

A Case Study of Olive Ridley Turtles and Vultures

Mayank Raj^{1,*}, Hegreev Kumar², Kaustubh Verma³

Abstract

Olive Ridley sea turtles and vultures are two species that were on the verge of extinction due to various factors such as habitat loss, hunting, and human intervention. The Government of India put policies in place to protect these species, and the efforts paid off. The government-imposed restrictions on Olive Ridley sea turtles included the use of turtle excluder devices in fishing gear and the establishment of protected zones along the coast. These precautions were required since the mortality rate of Olive Ridley turtles is increased by their propensity to be entangled in fishing nets. To allow turtles to escape, turtle excluder devices are fastened to fishing nets. India is one of the nations having the largest populations of Olive Ridley turtles worldwide. Since visitors come to see the turtles' nesting and hatching, they have a considerable economic impact.

Keywords: Olive Ridley, Wildlife, conservation, sea turtles, fishing community development

INTRODUCTION

Due to human actions, including habitat degradation, poaching, and pollution, two species, the Olive Ridley sea turtle, and the vulture, have been on the verge of extinction. These species have been saved from extinction thanks to the implementation of effective governmental policies, emphasizing the significance of conservation efforts and the role of the state in protecting biodiversity.

Olive Ridley sea turtles are an endangered species, and recent years have seen a sharp drop in their population. These turtles can be found across the world, including India, where the Wildlife Protection Act gives them protection [1]. Along the Odisha coast in India, there are significant Olive Ridley turtle nesting sites. These nesting locations are essential for the species' conservation. After 20 years, the tremendous effort of the 1972 Wild Life Protection Act has received some wonderful news: a huge number of Olive Ridley sea turtles have been discovered in Odisha.

The Marine Turtle Project was established in 1975, marking the beginning of conservation efforts for Olive Ridley turtles (Figure 1). The initiative attempted to protect marine turtles, namely Olive Ridley turtles, in India's coastal areas. The initiative included a number of turtle conservation efforts, such as

creating protected areas, keeping an eye on beaches where turtles lay their eggs, and raising community knowledge of conservation issues.

The creation of the Gahirmatha Marine Wildlife Sanctuary on the coast of Odisha in 1997 was one of India's greatest conservation successes. The largest Olive Ridley Sea turtle nesting location in the world is located in the sanctuary. The refuge is off limits to visitors and fishing activities from November to May, which is typically when Olive Ridelays lay their eggs. Turtle conservation volunteers patrol the nesting beaches to protect the nests and hatchlings.

*Author for Correspondence

Mayank Raj
E-mail: mayankraj0112@gmail.com

¹⁻³Student, University of Petroleum and Energy Studies,
Department of Law, Knowledge Acres, Kandoli Dehradun,
Uttarakhand, India

Received Date: May 05, 2023

Accepted Date: May 10, 2023

Published Date: May 15, 2023

Citation: Mayank Raj, Hegreev Kumar, Kaustubh Verma. A Case Study of Olive Ridley Turtles and Vultures. International Journal of Environmental Planning and Development Architecture. 2023; 1(2): 72–98p.



Figure 1. At the Gahirmatha nesting site in Odisha, hatchlings of the endangered Olive Ridley species have broken the shells of their eggs.

RETURN TO NATURAL HABITAT



Figure 2. Olive Ridley turtle hatchlings return to the sea from the Vizag coast./ V Kamalakara Rao / TNN / Updated: Mar 22, 2021, 11:45 IST Visakhapatnam /The Times of India Read more at:http://timesofindia.indiatimes.com/articleshow/81619786.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

Also, Olive Ridley turtles come ashore to lay eggs during the 'arribada,' a mass nesting occasion that takes place every year (Figure 2). Tourists from all around the world typically attend the event.

On the other hand, the use of diclofenac, a veterinary medicine that caused kidney damage in vultures that fed on the carcasses of animals that had taken the drug, led to a sharp drop in the vulture population in India. By removing animal carcasses and halting the spread of illness, vultures are essential members of the environment.

Nine different species of vultures are found in India, and the usage of diclofenac has resulted in a more than 95% drop in the number of these birds. The Indian government was compelled by the circumstance to act proactively to protect the vultures.

The "Vulture Conservation Breeding Centre" (Figure 3) was established by the government in 2006 with the goal of breeding vultures in captivity and releasing them into the wild. The breeding and release of 200 birds annually was the centre's goal.

Additionally, the government enforced regulations that forbade the use of diclofenac in veterinary medicine [2]. Meloxicam was used in its place, which is a safer medication for vultures.

In addition, the government worked with conservation groups like the Bombay Natural History Society to conduct studies and educate the public about the value of vultures to the environment.

BIRD'S EYE VIEW

9 RECORDED SPECIES:

Oriental white-backed, long-billed, slender-billed, Himalayan, red-headed, Egyptian, bearded, cinereous and the Eurasian Griffon.

(4 CRITICALLY ENDANGERED, 1 ENDANGERED, 3 NEAR THREATENED)

THE CRISIS:

A massive dip in vulture populations came into limelight in the mid-90s, and in 2004 the cause of the crash was established as diclofenac, a veterinary nonsteroidal anti-inflammatory drug.



WHAT NEXT AFTER 2006 PROJECT:

- Testing of nonsteroidal anti-inflammatory drugs on vultures, development of new NSAIDs
- Covering two more species in the breeding programme that earlier focussed on 3 critically endangered species
- Additional conservation breeding centres and four rescue centres planned across India
- Nationwide vulture survey once in four years

Figure 3. The Himalayan, bearded, and cinereous vultures are classified as "near threatened," while the Egyptian vulture is classed as "endangered." / THE INDIAN EXPRESS / EPAPER/ESHA ROY /NEW DELHI ,17 NOV ,2020 / 02:08 IST.



Figure 4. A newborn vulture of the white-rumped kind.

The population of vultures (Figure 4) has increased as a result of the conservation measures made in India. The Indian government is currently pushing for the adoption of healthy farming practices to lessen the need for vulture-harming chemicals.

The conservation efforts for the Olive Ridley turtle and the vulture in India show how effective government regulations are in preserving biodiversity. Ecosystems can gain from proactive interventions by increasing the population of endangered species. It emphasises the significance of adopting proactive efforts to safeguard ecosystems and threatened species before things get out of hand.

The environment has been severely impacted by the fall in the number of vultures (Figure 5), who are scavengers that consume animal carcasses. Nine different species of vultures are found in India, and the usage of the hazardous veterinary medication diclofenac has caused a population drop of more than 95%. As a result, the vulture population in India saw a considerable fall, which prompted the adoption of conservation measures.

To preserve these species (Figure 6), the Indian government has put in place a number of policies. To provide secure breeding locations for Olive Ridley turtles, the government constructed a number of

protected areas along the coast, notably the Gahirmatha Marine Wildlife Sanctuary. To lessen turtle mortality brought on by unintentional entanglement in fishing nets, measures including the installation of turtle excluder devices in fishing equipment were also put into place.

OLIVE RIDLEY TURTLES RETURN TO CITY AFTER 20 YRS

SCIENTIFIC NAME
LEPIDOCHELYS OLIVACEA

- ▶ Olive ridley turtles are a protected species under the Wildlife Protection Act, 1972
- ▶ They are the smallest and most abundant of all sea turtles in the world, inhabiting warm waters of the Pacific, Atlantic and Indian oceans. However, their numbers have been declining; the species is recognized as Vulnerable by the IUCN Red list
- ▶ The Olive ridley gets its name from its olive colored carapace, which is heart-shaped and rounded




2ft length
50kg weight

RARE MASS NESTING

- ▶ Olive ridley turtles are known for their unique mass nesting called Arribada. The females migrate great distances to nest on the same beach year after year, sometimes twice a year
- ▶ Thousands of females emerge from the water and over a period of 5-7 days lay eggs in about one-and-a-half-ft deep pit that they laboriously dig with their hind flippers
- ▶ After 45-65 days, young turtles hatch and make a dash towards the sea on their own. During this trek, they are exposed to predators like birds, fiddler crabs, and dogs

The coast of Orissa is the largest mass nesting site for the Olive ridley, followed by the coasts of Mexico and Costa Rica. The entire coast of India hosts nesting beaches



Nesting spots in Maharashtra
About 35 beaches along the Konkan coast

- Diveagar
- Maral
- Harihreshwar
- Velas
- Anjarle
- Ratnagiri
- Sindhudurg

THREAT FOR TURTLES

- ▶ Huge fishing nets of trawlers and propellers of mechanized boats
- ▶ They are extensively poached for their meat, shell and leather, and their eggs, though illegal to harvest, have a significantly large market around the coastal regions

Approx 1 hatchling survives to reach adulthood for every 1,000 hatchlings that enter the sea waters



Afroz Shah Week 127. Fantastic news for Mumbai . We got back Olive Ridley Sea Turtle after 20 years. Historic moment Nested and Hatched at our beach. We facilitate their journey to ocean. Constant cleaning helps marine species. Marine conservation centre needed at @versovabeach

Figure 5. After 20 years Olive Ridley turtles return in Odisha. This species is the smallest and most abundant in all of sea turtle in World. Published by The Times of India. On Olive Ridley and Wildlife Protection Act, 1972.

VANISHING SPECIES

Resident Gyps, Oriental white-backed, long-billed and slender-bill vultures suffered catastrophic decline in number in the 1990s and 2000s

- Veterinary drug diclofenac, used for pain relief in cattle, was found to be extremely toxic to vultures and was implicated in their population crash
- Though a 2012 survey showed a slowdown in their decline, in 2015, the estimates were approximately 6,000 Oriental white-backed, 12,000 long-billed and 1,000 slender-billed vultures, which are alarmingly low



Figure 6. Vulture species showed a rapid decline in numbers from 1900s to 2012 rapidly. The Times of India / Kerala / 4 Nov, 2018.

For vultures, the government has implemented regulations that forbid the use of diclofenac in veterinary settings and have meloxicam as a safer alternative [3]. The Vulture Conservation Breeding Centre, which aimed to breed vultures in captivity and release them into the wild, was also established by the government. The success of these breeding programmes has increased the number of vultures in India.

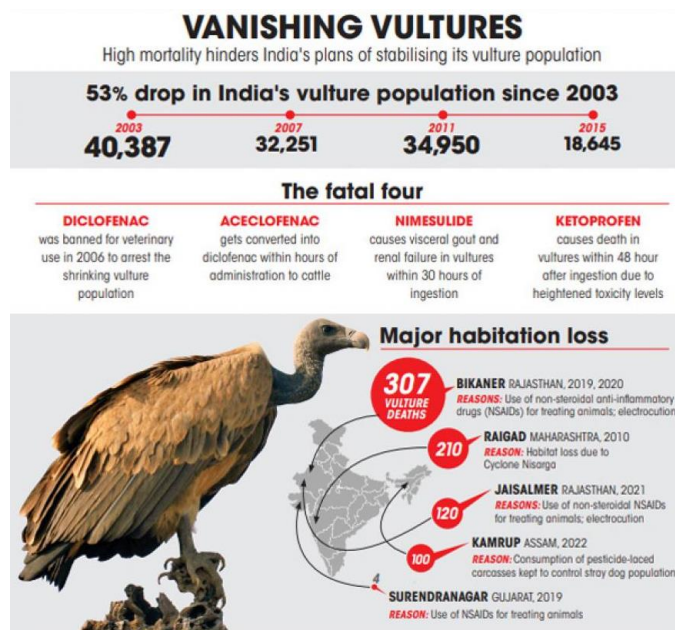


Figure 7. Vulture populations are "stabilizing" and the Ministry of Environment, Forest and Climate Change has launched an action plan to boost them. / The Times of India. Esha Roy 2 May.

Government action may have a big influence on the success of conservation efforts (Figure 7), as seen by the conservation efforts for these species, which emphasize the significance of government policy in maintaining biodiversity. Protected areas, breeding programmes, and the use of non-conventional drugs have all been used to stop the extinction of these species in India. Local communities have contributed significantly to conservation efforts as well. To increase public awareness of conservation initiatives and promote community involvement in managing protected areas, the government has cooperated with nearby towns.

The Olive Ridley turtle and vulture situation in India serves as a prime example of the importance of strong conservation strategies and active government involvement in biodiversity preservation. The introduction of protection measures for these species has been essential to maintaining their numbers. The resurgence of these species highlights the necessity of taking proactive steps to maintain biodiversity, and we must recognise the significance of conservation policies in safeguarding our natural heritage.

OLIVE RIDLEY SEA TURTLES

The Cheloniidae family of marine turtles includes Olive Ridley Sea turtles (*Lepidochelys olivacea*) (Figure 8). Their greenish carapace (upper shell) gave rise to their name. Olive Ridley sea turtles are the smallest species and can weigh up to 110 pounds (50 kg) and grow to a maximum length of roughly 2 feet (60 cm). They can be found in the Pacific, Indian, and Atlantic Oceans' warmer waters. They can be found in India along the coasts of Tamil Nadu, Andhra Pradesh, and Odisha.

Nesting and Feeding Habits

The distinctive nesting behaviour of Olive Ridley turtles is referred to as "arrivada," which is a Spanish term that means "arrival." At the same time, usually at night, thousands of female turtles come

ashore to deposit their eggs [4]. The moon cycles or ocean currents are assumed to be the main environmental drivers of this coordinated nesting activity. Along the Indian coast, arribada typically takes place between October and May.



Figure 8. Olive Ridley turtle (*Lepidochelys olivacea*).

Olive Ridley turtles have two different nesting habits: the more typical solitary nesting and the synchronised mass nesting, or arribadas, for which they are well known. Females return to the beach where they initially emerged to deposit their eggs. With their hind flippers, they laboriously dig 1.5-foot-deep conical nests for their eggs. The bulk of the Olive Ridley nests in the Indian Ocean are located around Gahirmatha in Odisha at two or three huge assemblies.



Figure 9. The life cycle of olive ridley sea turtle.

The coast of Odisha in India is one of the main mass nesting areas for the Olive Ridley (Figure 9), along with the beaches of Mexico and Costa Rica. In a single week in 1991, almost 600,000 turtles lay

their eggs along the coast of Odisha. Solitary nests are also prevalent, albeit they are dispersed, throughout the coastlines of Sri Lanka, the Coromandel, and Honawar (Karnataka). However, olive ridley is thought to be a rare species in most parts of the Indian Ocean.

The omnivorous Olive Ridley Sea turtle consumes a wide range of aquatic invertebrates, including jellyfish, crabs, and other invertebrates. They also consume a tiny number of seagrasses, which provide them the nutrients they need to grow and develop.

Conservation Status

The Indian Wildlife Protection Act also provides protection for Olive Ridley turtles, which are listed by the International Union for Conservation of Nature (IUCN) as vulnerable. Due to a number of causes, including habitat degradation, pollution, and unintentional deaths brought on by fishing methods, its population has severely decreased over the past several decades. When fishing methods are not sustainable or made to avoid accidental trapping, Olive Ridley turtles are particularly vulnerable to becoming bycatch in fishing nets.

Conservation Efforts in India

The Olive Ridley sea turtle (Figure 10) is threatened; hence the Indian government has taken many conservation efforts. These encompass the creation of protected areas, the utilization of turtle-excluding equipment in fishing nets, and neighbourhood-based conservation programmes.

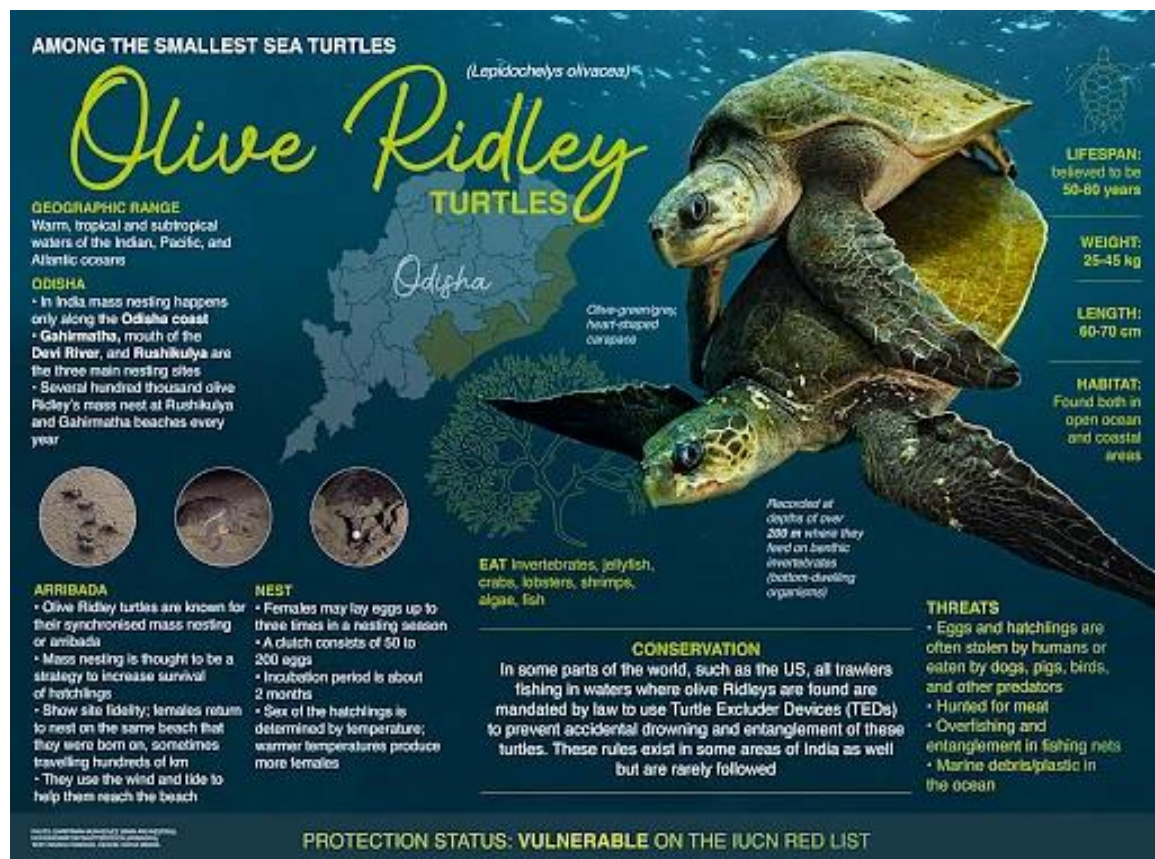


Figure 10. A record-breaking 4.92 lakh Olive Ridley turtles made their way to the Rushikulya coast in Odisha. This nesting set all previous records for density along the coast.

Establishment of Protected Areas

To safeguard the Olive Ridley Sea turtles' (Figure 11) breeding grounds, a number of protected zones have been set aside around the Indian coast. The greatest breeding area in the world for Olive Ridley

Sea turtles is the Gahirmatha Marine Wildlife Sanctuary, which is situated along the coast of Odisha. The sanctuary has stringent rules for how the coast should be used during the nesting season, and certain places are off-limits to tourists and fishing is prohibited.

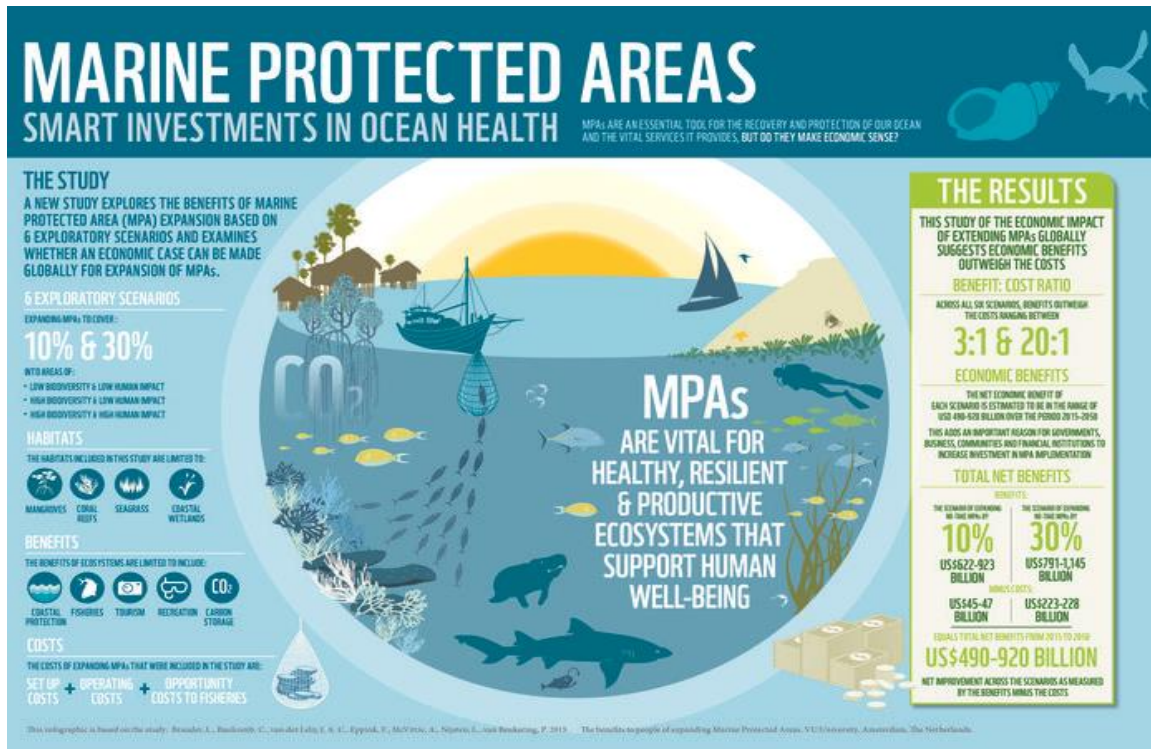


Figure 11. Marine Protection Area, these are the areas with restrictions on fishing.

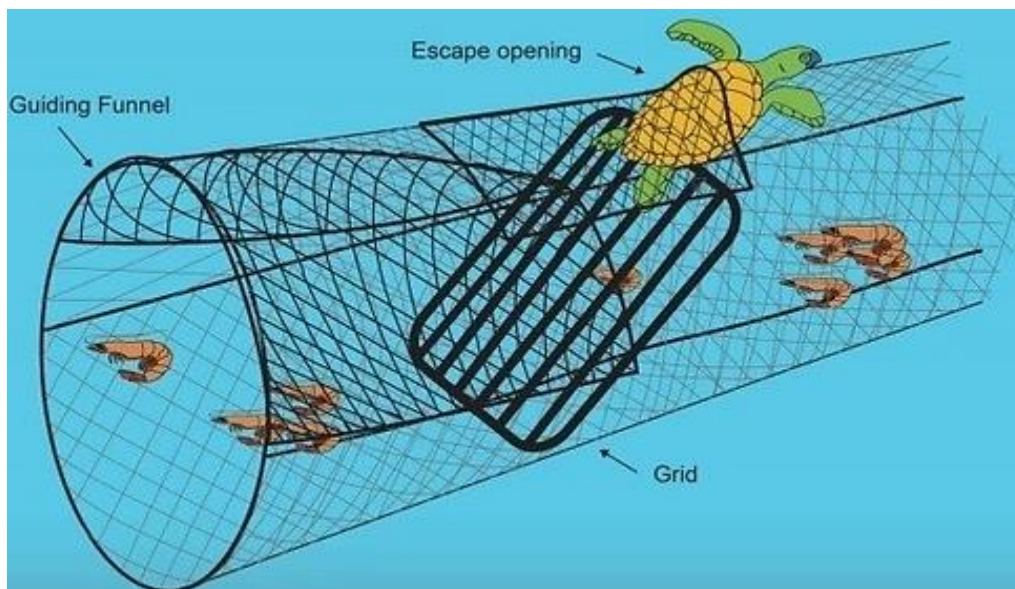


Figure 12. Turtle excluder device.

Turtle Excluder Devices

Fishermen in Indian seas have embraced the usage of turtle excluder devices (TEDs) in fishing nets to a large extent (Figure 12). TEDs make it possible for turtles and other marine creatures to escape from fishing nets, which lowers the rates of unintentional bycatch and death. For gillnet and trawl fisheries in India, the equipment is required.

Initiatives for Community-Based Conservation

To increase awareness and involve local populations in Olive Ridley Sea turtle conservation, a number of community-led programmes (Figure 13) have been put into place. In order to foster ethical fishing methods and further the preservation of sea turtles [5], the Orissa government established the Fishing Communities Development Project (FCDP) in partnership with international conservation organisations. The concept involves neighbourhood-based measures like setting up alternate sources of income and conducting night-time patrols to safeguard nesting areas.



Figure 13. Many a times, turtles come into the village area due to cyclone. Figure shows a turtle being examined by a doctor and rescue team.

OLIVE RIDLEY SEA TURTLES ARE IMPORTANT FOR THE ENVIRONMENT AND THE SEA

Olive Ridley turtles are an essential species in preserving and balancing marine ecosystems (Figure 14). The species is a vital part of food webs and plays a significant part in preserving the ecosystem's biodiversity and general health. This essay's goal is to examine the role played by Olive Ridley sea turtles in the environment and oceans, including their methods of reproduction, sources of food, and relevance to various ecosystems.




Olive Ridley turtles are generally found in the ocean and other bodies of water, including lagoons, bays, and estuaries; they are important biological players in the regulation of the marine ecosystem. The great variety of foods that sea turtles may consume includes jellyfish, crabs, fish, prawns, molluscs, and algae. They play a crucial predatory role by limiting the number of these species and maintaining the equilibrium of the environment. By fostering the development of other creatures within these habitats, sea turtles contribute to the general well-being of ecosystems, including seagrass beds, coral reefs, and shallow water regions.

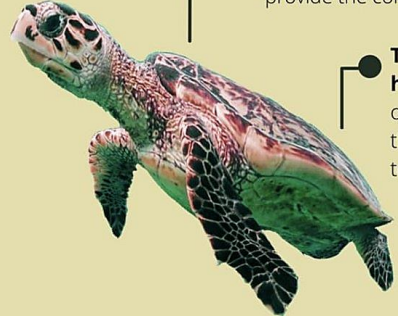
One other important element of Olive Ridley is nesting. The way sea turtles nest varies. Males and females gather in these areas, known as arribadas, for breeding purposes since these creatures like to reproduce in hot, tropical environments [6]. Thousands of turtles gather on the beaches during the breeding season to deposit eggs, build nests, and produce hatchlings simultaneously. The phenomenon known as arribadas, or coordinated nesting, is essential to the survival of the species. The population of the species may decline due to unchecked development or the removal of its nesting grounds, having negative ecological effects.

THE IMPORTANCE OF SEA TURTLES IN THE ECOSYSTEM

Sea turtles have been recognized as ‘keystone species’ which means they hold important roles in the ecosystem.

..... **HERE'S WHY**

- They help maintain balance food web.**
Sea turtles control the number of jellyfish by feeding on them. 
- They keep coral reefs healthy.**
Sponge grow faster than corals, sea turtles that feed on sponge will provide the corals chance to grow. 
- They keep seagrass beds healthy.** Green turtles feed on seagrass and control their growth from growing too long. 



© SEATRU UMT

Figure 14. Importance of sea turtle for the ecosystem.



Figure 15. Turtles eggs are securely incubated deep underneath in the sand for roughly 45 days.

The dispersion of nutrients in the marine ecosystem (Figure 15) is considerably aided by sea turtles. When they travel to the beaches to lay their eggs, they transport nutrients from the ocean that they have consumed. The nutrients released by turtle faeces and eggs are good for beach flora and wildlife, encouraging the establishment of healthy plants and supplying food for animals that live along the shore.

Additionally, the regulation of the carbon cycle is greatly influenced by Olive Ridley sea turtles. When sea turtles consume green plants and algae, they absorb carbon dioxide and use it as fuel. They can contribute to limiting the quantity of carbon dioxide present in marine habitats by consuming these specific forms of food [7]. Sea turtles contribute to the general well-being of the marine ecosystems by acting as an essential regulating mechanism in the carbon cycle and by devouring the primary producers (plants or algae).

Olive Ridley sea turtles are significant to conservationists worldwide, and a number of programmes have been established to help ensure their survival. In nations where there are Olive Ridley turtle nesting grounds, eco-tourism has gained popularity. As visitors swarm to see the turtles in their natural environment, local people profit from the heightened economic activity while preserving these locations.

Why are sea turtles important?

- * Sea turtles help maintain healthy seagrass beds and coral reefs that provide key habitats for other marine life and help balance marine food webs.



Credit: NMFS



Credit: USGS



Figure 16. Olive Ridley turtles are invertebrate feeders and may be significant players in both coastal and open ocean habitats.

In addition to ecotourism (Figure 16), governments around the world have enacted rules and safeguarded sensitive areas by passing legislation that forbids the hunting of turtles or the taking of their eggs, implementing sustainable fishing methods, and establishing protected areas that preserve the ecosystems crucial to the survival of the organisms.

Due to their involvement in the food web and nutrient cycling, sea turtles are essential to marine ecosystems and essential to understanding marine research. Because they are keystone species, their extinction could have negative ecological effects that harm other marine life. Enforcing conservation programmes like eco-tourism and sustainable farming and fishing techniques can prevent the extinction of Olive Ridley Sea turtles and the vital habitats they inhabit [8]. By taking decisive action to address the rapid extinction of these creatures, we can build a world that supports healthy ecosystems and an abundance of life.

CONSERVATION AND TO INCREASE THE POPULATION OF OLIVE RIDLEY SEA TURTLE PROJECT BY GOVERNMENT

The Wildlife Protection Act of 1972 and the Inland Fisheries Act of 1897 both provide protection for Olive Ridley Sea turtles in India. The Olive Ridley sea turtle is the target of a number of government-led conservation and protection programmes. The main goal of these initiatives is to lessen the negative effects on their habitats, such as beach pollution, industrial fishing, and development activities, among others.



Figure 17. Government project and protection programme to increase number of sea turtles.

The following are some of the government projects initiated for Olive Ridley turtle conservation in India:

- **Marine Protected Areas:** To preserve the Olive Ridley Sea turtle population (Figure 17), India has established a number of marine protected areas (MPAs). These MPAs aid in the preservation of the species and ecosystems that rely on them, such as sea turtles. A well-known Olive Ridley turtle nesting site is the Gahirmatha Marine Sanctuary in the state of Odisha, which, along with other MPAs, provides protection from fishing and other human activities during the nesting season.
- **Fishing practices are restricted** because trawler use kills turtles and poses a serious threat to Olive Ridley sea turtle populations (Figure 18). Indian authorities have put in place fishing regulations to lessen this effect, including a ban on mechanised trawlers during the Olive Ridley sea turtle nesting season.
- **Eco-tourism and Conservation Awareness:** In recent years, the expansion of eco-tourism has increased public and tourist awareness of Olive Ridley turtle conservation measures (Figure 19). Training has been provided to local communities on developing nesting hatcheries, saving turtles that have become stranded, and implementing sustainable tourism methods.
- **Protected Nesting Sites:** To ensure that sea turtle eggs are safe from both natural predators and human activities, the Indian government has identified nesting sites and established turtle hatcheries in collaboration with the Forest Department and local communities. One such project, the Manakudi Bay Model Hatchery in Tamil Nadu, focuses on the preservation of Olive Ridley sea turtles and seeks to safeguard their nesting grounds.
- **Studies are constantly being conducted** on population trends, nesting habits, and the distribution of Olive Ridley sea turtle habitats along the Indian coast because sea turtles serve as indicators for determining the health of marine environments. Understanding the needs of the species and offering solutions to safeguard and conserve it are made possible by the research.

- The Indian government has launched several initiatives to protect the Olive Ridley sea turtle, with a particular emphasis on regulating fishing practices (Figure 20), creating MPAs, establishing turtle hatcheries, and promoting ecotourism. The government-led initiatives are meant to protect aquatic species like the Olive Ridley sea turtle and their corresponding habitats. By supporting conservation projects, communities and individuals can encourage long-term environmental protection goals-aligned sustainable development.



Figure 18. Adani's turtle-saving plan is taking shape with the release of a conservation policy. Maulak Pathak/TNN/Updated: Feb 7,2021,17.42 IST. The Times of India// Ahmedabad <https://timesofindia.indiatimes.com/city/ahmedabad/conservation-policy-out-adanis-turtle-saving-plan-takes-shape/articleshow/80727535.cms>



Figure 19. Tourist spot, beachside sea turtle viewing area.



Figure 20. Rescue and treatment programmes initiated by government projects help the turtles.

SEA TURTLE REHABILITATION AND RESCUE

One of the main objectives of the Olive Ridley Project is the rescue and rehabilitation of as many injured sea turtles as possible.

Sea turtles frequently suffer fatal injuries when they get caught in marine debris, swallow fishing hooks, are hit by boats, or are kept improperly as pets, frequently in freshwater. Although they do their best, the project team unfortunately cannot save everyone.

The Olive Ridley Project (ORP), a sea turtle rescue and rehabilitation organisation, operates the Marine Turtle Rescue Centre in Baa Atoll and a Sea Turtle Rehabilitation Centre in North Male Atoll. They provide veterinary services and rehabilitation facilities for injured sea turtles found all over the country.

There are many pictures with description about turtle rescue by the Project (Figure 21a and b):

Sadly, sea turtles at all stages of development frequently ingest plastic and other marine debris (Figure 22 and 23). This plastic can occasionally pass through without creating a problem. Other times, it can result in serious obstructions, even complete obstructions, which can lead to sepsis, intestinal perforation, and ultimately death.

Plastic ingestion is so widespread that plastic is frequently discovered in the stools of healthy, recovering turtles, even if they were admitted for an entirely unrelated reason and even after many months had passed since they were last in the wild.

Although Olive Ridleys are typically seen in the Maldives caught in ghost gear, one occasionally finds Olive Ridleys and other species that have consumed enormous long-line fishing hooks (Figure 24), the kind that are used to catch tuna out in the open ocean. Sadly, these might also have gone much deeper inside their stomach or even beyond. They are frequently found lodged in someone's oesophagus or mouth.

These hooks are incredibly sharp and frequently pierce the victim's soft tissues, causing severe injury and infection. Thankfully, x-rays can quickly and accurately diagnose them, allowing us to take quick action to have them removed. A sea turtle frequently exhibits no outward signs of ingesting a fish hook, therefore all patients undergo x-rays when they are first admitted.

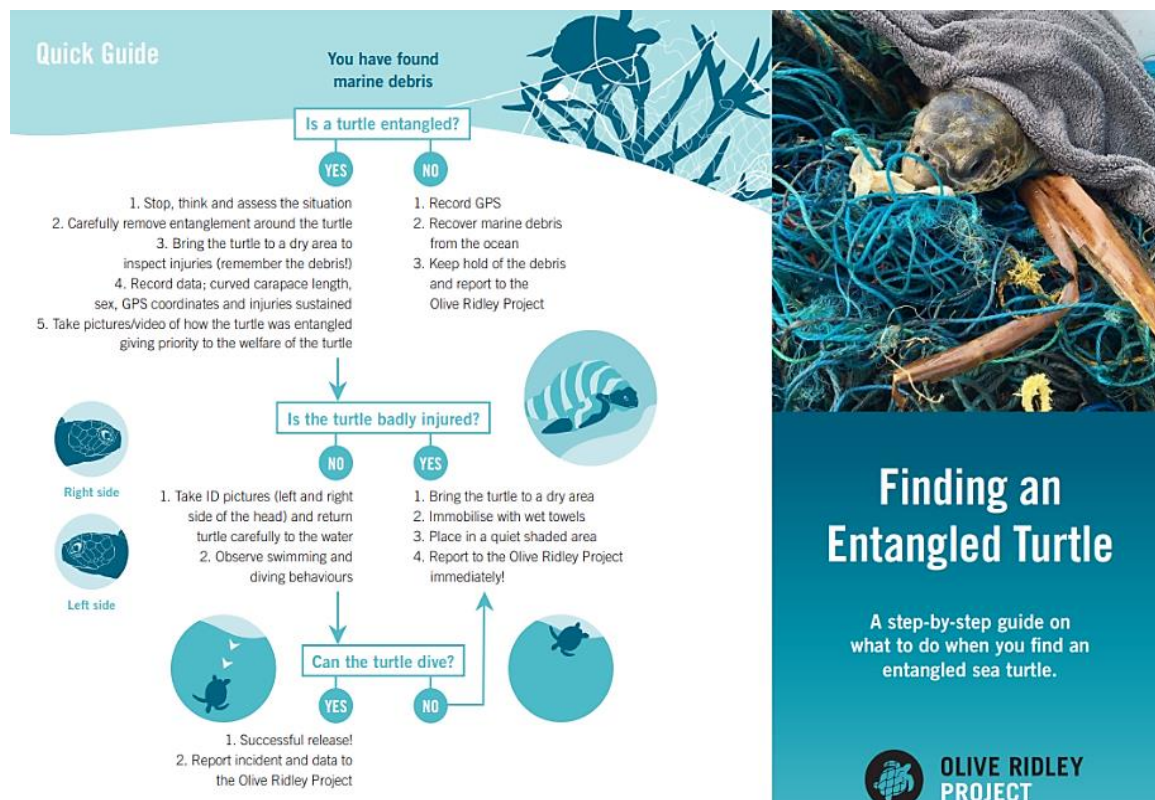



Figure 21. (a) Entangled turtles in sea.

**Finding an Entangled Turtle:
ASSESS, RETRIEVE, PHOTOGRAPH, REMOVE DEBRIS, SECURE**

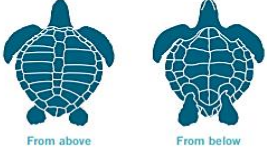
1 ASSESS

Assess the entanglement and make sure that the turtle can be **safely removed** from the sea. The debris may be attached to coral and so should be treated carefully. Use a knife to remove the debris from anything which may be anchoring it to the reef.




3 PHOTOGRAPH

Once turtle has been moved to a dry area, take pictures of the turtle, one from above (of its shell) and one from below (carefully turn over, use two people to prevent flapping). It is important to quickly **assess any injuries** that the turtle may have.



5 SECURE


Dampen a towel in sea water. Wrap the turtle in the towel, (swaddle like a baby). This prevents the turtle from moving and causing harm to you or itself. Cover its eyes with the towel as this will reduce stress.



If the turtle has any injuries, it will need medical help, so do not release it. If a turtle looks well but cannot dive after being released from the debris, it will also require medical help. Please call our veterinarian, and/or our support officer based in Male.

2 RETRIEVE

Retrieve the turtle. **Do not pick up the turtle by the debris**, but place hands around the turtle itself (one hand over the shoulder of one flipper/on the shell behind the head, and the other on the bottom of the shell). You could do more damage to the turtle if you pull it up by the debris. Be careful to keep fingers away from their beak, their bite is very painful!



4 REMOVE THE DEBRIS (AND KEEP IT)

Remove the debris carefully, making sure not to do any more damage to the turtle. This may be difficult as the debris may be embedded within the skin. If the debris is embedded or tightly wrapped around the turtle, **leave it in place** and wait for medical care.

CONTACT
 Veterinarian: 9552205
 Olive Ridley Community Support Officer: 9932446
 Facebook: The Olive Ridley Project
 Biologist:

Figure 21. (b). Finding an Entangled Turtles: Assess, Retrieve, Photograph, remove debris secure describe in above photo. The Olive Ridley Project Code of Conduct is easily and freely available to all resorts, nearby islands, and marine biologists to improve how turtles are saved by members of the public who find them. The Project’s team visits resorts frequently to train staff members and boat crews on the best techniques for saving and releasing turtles or identifying when they need medical attention. The condition of a rescued turtle can be discussed via video call with our on-staff veterinarian, who can then decide whether it needs to be examined and treated at the centre.

Transporting Injured Sea Turtles



Dr Claire, ORP's Lead Vet, with our first flying sea turtle patient Takao, and the TMA pilots that transported him.

Figure 22. All resorts, adjacent islands, and marine scientist may easily view the olive ridley project code of conduct for free. The Olive Ridley Project Code of Conduct is easily accessible to all resorts, nearby islands, and marine biologists, and it is free. This will help them improve how turtles are saved by onlookers who find them. The Project's team frequently visits resorts to train the staff and boat captains on the best ways to rescue and release turtles or identify when one needs care [9]. When receiving video calls about a rescued turtle's condition, the on-staff veterinarian can decide whether the turtle needs to be examined and treated at the facility.



Some of the plastic pieces found in Ash's faeces.

Figure 23. Injuries caused by ingestion of marine debris.



X-ray showing the fish hook lodged in Blanc's oesophagus.

Figure 24. Injuries brought on by ingesting fishing hooks.



Figure 25. Hard plastic straw stuck in the nostril of a turtle.

Fish hook consumption frequently affects hawksbill and green sea turtles, despite the fact that these are typically smaller hooks that are frequently used for reef fishing. They are still capable of causing significant harm, though.

Nathan J. Robinson saved an Olive Ridley sea turtle from having a 10 cm (4 in) plastic straw completely inserted into its nostril while conducting research in Costa Rica (Figure 25). Sadly, this is a result of the single-use, non-biodegradable plastic world in which we currently reside.

EFFECTS OF PLASTIC INGESTION ON TURTLES

Sea turtles are susceptible to plastic pollution, which is one of the biggest threats to the marine ecosystem. Many sea creatures, including many species of sea turtles, become entangled in and die from plastic waste in the ocean. Sea turtles are particularly vulnerable to ingesting plastic because they may mistake it for natural food sources like jellyfish and end up stuffing their stomachs with non-nutritious substances that can cause malnutrition, obstructed digestion, and other health issues. The effects of

plastic pollution on sea turtles, specifically how ingesting plastic affects their health and potential conservation efforts, will be the focus of this report.

Effects of Plastic Ingestion on Turtles

Community initiatives to raise awareness and educate people about the impacts of plastic waste on sea turtles are essential (Figures 26 and 27). Programmes that increase awareness can enlist people and regional communities in the fight against marine plastic pollution. Discovering efficient solutions and controls will help you better understand the long-term effects of plastic waste.

Conservation Efforts

Many conservation efforts have been implemented worldwide to address the issue of plastic pollution and to conserve sea turtles. Some of these conservation initiatives are as follows:

- Awareness-raising and educational initiatives in the community are crucial for educating people about the effects of plastic waste on sea turtles. Programmes that raise awareness can engage individuals and local communities in the effort to address the issue of marine plastic pollution. Understanding the long-term effects of plastic waste will help one find effective solutions and controls.
- Implementing the three R's—reduce, reuse, and recycle—can help cut down on the amount of plastic waste that ends up in the ocean. A small but crucial step towards effective marine conservation is limiting personal consumption of products that cause plastic pollution.
- Clean-up initiatives are a practical way to remove plastic waste from shorelines before it reaches the ocean. They also involve the weeding out of plastic waste. An illustration is the plastic weeding project in the Australian Torres Strait islands, where weed-combing machines are used to collect and remove plastic waste from surrounding areas and viewable areas. Such initiatives aid in reducing the harm that plastic pollution causes to the environment and marine life.
- Governments must enact regulations and policies to combat plastic pollution. Consideration should be given to laws that limit the use of single-use plastics that might endanger wildlife, such as sea turtles.



Figure 26. Turtles stuck in plastic material.



Figure 27. A turtle freed from 6-pack rings is unstoppable. By Stephen Messenger:
<https://www.thedodo.com/turtle-six-pack-unstoppable-1166240209.html>

Because ingesting plastic poses a significant risk to their health, reproductive efficiency, and population sustainability, plastic pollution poses a serious threat to the Olive Ridley Sea turtle's ability to survive. By spreading awareness, creating and putting into practise strategies to reduce, reuse, and recycle plastic products, cleaning up shorelines, and passing laws and regulations to protect sea turtles from plastic waste, conservation efforts are necessary to stop the spread of plastic pollution in the marine ecosystem. We can help lessen and eventually eliminate the threat of plastic pollution to sea turtles by raising awareness and taking action to protect them from plastic debris, which will help preserve the species for future generations.

It is a well-established fact that plastic pollution poses a severe threat to the marine ecosystem, and sea turtles are among the most vulnerable species that are negatively affected by plastic waste. Ingestion of plastic debris is a significant cause of morbidity and mortality in sea turtles. Intake of plastic can cause injuries, impair the immune system, contribute to intestinal blockages and malnutrition, and eventually lead to death. It is estimated that more than half of the world's sea turtles have ingested plastic, whether they died or have spent their lives in pain.

Studies have revealed an alarmingly high rate of plastic ingestion in sea turtles, with up to 40% of turtles discovered dead or stranded on beaches having consumed plastic debris. When turtles consume plastic, the plastic builds up in their digestive tracts, clogging their systems and making the animals feel full, which causes them to starve. Sea turtles who eat plastic may also be exposed to harmful chemicals that weaken their immune systems, cause malnutrition, and result in long-term harm.

Sea turtles may become entangled in plastic debris, which could cause them to suffocate, drown, or sustain injuries. Lower limb amputations brought on by turtles becoming entangled in fishing nets, plastic bags, and other debris can make it difficult for them to hunt, swim, mate, or flee from predators. Sea turtle nesting grounds are also in danger due to plastic waste, which can reduce the best places for eggs to grow and survive in the nest.

In Figure 28, meet Mae West, a common snapping turtle who made headlines 20 years ago after being discovered in a Louisiana drainage canal with a plastic milk jug ring stuck around the centre of her shell by a young boy. Fortunately, her body grew to fit the ring and eventually took on an hourglass shape. According to a disturbing image of a turtle that is frequently shared online, the poor animal was trapped in a plastic ring around its waist, causing it to grow into an odd, deformed shape. The Snapping Turtle named after the actress Mae West did, in fact, grow despite all odds.



Figure 28. Mae West, a common napping turtle.

As a keystone species in marine ecosystems, sea turtles' demise or suffering as a result of plastic waste has serious negative effects on the health of the marine environment. By balancing the food web, distributing nutrients, and affecting the movement and development of seagrasses and other marine vegetation, sea turtles contribute to the preservation of the harmony of marine ecosystems. Therefore, in the fight against plastic pollution, the preservation of the sea turtle species must come first.

It is necessary to make an effort to spread awareness of the terrible effects that plastic waste has on sea turtles and other marine life. We can hope that community education, the promotion of eco-friendly behaviours, and long-term habitat protection will help sea turtle conservation efforts succeed. It is clear that laws and policies that reduce the amount of plastic waste that ends up in the oceans can help to address the challenges that plastic pollution poses both now and in the future. Global action and initiative from civil society and governments are required to preserve these lovely animals and their aquatic habitats, ensuring a better and more sustainable future for them.

VULTURES IN INDIA

Vulture populations in India are a prime example of how human activity affects wildlife populations. India experienced a sharp decline in vulture populations in the middle of the 1990s; in some places, the vulture population fell by 95%. Diclofenac, a common anti-inflammatory medication used to treat pain and inflammation in cattle, was ultimately found to be the cause of the decline.

The drug, which proved fatal, was being consumed by vultures while they were eating the treated cattle carcasses [10]. The medication rendered the birds dead as a result of kidney failure. The scale of the problem was so severe that three species of Indian vultures were declared critically endangered by the International Union for Conservation of Nature (IUCN), meaning they were at high risk of extinction.

The absence of vultures (Figure 29) has serious negative effects on the environment and the economy. As scavengers, vultures are essential to the ecosystem because they prevent the spread of disease by eating the carcasses of dead animals. Without vultures, dead animal carcasses would build up, causing disease to spread and other animal populations to decline. Vultures also play a big economic role in India's traditional method of getting rid of animal carcasses. The majority of the time, the carcasses were left out in the open for vultures to eat, preventing the need for manual disposal and maintaining a clean environment.

The Indian government and several conservation organizations took a variety of actions in response to the vulture crisis. These actions included regulating the use of diclofenac and establishing vulture

breeding and conservation facilities. Additionally, they enforced laws that forbade the sale of diclofenac for use on animals and demanded that pharmaceutical firms put warning labels on the packaging of their products.



Figure 29. India is home to nine different vulture species, but due to a recent rapid and severe population decline, the majority are now in risk of going extinct.

The purpose of the breeding and conservation facilities was to boost vulture populations and protect the species. The remaining vultures were captive-bred at the breeding facilities in order to boost their population and release them back into the wild. The facilities also offered medical attention and rehabilitation to injured vultures.

With some areas seeing an increase of over 100%, conservation efforts in India have been successful in growing the vulture populations. The effectiveness of these conservation efforts has reduced cattle mortality and improved the environment's hygienic conditions.

The situation with the Indian vultures serves as a reminder of the significance of human responsibility in maintaining wildlife populations. Diclofenac use, among other human activities, had disastrous effects on the vulture population, and it took concerted conservation efforts to undo the harm. The vulture crisis serves as a reminder of the importance of conservation and the need to preserve wildlife populations in order to maintain a healthy and balanced ecosystem.

In the 1980s, three species of vultures—the white-rumped vulture, the Indian vulture, and the slender-billed vulture—numbered more than 40 million birds on the Indian subcontinent. The populations of all three species had fallen by over 95% by the early 2000s, though, signalling an alarming crisis.

A veterinary painkiller called diclofenac, which was used to treat cattle, was discovered to be the cause of the decline. The carcasses of these cattle would be eaten by vultures (Figure 30) because they contained high levels of the analgesic, which led to renal failure and death.

According to a 2003 study by the Royal Society for the Protection of Birds and the Bombay Natural History Society, the white-rumped vulture population in India decreased by 99.9% between 1992 and 2002. The white-rumped vulture was consequently classified as critically endangered, with estimates indicating that only 10,000 individuals were left in the wild.

In 2006, the Indian government swiftly took action in response to the vulture crisis by banning the use of diclofenac in veterinary medicine [8]. With the intention of reintroducing affected vulture species into the wild once diclofenac was no longer a threat, conservation organizations also established breeding programmes for those species.



Figure 30. Prevent from Diclofenac. Concasse that have deteriorated so severely that the meat is hazardous to other animals can be consumed by vultures.



Figure 31. Types of vulture species found in India.

Over 1,000 white-rumped vultures and 139 slender-billed vultures have been successfully bred and released into the wild, demonstrating the breeding program's success. The Indian government has also established "vulture safe zones," where diclofenac use is prohibited and where conservation groups can keep an eye on and defend vulture populations.

Despite these initiatives the Indian vulture population (Figure 31) is still in decline. Unfortunately, diclofenac preparations sold over the counter are still widely used in India. Ketoprofen and aceclofenac,

among other veterinary medications, are now known to be toxic to vultures. Since these medications are still in use, it is possible that their effects on vulture populations will not be recognized until it is too late. Changes in agricultural practices that affect the composition and timing of livestock carcasses and alterations in consumer preferences for beef products that may affect the number of cattle and subsequently the availability of carcasses are some additional obstacles to the safe recovery of vulture species.

Indian vulture populations are declining, which serves as a stark reminder of the dangers new veterinary drugs pose as well as the necessity of monitoring programmes to identify population declines and swiftly implement conservation measures [7]. There is hope that the breeding programmes will eventually result in increased population numbers, as the prohibition of veterinary diclofenac and the creation of vulture safe zones were crucial steps to protect the remaining vulture populations. However, more needs to be done to make sure that diclofenac is not replaced by other toxic veterinary medications and that the safe zones are sufficiently safeguarded to ensure the survival of these important scavengers.

CAUSE OF DEPLETION OF VULTURES IN INDIA

The main cause for the depletion of vultures in India is the use of the veterinary drug diclofenac, which is used to alleviate pain in cattle (Figure 32). India was once home to millions of vultures, with three species – the white-rumped vulture, the Indian vulture, and the slender-billed vulture – numbering over 40 million birds in the 1980s. However, by the early 2000s, the populations of all three species had declined by over 95%.



Figure 32. White-rumped species vulture.

The Bombay Natural History Society first became aware of the decline in the early 1990s, and it soon became clear that the consumption of cattle carcasses was a contributing factor. It was later discovered through research that vultures were eating the carcasses of cattle that had been given the fatal drug diclofenac.

When consumed by vultures, the non-steroidal anti-inflammatory drug (NSAID) diclofenac results in kidney failure. Diclofenac, which is administered to cattle, enters their urine after being formed by the liver and typically excreted in the urine of the animal. When a vulture eats the carcass of livestock that has received diclofenac treatment, it consumes the medication and experiences kidney failure, which ultimately causes its demise.

The absence of vultures had serious negative effects on the environment and the economy. As scavengers, (Figure 33) vultures are essential to the ecosystem because they prevent the spread of disease by eating the carcasses of dead animals. Without vultures, dead animal carcasses would build up, causing disease to spread and other animal populations to decline.

Additionally, vultures were essential to India's traditional system of disposing of animal carcasses, which avoided the need for manual disposal and promoted environmental hygiene.

The Indian government outlawed the use of diclofenac in veterinary medicine in 2006 in response to the crisis [8]. Once diclofenac was no longer a threat, conservation programmes were established to breed the affected vulture species and reintroduce them into the wild. Since the programmes' inception, thousands of vultures have been bred and returned to the wild thanks to their success in breeding. The creation of "vulture safe zones," where the use of diclofenac is prohibited, has improved the species' protection.



Figure 33. When vulture populations to safeguard its vultures, India outlawed the use of diclofenac in veterinary medicine sixteen years ago fell by 95% in the early 2000s, the severity of the issue became clear. The International Union for Conservation of Nature (IUCN) declared the three species of Indian vultures to be critically endangered, meaning they were facing a high risk of going extinct, due to the severity of the decline.

The use of diclofenac, which had fatal effects for vultures, was the primary contributor to the decline of vultures in India (Figure 34). Diclofenac's effects on vulture populations brought to light the dangers of novel veterinary medications as well as the necessity of monitoring programmes to identify population declines and swiftly implement conservation measures. There is hope that the breeding programmes will eventually result in increased population numbers, as the prohibition of veterinary diclofenac and the creation of vulture safe zones were crucial steps to protect the remaining vulture populations. But in the long run, it is crucial to create sustainable cattle production systems for the right handling of cattle, which encourages respect and consideration for both domestic and wild animals.

VULTURES ARE IMPORTANT FOR ECOSYSTEMS

Due to their significant contribution to the natural process of decomposition, vultures are essential to the ecosystem. Scavengers like vultures consume the remains of dead animals in the wild. Vultures help to keep the environment clean and lower the risk of disease by eating the carcasses of dead animals.

Due to their distinctive physical characteristics, such as a bald head that prevents them from becoming matted with blood and feathers (Figure 35), vultures are especially adapted to consume carcasses. They also have robust digestive systems, which enable them to consume and digest decaying flesh that might be harmful to other scavengers.

The carcasses of large animals can be consumed by vultures, which are frequently referred to as nature's garbage collectors. They can fly great distances in search of food and have a special ability to detect the presence of carrion.

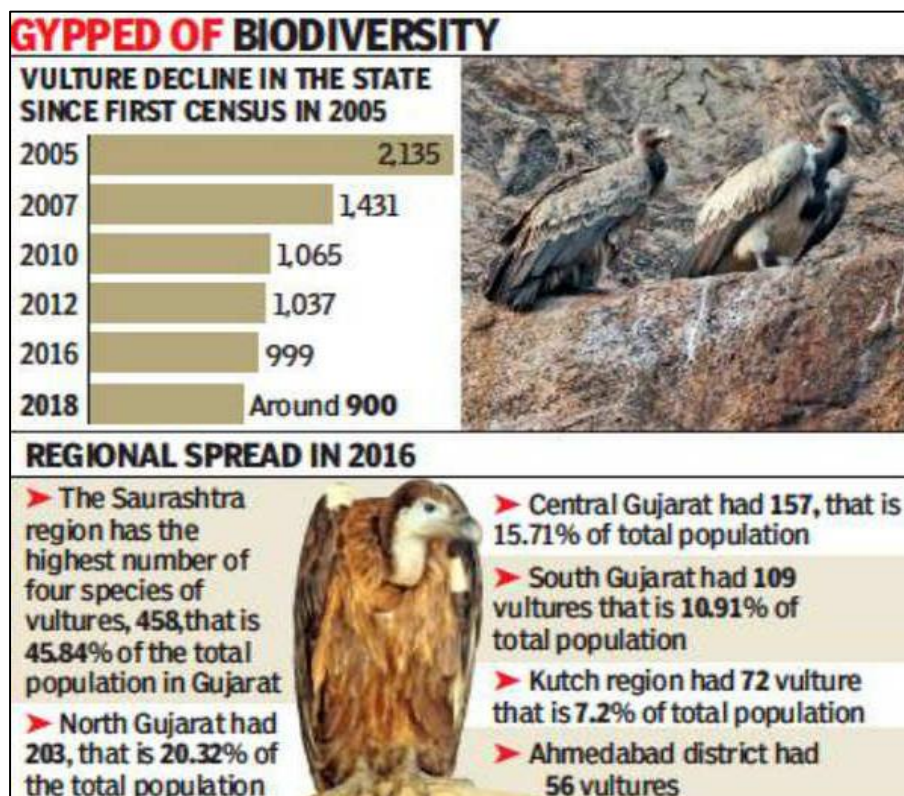


Figure 34. Vanishing white-rumped vulture from Ahmedabad.
http://timesofindia.indiatimes.com/articleshow/64608040.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst



Figure 35. Natural clean-up crew. September 5 is Vulture Awareness Day.

The accumulation of animal carcasses without vultures would cause disease to spread and serve as a breeding ground for bacteria and other dangerous organisms (Figure 36) [10]. The ecosystem would suffer greatly if vultures were to be eradicated, as disease incidences would rise, other animal populations would decline, and there might even be health risks for humans.

In some parts of the world, vultures also play a significant cultural and religious role. Vultures are revered by some Hindu and Parsi communities in India, for instance, and their decline had a significant social impact.

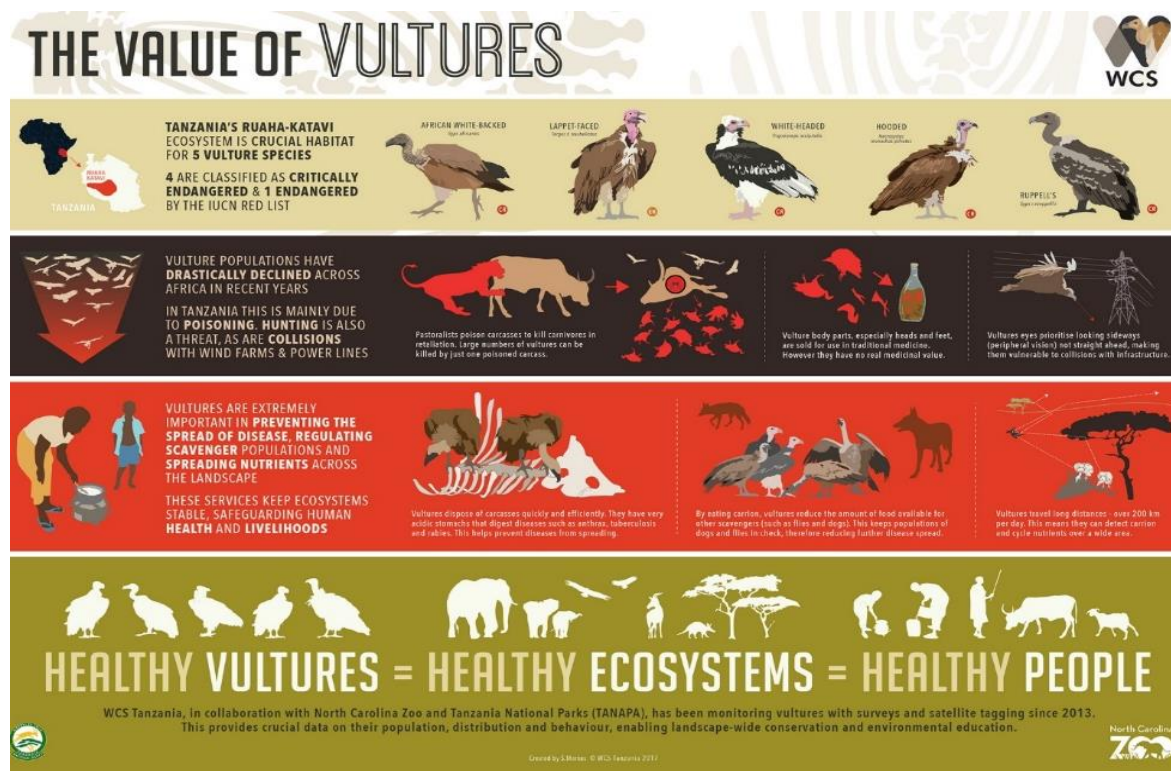


Figure 36. The value of vultures.

Vultures are important scavengers in the ecosystem, promoting environmental cleanliness, and halting the spread of disease. Vulture populations are declining, which draws attention to the dangers that human activity poses to wildlife populations and the need for effective conservation measures to safeguard them. For the ecosystem to remain healthy and balanced, wildlife populations, including vulture populations, must be preserved.

CONCLUSION

Despite being two very different species, the Olive Ridley turtle and vultures are both crucial to the ecosystem. Vultures are raptors, while the Olive Ridley turtle is a marine reptile. Both species, however, deal with similar issues and can teach us vital lessons about conservation.

Olive Ridley turtles nest in large numbers on beaches in the Indian Ocean. The Olive Ridley turtles' crucial 'arribada' is a mass nesting event, which is known in India, and is essential to their survival. However, coastal development, fishing methods, and pollution are endangering the turtle's habitat.

On the other hand, vultures were once common throughout India. However, vulture populations have decreased due to overuse of the toxic veterinary drug diclofenac. Vultures play a critical role in the natural process of decomposition and are revered by some Hindu and Parsi communities, so their extinction had serious ecological and economic repercussions.

In the Indian context, conservation efforts for these two species have been successful. Conservation efforts for the Olive Ridley turtle include the adoption of safe fishing techniques, the preservation of nesting areas, and the implementation of laws to forbid the trade in turtle products.

For the benefit of vultures, the Indian government outlawed the use of diclofenac in veterinary medicine and set up safe areas where the drug is not allowed. Additionally, breeding programmes for the affected species were established, and their progeny were then released back into the wild to increase population levels.

The successful preservation of vultures and Olive Ridley turtles shows how crucial conservation initiatives and laws are to safeguarding threatened species. Both species are important for preserving the ecological balance, and their extinction would have a big ecological and financial impact.

Finally, the preservation of Olive Ridley turtles and vultures serves as an illustration of how conservation initiatives and laws can help save species that are in danger of extinction. The maintenance of ecosystem balance depends on the conservation of biodiversity, and the methods used to save these species can be used to save other species that are in danger of going extinct.

REFERENCES

1. NOAA Fisheries. Olive Ridley Turtle. [Online]. NOAA. 2022 Available at <https://www.fisheries.noaa.gov/species/olive-ridley-turtle> [Accessed on May 6, 2023].
2. Olive Ridley Turtle | Olive Ridley Project. [Online]. Olive Ridley Project. 2021. Available at <https://oliveridleyproject.org/sea-turtles-of-the-world/olive-ridley-turtle> [Accessed on May 6, 2023].
3. Sea Turtle Rescue & Rehabilitation | Olive Ridley Project. [Online]. Olive Ridley Project. 2022. Available at <https://oliveridleyproject.org/sea-turtle-rescue-rehabilitation> [Accessed on May 6, 2023].
4. Sea Turtle Photo-ID | Olive Ridley Project. [Online]. Olive Ridley Project. 2022. Available at <https://oliveridleyproject.org/research/biogeography/sea-turtle-photo-id> [Accessed on May 6, 2023].
5. Threats to Sea Turtles | Olive Ridley Project. [Online]. Olive Ridley Project. 2021. Available at <https://oliveridleyproject.org/threats-to-sea-turtles> [Accessed on May 6, 2023].
6. Biology Conservation of Olive Ridley Marine Turtles. [Online]. Encyclopedia.pub. 2022. Available at <https://encyclopedia.pub/entry/25718> [Accessed on May 6, 2023].
7. PAC2013. White-Rumped Vulture Conservation Case Study | The Mohamed bin Zayed Species Conservation Fund. [Online]. Speciesconservation.org. 2013 Available at <https://www.speciesconservation.org/case-studies-projects/white-rumped-vulture/3096> [Accessed on May 6, 2023].
8. BirdLife Data Zone. [Online]. Birdlife.org. 2013. Available at <http://datazone.birdlife.org/sowb/casestudy/vultures-are-under-threat-from-the-veterinary-drug-diclofenac> [Accessed on May 6, 2023].
9. Wikipedia Contributors. Indian Vulture Crisis [Online.]. Wikipedia. Wikimedia Foundation; 2023. Available at https://en.wikipedia.org/wiki/Indian_vulture_crisis [Accessed on May 6, 2023].
10. WCS Wild View: The Value of Vultures [Online]. Wcs.org. 2021. Available at <https://blog.wcs.org/photo/2021/06/10/the-value-of-vultures-tanzaniaafrica/#:~:text=Vultures%20may%20not%20be%20the,and%20spreading%20nutrients%20across%20landscapes> [Accessed on May 6, 2023].