

“ASSESSMENT OF NON-BIODEGRADABLE WASTE SPREAD IN BHIMASHANKAR WILDLIFE SANCTUARY”

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Abstract:

The spread of non-degradable waste in Bhimashankar Wildlife Sanctuary (BWS) is considered to be a huge problem, while the actual damage caused by the same is not yet assessed. The sanctuary is well known pilgrim place and due to which attracts lot of tourists which generate a large quantitative of non biodegradable waste. The study tried to assess the spread of non degradable solid waste along frequently visited areas as well as along streams in sanctuary. There is a significant difference in the area covered by non-degradable wastes from pre and post Shravan sampling from all sampled areas. The total area covered by non degradable solid waste has been found to be below 5% from all areas except quadrat no. 1 of the control so it may not be the major issue of BWS.

Keywords: Bhimashankar Wildlife Sanctuary, Pre-Shravan, Post Shravan, Non degradable Solid Waste management

Introduction:

Bhimashankar Wildlife Sanctuary (BWS) lies in the chain of Western Ghats. Though Bhimashankar being primarily a wildlife sanctuary it is well known for lord Shiva temple which is visited by about three hundred thousand pilgrims annually since it is among 12 most important Shiva temples in the country (Borges, 1996). While thousands of pilgrims congregate to this temple during the month long festival of “Shravan”(Month of August), and on Mahashivratri and Tripuri Purnima, Bhimashankar with its breath taking views and thick forest cover has always been a favorite of wildlife tourists and trekkers. The problems associated with tourism are exacerbated by the lack of recognition given to the impacts resulting from religious tourists visiting the area and the lack of controls placed on their behavior within the Park (J.Buultjens et al, 2005). There has been a huge hue and cry about the spread of non-degradable solid waste within the Sanctuary and

concerns has been voiced and discussed upon since the last few years. Many NGOs along with the forest department have taken up cleaning up drives from within the area. Lack of proper collection and disposal of wastes is a major issue burning up within the sanctuary. The waste generated by the Hotels and Restaurants in Bhimashankar is dumped into the stream behind Bombay point and also at the origin of river Bhima near the temple area. Though it is a general belief that the spread of non-degradable wastes is detrimental to the forests, no study has ever been done in BWS to assess the area over which the wastes have spread and the extent of damage done by the same except for that of Jagdale, 1994 where results were found out by weighing litter bags found in the forest and calculating the rate for its decomposition (Jagdale, 1994). The environmental, cultural, aesthetic, commercial and other problems arising from pelagic plastics in severe, widely acknowledged but difficult to address (Gregory, 2009) The spread of non-degradable waste in the riparian forests of Gupta Bhima and other areas is aesthetically considered to be a huge problem while the actual damage caused by the same goes unnoticed as it is very difficult to document the same. One of the major concerns other than aesthetics is considered to be the consumption of plastic along with food items by wild animals and cattle.

Methodology

The study aimed to assess the impact and spread of non degradable solid wastes in the sanctuary hence the ground area covered by non degradable solid waste was considered as the most important parameter which needed to be documented. Most of the studies done on assessing the wastes generated would take into consideration either weight or volume, which do not suit our study methodology and hence only ground area covered was taken into consideration. This methodology was used taking into consideration that the amount of ground covered by non degradable solid waste would affect the forest regeneration. After observing the tourist movements and also on qualitative examination the quadrat's were laid in five areas which were as follows:

- I. Quadrats were laid on either side of the tar road between Hanuman Tala (lake) and Bhimashankar Temple.
- II. The path leading to Vanaspati point from the junction of the tar road between Hanuman Tala and the Bhimashankar Temple.
- III. The steps leading to the main Shiva temple from the main road to Hanuman Tala.
- IV. The Shiva temple to Gupta Bhima area was sampled in and along the stream.

- V. The stream in the west which flows from behind the Devi Mandir, bus stand, Bombay point, Forest Department Office etc. was also sampled as a control.

On qualitative assessment it was decided to lay the quadrats along the footpath/ unmetaled roads and temple steps as the non degradable solid wastes seemed to be restricted to the area along the paths. The human settlements and the temple are situated in the ravine through which the river Bhima originates and flows. The rain water collects the non degradable solid wastes while passing through the temple area and floods the stream with plastics and other non-degradable wastes. The stream in the west gets all the non-degradable wastes from the hotels and restaurants located close to the cliff. The quadrats were laid across the streams which are approximately 15 m wide, covering the bed and also the banks.

Sampling was done twice, once prior to Shravan i.e. pre monsoon when the Sanctuary had been cleaned up in month of May and once post Shravan i.e. after the monsoon in month of December when most of the pilgrims had visited the place and spread the non-degradable wastes yet once again. 20 m X 5 m quadrats were laid at 100 m interval, across the stream to assess the spread of plastic on the banks as well. Along the road and steps quadrats were laid on either side measuring 5 m X 5 m at 50 m interval. To compare the data with a control 20 m X 5 m quadrats were laid at 100 m interval in the stream which flows in the west from behind the Devi temple, bus stand, Bombay point, & Forest Department office, which had never been cleaned. A Measuring tape was used to ensure the distance between two quadrats was maintained and a 1 m by 1 m grid having 10 cm marking was used to document the area covered by the wastes.

Results and Discussion:

The area covered by the non-degradable wastes for both pre and post Shravan sampling has been plotted for all the five areas. To enumerate the significant difference in the amount of spread of the wastes from pre and post Shravan sampling the data was subject to Chi-Square test.

1.1 Main Temple to Gupt Bhima

The pre and post Shravan graph clearly shows that there is a marked difference in the amount of non-degradable wastes. In the pre Shravan sampling most of the wastes were in quadrats closer to the temple and the amounts reduced along with the distance from the temple; whereas most of the non-degradable waste in the post Shravan sampling is two hundred meters away from the temple (Fig. No.4). This difference is probably due to

the fact that the wastes are carried out of the Sanctuary by the water current during the Monsoon. Chi square analysis on the data from pre and post Shravan sampling is insignificant which may be due to very little ground covered by the waste.

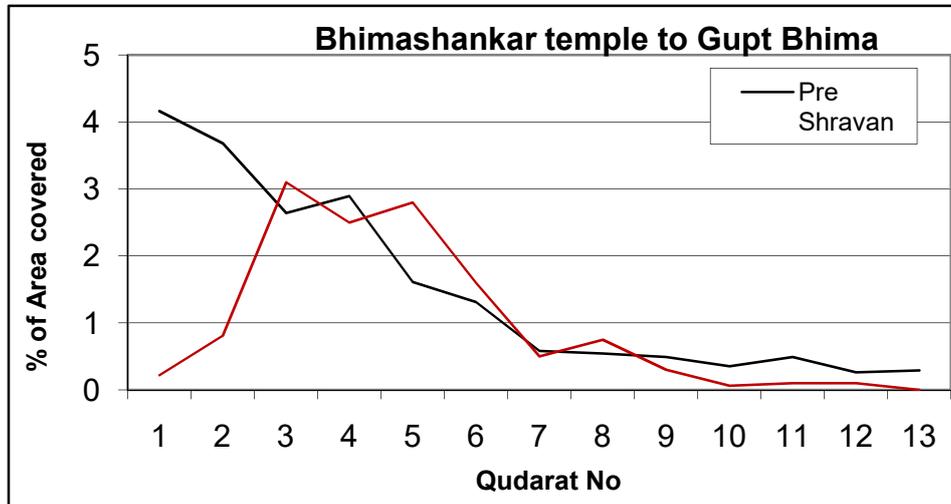


Fig No.1: Graph of % area covered by non degradable solid waste along Bhimashankar temple to Gupt Bhima.

1.2 Main road to the temple along the steps

There is a shift in the area covered by wastes from close to the temple from pre Shravan sampling to close to the main road in post Shravan sampling. The amount of wastes has also reduced in the post Shravan sampling (Fig. No.2). The quadrats close to the main road are areas where the rain water has very little intensity of flow whereas the quadrats near the temple are in the river bed. The river passes through the temple village of Bhimashankar which is used to dispose the wastes generated by the temple, business houses and the villagers.

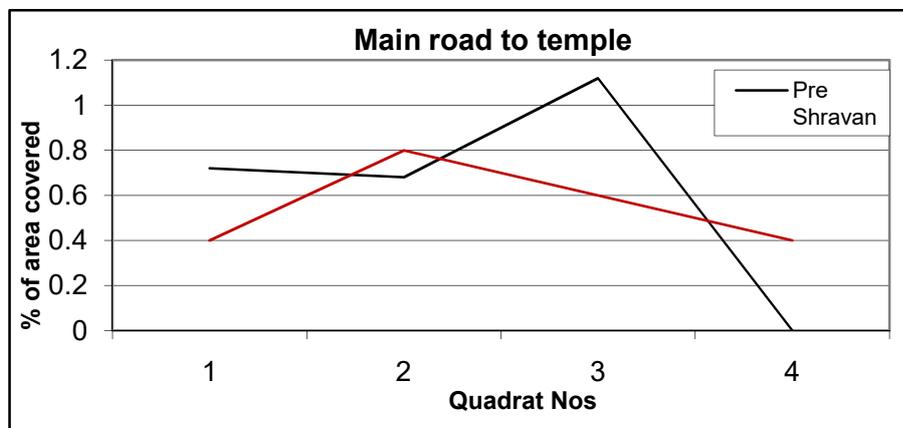


Fig No.2: Graph of % area covered by non degradable solid waste along main road to Bhimashankar temple.

1.3 Hanuman temple to Bhimashankar Temple

Maximum waste in this tourist spot was close to Hanuman Tal during the pre Shravan sampling which was due to a Hindu festival which was to be celebrated in the area. In the quadrats between Hanuman temple to Main Shiva temple the waste was more in the post Shravan sample(Fig. No.4). This trend is because the sanctuary was not cleaned and the rain water could not carry the waste out of the sanctuary. Chi square analysis on the data from pre and post Shravan sampling is insignificant which may be due to very little ground covered by the wastes.

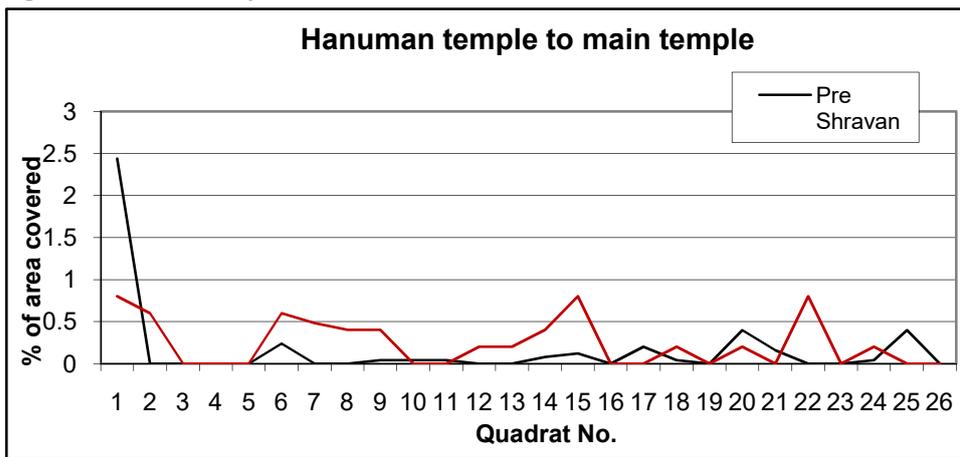


Fig no.3: Graph of % area covered by non degradable solid waste along main Hanuman temple to main temple.

1.4 Vanaspati point to Hanuman Tal road junction

The percentage of area covered by wastes between Hanuman Tal road junctions to Vanaspati point was maximum in the post Shravan sampling (Fig. No.4). This was due to the wastes getting collected during the period between the two sampling. The chi square analysis shows that there is a significant difference in the amount of ground area covered by non degradable solid wastes at 1% probability.

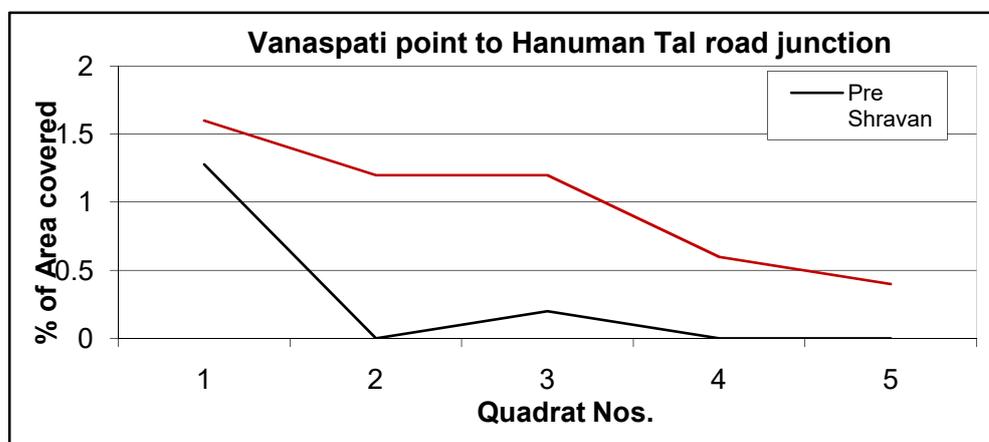


Fig No.4: Graph of % area covered by non degradable solid waste along Vanaspati point to Hanuman Tal road junction.

1.5 Nala in the west behind the Devi Temple

This was a control which was sampled mainly because it was never cleaned up by any NGO or the Forest Department. The total area covered by non-degradable wastes at 65% which was way too high in the first quadrat and then it reduced drastically to 0.03%. The non-degradable wastes from the control are less than 0.05% from the second quadrat onwards which is similar to the trend in the other areas.

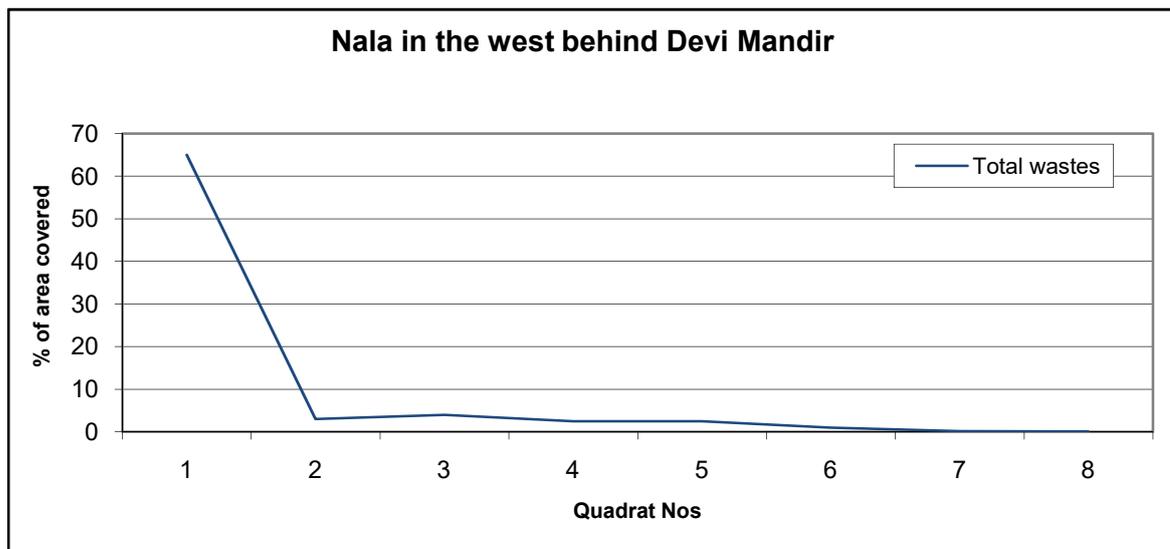


Fig No.5: Graph of % area covered by non degradable solid waste along Nala in the west behind Devi Temple

1.6 Animal Deaths due to consumption of wastes:

During the study not a single animal i.e. domestic or wild was reported dead due to consumption of plastic and other non degradable solid wastes. A Civet was seen to be eating out of a plastic bag from personal observation on one occasion but it did not consume any part of the bag. Cattle have been seen lifting Prasad i.e Holy food filled carry bags and consuming it whole but the effect of this behavior is difficult to document. The cattle was not found dead anywhere, however the locals reported that a few cattle have been found dead due to plastic blocking the alimentary canal. The number of cattle deaths due to consumption of plastics is difficult to ascertain as no autopsies are carried out for the same.

Conclusions:

Though the total area covered by non degradable solid waste has been found to be below 5% from all areas except quadrat no. 1 of the control it may not be the major issue of

BWS. The non-degradable wastes consisted of very low microns carry bag, plastic bottles, cans, plastic sheets, wrappers and empty packets of eatables, batteries in low quantities etc. The areas sampled were the streams and along the path which were the most frequented places by the tourists. In the streams the amount of wastes seems to be lower in the post Shravan sampling than the pre Shravan sampling, while the quadrats along the road showed a reversal of this trend. However from all the areas and especially the control it can be clearly seen that most of the wastes are limited to areas near the temples or close to the origin of the streams. There is a significant difference in the area covered by non-degradable wastes from pre and post Shravan sampling from all areas. Post Shravan data from the streams indicate that the rain water carries the non-degradable wastes outside the sanctuary. (From personal observations it has been seen that the plastic disintegrates due to weathering by the sun and also by shearing due to the pressure exerted by the flow of the stream.) Light weight bottles, cans, other plastic etc. are directly carried out of the sanctuary along with the flow of water. The wastes were disposed mainly near the main temple and Hanuman tal. The local business houses used the streams and ravines as convenient waste disposal pits. The waste generated in the temple finds its way into the streams every year.

There is no waste management system in BWS. The Forest Department and NGOs had collected approximately a truck full of garbage however there is no system for carting the wastes out of the sanctuary or a waste pit, or even dustbins for that matter. To address the issues a management plan for the disposal and collection of the wastes need to be designed and implemented. The packaging and distribution of holy food in plastic bags cannot be avoided owing to the climatic conditions of the sanctuary but a proper waste disposal and collection system can ensure the waste do not pose a threat to the sanctuary. There have been a number of suggestions to introduce paper bags and baskets etc in the sanctuary, which are eco friendly and will give employment to a few locals but it will not yet solve the problem. The paper bags cannot be used during the monsoon when the number of pilgrims visiting the sanctuary is at its peak due to Shravan. The place of plastic will be taken by paper bags which maybe degradable but will yet not be acceptable aesthetically plus the chemicals from the paper will contaminate the water. A plausible solution to the issue of wastes seems to be the collection of an environmental tax from the tourist. The revenue generated can be used for employing locals for the collection and scientific disposal of the wastes, which will be beneficial to the tourists, the locals, and the sanctuary.

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