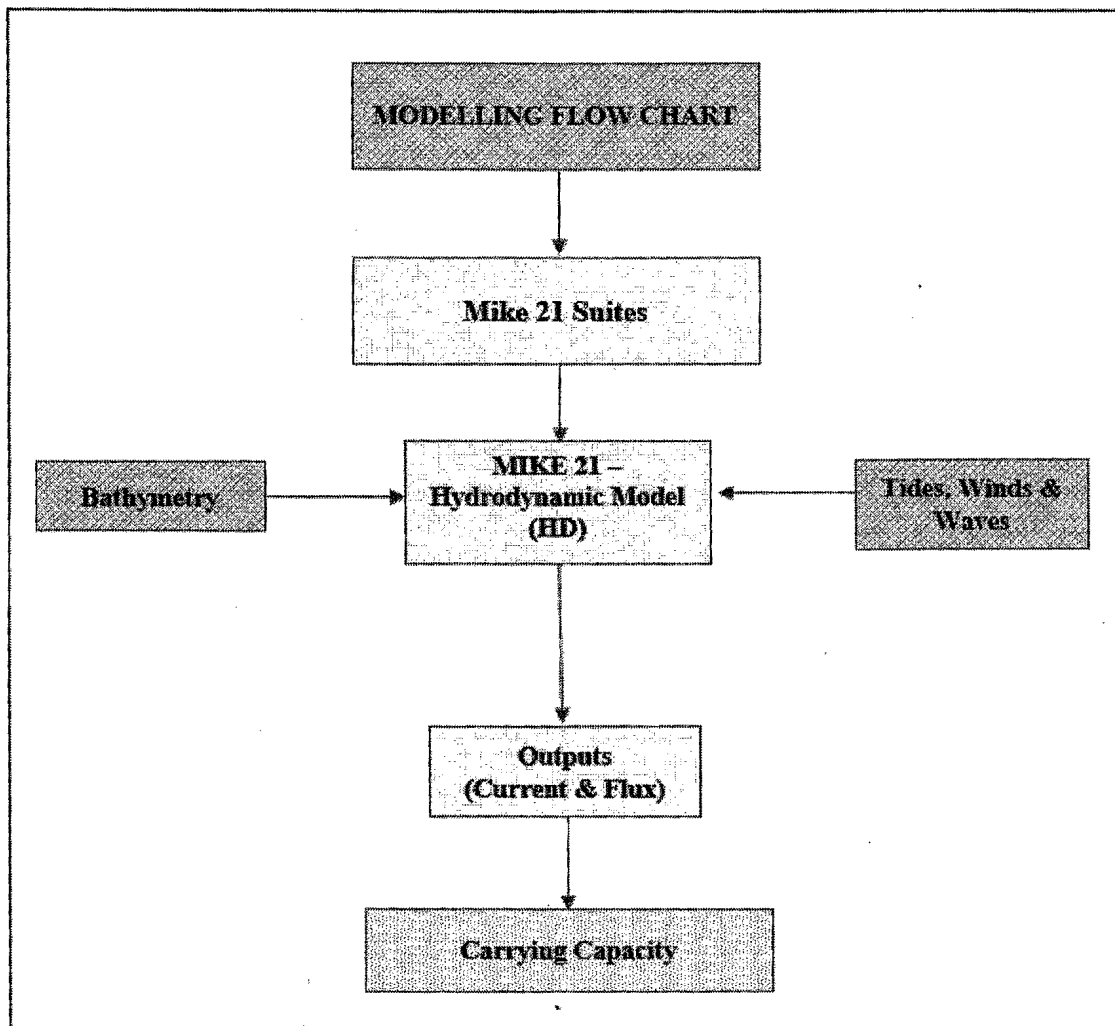
ii) Carrying Capacity study – MIKE 21

- To study the carrying capacity of the Sharavathi River Estuary.



3. MODELLING APPROACH

In order to understand the volume of water getting exchanged across the Sharavathi River Estuary, for the prevailing environmental conditions, it is essential to understand the tide and flow characteristics in the project region before and after the construction of port facilities during different tidal condition over a Spring - Neap tidal cycle. It is convenient to use mathematical modelling studies to simulate the variation of tides and currents under different tidal conditions. DHI - MIKE 21 HD module has been used to study the variation of tides and currents in the project region. DHI - MIKE 21 models have been developed by Danish Hydraulic Institute (DHI), Denmark, and are being used worldwide for many coastal engineering applications. The flow chart of the model describing the approach followed in the present study is given below:





4. COMPILATION OF OCEANOGRAPHIC DATA

4.1. Project location

Sharavathi Estuary

India has a vast coastline stretching approximately 7,516.6 km, where numerous rivers flow into the Arabian Sea and the Bay of Bengal, forming estuaries. Among these rivers, the Sharavathi River is notable as a westward-flowing river in the state of Karnataka. It originates from Ambuthirtha near Kavaledurga in Thirthahalli. The river flows for about 128 km before emptying into the Arabian Sea at Honnavar in the Uttara Kannada district.

Honnavar Port has historically been an important trade and fishing center, benefiting from its proximity to the Sharavathi Estuary. Over the years, the region has seen significant infrastructural developments, including the construction of three major reservoirs along the Sharavathi River:

- i) Madenur (Hirebhaskar) Dam in 1932,
- ii) Linganamakki Dam in 1964, and
- iii) Gerusoppa (Sharavathi TailRace Project) in 2001

These reservoirs have played a crucial role in water management but have also led to changes in the estuarine dynamics, including alterations in water quality and increased seawater intrusion.

The environmental significance of the Sharavathi Estuary cannot be overstated. It acts as a natural buffer against coastal erosion, supports a thriving fishery, and is home to a variety of flora and fauna. The nutrient-rich waters, fed by both riverine inputs and marine upwelling, make the estuary a highly productive zone, crucial for sustaining local livelihoods.

The convergence of the Arabian Sea and the Sharavathi River forms a highly productive and biodiverse estuary. This estuary serves as a crucial ecosystem, receiving nutrients from both land and marine sources through tides and upwelling. The nutrient-rich environment supports thriving fisheries and sustains a wide variety of aquatic life.

The river also forms a depositional coastal landform which is known as sand spit which separate the sea and the river.

4.2. Tides

The tides in the project region are predominantly semidiurnal in nature. The various design tide levels with respect to chart datum for Honnavar region as presented in Naval Hydrographic Chart NHC No. 216 are given in **Table 4.1**.



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Table 4.1. Design tide level

Level	Tide (m)
Mean High Water Spring (MHWS)	(+) 1.8
Mean High Water Neap (MHWN)	(+) 1.5
Mean Sea Level (MSL)	(+) 1.2
Mean Low Water Neap (MLWN)	(+) 1.0
Mean Low Water Spring (MLWS)	(+) 0.4

Source: Honnavar (NHC-216)

Additionally, the tide measurements carried out at the project location in April 2011 have been compiled and the variation of measured tides is shown in **Fig. 4.1**.

4.3. Currents

Based on the oceanographic study conducted in April 2011 at the project region, the current patterns in the area exhibited significant variation in both speed and direction. The variations of current speed and direction at the proposed project location is shown in **Fig. 4.2**. The maximum surface current speeds ranged from 0.34 m/s in the open sea to as high as 1.23 m/s inside the river close to the project location.

In the open sea, the currents generally flowed southward, influenced by the regional monsoon winds. Within the river areas, the current patterns were more complex and heavily influenced by the tidal phases. During flood tide, the river currents predominantly moved southward, driven by the incoming tide pushing water upstream. Conversely, during ebb tide, the currents reversed direction, flowing northward as the tide receded and water drained back into the sea. This bidirectional flow is typical of estuarine environments, where the interaction between river discharge and tidal forces creates dynamic and variable current patterns.

4.4. Waves

In the Honnavar region, wave dynamics play a crucial role in shaping the coastal environment and influencing maritime activities. The study conducted by Indomer in April 2011 provides a detailed understanding of these wave conditions on the open sea adjacent to the proposed project location. The variation of measured wave characteristics at the project location is shown in **Fig. 4.3**. During the measurement period, the significant wave height varied between 0.32 m and 1.02 m. The maximum wave height recorded was 1.67 m. The zero-crossing wave periods range from 3 to 10 seconds. The predominant wave direction was around 230°, indicating that waves generally approached the coast from the southwest.

Additionally, to understand annual wave climate, the in-house available wave data pertaining to the project location is compiled. The monthly and annual wave rose at the project location is shown in **Fig. 4.4**.

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Based on the compiled wave statistics, the monthly predominant wave characteristics are given below.

January: Wind speed predominantly varied 2 – 6 m/s and the wind predominantly arrived from 292.5° – 360°.

February: Wind speed predominantly varied 2 – 6 m/s and the wind predominantly arrived from 292.5° – 360°.

March: Wind speed predominantly varied 2 – 6 m/s and the wind predominantly arrived from 270° – 360°.

April: Wind speed predominantly varied 2 – 6 m/s and the wind predominantly arrived from 247.5° – 337.5°.

May: Wind speed predominantly varied 2 – 6 m/s and the wind predominantly arrived from 270° – 337.5°.

June: Wind speed predominantly varied 2 – 8 m/s and the wind predominantly arrived from 225° – 292.5°.

July: Wind speed predominantly varied 2 – 8 m/s and the wind predominantly arrived from 247.5° – 292.5°.

August: Wind speed predominantly varied 2 – 8 m/s and the wind predominantly arrived from 247.5° – 292.5°.

September: Wind speed predominantly varied 2 – 6 m/s and the wind predominantly arrived from 247.5° – 315°.

October: Wind speed predominantly varied 2 – 6 m/s and the wind predominantly arrived from 270° – 337.5°.

November: Wind speed predominantly varied 2 – 6 m/s and the wind predominantly arrived from 45° – 90°.

December: Wind speed predominantly varied 2 – 6 m/s and the wind predominantly arrived from 45° – 90°.

From the compilation of wind parameters, it is observed that wind speed is high during monsoon months i.e., from June to August. During the rest of the months in the year, the wind speed is relatively low.



4.5. Bathymetry

The bathymetric chart of the project region based on the bathymetry survey carried out in 2011 is shown in Fig. 4.5. The bathymetry chart depicts that the depth contours are generally uniform and parallel to the coastline. The seabed in the project region displays a steep slope of 1:150 up to a depth of 5 meters from the shoreline, beyond which the slope becomes gentler at 1:650 from 6 to 10 meters depth. The variation in water depth with distance from the shoreline shows a gradual increase in depth from 2 meters at approximately 520 meters from the shore to 10 meters at about 3630 meters offshore. The variation of water depth with respect to distance from the shoreline is given in Table 4.2.

Table 4.2. Variation of water depths with distance

Water depth (m)	Approximate distance from shoreline (m)
Wave breaking zone	
2	520
3	560
4	600
5	720
6	1000
7	1320
8	1940
9	2640
10	3630

In contrast, the riverine part of the Sharavathi estuary exhibits more variability in depth contours. Near the river mouth, particularly in the SE part, the depth contours are more regular and parallel to the embankment, with depths ranging from 2 to 7 m. However, the NW part of the river shows irregular depth contours, reflecting a more complex riverbed morphology, likely influenced by sediment transport and erosion. Near the river mouth and embankment, the depths vary between 4 and 8 meters, indicating dynamic interactions between riverine and marine processes.

4.6. U/S Discharge

The Sharavathi River is influenced by an upstream discharge from the Gerusoppa Dam located at about 35 km upstream from its mouth. The variation of annual upstream discharge from the Gerusoppa Dam during 2023 is shown in Fig. 4.6.

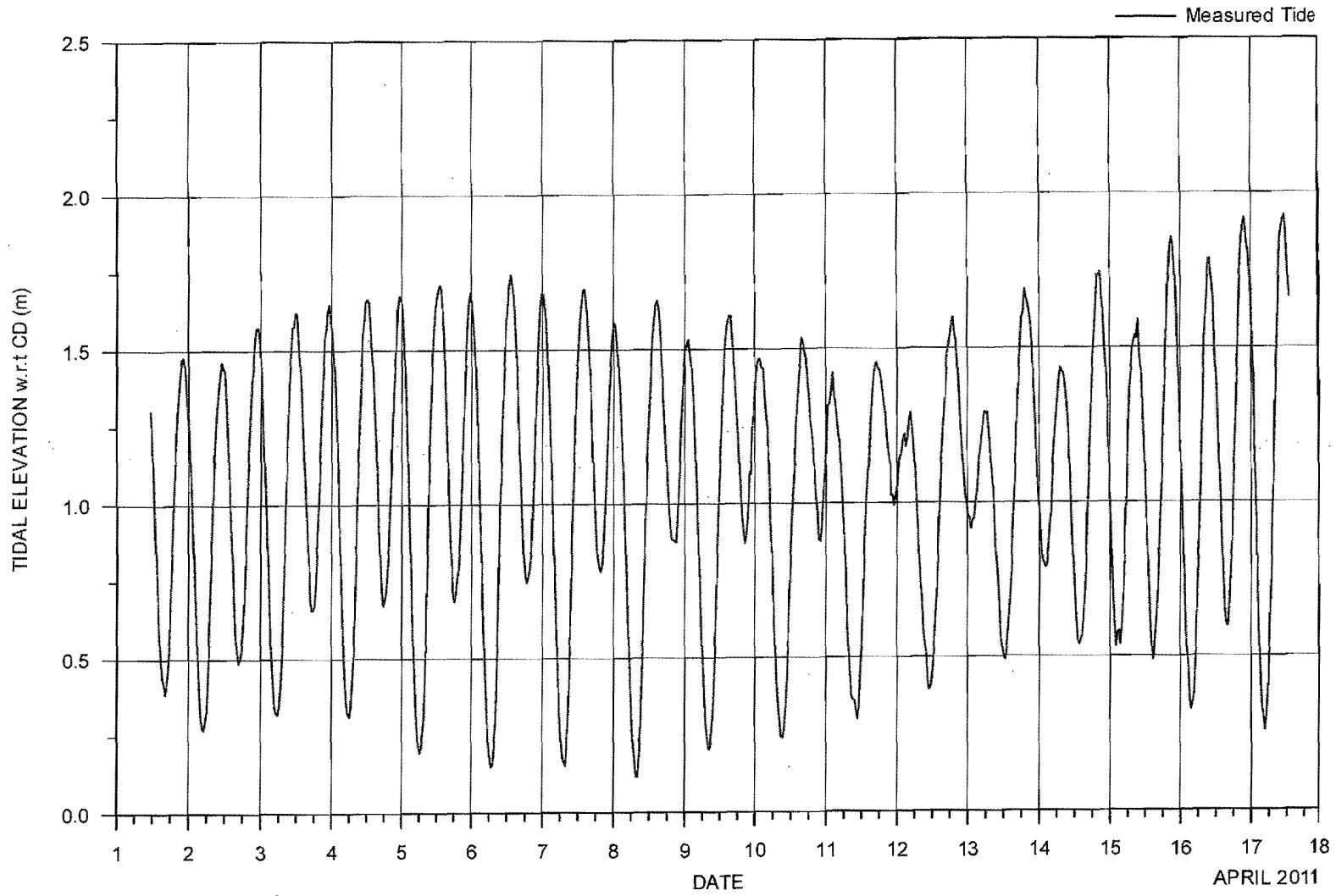


FIG. 4.1. VARIATION OF TIDES AT PROJECT LOCATION

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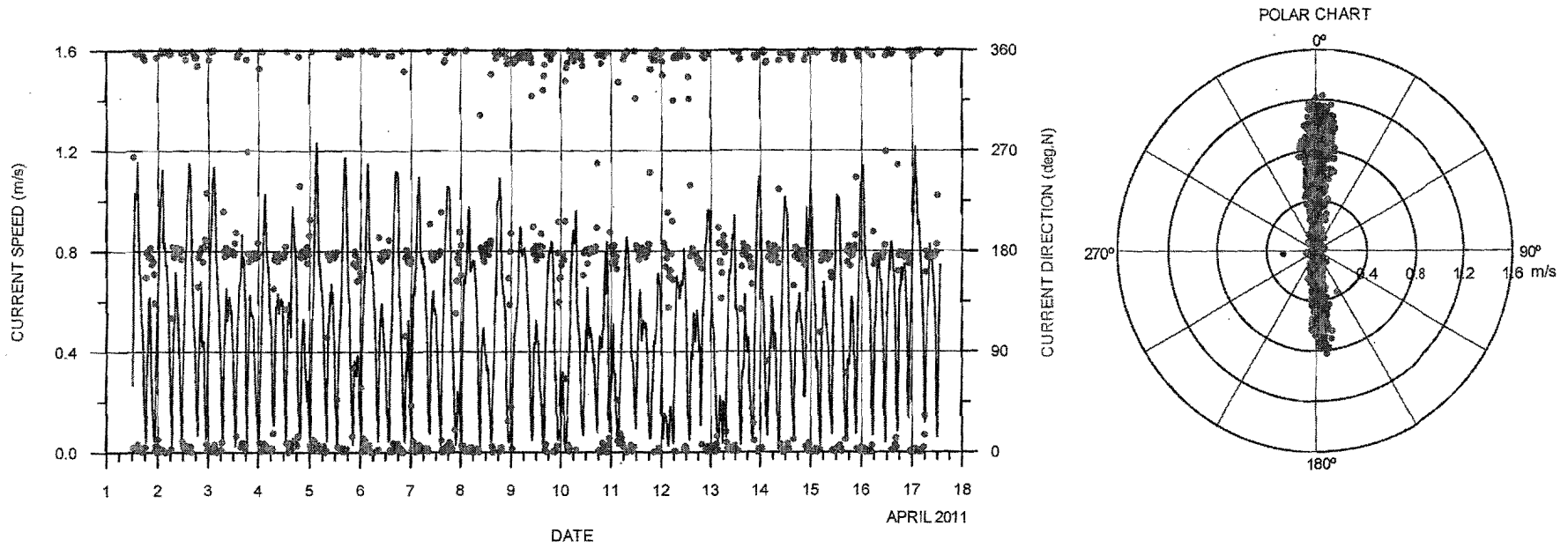


FIG. 4.2. VARIATION OF CUREENT SPEED AND DIRECTION WITH POLAR CHART

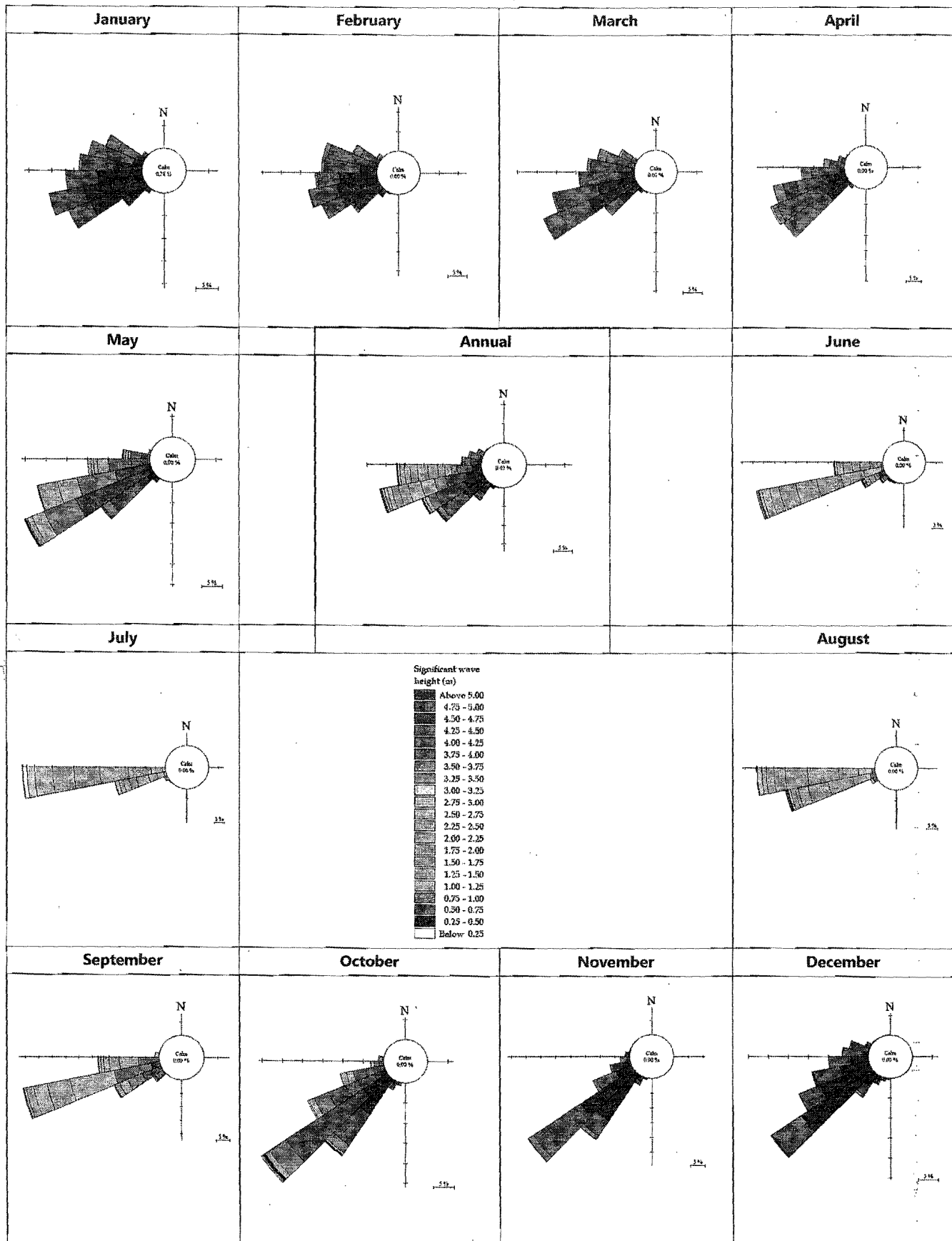


Fig. 4.4. Monthly and annual wave roses at Honnavar

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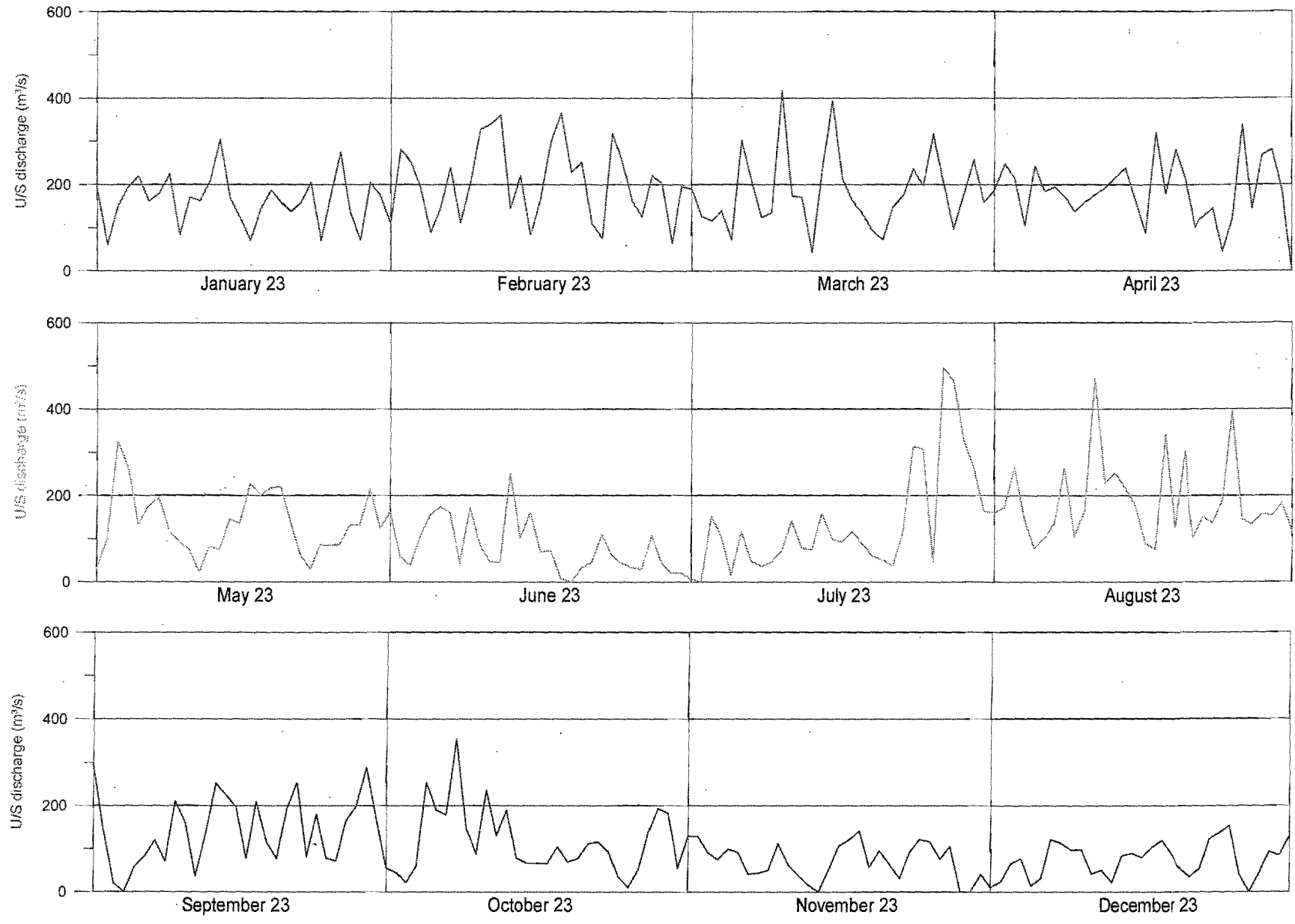


FIG 4.6. VARIATION OF UPSTREAM DISCHARGE



5. HYDRODYNAMIC MODEL – MIKE 21 HD

The hydrodynamic flow model has been carried out to understand the flood and ebb tidal flow characteristics near the study area during different phases of tide on spring and neap tidal days due to the proposed developments. The results of the flow model were utilized for the carrying capacity study which is explained in the next chapter. The modelling studies have been carried out using DHI - MIKE 21 suites.

Units: Units of all parameters and variables in the model study are according to international SI conventions. **Coordinate system:** The coordinate system used for model grid generation and other horizontal positioning was UTM based on WGS 84 spheroid. **Vertical reference level:** The depth information used in the tidal flow models is relative to Mean Sea Level (MSL); depths below MSL are defined negative.

Directions: **Current** – Ocean current directions refer to the direction **towards** which the flow is taking place. Directions of the flow are always given clockwise with respect to North. The Unit is degrees, where 360 degrees cover the circle. **Wind** - Wind directions refer to the direction **from** which the wind is approaching the observer. Directions of the wind are always given clockwise with respect to North. The Unit is degrees, where 360 degrees cover the circle. **Wave** - Wave directions refer to the direction **from** which the wave (orthogonal) is approaching. Directions of the wave are always given clockwise with respect to North. The Unit is degrees, where 360 degrees cover the circle.

5.1. Model domain

The tide and wind induced flow field over the study area was simulated using MIKE 21-HD module. The vertically integrated shallow water equations governing large scale flow fields and the alternate direction implicit method are used in MIKE 21 HD module for the solution.

Simulation of flow field with existing condition: The model domain in the study area covers an area of approximately 21 km x 13 km. The grid spacing is 20 m in both X and Y directions. A rectilinear grid system was used for the simulation of flow field in the study region. The grid system comprised of totally 6,82,500 computational points. The model domain used for the simulation are shown in **Fig. 5.1** (without breakwater). **Simulation of flow field with proposed developments:** The computational model was modified by incorporating the proposed developments. The channel as well as harbor area is dredged up to -10.0m depth. A northern breakwater of 820m length and southern breakwater of 865m length having a clear gap of 360m in between them was incorporated in the model. The model domain in the study area covers an area of approximately 28 km x 15 km. The grid spacing is 20 m in both X and Y directions. A rectilinear grid system was used for the simulation of flow field in the study region. The grid system comprised of totally 10,50,000 computational points. The model domain used for the simulation are shown in **Fig. 5.2(a)** and **Fig. 5.2(b)** (with breakwater) respectively.

Data requirements:

The data for the MIKE 21 HD module is described below:



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- i) Bathymetry
- ii) Initial Conditions:
Water surface levels and Flux densities in x and y directions
- iii) Boundary Conditions:
Water levels
- iv) Other Driving Forces:
Wind speed and direction

5.2. Depth schematization

For the schematization of depths in the flow model, the water depths were extracted from: i) DHI - MIKE 21 - C Map data base, ii) Indian Naval Hydrographic Charts corresponding to this region, and iii) available measured bathymetry data.

Depth schematization or estimation of water depths at model grid points has always been one of the most important and yet crucial part of any coastal modelling problem. The availability of MIKE C-MAP worldwide electronic chart database has significantly reduced the time and effort required for this task. This database and the program to extract the bathymetric data over the selected area with as much detail as possible have been developed jointly by DHI and C-MAP, Norway. C-MAP database is extracted from large and small scale Admiralty Sea charts, where a larger scale chart covers large areas with limited detail and small scale maps cover smaller areas in greater detail. The larger scale maps offer complete coverage, and the small scale maps are available only in regions where ships and boats navigate, which require detailed maps for safe navigation. From this database it is also possible to get information on tidal elevation at important tidal stations.

5.3. Model description

MIKE 21 Flow Model is a modelling system based on a rectangular grid approach. The modelling has been developed for applications within oceanographic, coastal and estuarine environments. The MIKE 21 Flow module is a modeling system for two dimensional free-surface flows. It calculates non-steady flow and transport phenomena that result from tidal and meteorological forcing on a spherical, or rectilinear or curvilinear boundary fitted grid. This module is applicable for the simulation of flow fields in natural water bodies, such as lakes, estuaries, bays, coastal areas and seas, wherever stratification can be neglected.

The HD module forms a basic module of MIKE 21 Model suite, and it provides the hydrodynamic basis for the computations performed in the Environmental Hydraulics modules. The output of the HD module is also used as input for many of the other MIKE 21 modules, viz., Transport module, Sediment Transport module (ST), Particle tracking, (PT) Spill Analysis (SA) and the Environmental module (ECO).



The MIKE 21 Flow module is a multi-dimensional 2D or 3D hydrodynamic flow simulation model (in the present case a 2D model), which solves shallow-water equations for given boundary conditions to compute non-steady flow fields in response to a variety of environmental forcing and processes in natural water bodies. The environmental forcing and processes include *bottom shear stress, wind shear stress, barometric pressure gradients, Coriolis force, momentum dispersion, sources and sinks, evaporation, flooding and drying and wave radiation stresses*. The basic shallow-water equations in the Cartesian co-ordinate system used in the HD flow module are:

Continuity equation:

$$\frac{\partial \zeta}{\partial t} + \frac{\partial p}{\partial x} + \frac{\partial q}{\partial y} = \frac{\partial d}{\partial t}$$

Momentum equations in x- and y- directions:

$$\begin{aligned} \frac{\partial p}{\partial t} + \frac{\partial}{\partial x} \left[\frac{p^2}{h} \right] + \frac{\partial}{\partial y} \left[\frac{p \cdot q}{h} \right] + gh \frac{\partial \zeta}{\partial x} + \frac{gp\sqrt{p^2 + q^2}}{C^2 h^2} - \frac{1}{\rho_w} \left[\frac{\partial}{\partial x} (h\tau_{xx}) + \frac{\partial}{\partial y} (h\tau_{xy}) \right] - \Omega_q - fVV_x \\ + \frac{h}{\rho_w} \cdot \frac{\partial}{\partial x} (p_a) = 0 \end{aligned}$$

$$\begin{aligned} \frac{\partial q}{\partial t} + \frac{\partial}{\partial y} \left[\frac{q^2}{h} \right] + \frac{\partial}{\partial x} \left[\frac{p \cdot q}{h} \right] + gh \frac{\partial \zeta}{\partial y} + \frac{gq\sqrt{p^2 + q^2}}{C^2 h^2} - \frac{1}{\rho_w} \left[\frac{\partial}{\partial y} (h\tau_{yy}) + \frac{\partial}{\partial x} (h\tau_{xy}) \right] + \Omega_p - fVV_y \\ + \frac{h}{\rho_w} \cdot \frac{\partial}{\partial y} (p_a) = 0 \end{aligned}$$

Symbol List:

$h(x, y, t)$	-	water depth (m)
$d(x, y, t)$	-	time varying water depth (m)
$\zeta(x, y, t)$	-	surface elevation (m)
$p(x, y, t)$	-	flux density in the x-direction ($m^3/s/m$)
$q(x, y, t)$	-	flux density in the y-direction ($m^3/s/m$)
(u, v) ; (u, v)	-	depth averaged velocity in x and y direction
$C(x, y)$	-	Chezy resistance ($m^{1/2}/s$)
g	-	gravitational acceleration (m/s^2)
$f(V)$	-	wind friction factor
$V, V_x, V_y(x, y, t)$	-	wind speed and components in x and y directions (m/s)
$\Omega(x, y)$	-	Coriolis parameter (latitude dependent) (s^{-1})
$p_a(x, y, t)$	-	atmospheric pressure ($Kg/m/s^2$)
ρ_w	-	density of water (kg/m^3)
x, y	-	space coordinates (m)
t	-	time (s)
$\tau_{xx}, \tau_{xy}, \tau_{yy}$	-	components of effective shear stress



5.4. Boundary conditions

The coarse resolution model is forced by the tidal water level variations along the open sea boundaries. For the generation of these boundary conditions, the global tide database is used. These boundary conditions for the coarse resolution model are prescribed as time series of tidal water level variations along the open boundaries of the model. If the tidal constituents along the boundaries of the coarse resolution model are available, then the boundary conditions are represented by:

$$h_t = A_0 + \sum_{i=1}^n f_i A_i \cos(\omega_i t + (V_0 + u)_i g_i)$$

With:

h_t	=	water level at time = t
A_0	=	mean value of the signal
A_i	=	amplitude of component i
f_i	=	nodal amplitude factor of component i
ω_i	=	angular frequency of component i
$(V_0 + u)_i$	=	astronomic argument of component i
g_i	=	phase lag of component i

5.5. Calibration and validation

The model is calibrated using the predicted tides for the period from 01.03.24 to 30.03.24 with the simulated tides. The comparison of predicted tides and simulated tides is shown in Fig. 5.3. A good agreement is observed between the measured tides and simulated tides.

5.6. Model simulations

The tide induced flow fields were simulated for the following different scenarios:

- One lunar month i.e., for 28 days
- Three seasons, i.e., fair weather, southwest monsoon and northeast monsoon.
- Without breakwater
- With breakwater

The simulated currents are presented for the following typical scenarios.

- Fair weather (March) - Flood and ebb phases of spring tide and neap tide,*
- Southwest monsoon (July) - Flood and ebb phases of spring tide and neap tide, and*
- Northeast monsoon (November) - Flood and ebb phases of spring tide and neap tide.*



5.7. Results - Flow field

In order to assess the influence of breakwaters in the nearshore region, the flow field has been simulated over the project region for the existing scenario (without the presence of breakwater) and the scenario after the construction of the breakwater. The time series variations of simulated tide, current speed, and direction were extracted at three points for both scenarios, as shown in **Fig. 5.4**. These points correspond to the entrance of the estuary (Stn. E1), near the turning circle (Stn. E2), and inside the river (Stn. E3).

5.7.1. Flow field without breakwater

Fairweather

Spring tide: The tide induced flow fields on a *spring tidal day* in case of without breakwater, when the wind effect is absent during flood and ebb tides are shown in **Fig. 5.5**. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.21 m/s and directed towards east. At station E2, the current speed showed around 0.25 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.33 m/s, and the direction is towards southeast. On the other hand, during the ebb tide, the maximum current speed at station E1 was 0.16 m/s and it is directed towards west. At station E2, the current speed remained at 0.21 m/s and directed towards north. At station E3 inside the river, the current speed is 0.29 m/s, and the direction is towards northwest.

Neap tide: The tide induced flow fields on a *neap tidal day* in case of without breakwater, when the wind effect is absent during flood and ebb tides are shown in **Fig. 5.6**. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.13 m/s and directed towards east. At station E2, the current speed showed around 0.17 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.24 m/s and the direction is towards southeast. On the other hand, during the ebb tide, the maximum current speed at station E1 was 0.10 m/s and it is directed towards west. At station E2, the current speed remained at 0.13 m/s and directed towards north. At station E3 inside the river, the current speed is 0.18 m/s and the direction is towards northwest.

Southwest monsoon

Spring tide: The tide induced flow fields on a *spring tidal day* in case of without breakwater, when the wind effect is maximum during southwest monsoon in case of flooding and ebbing tides are shown in **Fig. 5.7**. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.25 m/s and directed towards northeast. At station E2, the current speed showed around 0.27 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.37 m/s and the direction is towards southeast. On the other hand, during the ebb tide, the maximum current speed at station E1 was 0.18 m/s and it is directed towards southwest. At station E2, the current speed remained at 0.21 m/s and directed towards southwest. At station E3 inside the river, the current speed is 0.32 m/s and the direction is towards northwest.



Neap tide: The tide induced flow fields on a *neap tidal day* in case of without breakwater, when the wind effect is maximum during southwest monsoon in case of flooding and ebbing tides are shown in **Fig. 5.8**. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.13 m/s and directed towards northeast. At station E2, the current speed showed around 0.18 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.26 m/s, and the direction is towards southeast. On the other hand, during the ebb tide, the maximum current speed at station E1 was 0.10 m/s and it is directed towards southwest. At station E2, the current speed remained at 0.13 m/s and directed towards southwest. At station E3 inside the river, the current speed is 0.20 m/s, and the direction is towards northwest.

Northeast monsoon

Spring tide: The tide induced flow fields on a *spring tidal day* in case of without breakwater, when the wind effect is maximum during northeast monsoon in case of flooding and ebbing tides are shown in **Fig. 5.9**. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.23 m/s and directed towards southeast. At station E2, the current speed showed around 0.26 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.35 m/s and the direction is towards southeast. On the other hand, during the ebb tide, the maximum current speed at station E1 was 0.17 m/s and it is directed towards southwest. At station E2, the current speed remained at 0.21 m/s and directed towards southwest. At station E3 inside the river, the current speed is 0.26 m/s, and the direction is towards northwest.

Neap tide: The wind and tide induced flow fields on a *neap tidal day* in case of without breakwater, when the wind effect is maximum in northeast monsoon are shown in case of flooding and ebbing tides in **Fig. 5.10**. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.13 m/s and directed towards southeast. At station E2, the current speed showed around 0.17 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.25 m/s, and the direction is towards southeast. On the other hand, during the ebb tide, the maximum current speed at station E1 was 0.10 m/s and it is directed towards southwest. At station E2, the current speed remained at 0.13 m/s and directed towards southwest. At station E3 inside the river, the current speed is 0.19 m/s, and the direction is towards northwest.

The time series variation of simulated tides, current speed, and direction for each extraction points during during fair weather, southwest monsoon and northeast monsoon are shown in **Fig. 5.11** to **Fig. 5.19** respectively.

5.7.2. Flow field with breakwater

Fairweather

Spring tide: The tide induced flow fields on a *spring tidal day* in case of with breakwater, when the wind effect is absent during flood and ebb tides are shown in **Fig. 5.20**. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.22 m/s and directed towards southeast. At station E2, the current speed showed around 0.46 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.36 m/s, and the direction is towards

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southeast. On the other hand, during the ebb tide, the maximum current speed at station E1 was 0.17 m/s and it is directed towards southwest. At station E2, the current speed remained at 0.39 m/s and directed towards north. At station E3 inside the river, the current speed is 0.30 m/s, and the direction is towards northwest.

Neap tide: The tide induced flow fields on a *neap tidal day* in case of with breakwater, when the wind effect is absent during flood and ebb tides are shown in **Fig. 5.21**. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.15 m/s and directed towards southeast. At station E2, the current speed showed around 0.31 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.24 m/s and the direction is towards southeast. On the other hand, during the ebb tide, the maximum current speed at station E1 was 0.12 m/s and it is directed towards southwest. At station E2, the current speed remained at 0.24 m/s and directed towards north. At station E3 inside the river, the current speed is 0.18 m/s and the direction is towards northwest.

Southwest monsoon

Spring tide: The tide induced flow fields on a *spring tidal day* in case of with breakwater, when the wind effect is maximum during southwest monsoon in case of flooding and ebbing tides are shown in **Fig. 5.22**. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.25 m/s and directed towards northeast. At station E2, the current speed showed around 0.57 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.42 m/s and the direction is towards southeast. On the other hand, during the ebb tide, the maximum current speed at station E1 was 0.20 m/s and it is directed towards southwest. At station E2, the current speed remained at 0.50 m/s and directed towards southwest. At station E3 inside the river, the current speed is 0.38 m/s and the direction is towards northwest.

Neap tide: The tide induced flow fields on a *neap tidal day* in case of with breakwater, when the wind effect is maximum during southwest monsoon in case of flooding and ebbing tides are shown in **Fig. 5.23**. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.22 m/s and directed towards northeast. At station E2, the current speed showed around 0.47 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.38 m/s, and the direction is towards southeast. On the other hand, during the ebb tide, the maximum current speed at station E1 was 0.18 m/s and it is directed towards southwest. At station E2, the current speed remained at 0.41 m/s and directed towards southwest. At station E3 inside the river, the current speed is 0.29 m/s, and the direction is towards northwest.

Northeast monsoon

Spring tide: The tide induced flow fields on a *spring tidal day* in case of with breakwater, when the wind effect is maximum during northeast monsoon in case of flooding and ebbing tides are shown in **Fig. 5.24**. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.23 m/s and directed towards southeast. At station E2, the current speed showed around 0.54 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.41 m/s and the direction is towards southeast. On the other hand, during the ebb tide, the



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maximum current speed at station E1 was 0.18 m/s and it is directed towards southwest. At station E2, the current speed remained at 0.46 m/s and directed towards southwest. At station E3 inside the river, the current speed is 0.37 m/s, and the direction is towards northwest.

Neap tide: The wind and tide induced flow fields on a neap tidal day in case of with breakwater, when the wind effect is maximum in northeast monsoon are shown in case of flooding and ebbing tides in Fig. 5.25. At station E1, the maximum current speed during the flood tide on a spring tidal day showed around 0.17 m/s and directed towards southeast. At station E2, the current speed showed around 0.39 m/s and directed towards northeast. At station E3 inside the river, the current speed is 0.31 m/s, and the direction is towards southeast. On the other hand, during the ebb tide, the maximum current speed at station E1 was 0.14 m/s and it is directed towards southwest. At station E2, the current speed remained at 0.34 m/s and directed towards southwest. At station E3 inside the river, the current speed is 0.29 m/s, and the direction is towards northwest.

The time series variation of simulated tides, current speed, and direction for each extraction points during during fair weather, southwest monsoon and northeast monsoon are shown in Fig. 5.26 to Fig. 5.34 respectively.

5.8. Conclusions

- The hydrodynamic model indicates that the current speed remains below 0.57 m/s under various conditions, including fair weather and monsoon seasons.
- There is no significant change in the flow field outside the port facilities before and after the construction of breakwater & associated facilities. While the direction of flow varies with tidal conditions and monsoon influences, the overall flow field at the project location remains largely unchanged.
- The construction of the proposed port facilities results in only a minor change in current speed near the project region. However, some current variation is observed at the river mouth between the breakwaters which is located in the navigational channel attributed to dredging activities.
- Based on the flow model for both scenarios, with and without the construction of port facilities, it is inferred that there is no significant change in the overall flow conditions, and a stable condition would prevail after the construction of the port facilities.

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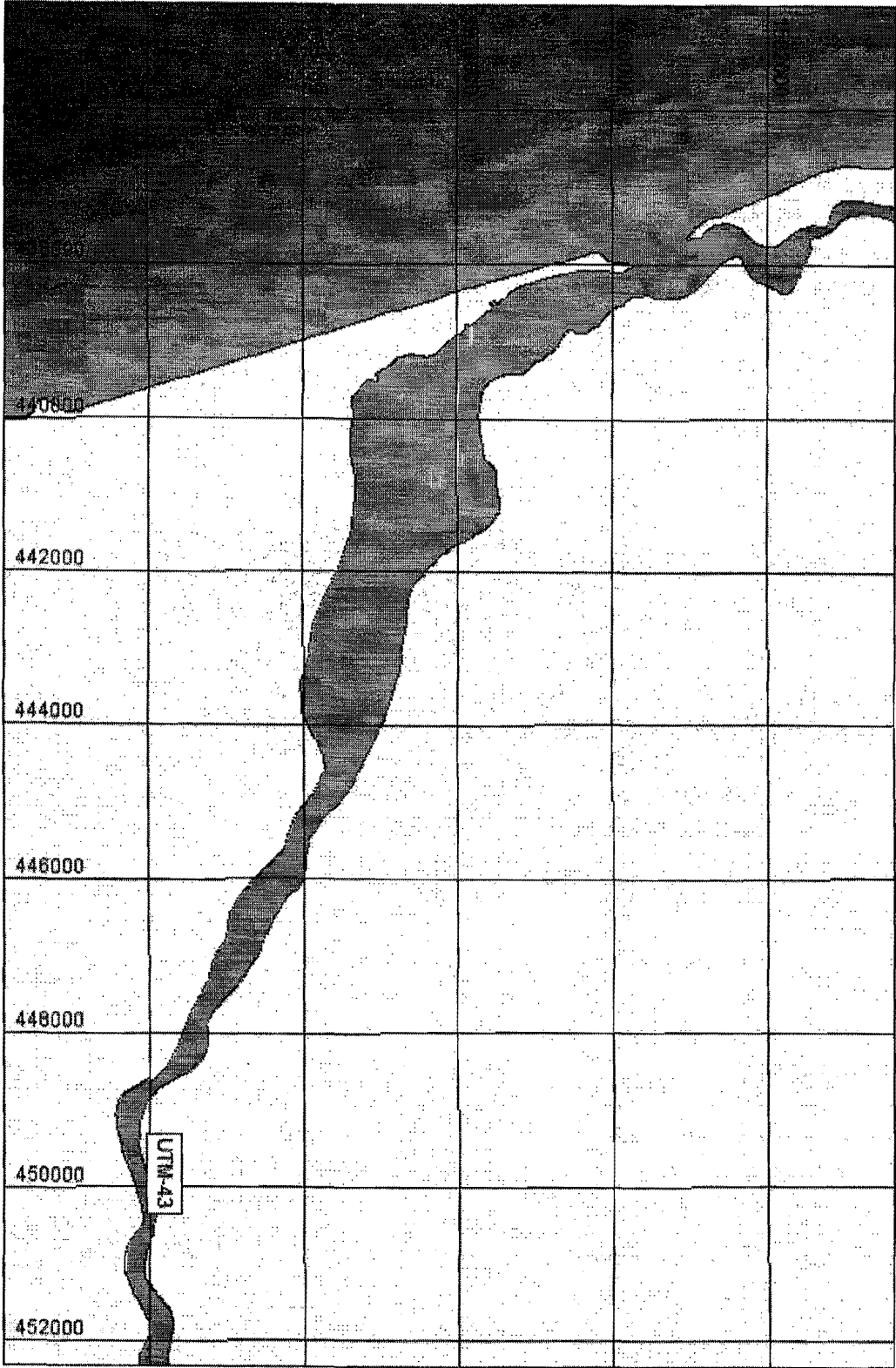
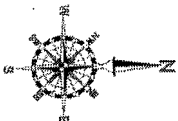
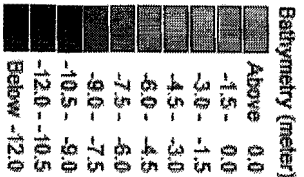


FIG. 5.1. MODEL DOMAIN- WITHOUT BREAKWATER



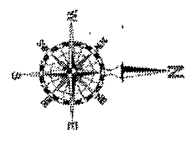
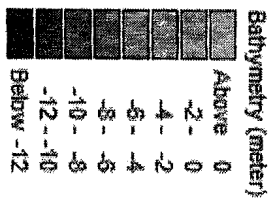
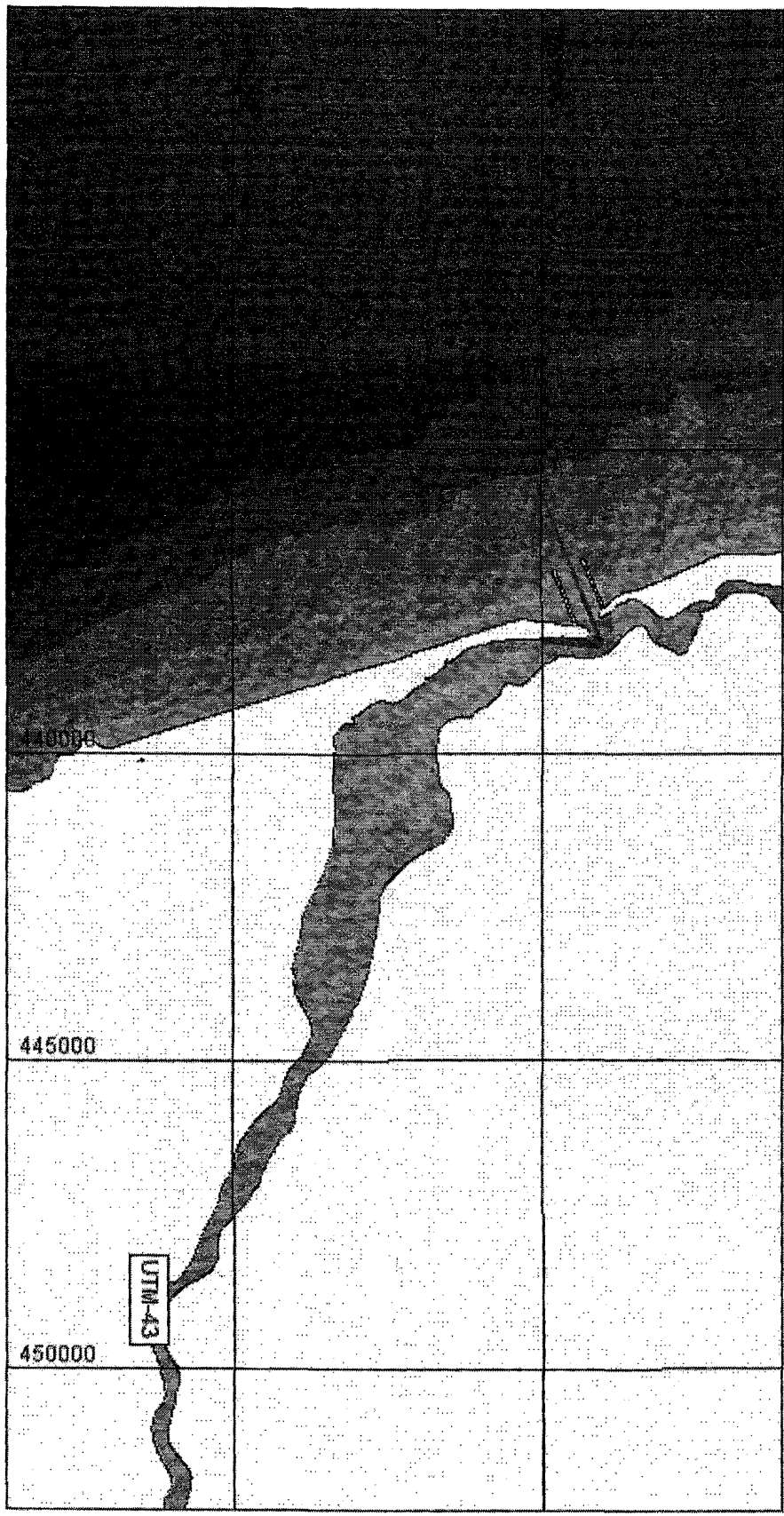
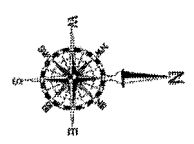
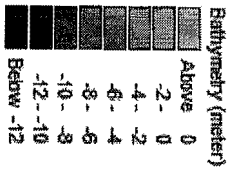
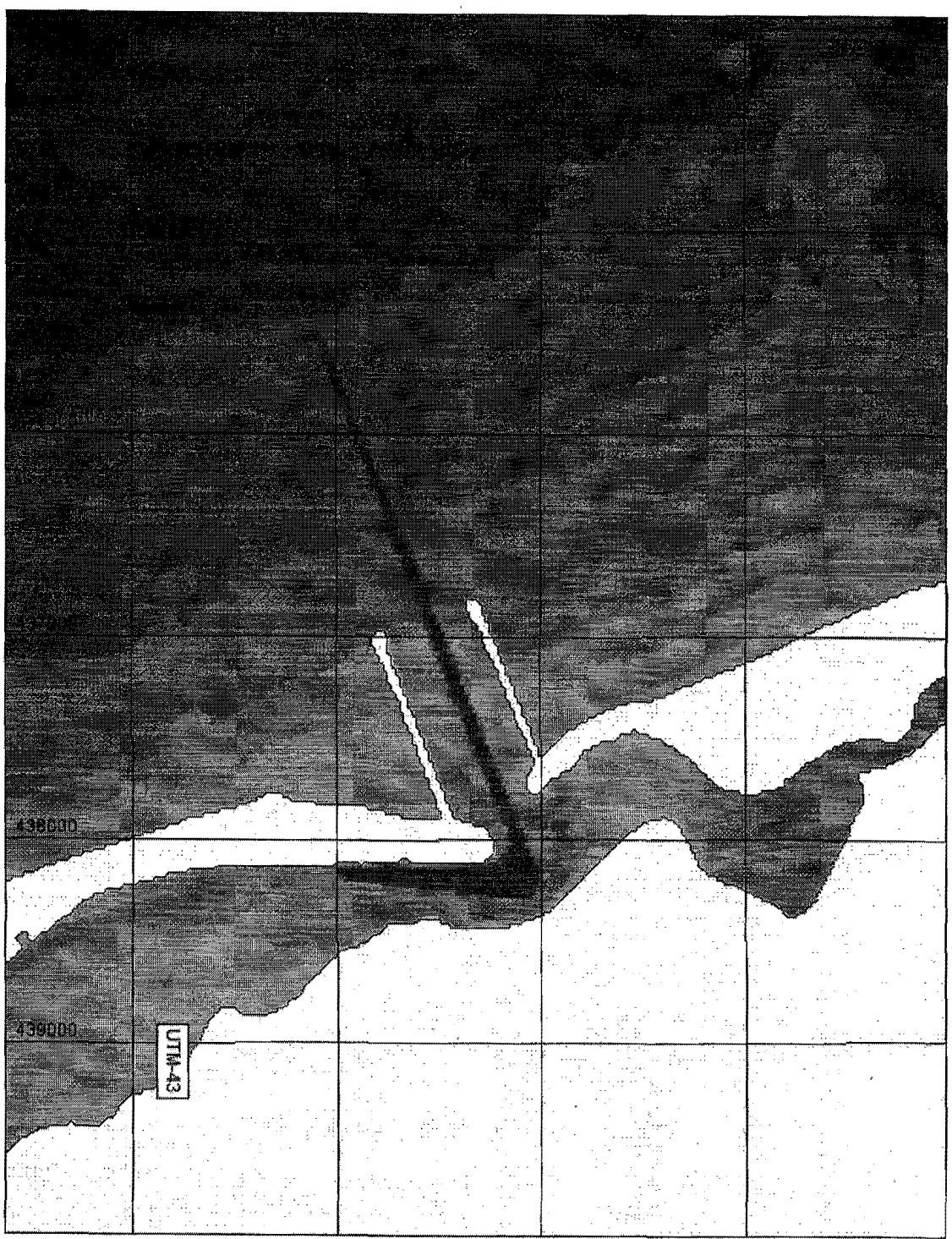


FIG. 5.2(a). MODEL DOMAIN- WITH BREAKWATER

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FIG. 5.2(b). MODEL DOMAIN - WITH BREAKWATER



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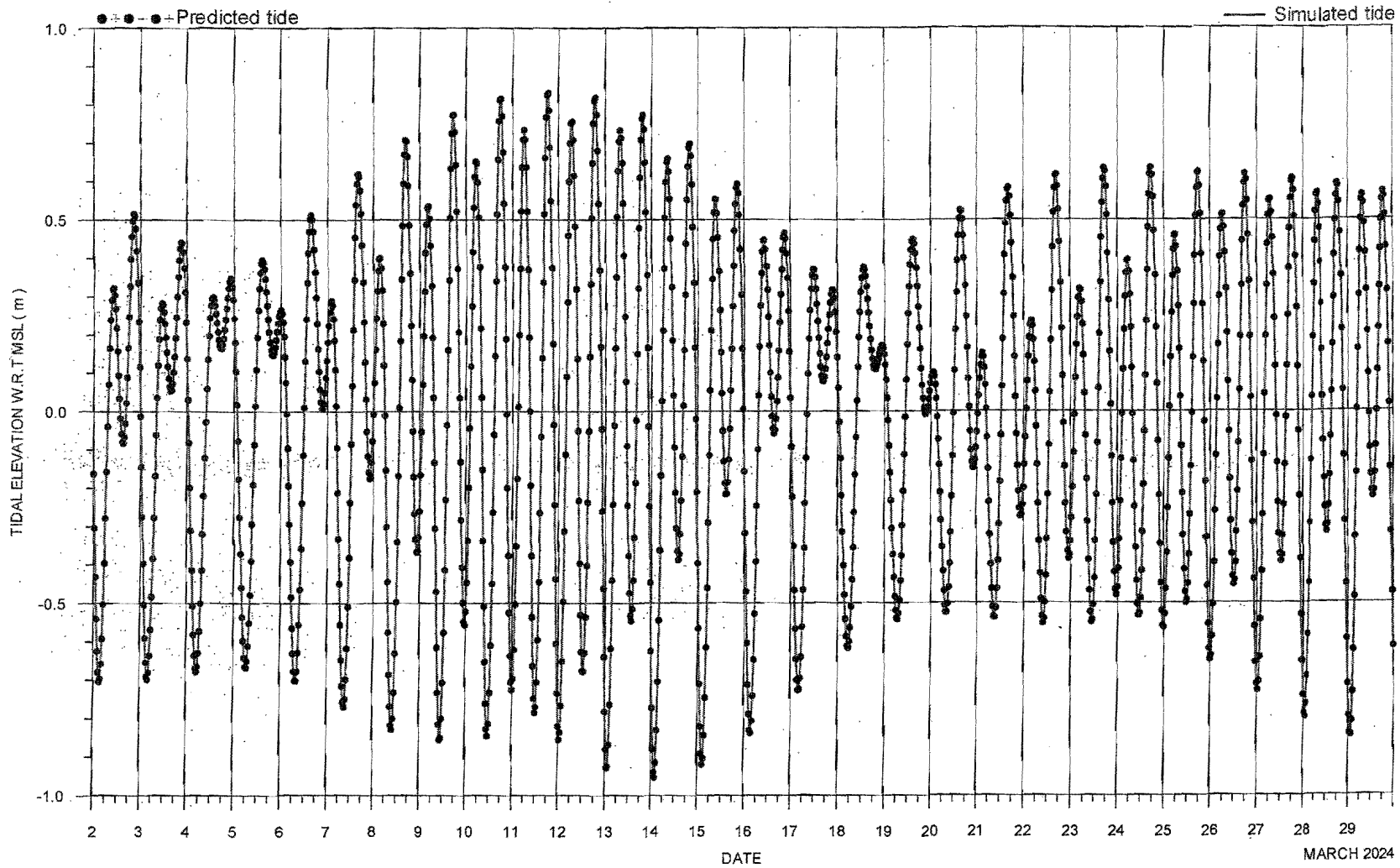


FIG. 5.3. COMPARISON OF PREDICTED AND SIMULATED TIDES

SIZ

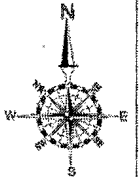


FIG. 5.4. LOCATION OF EXTRACTION POINTS - HONNAVAR

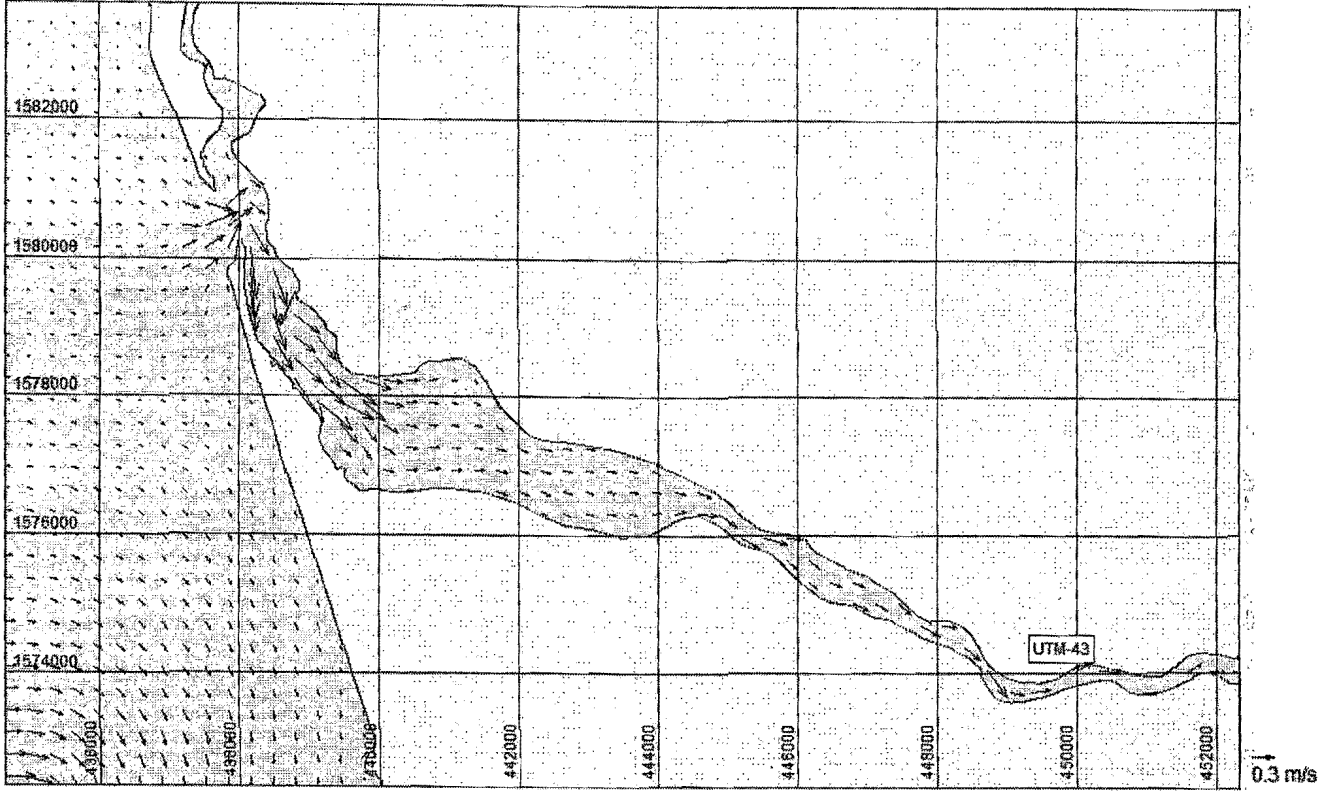
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5J



Flood Phase



Ebb Phase

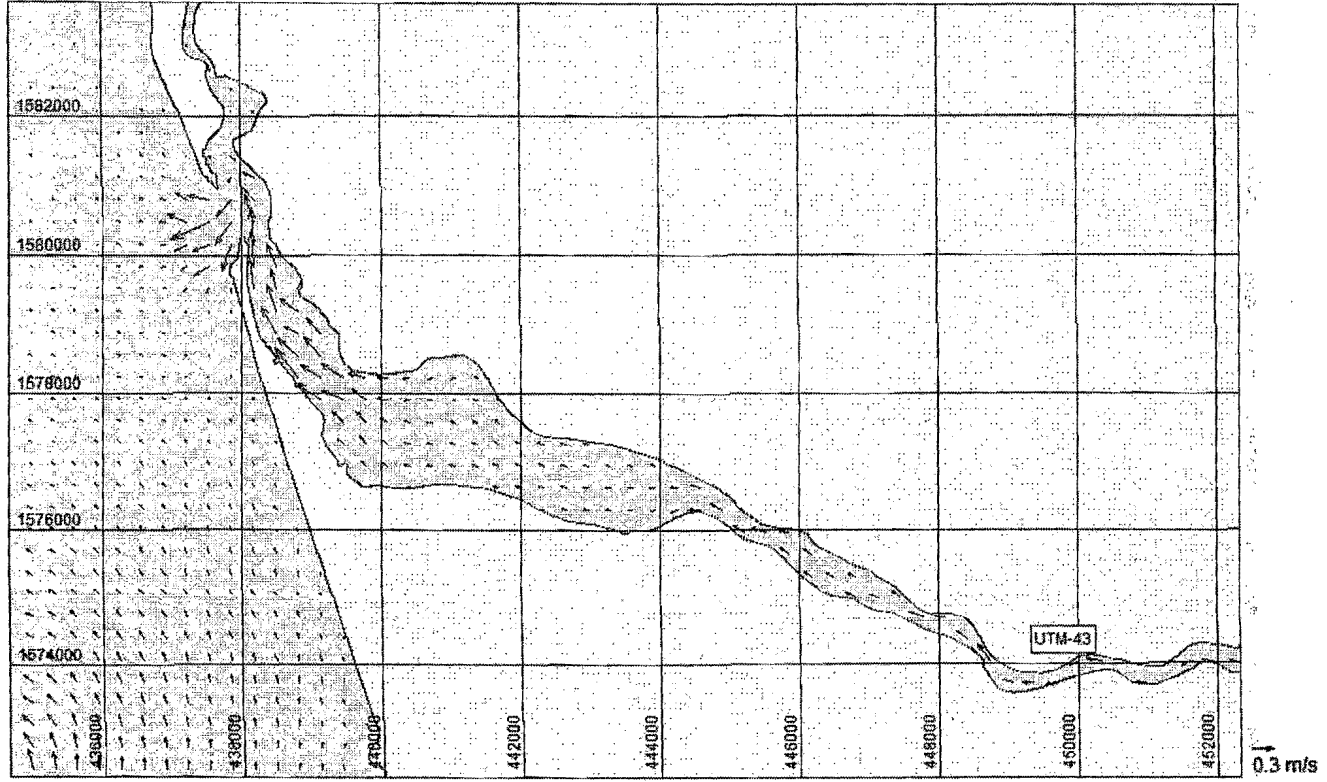
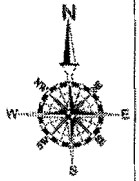
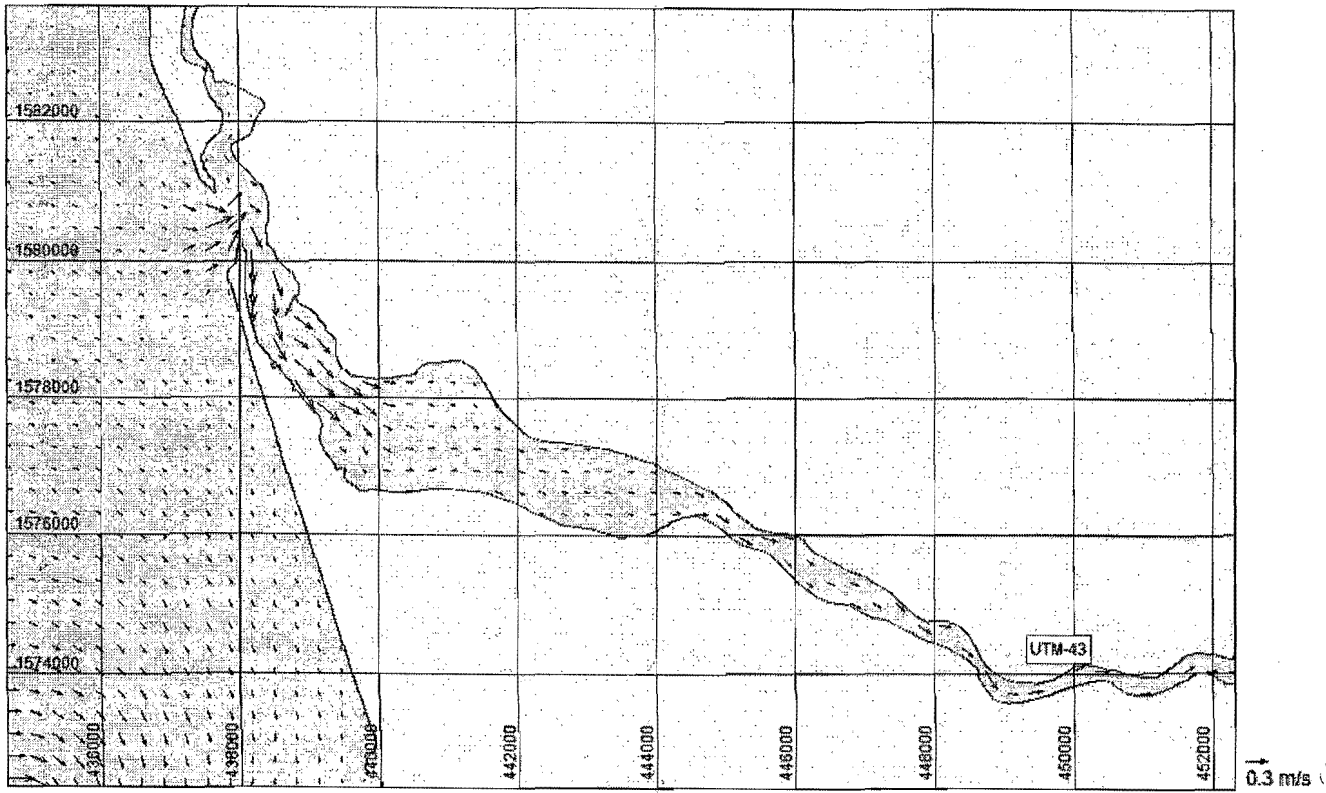


FIG. 5.5. FLOW FIELD - FAIR WEATHER - SPRING TIDE- WITHOUT BREAKWATER



Flood Phase



Ebb Phase

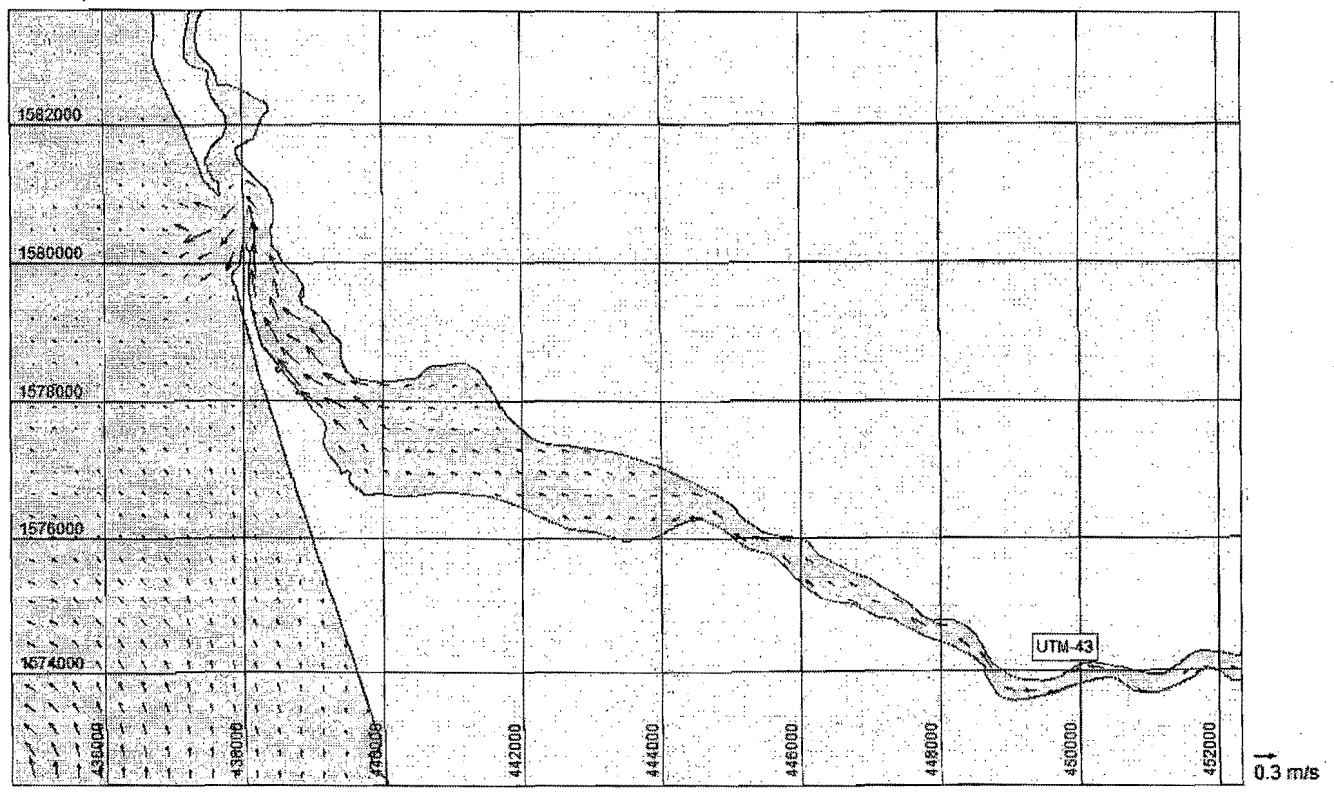
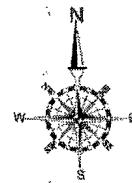
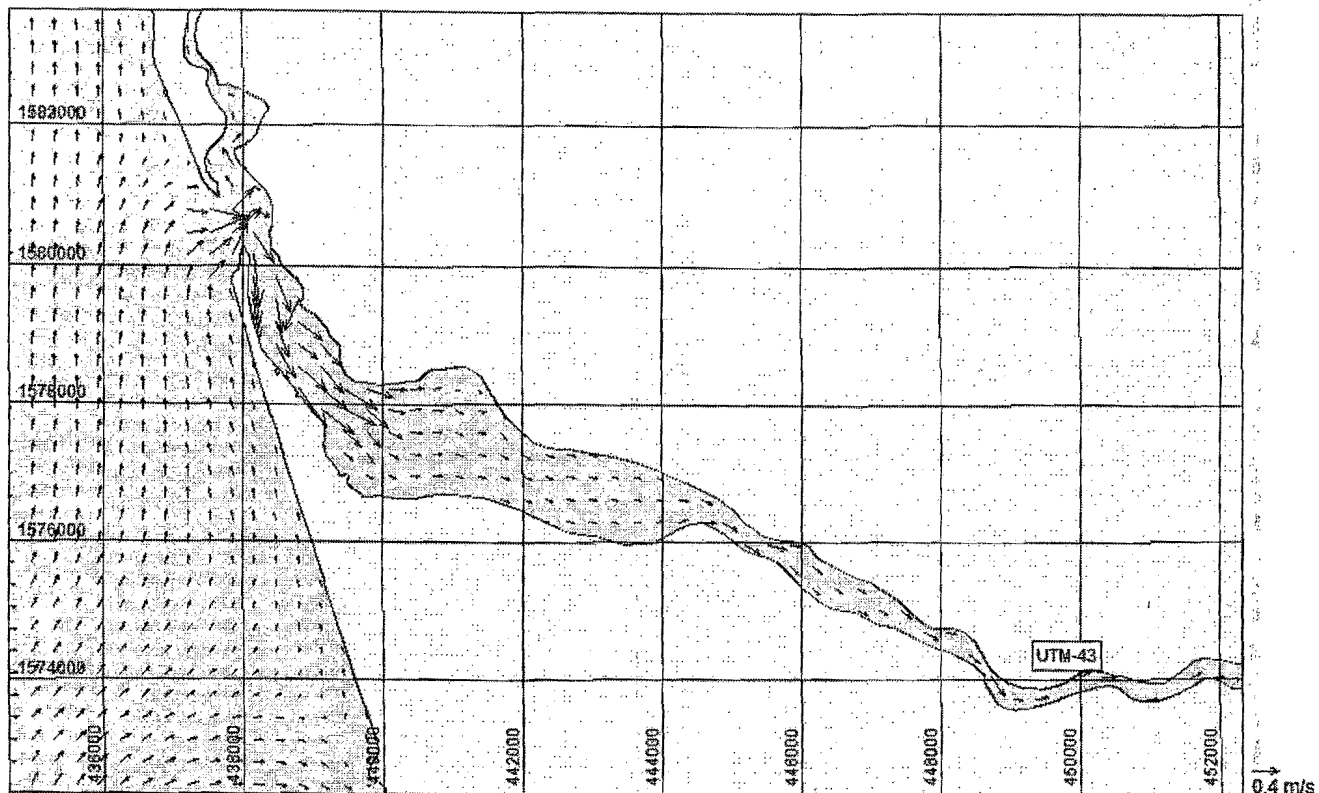


FIG. 5.6. FLOW FIELD - FAIR WEATHER - NEAP TIDE- WITHOUT BREAKWATER



Flood Phase



Ebb Phase

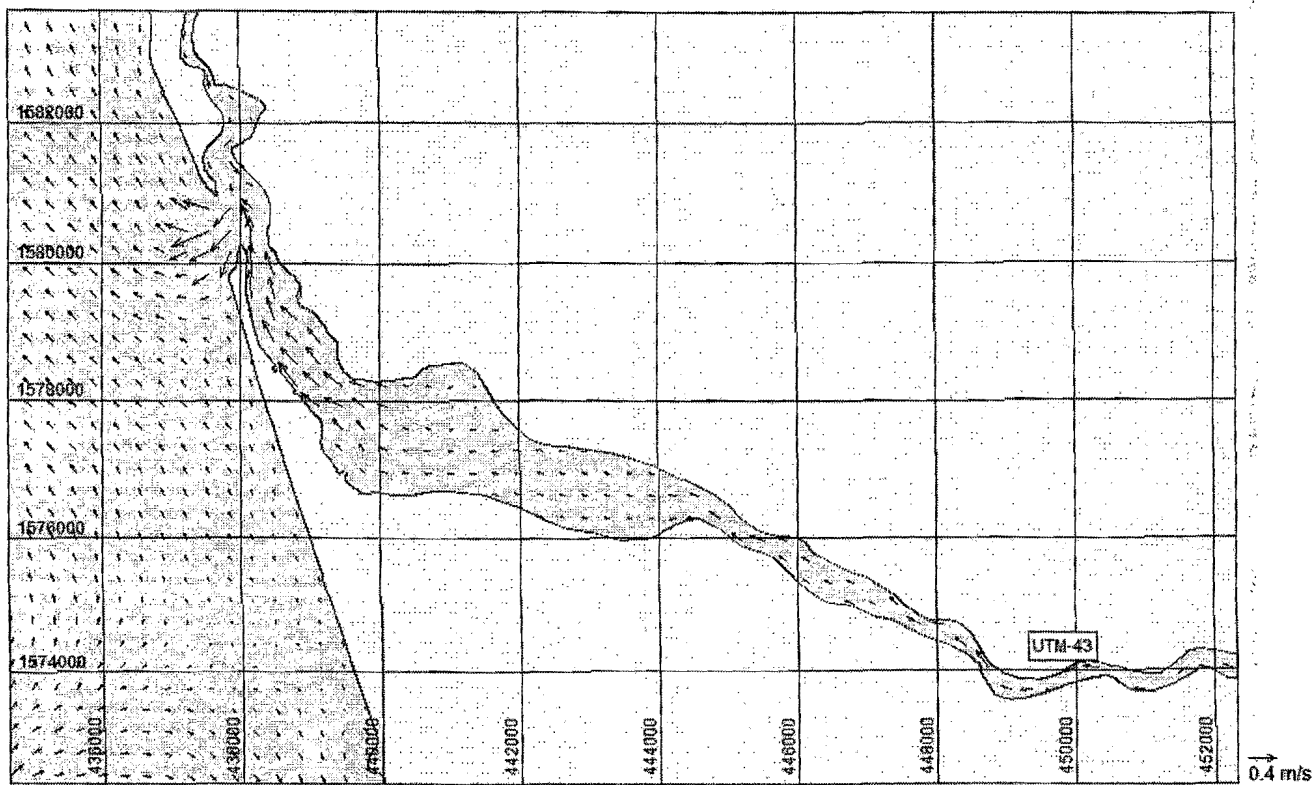
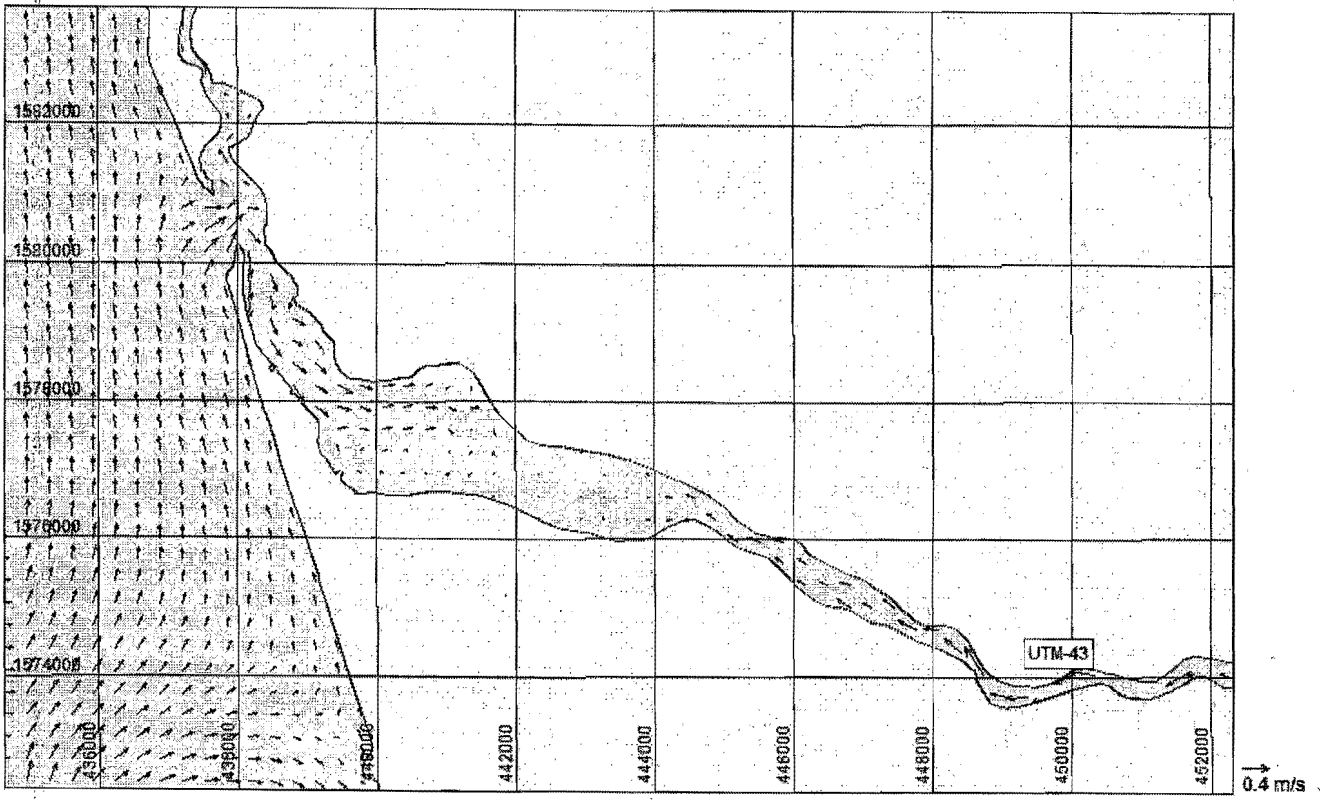
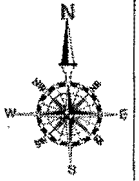


FIG. 5.7. FLOW FIELD - SW MONSOON - SPRING TIDE- WITHOUT BREAKWATER

Flood Phase



Ebb Phase

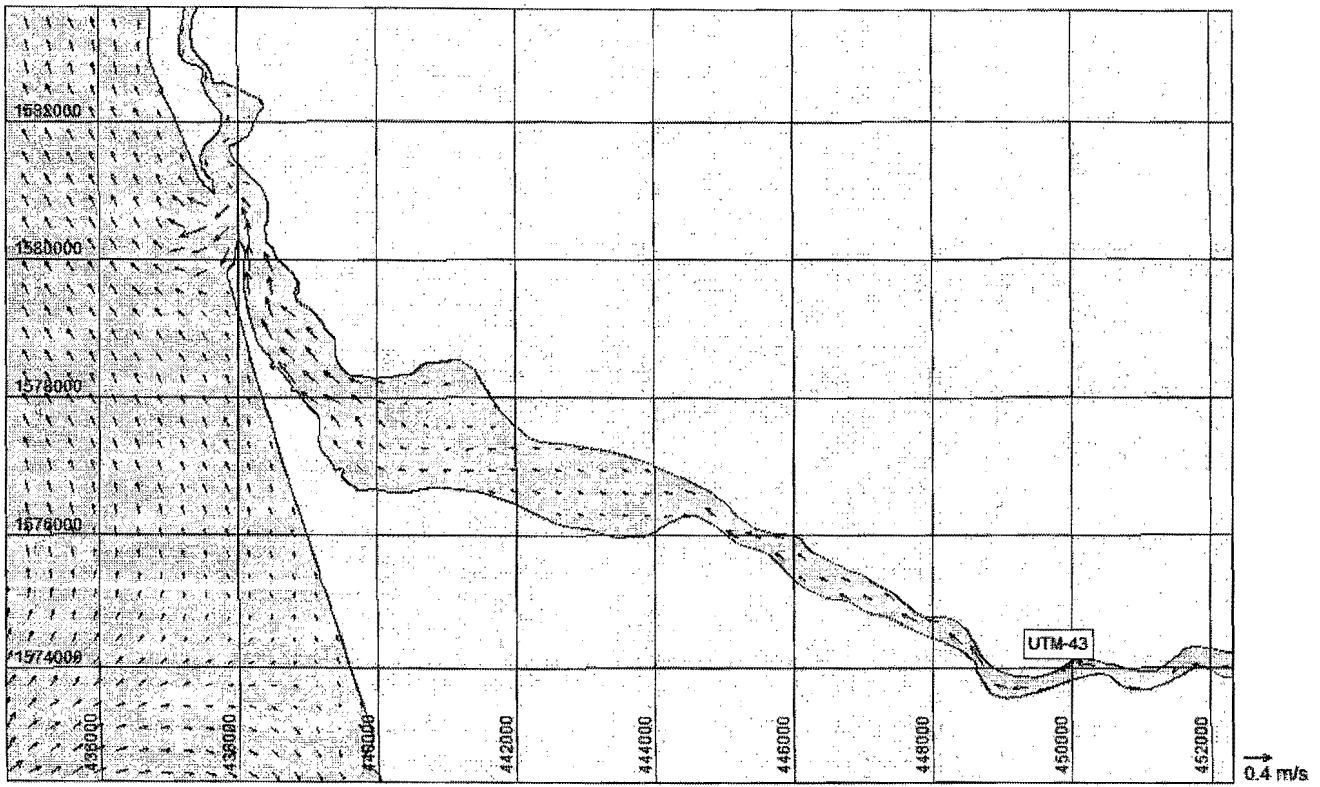
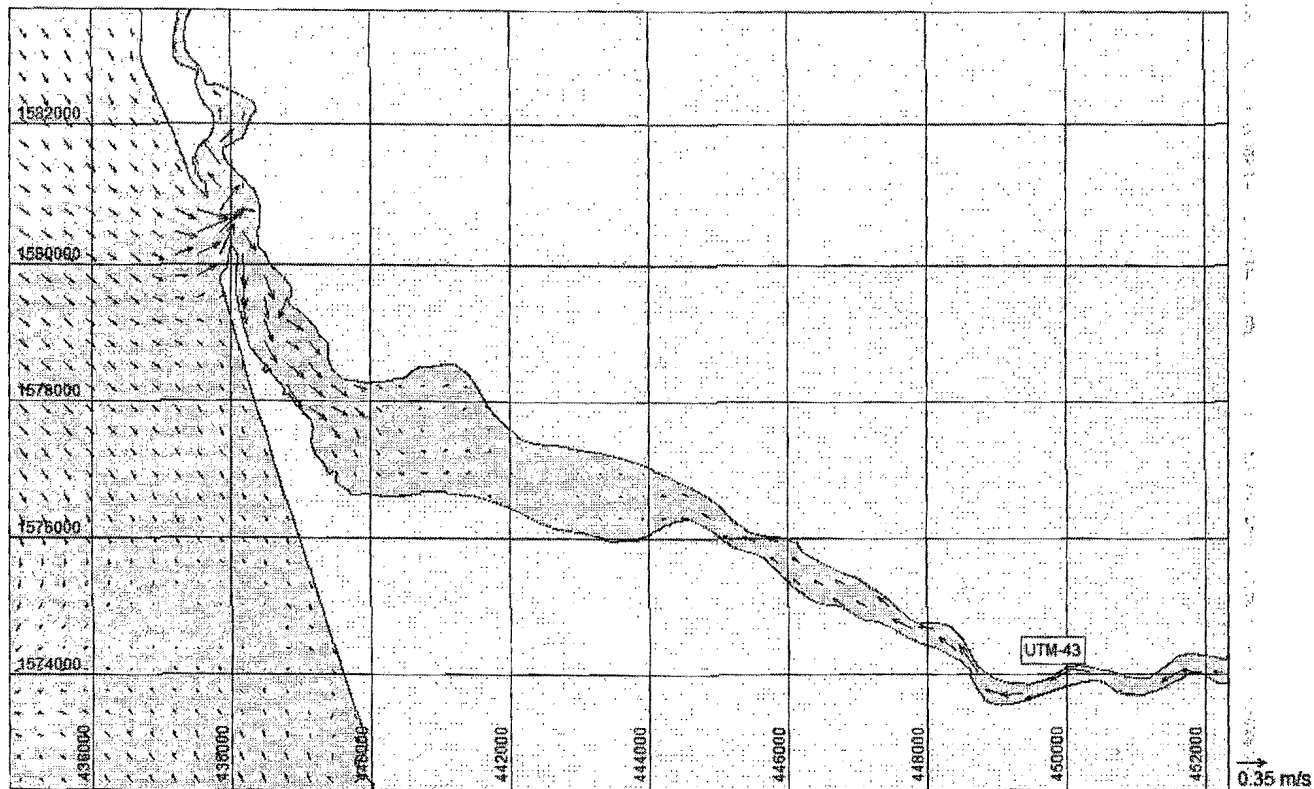


FIG. 5.8. FLOW FIELD - SW MONSOON - NEAP TIDE- WITHOUT BREAKWATER



Flood Phase



Ebb Phase

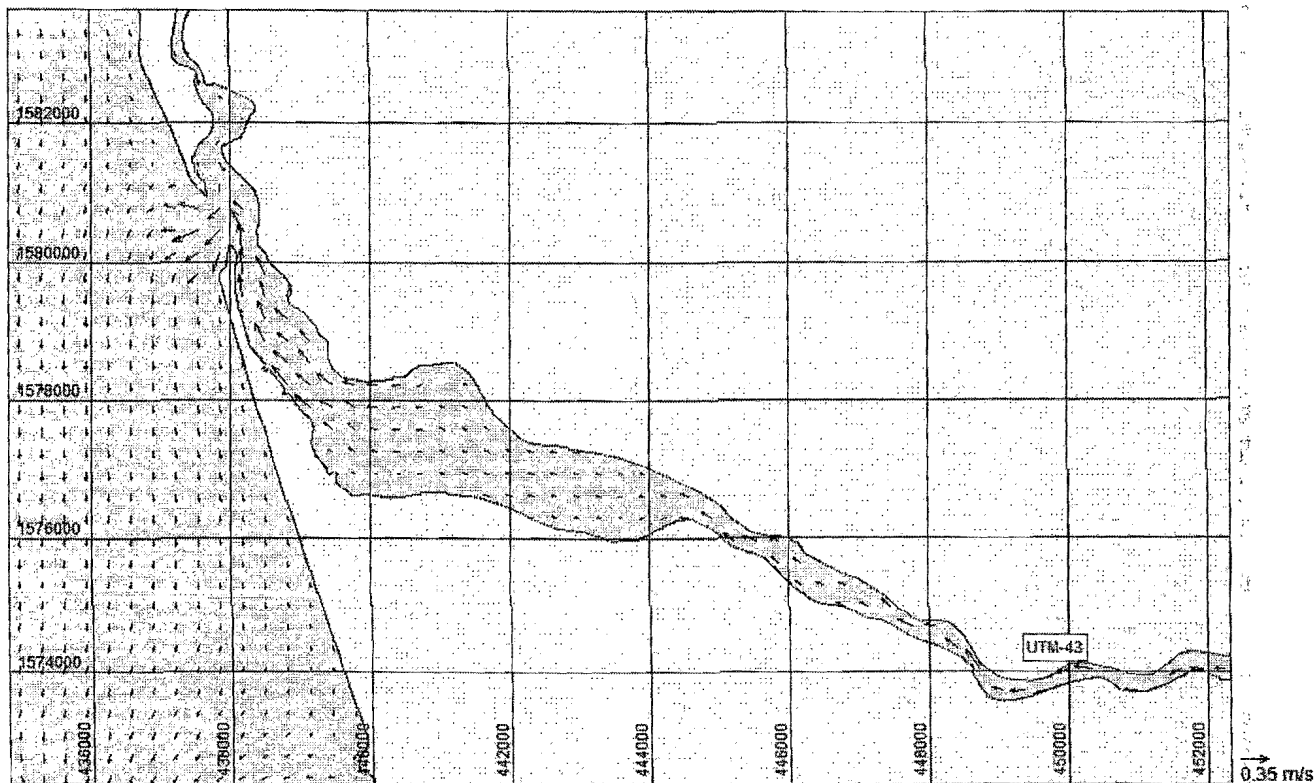
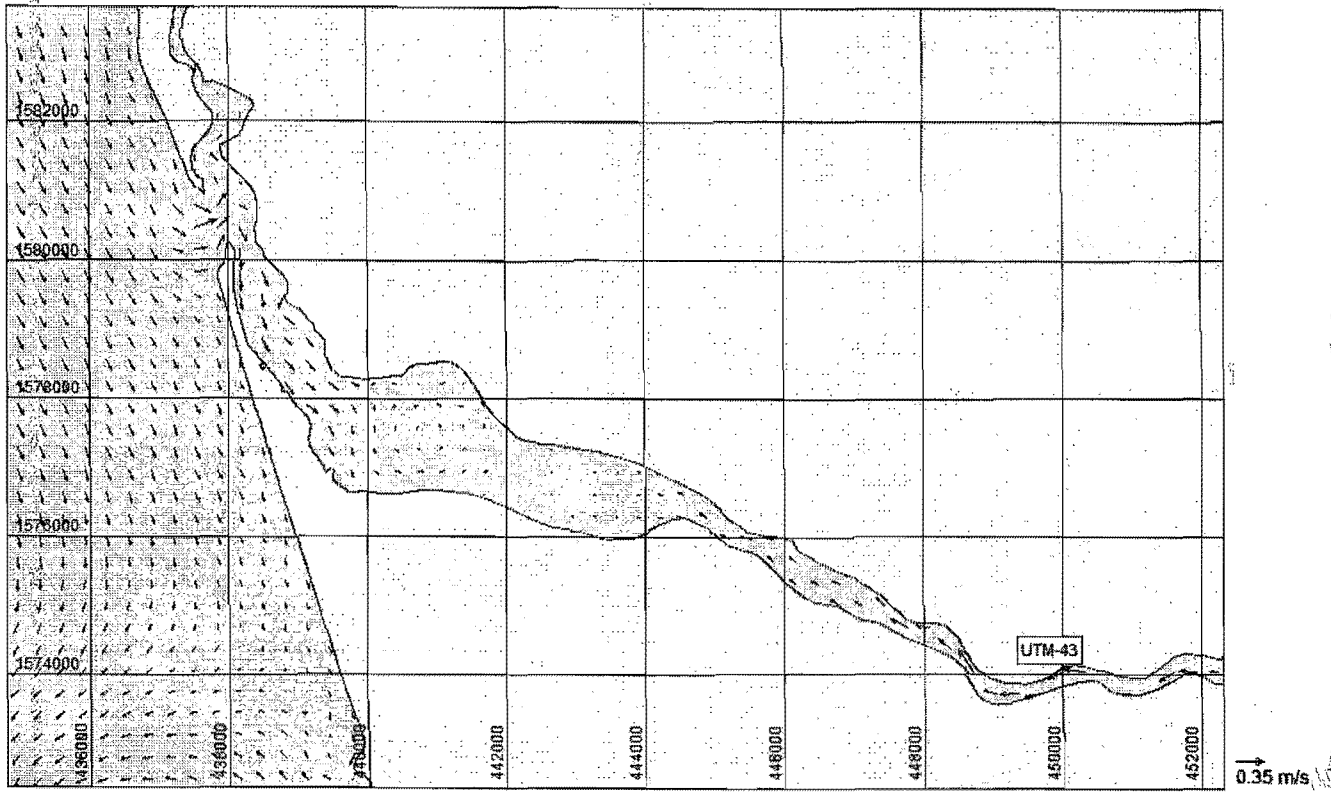
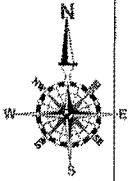


FIG. 5.9. FLOW FIELD - NE MONSOON - SPRING TIDE- WITHOUT BREAKWATER

Flood Phase



Ebb Phase

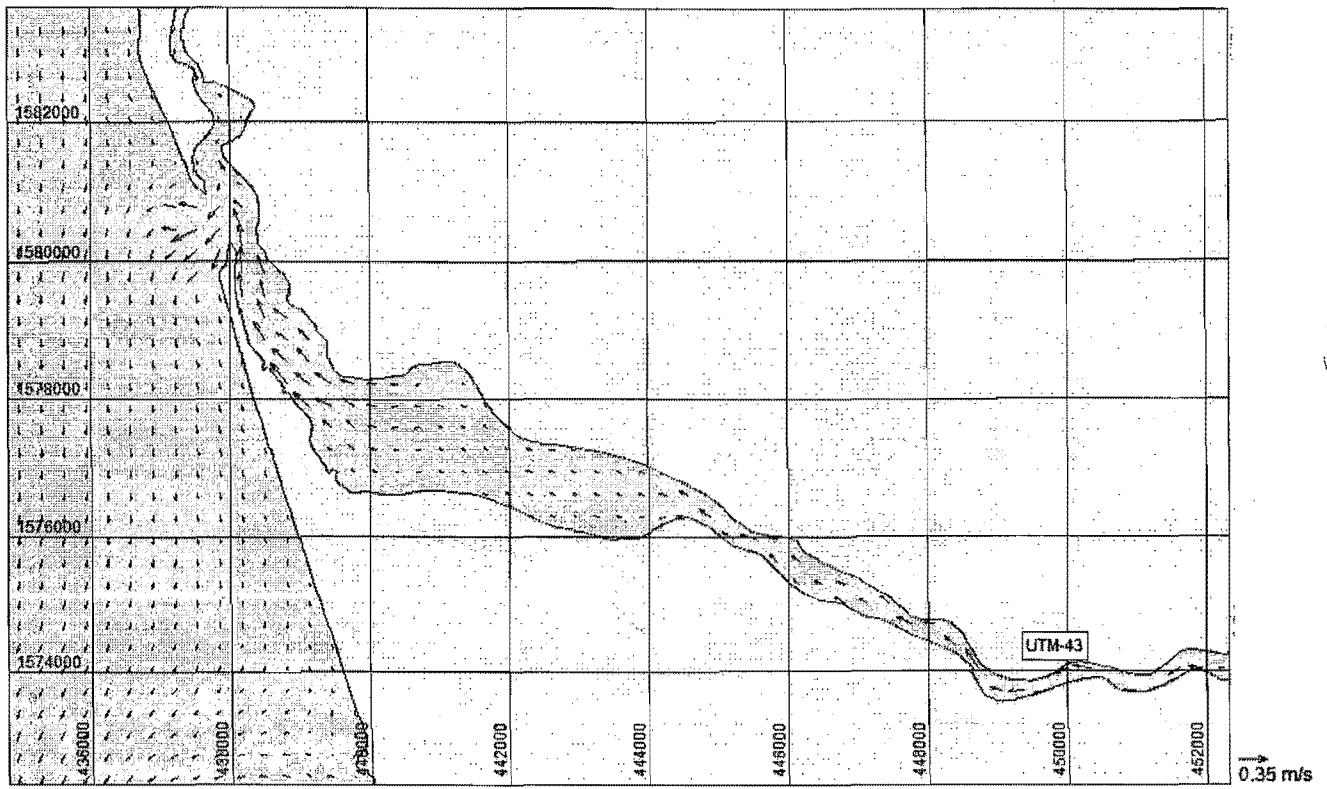


FIG. 5.10. FLOW FIELD - NE MONSOON - NEAP TIDE- WITHOUT BREAKWATER

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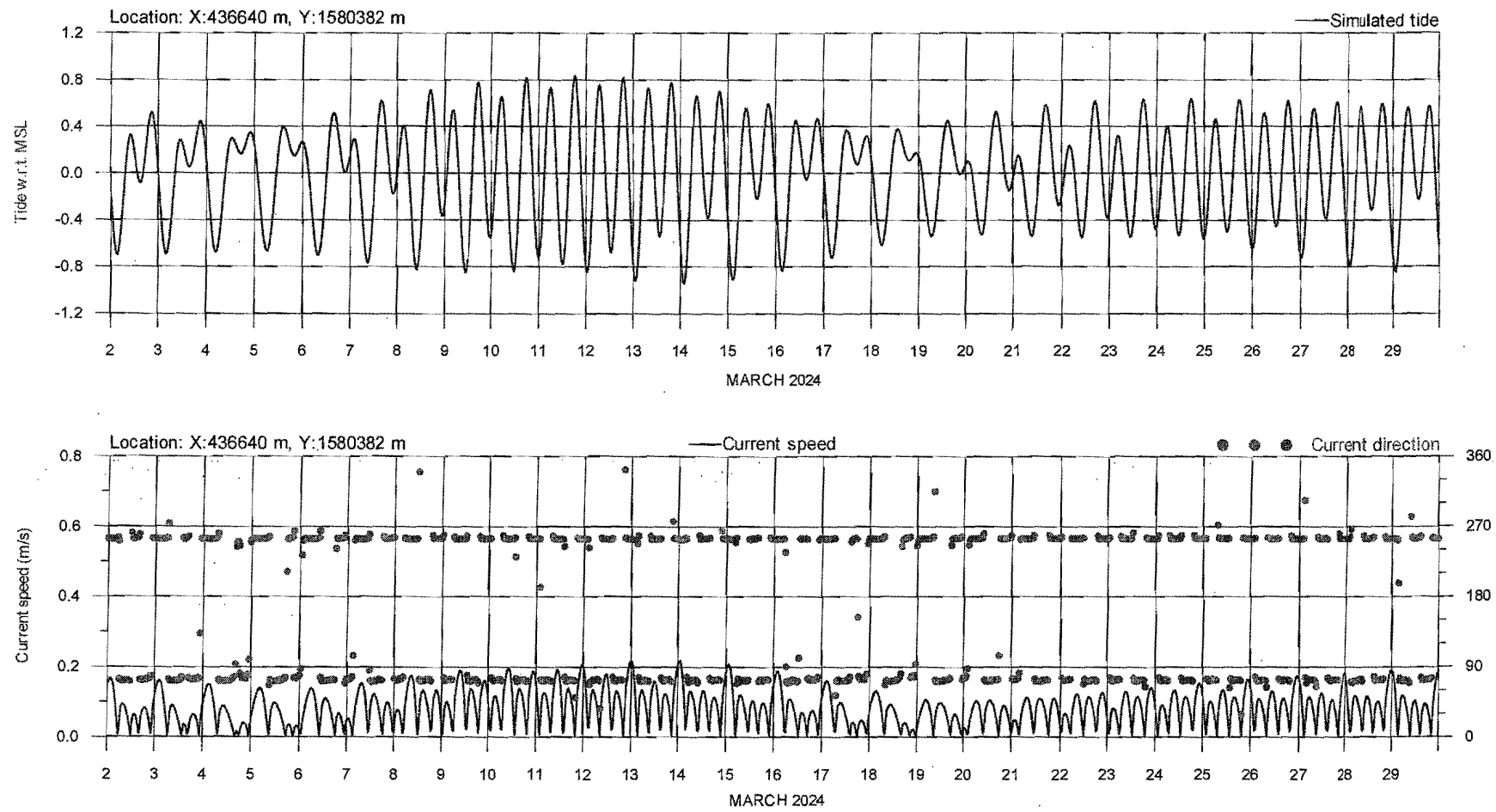


FIG. 5.11. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E1- WITHOUT BREAKWATER- FAIR WEATHER

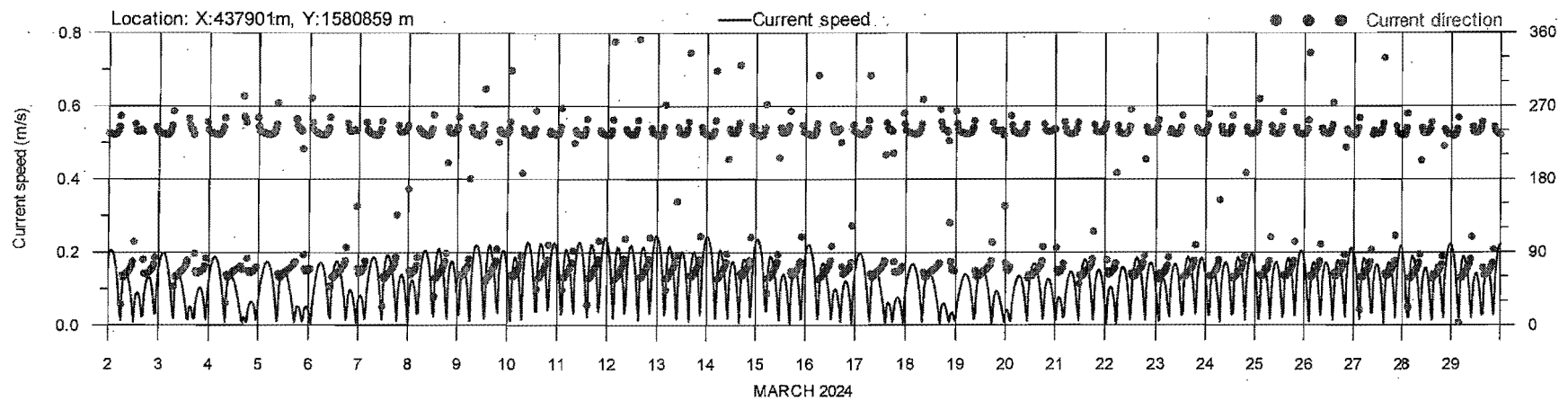
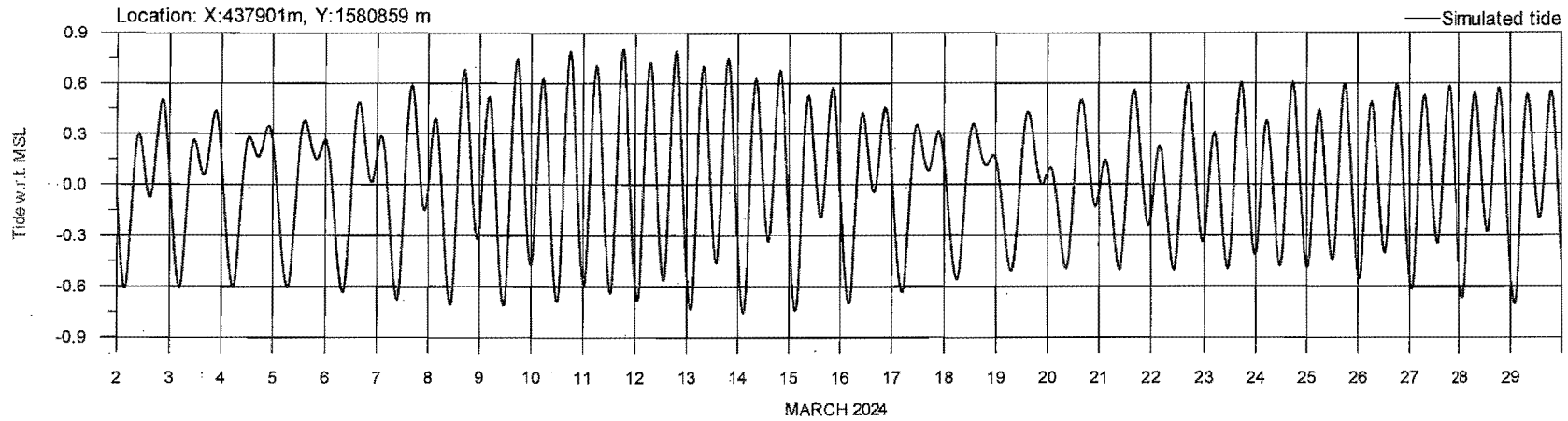


FIG. 5.12. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E2- WITHOUT BREAKWATER FAIR WEATHER

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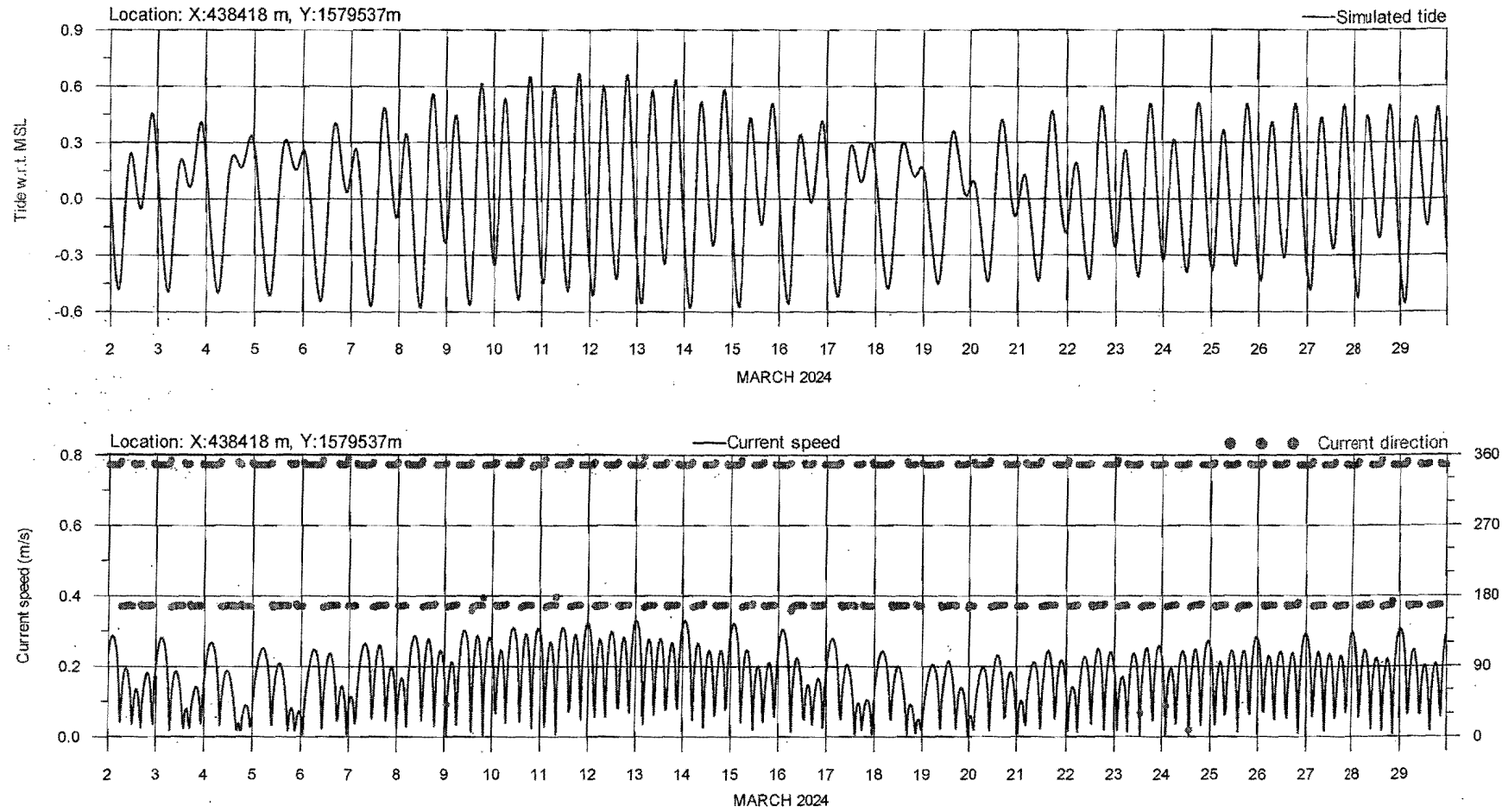


FIG.5.13. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E3- WITHOUT BREAKWATER- FAIR WEATHER

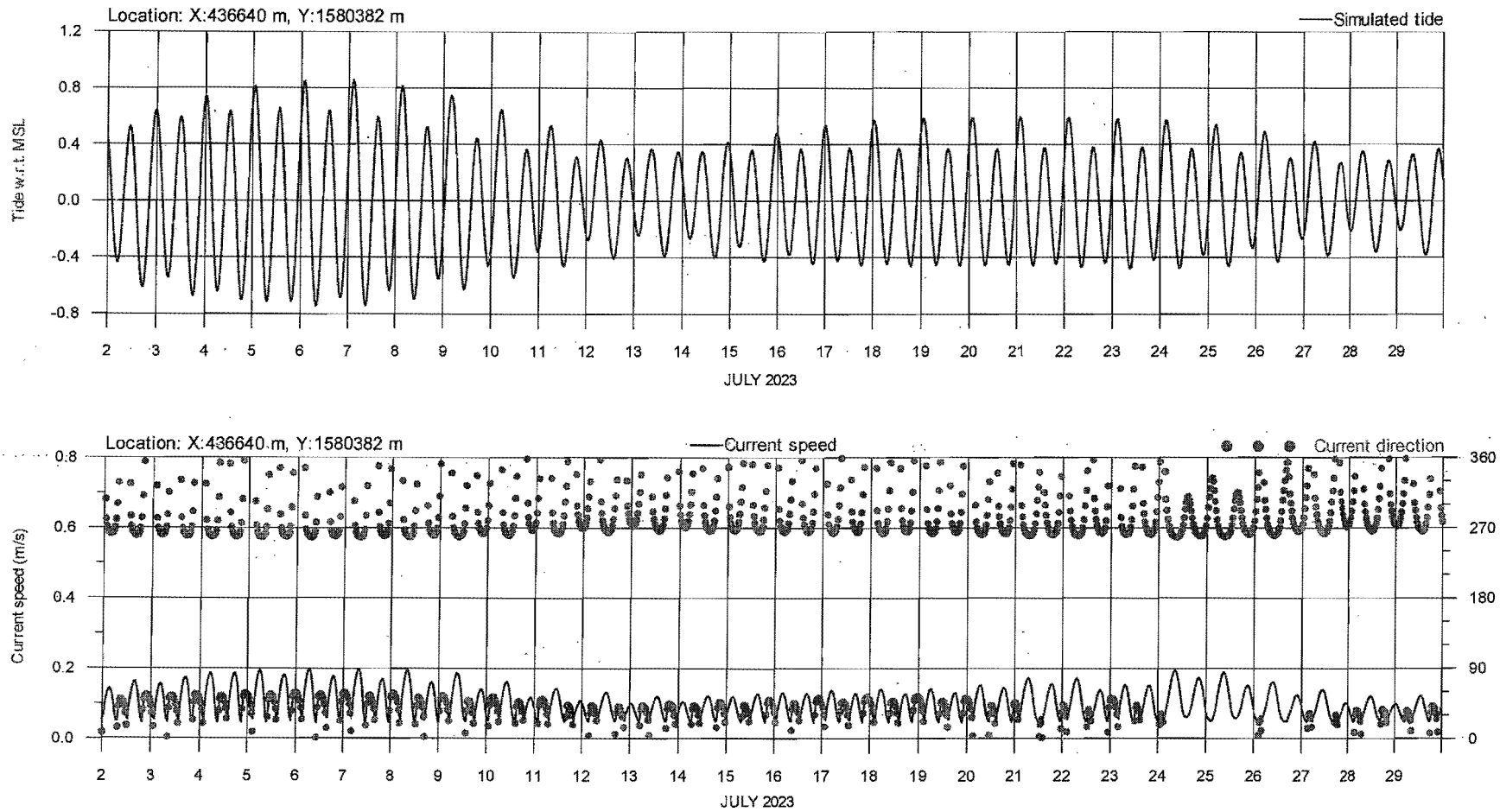


FIG. 5.14. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E1- WITHOUT BREAKWATER- SW MONSOON

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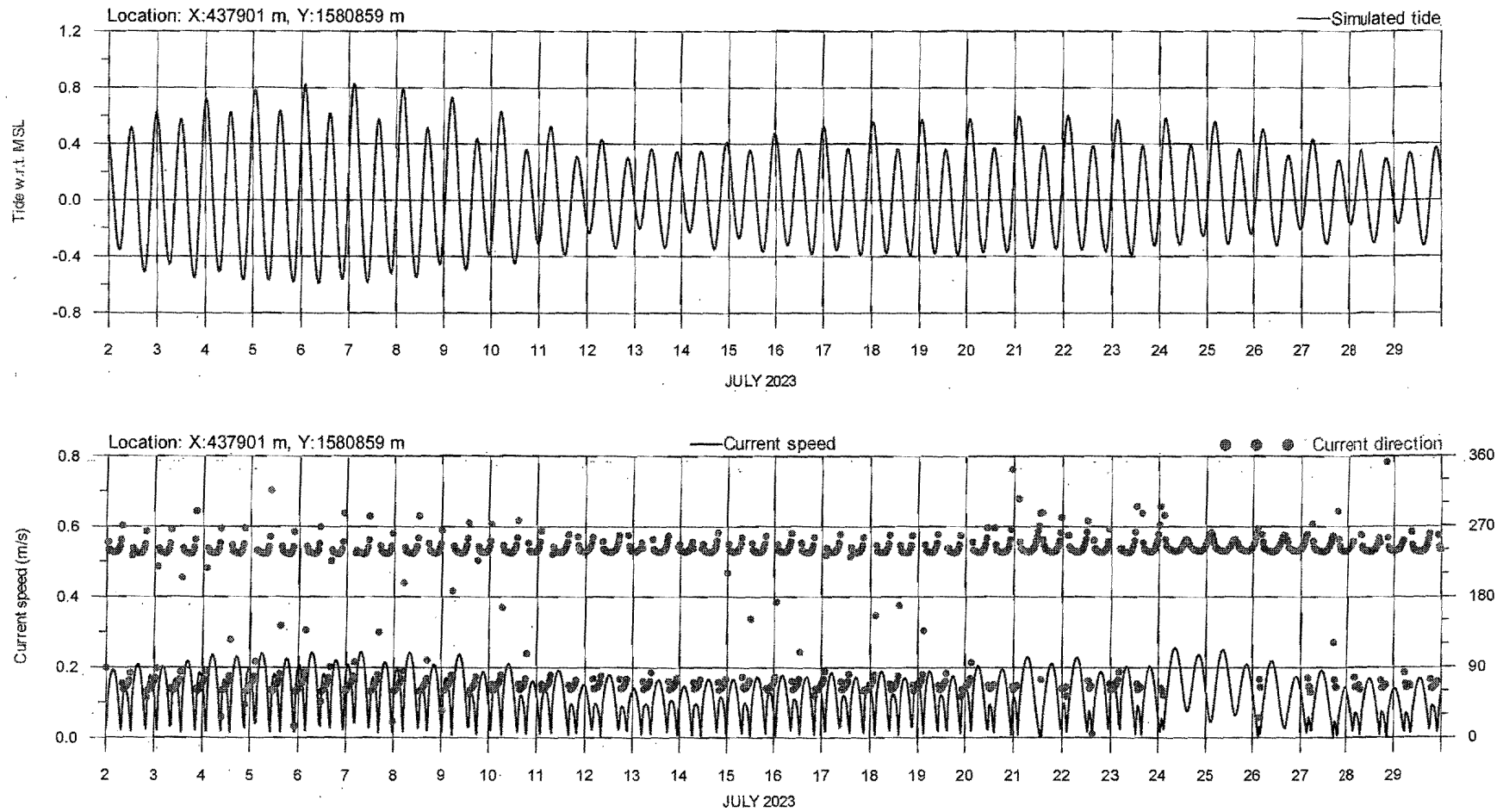


FIG. 5.15. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E2- WITHOUT BREAKWATER- SW MONSOON

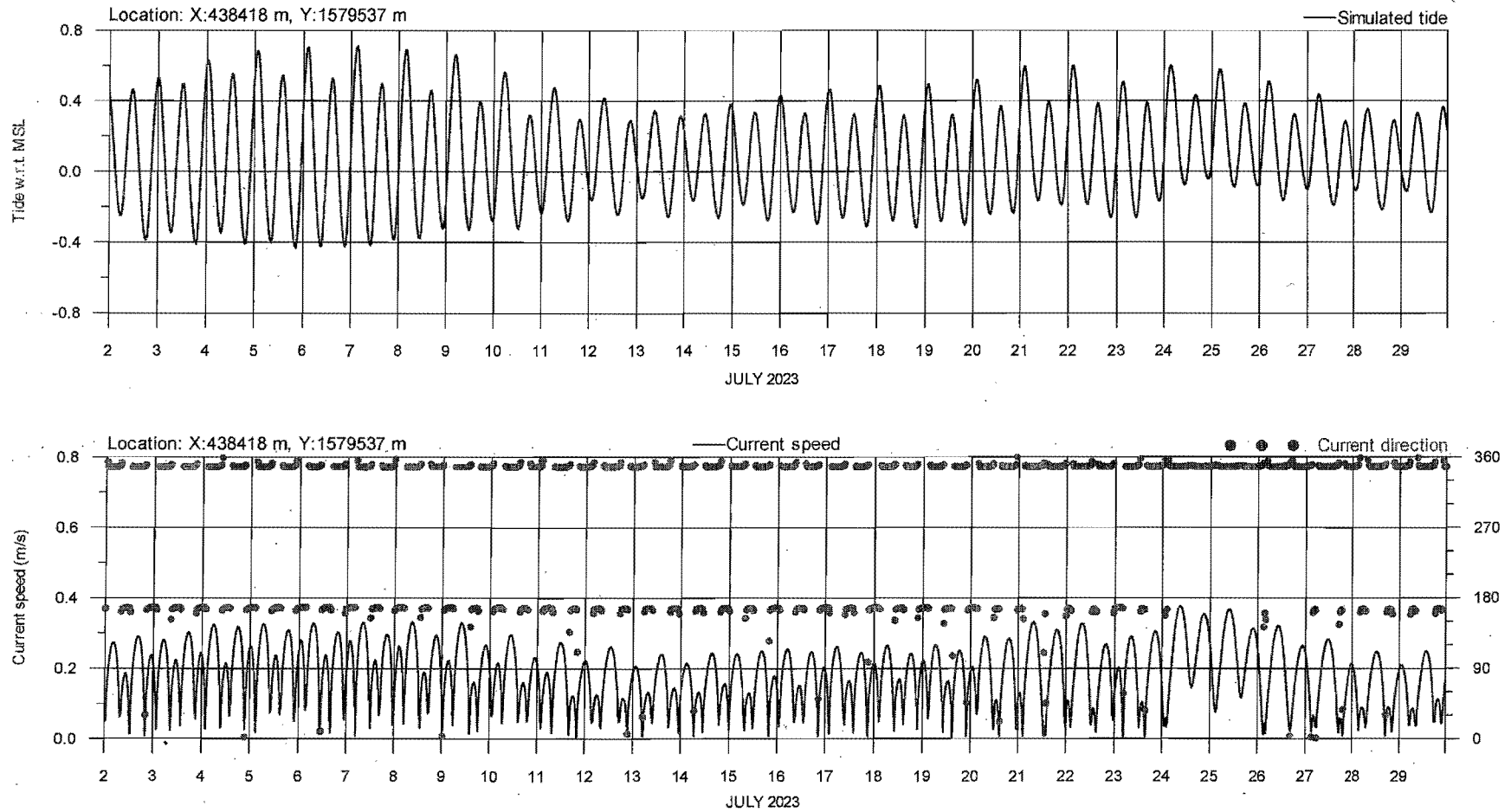


FIG. 5.16. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E3- WITHOUT BREAKWATER- SW MONSOON

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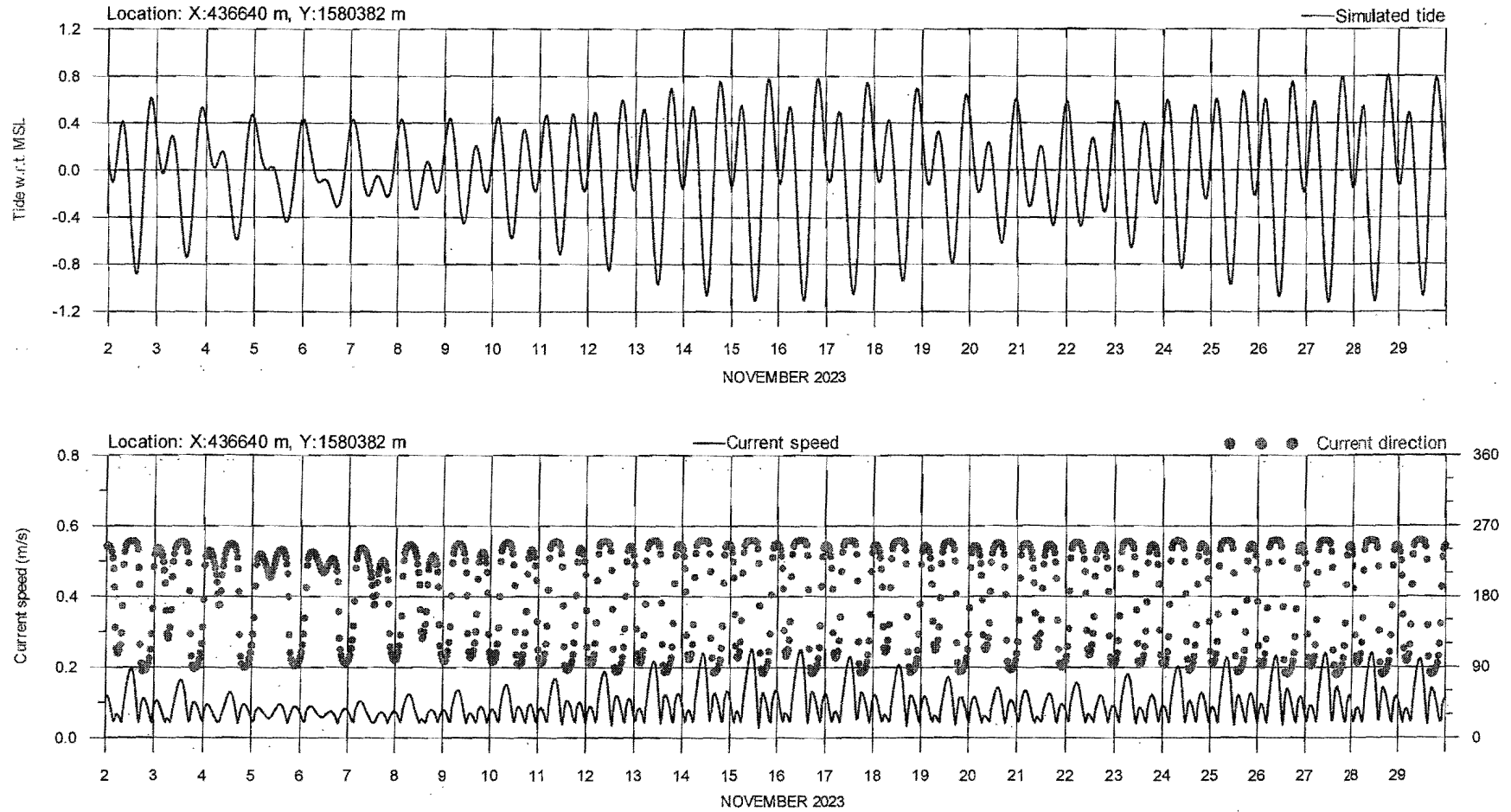


FIG. 5.17. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E1-WITHOUT BREAKWATER - NE MONSOON

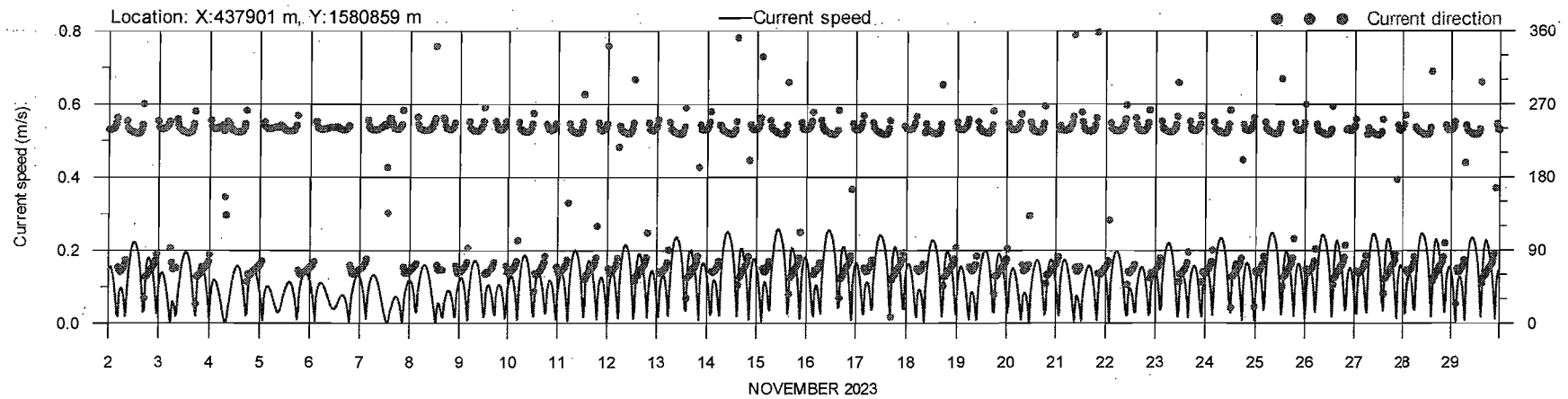
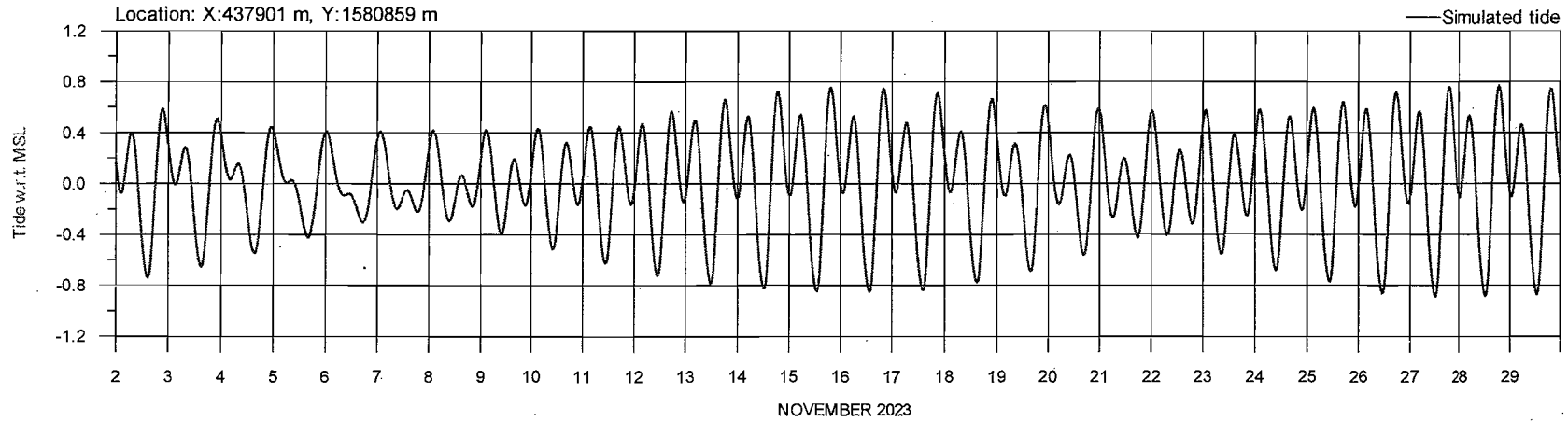


FIG. 5.18. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E2 - WITHOUT BREAKWATER- NE MONSOON

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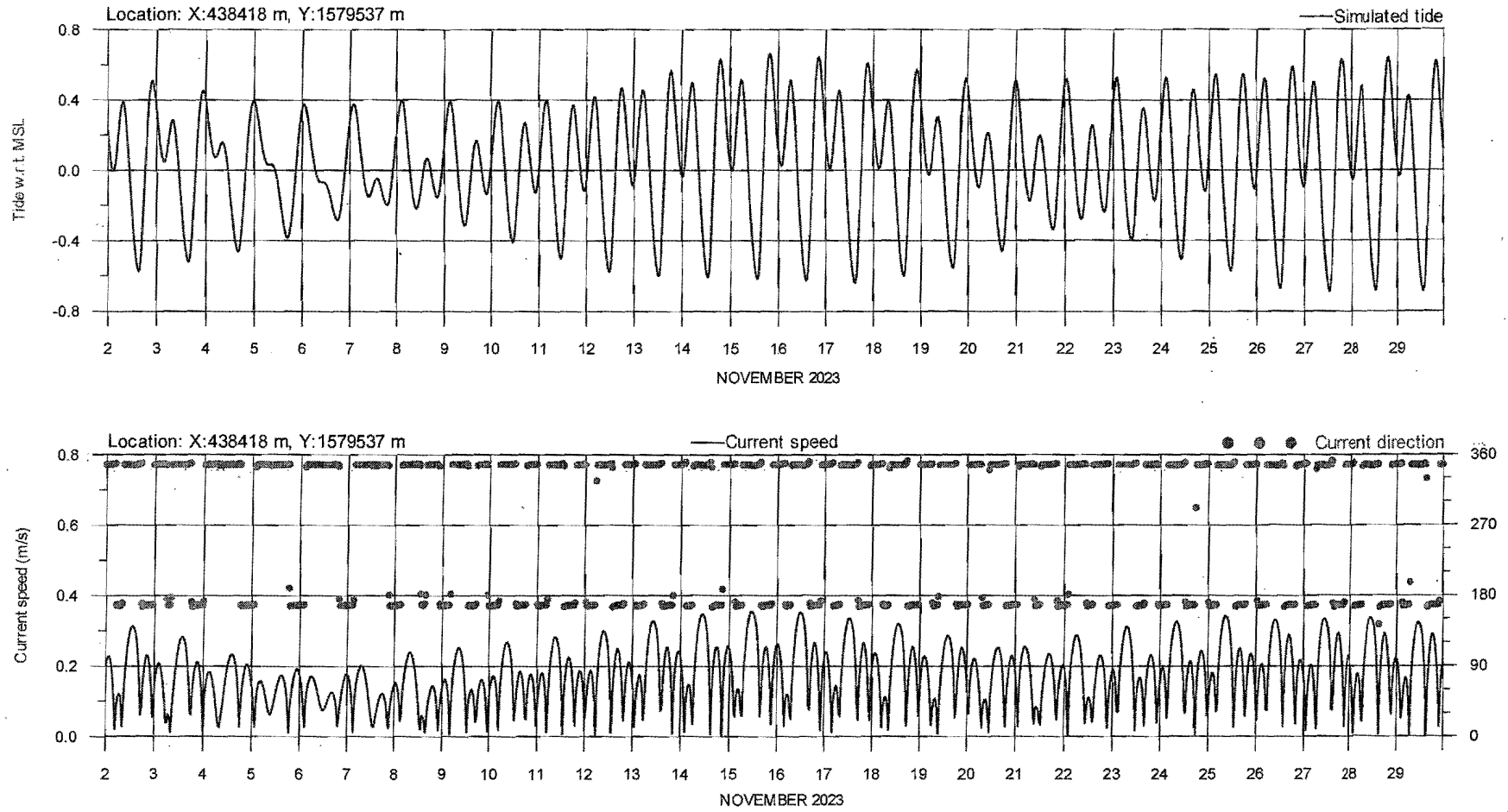
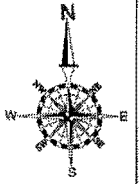
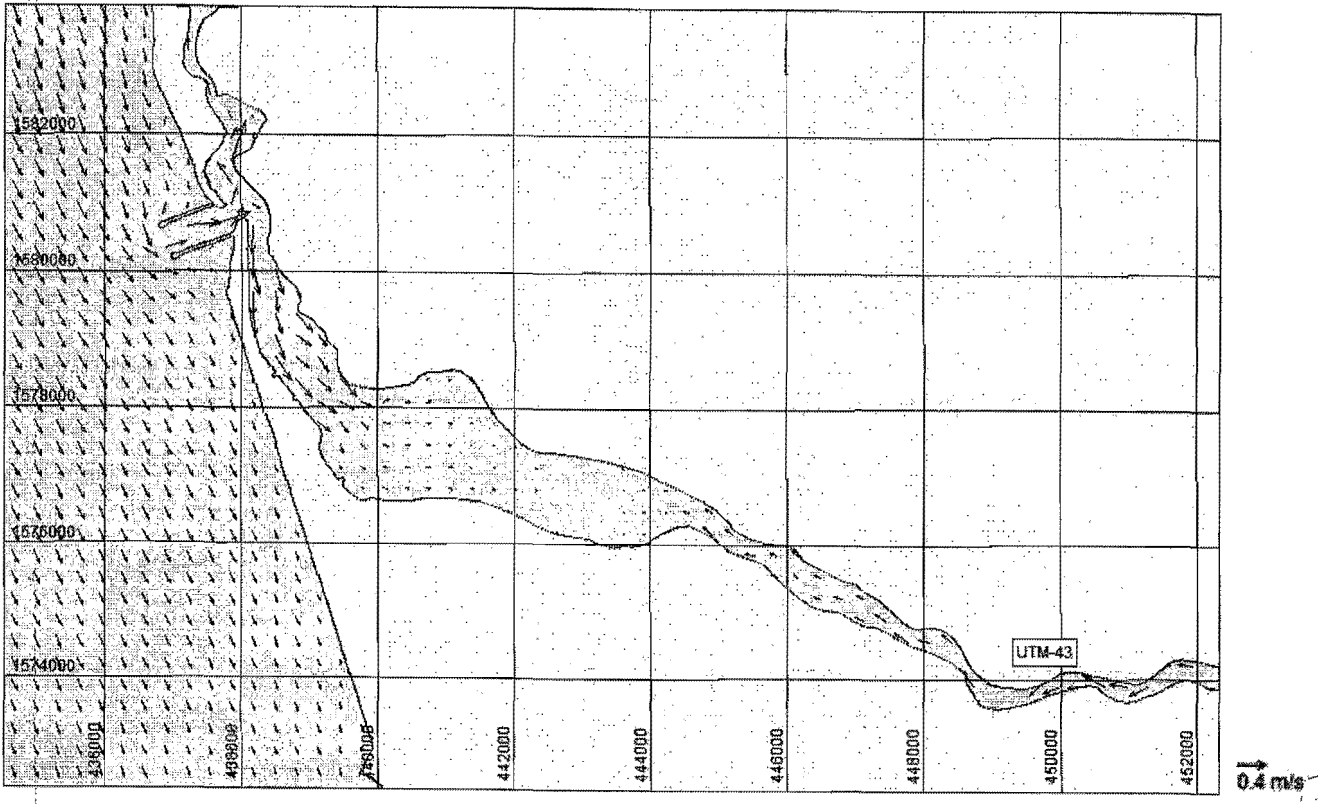


FIG. 5.19. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E3- WITHOUT BREAKWATER- NE MONSOON

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Flood Phase



Ebb Phase

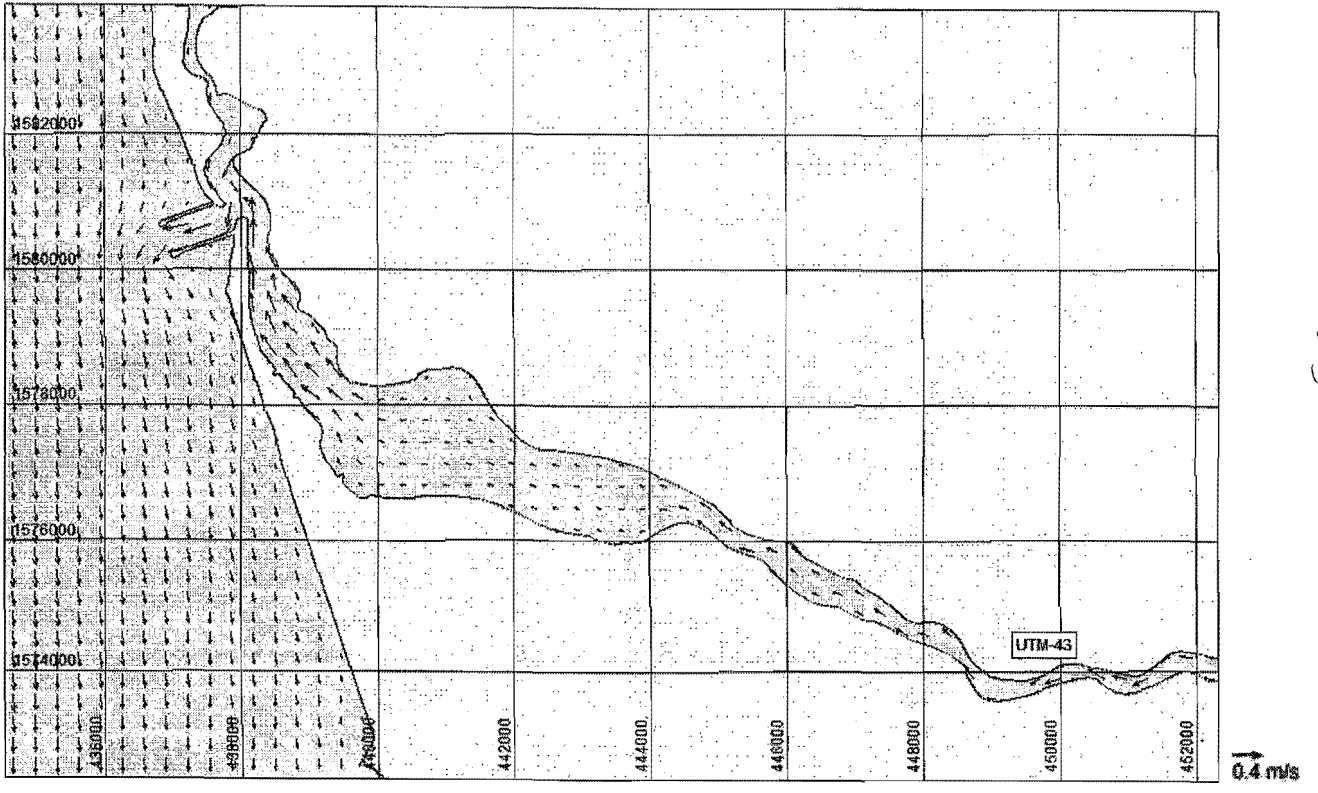
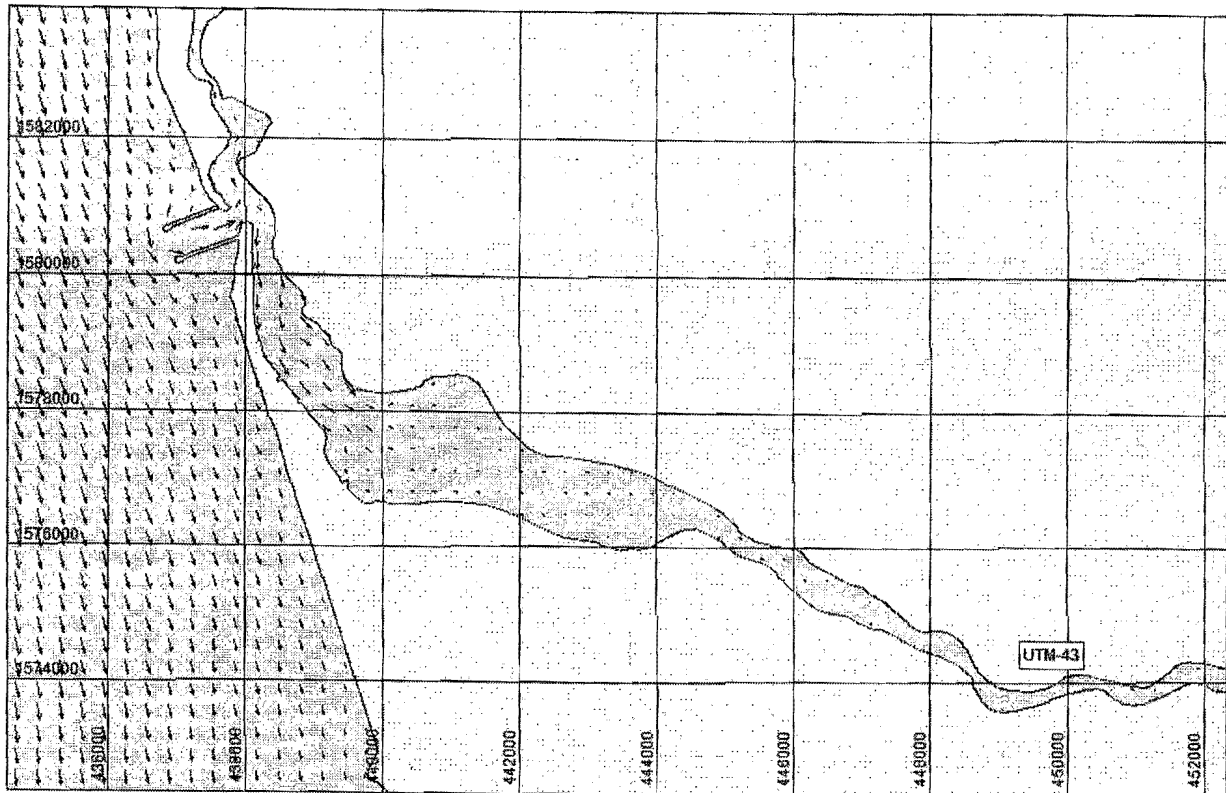
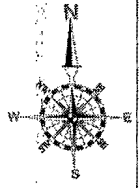


FIG. 5.20. FLOW FIELD - FAIR WEATHER - SPRING TIDE- WITH BREAKWATER

Flood Phase



Ebb Phase

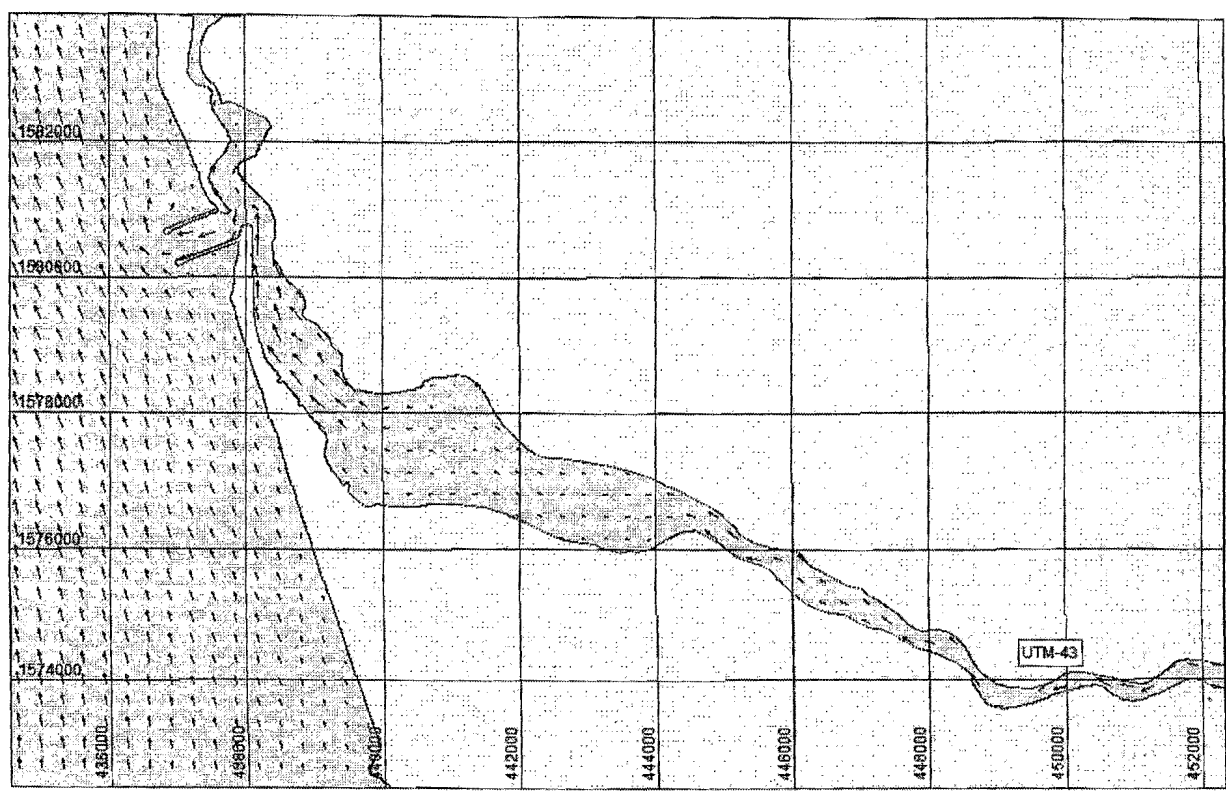
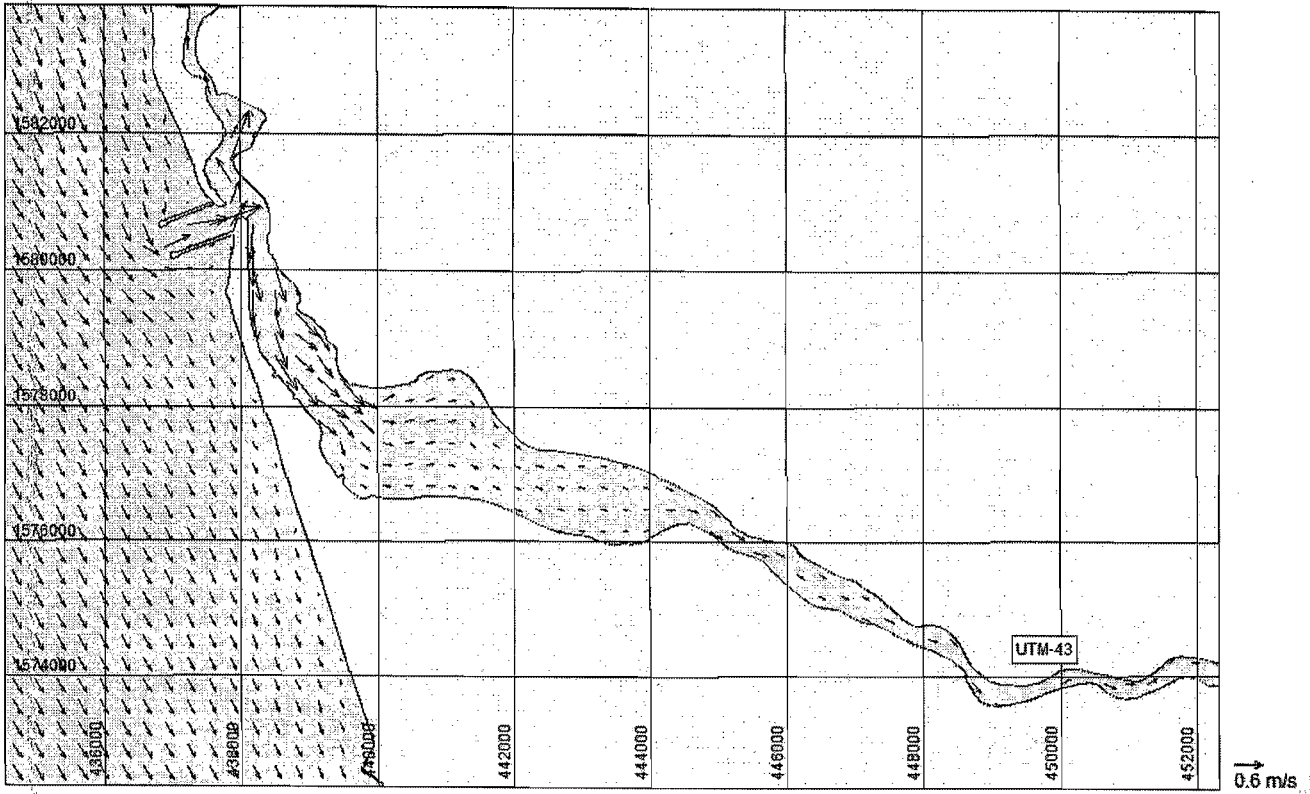
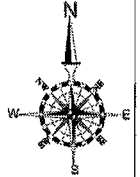


FIG. 5.21. FLOW FIELD - FAIR WEATHER - NEAP TIDE- WITH BREAKWATER

Flood Phase



Ebb Phase

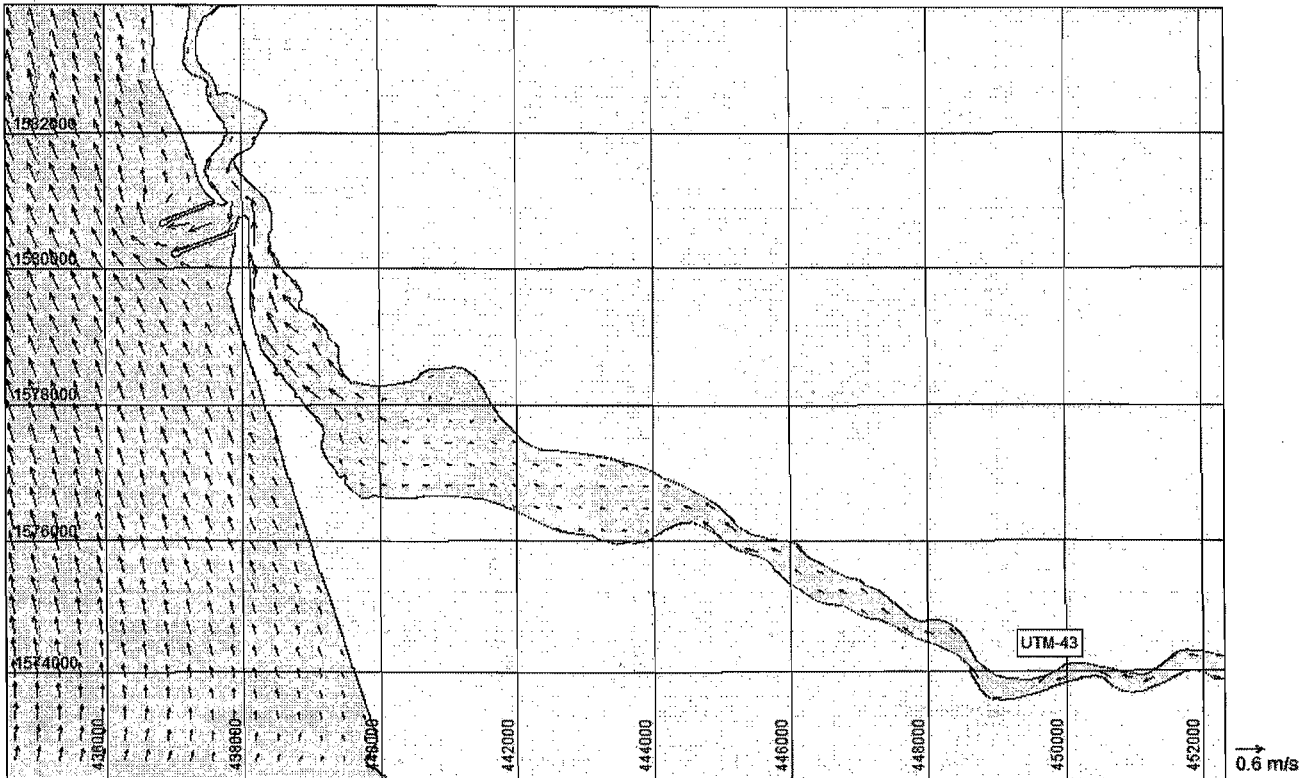
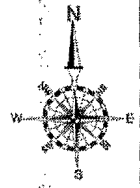
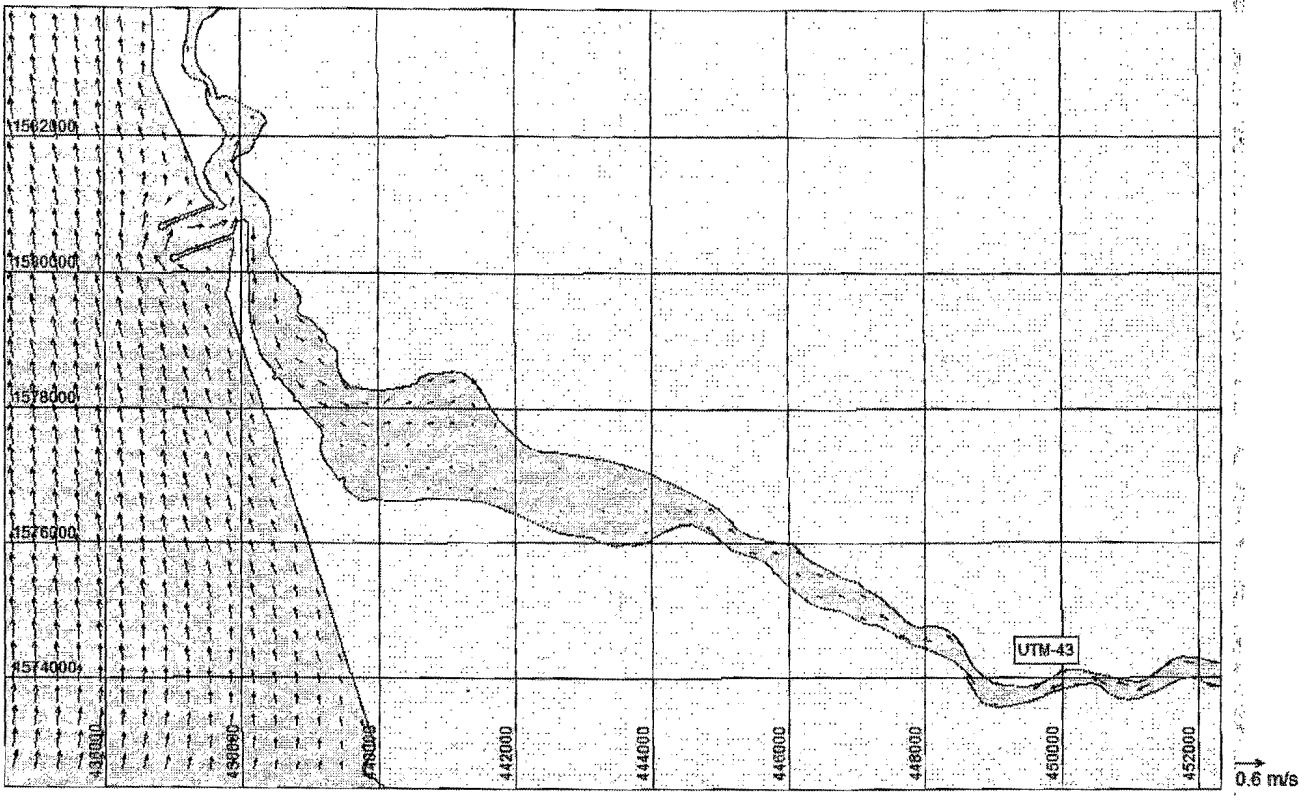


FIG. 5.22. FLOW FIELD - SW MONSOON - SPRING TIDE- WITH BREAKWATER



Flood Phase



Ebb Phase

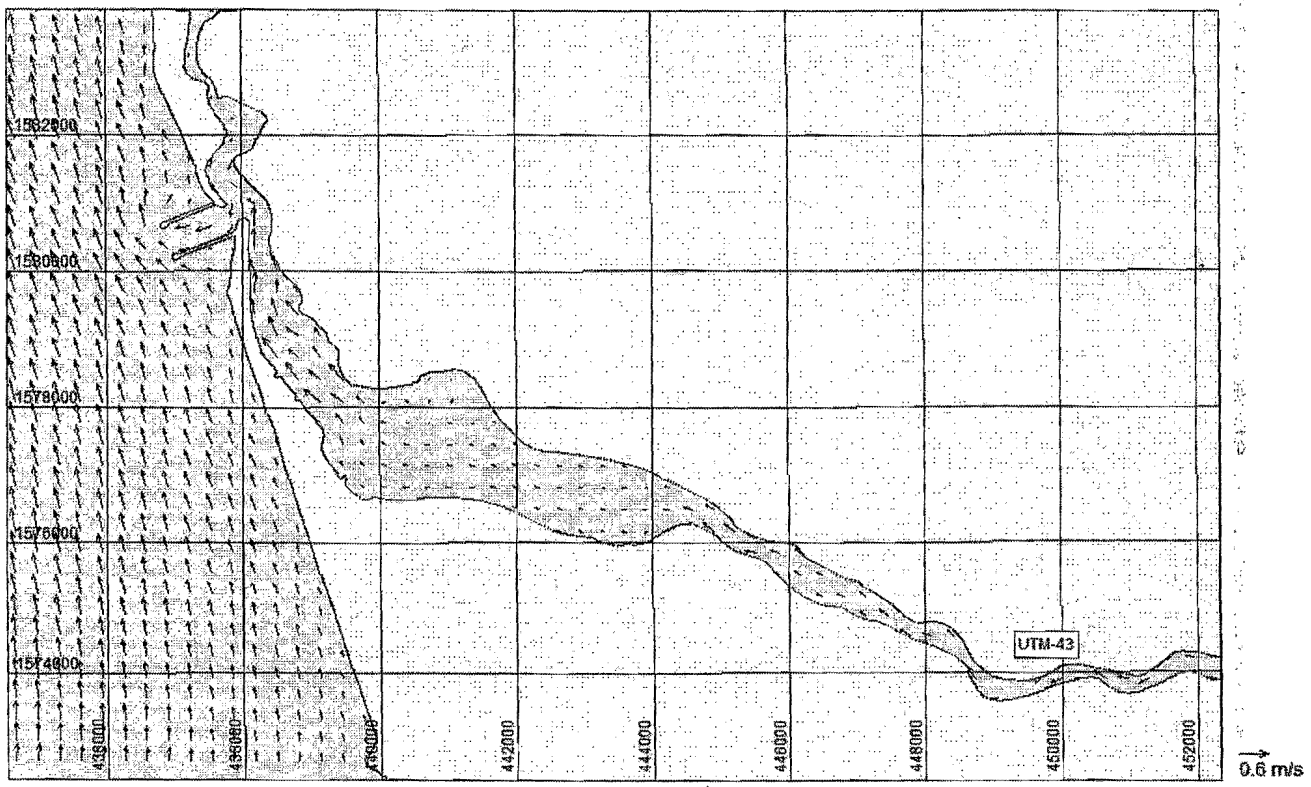
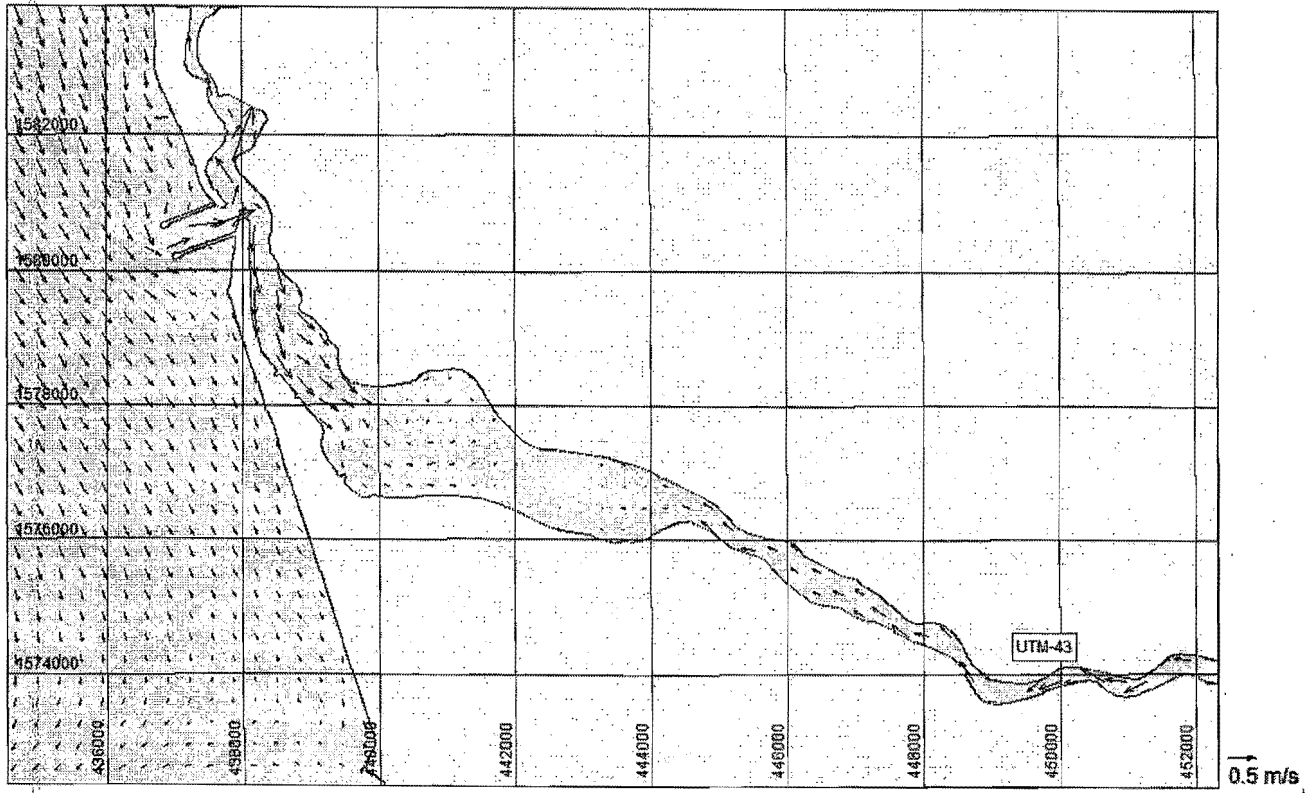
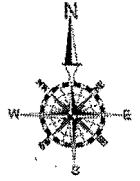


FIG. 5.23. FLOW FIELD - SW MONSOON - NEAP TIDE- WITH BREAKWATER

Flood Phase



Ebb Phase

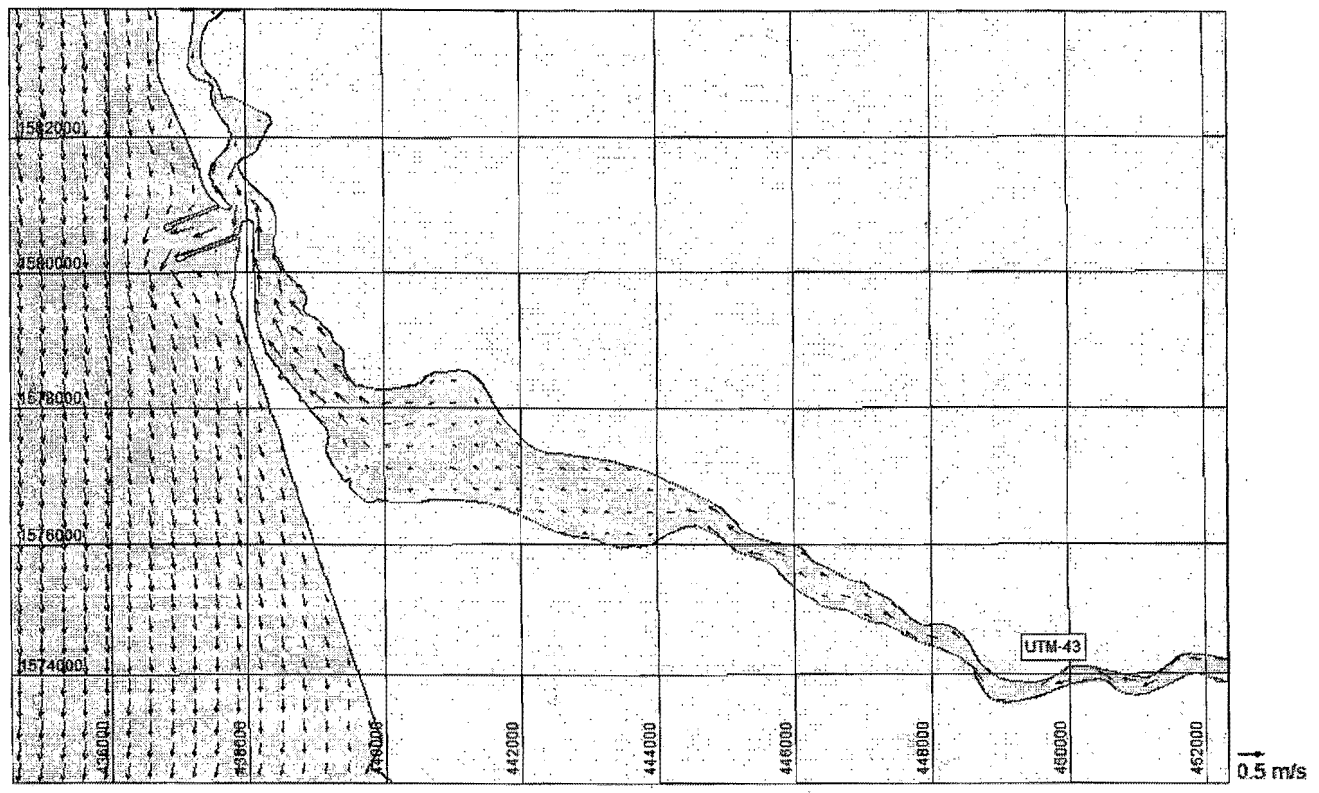
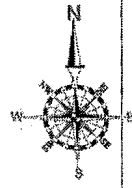
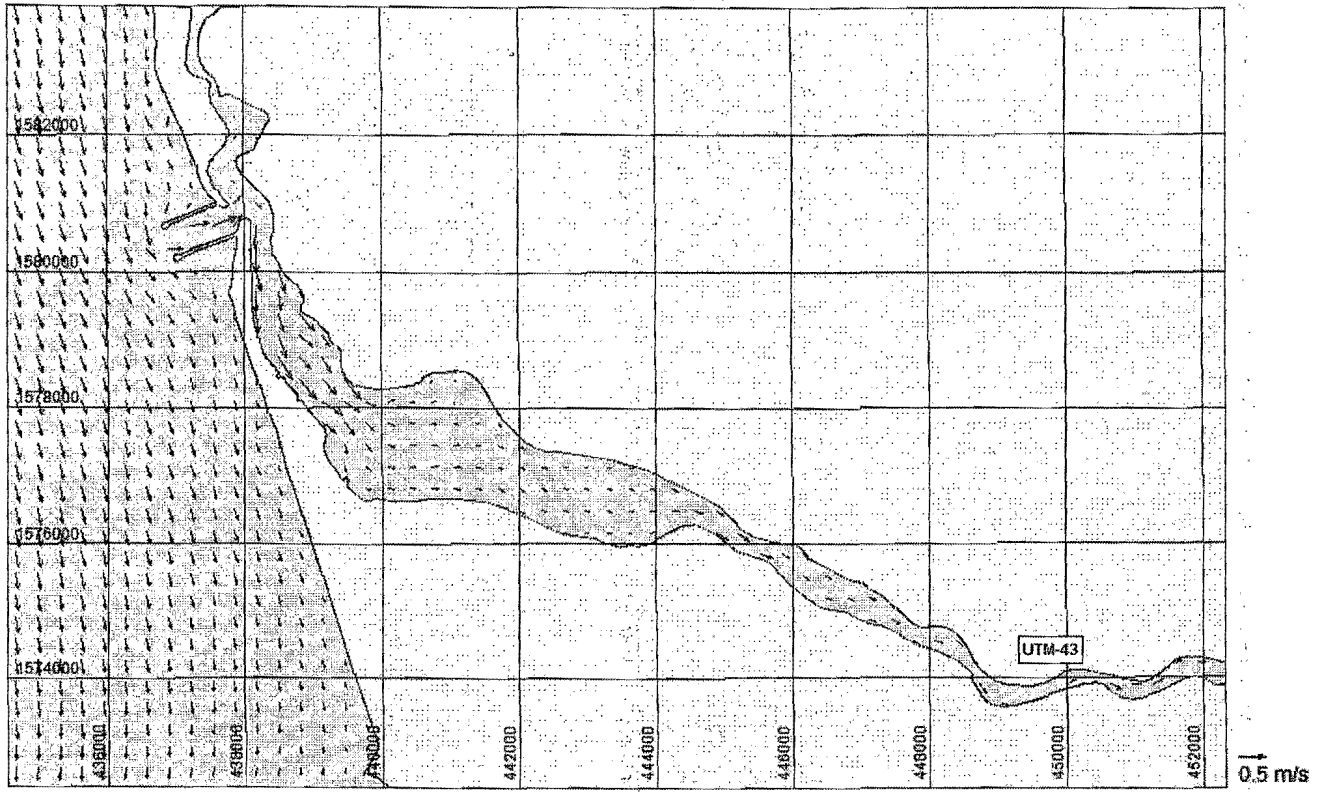


FIG. 5.24. FLOW FIELD - NE MONSOON - SPRING TIDE- WITH BREAKWATER



Flood Phase



Ebb Phase

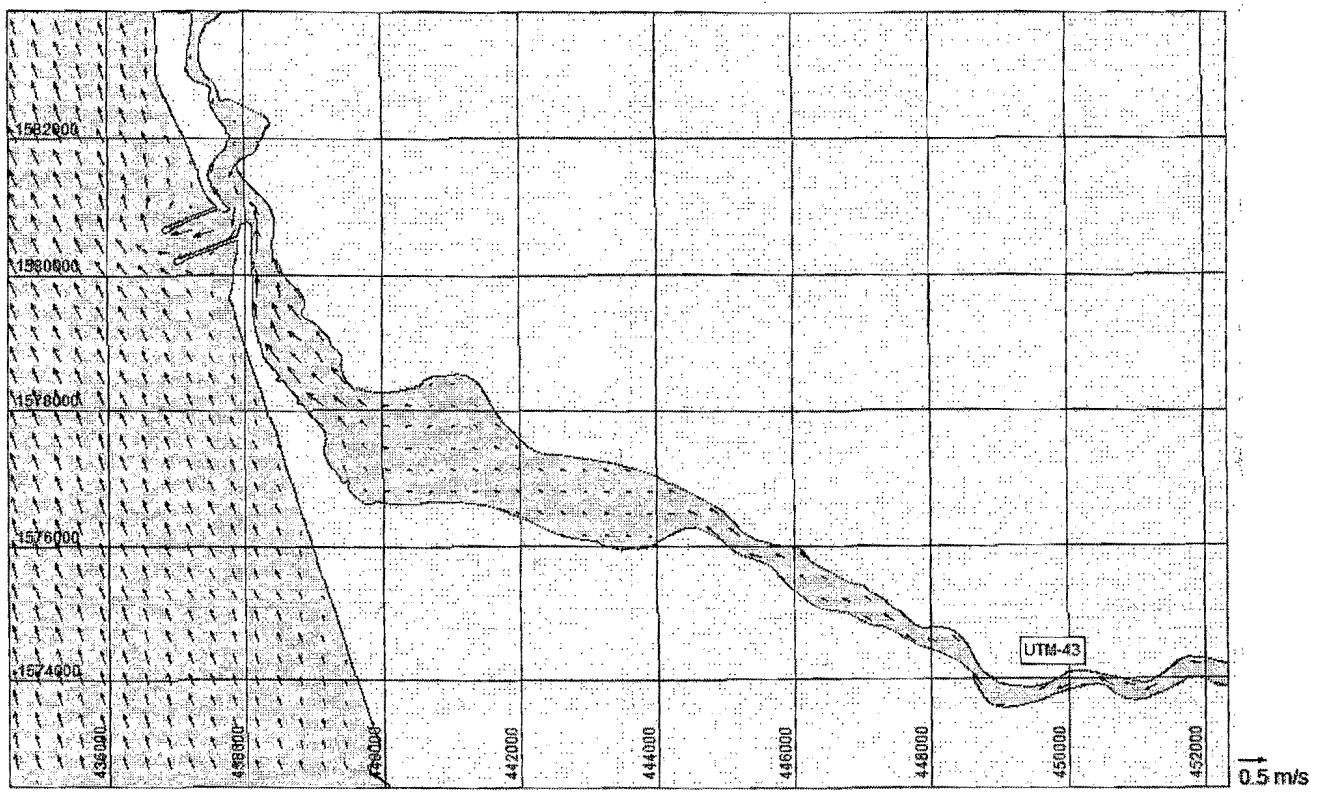


FIG. 5.25. FLOW FIELD - NE MONSOON - NEAP TIDE- WITH BREAKWATER

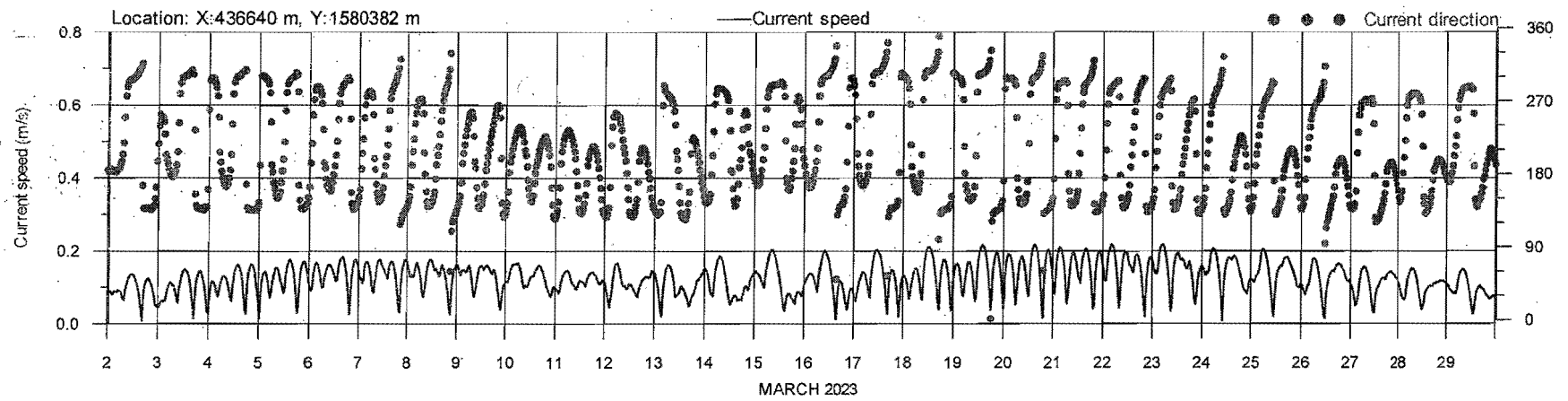
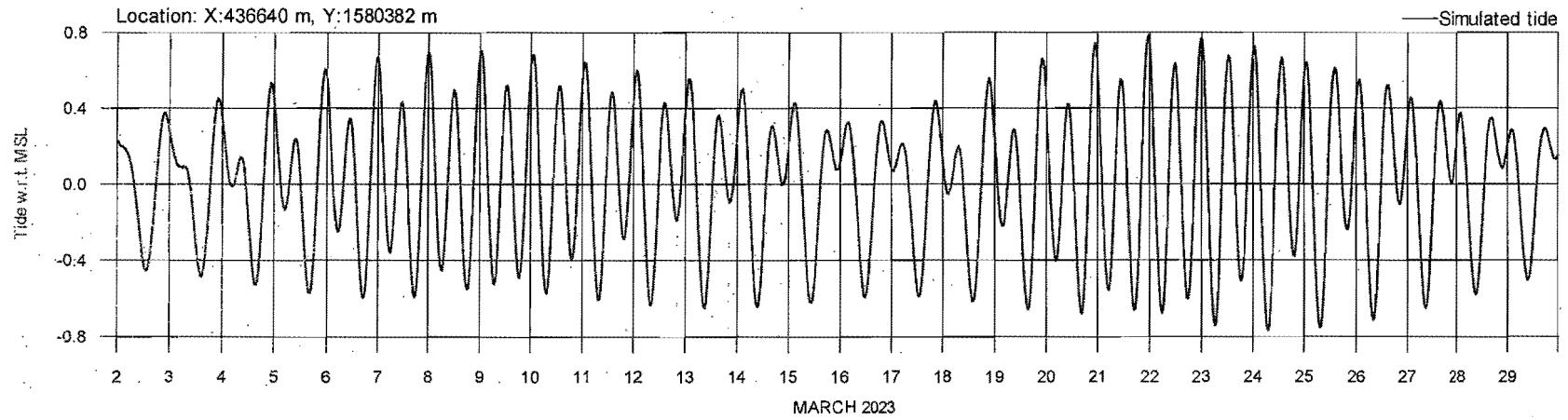


FIG. 5.26. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E1- WITH BREAKWATER- FAIR WEATHER

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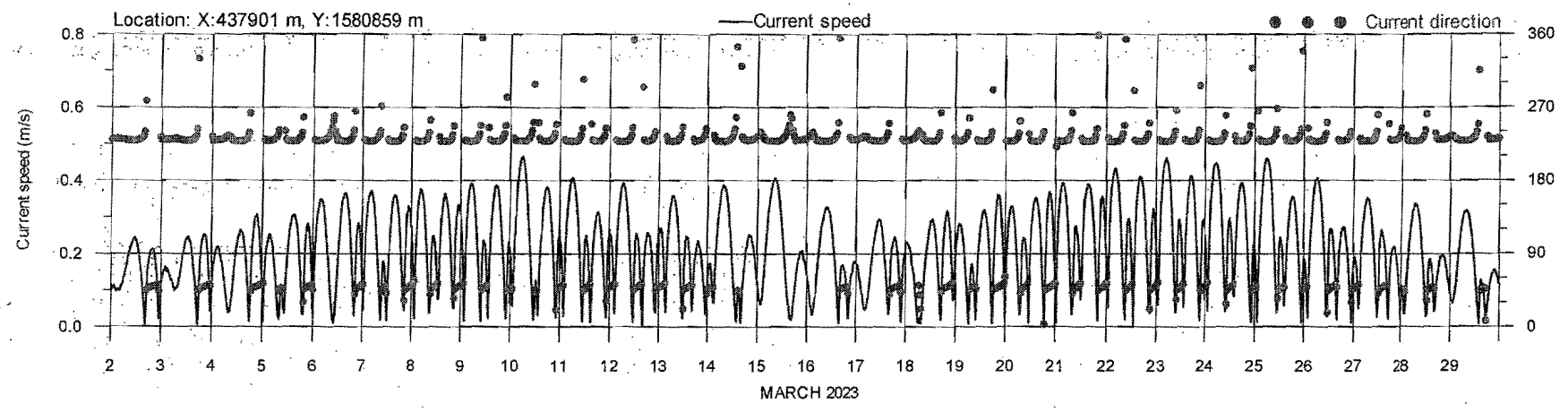
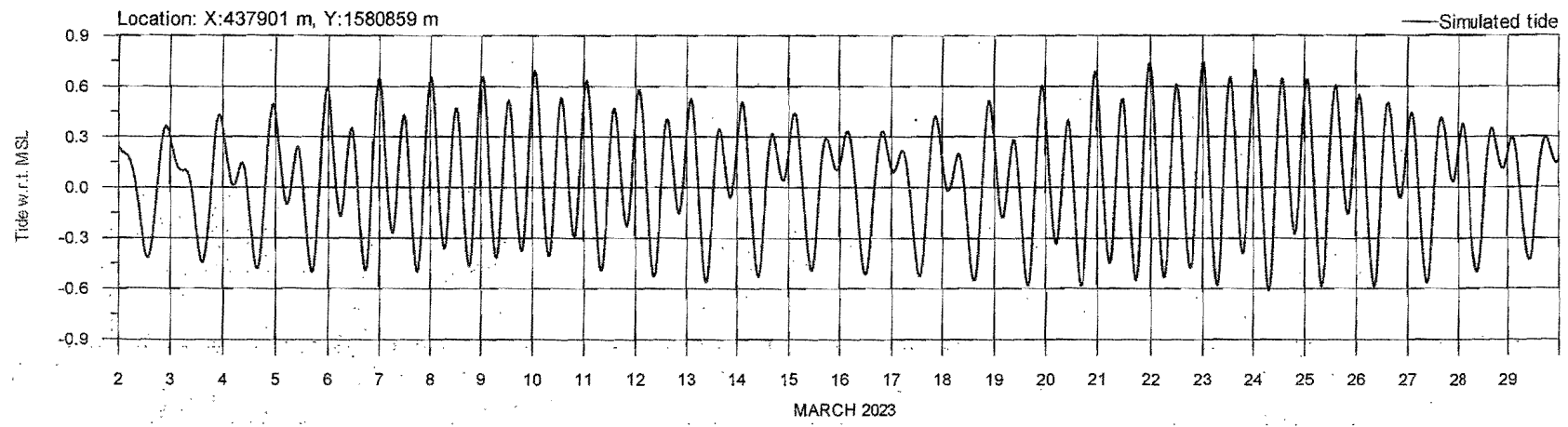


FIG. 5.27. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E2- WITH BREAKWATER- FAIR WEATHER

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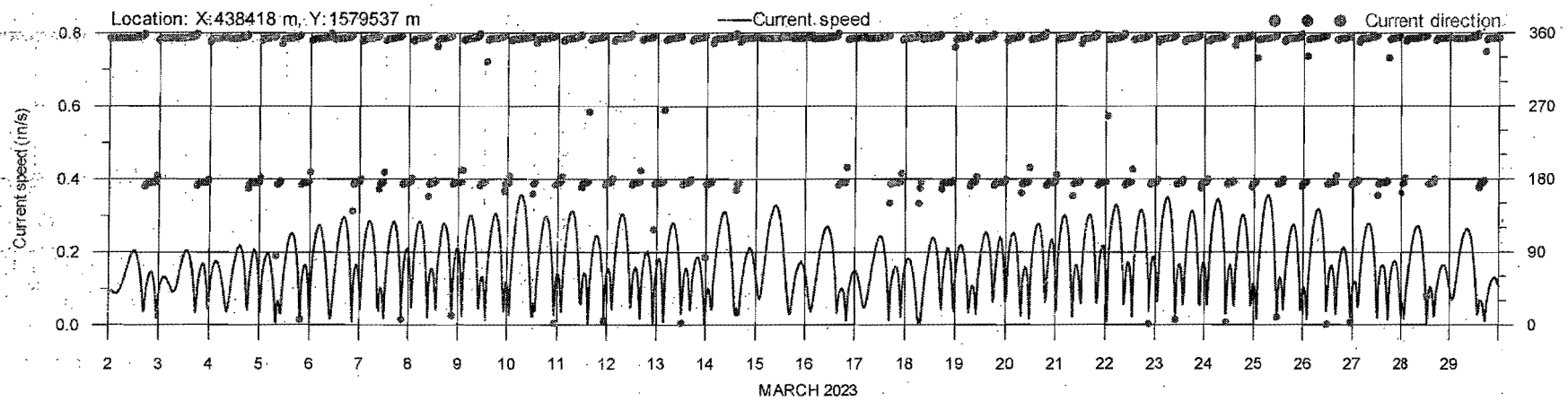
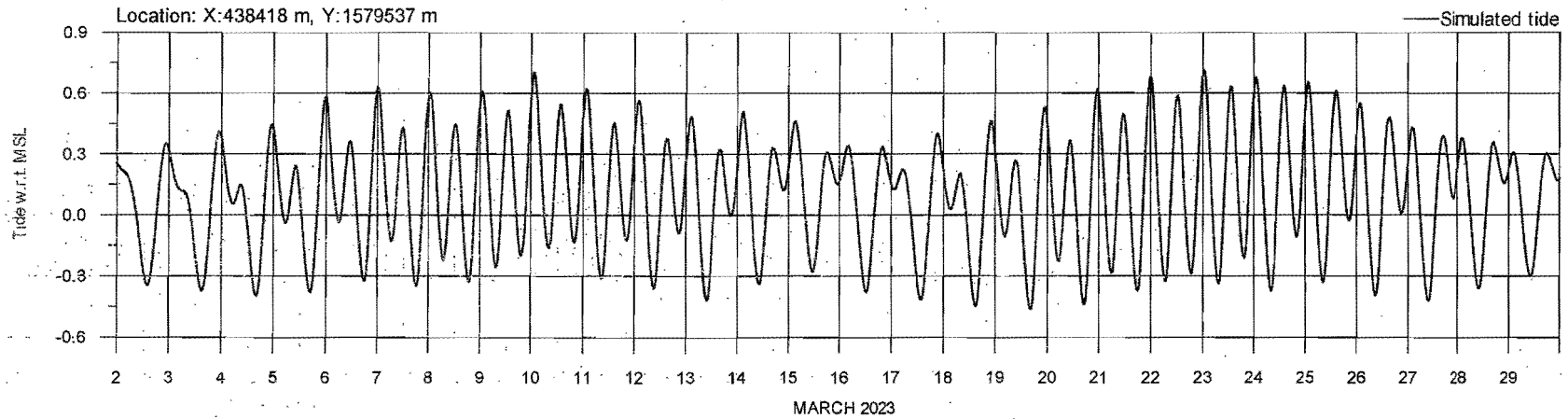


FIG.5.28. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E3- WITH BREAKWATER- FAIR WEATHER

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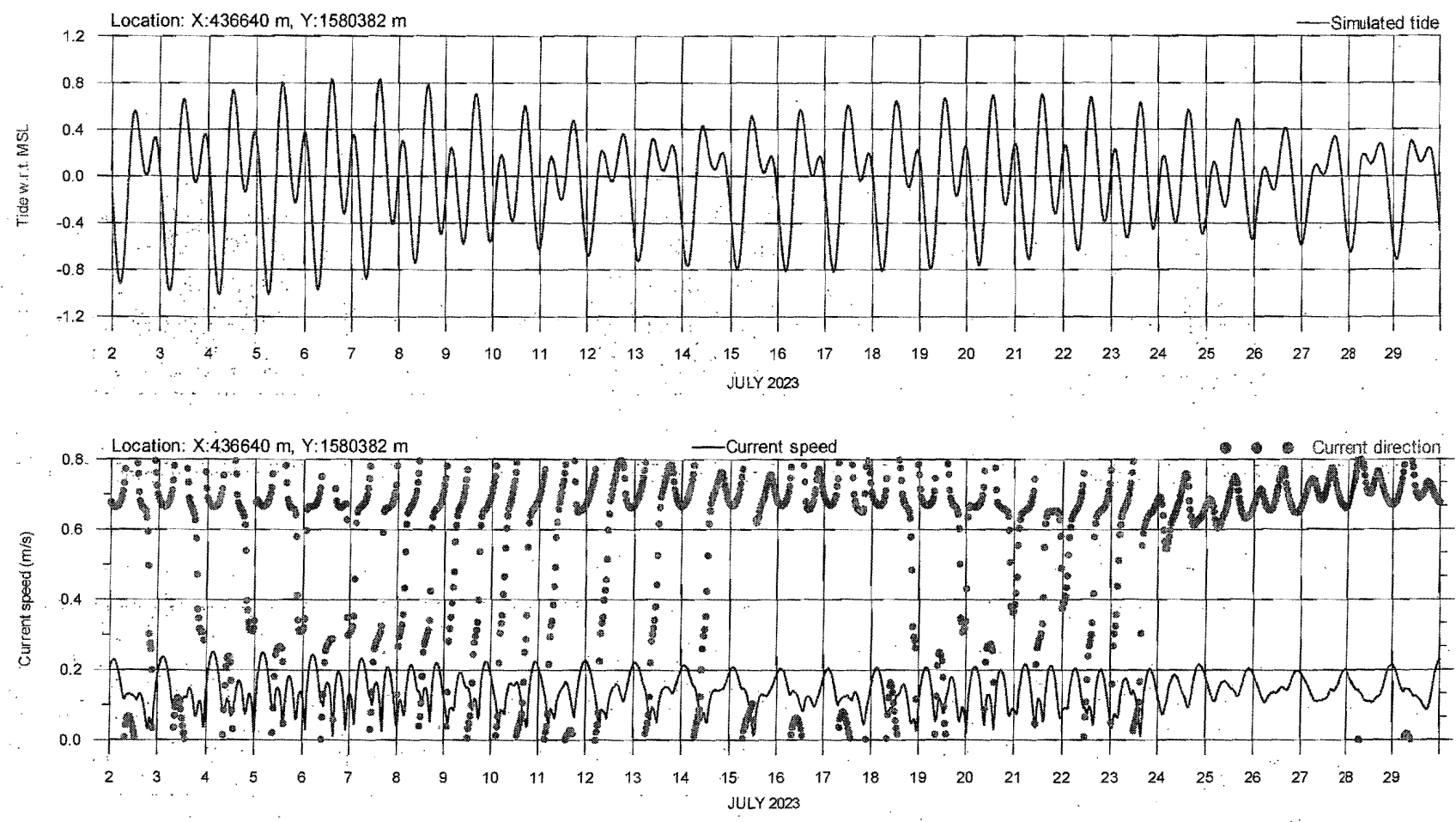


FIG. 5.29. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E1- WITH BREAKWATER- SW MONSOON

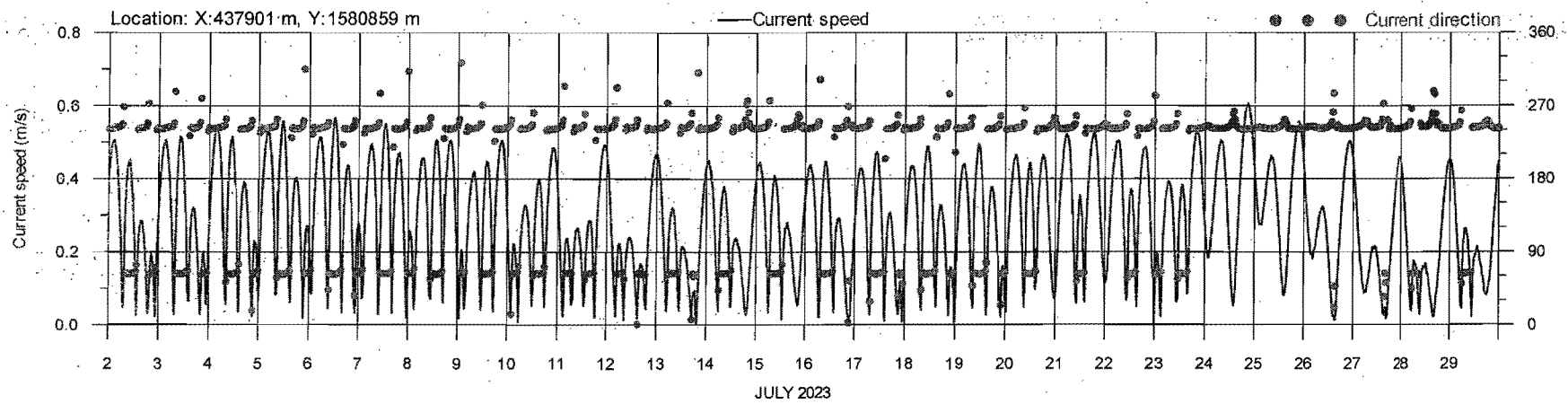
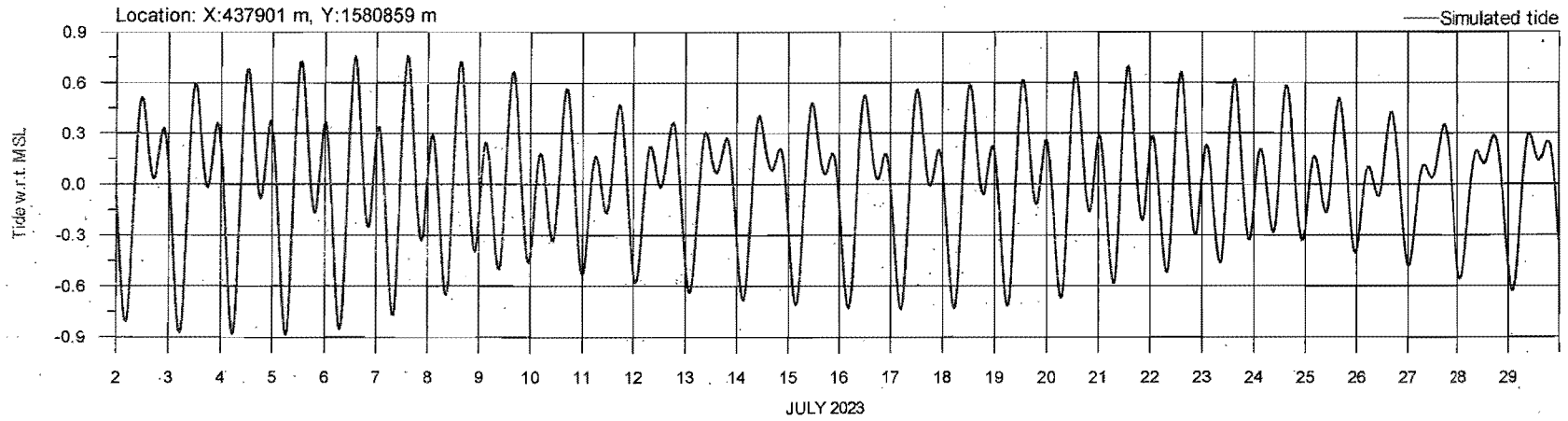


FIG. 5.30. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E2- WITH BREAKWATER- SW MONSOON

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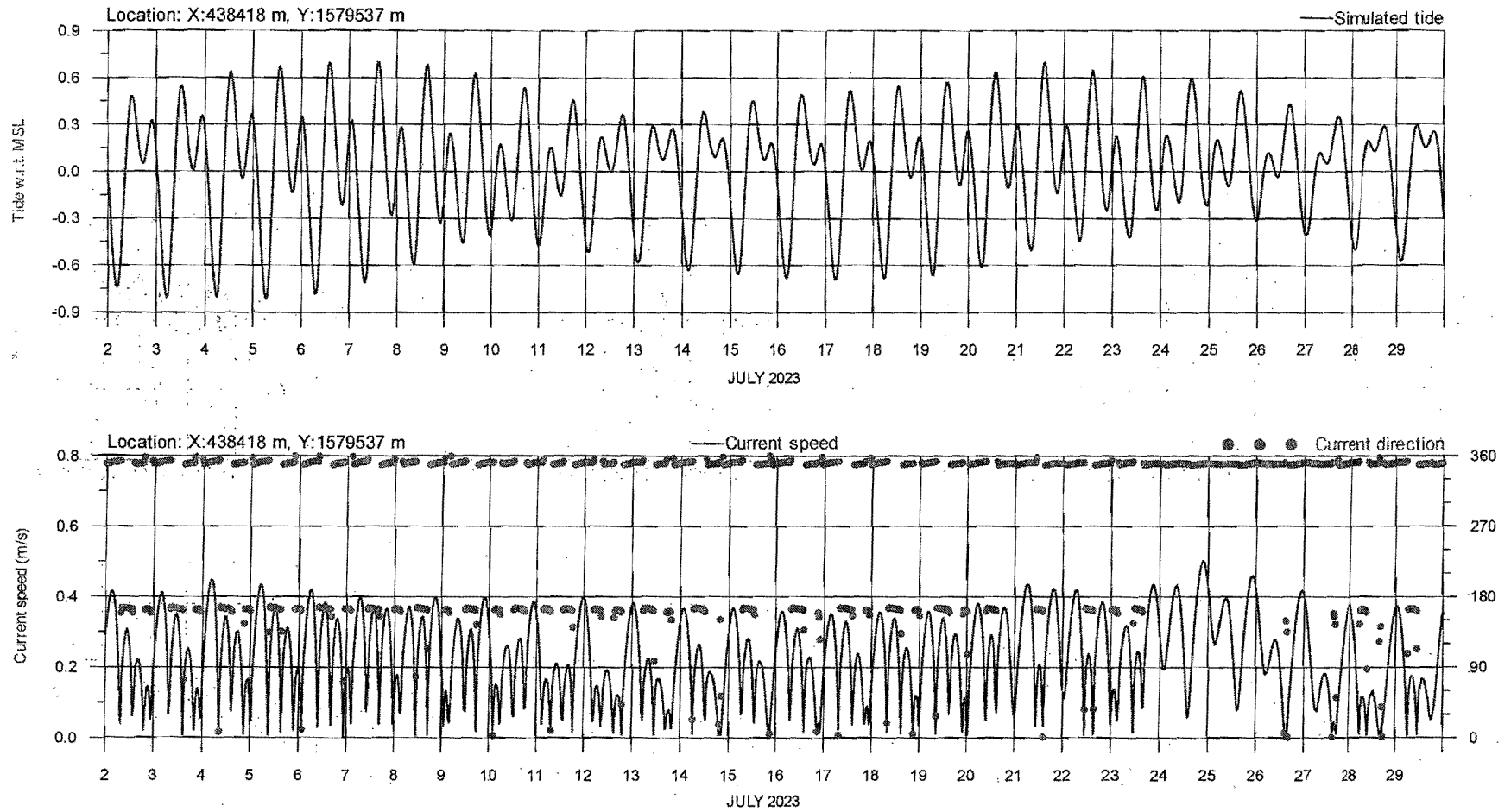


FIG 5.31. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E3- WITH BREAKWATER- SW MONSOON

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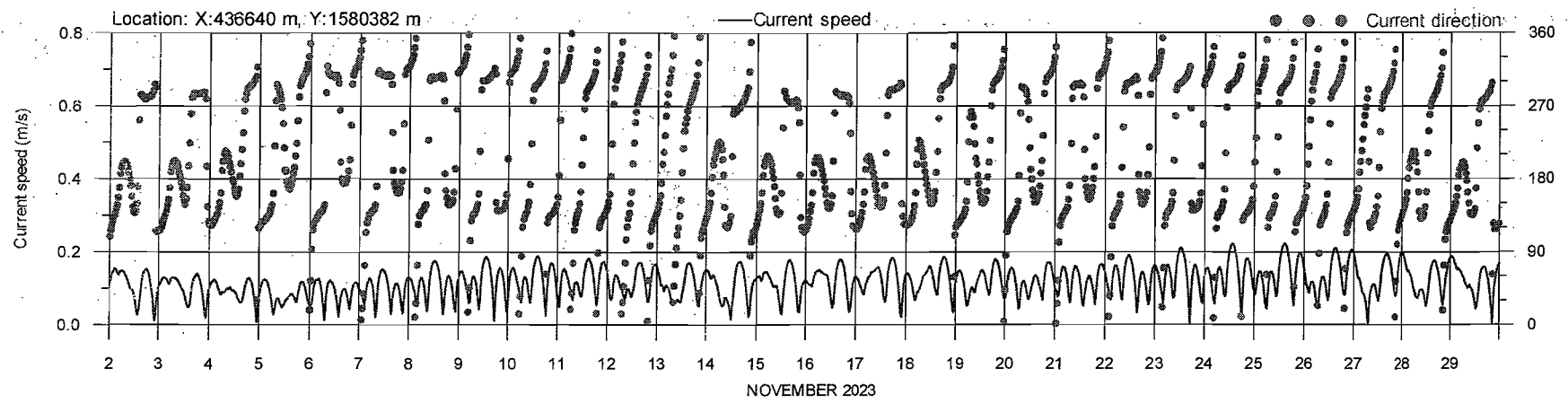
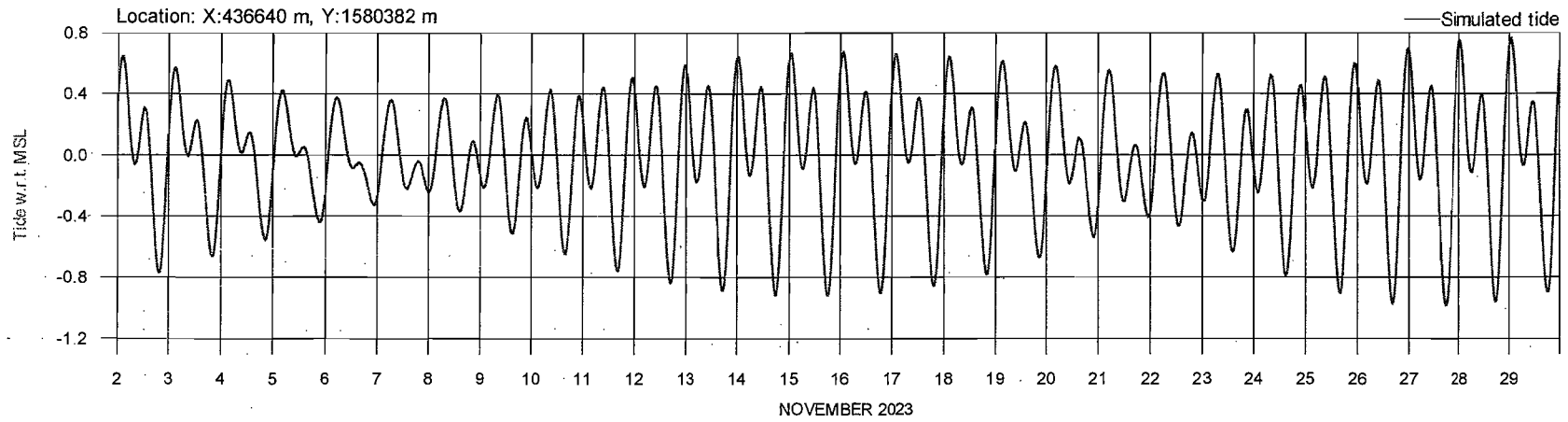


FIG. 5.32. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E1- WITH BREAKWATER- NE MONSOON

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24.4

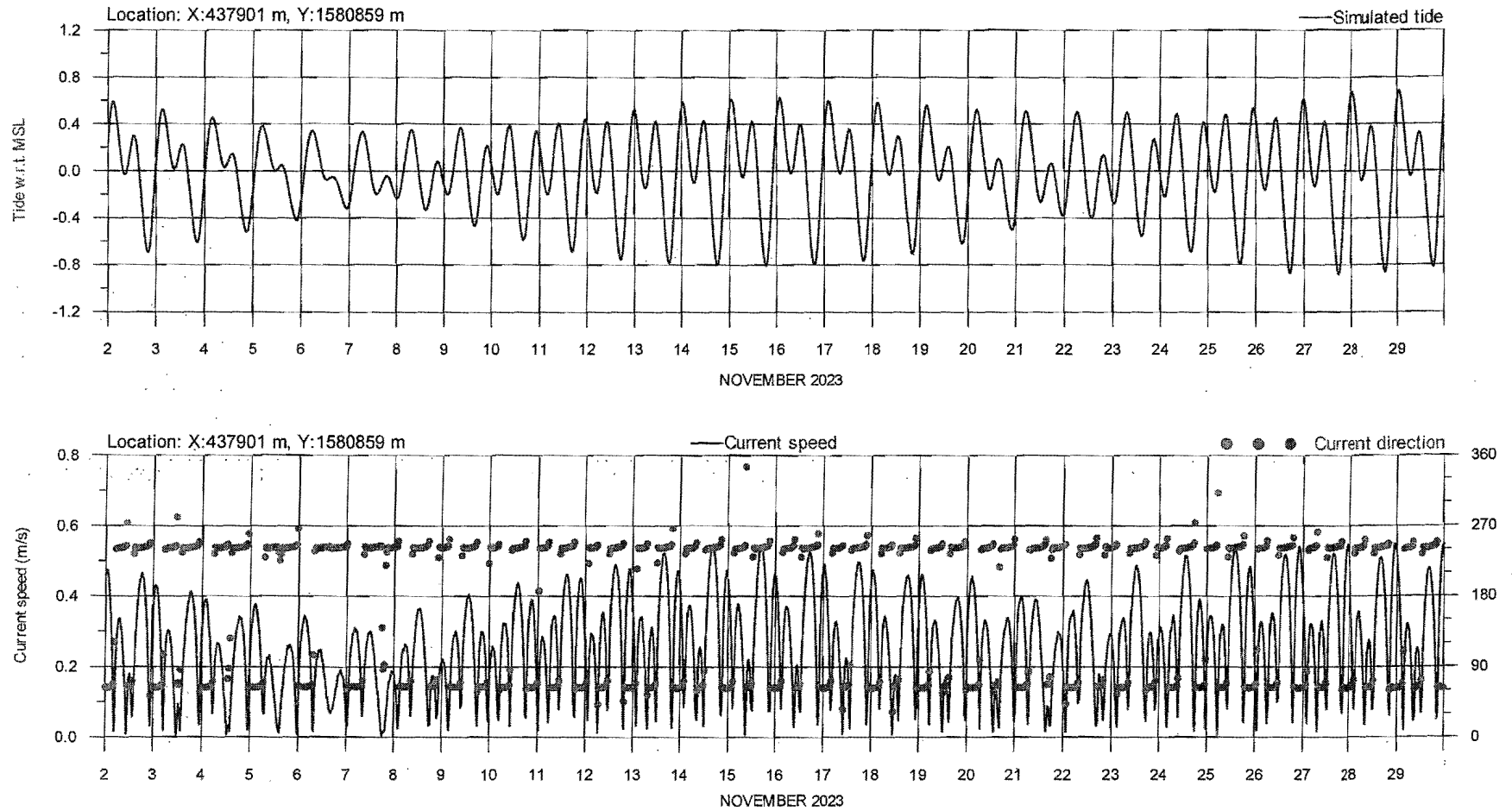


FIG. 5.33. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E2- WITH BREAKWATER- NE MONSOON

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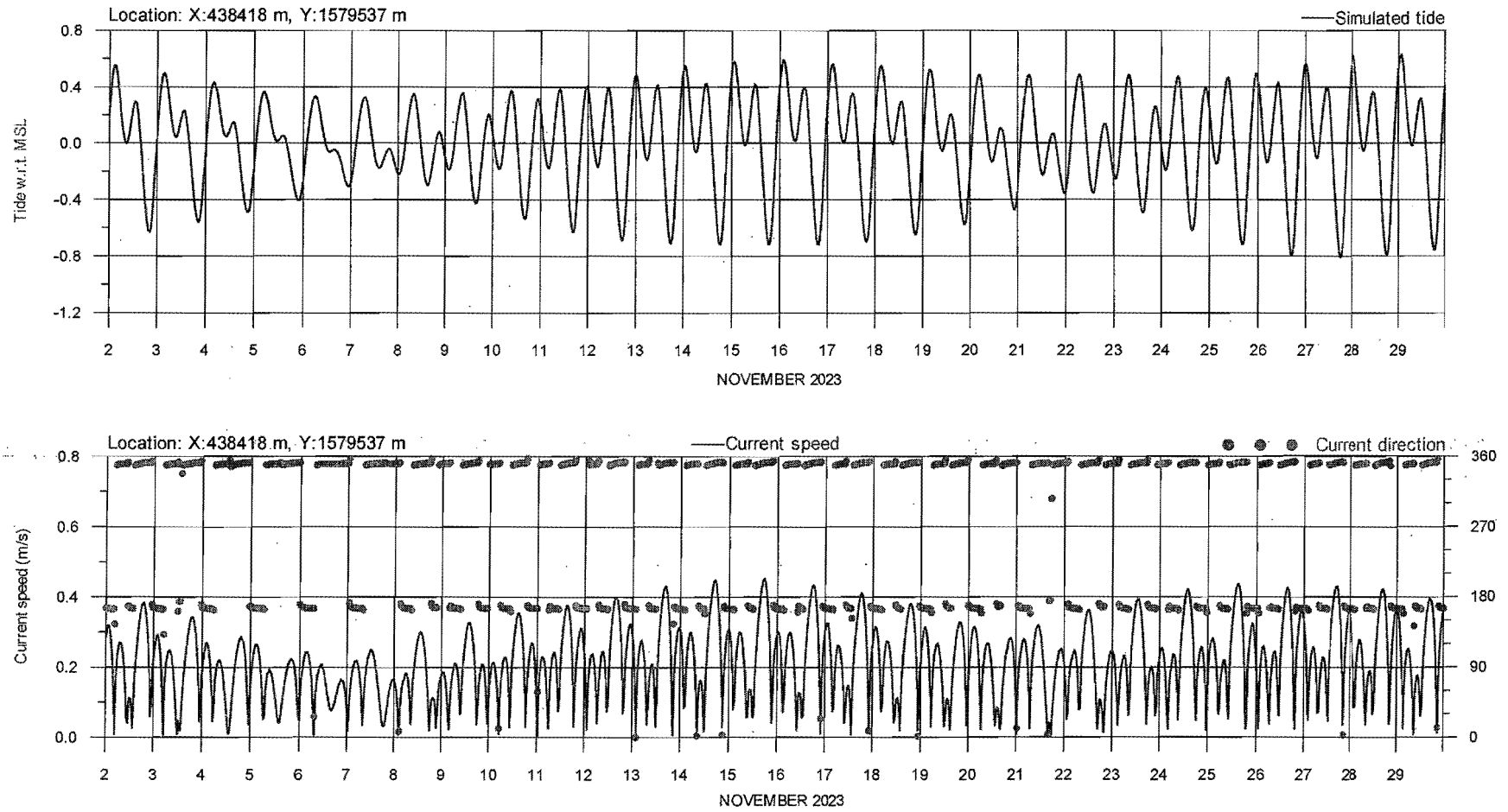


FIG. 5.34. VARIATION OF SIMULATED TIDES & CURRENTS AT STATION E3-WITH BREAKWATER- NE MONSOON

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6. CARRYING CAPACITY OF ESTUARY

Carrying capacity can be defined as the maximum sustainable discharge or pollutant load the river can handle without adverse effects on its hydrodynamic behavior, sediment balance, and ecological health.

The carrying capacity of a river, particularly in tidal environments, is a crucial concept in understanding the dynamics of water flow, sediment transport, and ecological balance. In a tidal river, the flow characteristics are heavily influenced by the cyclical rise and fall of tides, typically occurring over a period of approximately 12 hours, with distinct flood (incoming tide) and ebb (outgoing tide) phases, each lasting around 6 hours.

During the flood phase, seawater enters into the river, increasing the water level and altering the flow velocity and direction. Conversely, during the ebb phase, water flows back toward the sea, reducing the river's water level and changing the flow dynamics once more. These phases significantly affect the river's ability to carry water, sediments, nutrients, and other materials, collectively referred to as its carrying capacity.

Understanding the carrying capacity of a river over a single tidal cycle requires an analysis of the physical processes that govern the volume of water transported, the flow velocity, and the interaction between river discharge and tidal forces. The dynamics of these processes are not only critical for the river's natural functions but also for human activities such as navigation, sediment management, and environmental conservation.

This analysis considers both the flood and ebb phases, focusing on the variations in flow characteristics and the factors influencing the carrying capacity during each phase.

6.1. River dynamics

Flood Phase Dynamics

Flow Velocity: During the flood phase, as the tide rises, water from the ocean or estuary enters upstream into the river. This upstream movement is characterized by a change in flow velocity, which typically increases as the tide progresses. The river's flow direction temporarily reverses, with water moving against the usual downstream flow. The magnitude of this reversal depends on the river's gradient, tidal range, and the river's cross-sectional area. In narrow or shallow sections of the river, the flow velocity may increase more significantly due to the constricted flow path. The upstream flow velocity is critical for determining how much water and material the river can carry upstream, which influences sediment deposition patterns and the distribution of nutrients or pollutants.

Discharge: The discharge during the flood phase refers to the volume of water being transported upstream as the tide rises. It is calculated as the product of the flow velocity and the cross-sectional area of the river. This volume varies over the course of the flood tide, typically peaking as the tide reaches its maximum height. Estimating the discharge during the flood phase is



essential for understanding the river's capacity to carry sediment and pollutants upstream. High discharge rates may result in significant upstream transport of materials, which can affect the river's morphology and water quality.

Ebb Phase Dynamics

Flow Velocity: The ebb phase occurs as the tide recedes, and water flows back downstream, returning to the ocean or estuary. During this phase, the flow velocity increases in the downstream direction, often exceeding the river's natural flow velocity. The speed of the ebb flow is influenced by the tidal range, river gradient, and channel morphology. In some cases, the ebb flow may cause rapid water movement, particularly in narrow or steep sections of the river. The increase in downstream flow velocity is critical for the transport of sediment and pollutants out of the river system. The ebb phase can also create conditions for the scouring of the riverbed, leading to erosion and the downstream movement of larger sediment particles.

Discharge: Discharge during the ebb phase refers to the volume of water being transported downstream as the tide falls. This volume generally peaks just before low tide when the river's flow is most forceful. The ebb discharge is typically higher than during the flood phase due to the combined effect of the river's natural flow and the outgoing tidal water. Estimating the ebb discharge is essential for understanding how much water and material the river can export to the ocean or estuary. High discharge rates during the ebb phase are often associated with increased sediment transport and the potential for significant changes in riverbed morphology.

6.2. Results – Carrying capacity

6.2.1 Pre-construction of breakwater

Based on the tide and wind induced hydrodynamic model execution, the details of volume of tidal water getting exchanged across the river close to the proposed project location in case of without breakwater is calculated and presented in **Table 6.1**. The table provides detailed data on the total carrying capacity of a river over a single tidal cycle (6 hours) during both the flood and ebb phases. The data is categorized according to different tidal conditions - Spring Tide and Neap Tide - and seasonal weather patterns, including fair weather, southwest monsoon and northeast monsoon. This categorization allows for a comprehensive analysis of how varying tidal and seasonal conditions impact the river's ability to transport water during each phase of the tidal cycle.

Table. 6.1. Total carrying capacity in Sharavathi River Estuary (without breakwater)

Season	Carrying capacity of the river over one tidal cycle (6 hours) (million m ³)			
	Spring Tide		Neap Tide	
	Flood (Carrying capacity)	Ebb (Return capacity)	Flood (Carrying capacity)	Ebb (Return capacity)
Fair Weather	13.61	19.43	6.48	10.92



SW Monsoon	19.16	21.24	9.33	15.52
NE Monsoon	16.86	14.87	7.21	11.94

Spring Tide

During spring tide, which occurs when the sun and moon align and their gravitational forces combine to produce the highest tides, the river's carrying capacity is significantly larger.

- Fair Weather
During the flood phase, the river can carry 13.61 million cubic meters of water, while in the ebb phase, it returns 19.43 million cubic meters.
- Southwest (SW) Monsoon
Under these conditions, the carrying capacity during the flood phase rises dramatically to 19.16 million cubic meters, with the return capacity during the ebb phase also increasing to 21.24 million cubic meters. This increase is likely due to the enhanced water flow and rainfall associated with the monsoon season.
- Northeast (NE) Monsoon
The flood phase has a carrying capacity of 16.86 million cubic meters, with the ebb phase carrying back 14.87 million cubic meters. The reduction compared to the Southwest Monsoon is consistent with the typically lower rainfall and river discharge during the Northeast Monsoon.

Neap Tide

Neap Tide occurs when the sun and moon are at right angles relative to the Earth, resulting in the smallest tidal range.

- Fair Weather
The flood phase carries 6.48 million cubic meters, and the ebb phase returns 10.92 million cubic meters. The significantly lower carrying capacity compared to Spring Tide highlights the reduced tidal influence.
- Southwest (SW) Monsoon
The flood phase sees a capacity of 9.33 million cubic meters, while the ebb phase returns 15.52 million cubic meters. Despite the smaller tidal range, the monsoon influence is evident in the increased volumes compared to Fair Weather.
- Northeast (NE) Monsoon
The flood phase carries 7.21 million cubic meters, with the ebb phase returning 11.94 million cubic meters. This is slightly lower than during the Southwest Monsoon but still significantly higher than in Fair Weather.



The variation of carrying capacity with respect to flood and ebb tidal phase on spring and neap tidal days during various seasons are shown in Fig. 6.1.

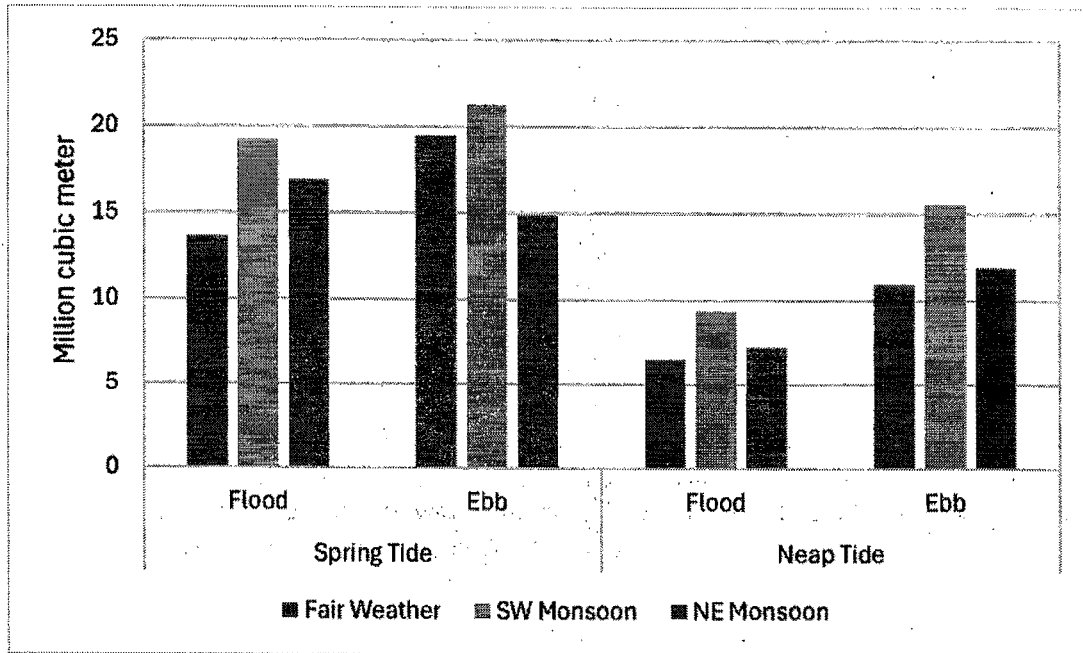


Fig. 6.1. Variation of carrying capacity- without breakwater

6.2.2 Post-construction of breakwater

Based on the tide and wind induced hydrodynamic model execution, the details of volume of tidal water getting exchanged across the river close to the proposed project location in case of with the breakwater is calculated and presented in Table 6.2. The table provides detailed data on the total carrying capacity of a river over a single tidal cycle (6 hours) during both the flood and ebb phases. The data is categorized according to different tidal conditions - Spring Tide and Neap Tide - and seasonal weather patterns, including fair weather, southwest monsoon and northeast monsoon. This categorization allows for a comprehensive analysis of how varying tidal and seasonal conditions impact the river's ability to transport water during each phase of the tidal cycle.

Table. 6.2. Total carrying capacity in Sharavathi River Estuary (with breakwater)

Season	Carrying capacity of the river over one tidal cycle (6 hours) (million m ³)			
	Spring Tide		Neap Tide	
	Flood (Carrying capacity)	Ebb (Return capacity)	Flood (Carrying capacity)	Ebb (Return capacity)
Fair Weather	16.33	21.89	8.34	14.24
SW Monsoon	20.06	22.32	11.11	18.47
NE Monsoon	18.64	15.95	9.42	16.22



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Spring Tide

During spring tide, which occurs when the sun and moon align and their gravitational forces combine to produce the highest tides, the river's carrying capacity is significantly larger.

- Fair Weather

During the flood phase, the river can carry 16.33 million cubic meters of water, while in the ebb phase, it returns 21.89 million cubic meters.

- Southwest (SW) Monsoon

Under these conditions, the carrying capacity during the flood phase rises dramatically to 20.06 million cubic meters, with the return capacity during the ebb phase also increasing to 22.32 million cubic meters. This increase is likely due to the enhanced water flow and rainfall associated with the monsoon season.

- Northeast (NE) Monsoon

The flood phase has a carrying capacity of 18.64 million cubic meters, with the ebb phase carrying back 15.95 million cubic meters. The reduction compared to the Southwest Monsoon is consistent with the typically lower rainfall and river discharge during the Northeast Monsoon.

Neap Tide

Neap Tide occurs when the sun and moon are at right angles relative to the Earth, resulting in the smallest tidal range.

- Fair Weather

The flood phase carries 8.34 million cubic meters, and the ebb phase returns 14.24 million cubic meters. The significantly lower carrying capacity compared to Spring Tide highlights the reduced tidal influence.

- Southwest (SW) Monsoon

The flood phase sees a capacity of 11.11 million cubic meters, while the ebb phase returns 18.47 million cubic meters. Despite the smaller tidal range, the monsoon influence is evident in the increased volumes compared to Fair Weather.

- Northeast (NE) Monsoon

The flood phase carries 9.42 million cubic meters, with the ebb phase returning 16.22 million cubic meters. This is slightly lower than during the Southwest Monsoon but still significantly higher than in Fair Weather.

The variation of carrying capacity with respect to flood and ebb tidal phase on spring and neap tidal days during various seasons are shown in **Fig. 6.2**.

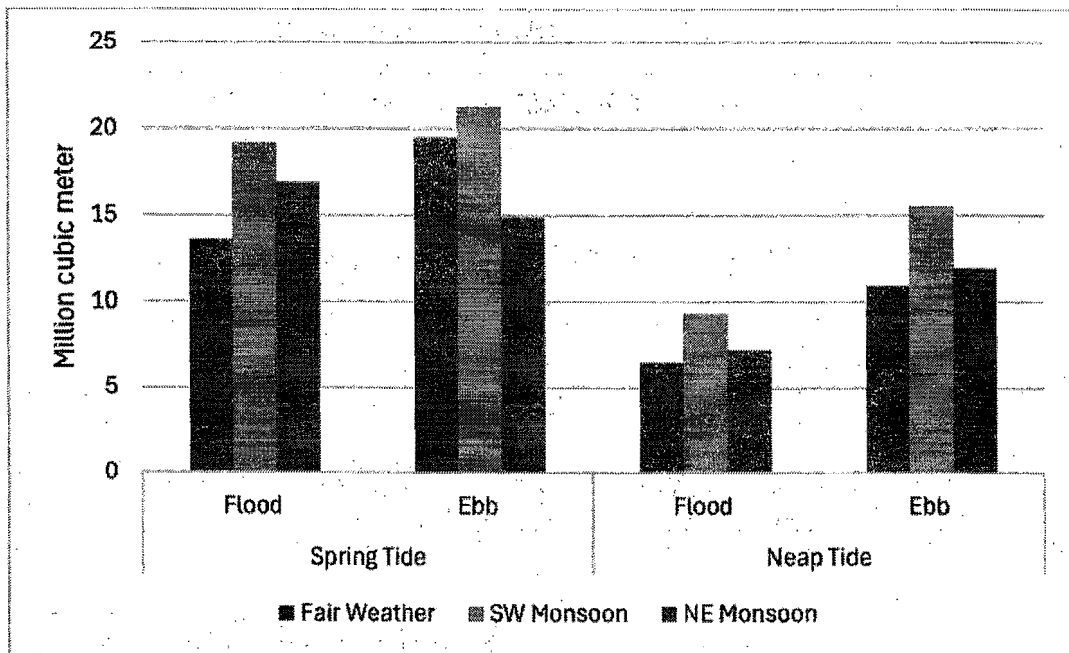


Fig. 6.2. Variation of carrying capacity- with breakwater

6.3. Conclusion

- The data indicates a clear influence of tidal conditions and seasonal weather patterns on the river's carrying capacity.
- The spring tide generally results in higher water volumes being transported, with the monsoon seasons further enhancing this effect.
- On the other hand, neap tide shows reduced carrying capacity, though the monsoon seasons still exert a notable influence, increasing the overall water volumes compared to fair weather conditions.
- The ebb phases consistently show higher return capacities, especially during the monsoon seasons, reflecting the dynamic interplay between tidal forces and seasonal weather patterns on riverine systems.
- Additionally, the construction of port facilities has led to a slight increase in the river's overall carrying capacity, indicating that the infrastructure may enhance the water transport capabilities of the river under various conditions.
- This suggests that the port facilities contribute positively to the river's ability to manage increased water volumes, particularly during peak tidal and seasonal events.