

2018

ANNUAL REPORT



**Wildlife
Conservation
Society**

We Stand for WildlifeSM

Mission

WCS saves wildlife and wild places worldwide through science, conservation action, education, and inspiring people to value nature.

Vision

WCS envisions a world where wildlife thrives in healthy lands and seas, valued by societies that embrace and benefit from the diversity and integrity of life on earth.



Letter from Country Director



Prakriti Srivastava, IFS

During the year 2018, WCS-India continued to work in line with the organisation's motto to save wildlife and wild spaces through a combination of conservation actions, science, education and inspiration. While making steady progress in our traditional areas of operation, we also charted new domains where we can contribute to conservation.

The CWT initiative has gone on to get well established, tying up with many forest departments and enforcement agencies. We have successfully incorporated technology into the monitoring and detection processes and put in place a 24-hour helpline support. We have established a network of 25 pro-bono lawyers for providing legal support to Forest Departments. Our marine program and ecotourism projects are poised to accelerate as we take on some major projects in collaboration with the government.

The conservation work across the country saw us work with the forest department and other agencies for pre and post voluntary relocation support. We are hopeful that our initiatives like the first photographic database of Asian elephants in the Kaziranga National Park will be of use to the authorities in monitoring the animals and tackling conflicts.

Be it the study of the ecology of dholes, leopards or LTMs, transboundary connectivity or conflict mitigation studies, our teams are working with the government and other partners to protect some of the best wild habitats and species that inhabit them. At WCS-India, we stay committed to working with the government and other relevant agencies for effective conservation of our wild spaces and wild life.

Highlights

WCS-India continued to contribute towards the conservation of the world's largest tiger and Asian elephant populations, while taking on new areas of operation as well as species. Some major achievements for the reporting period include:

Voluntary Resettlement: Working with the forest department and other agencies for the voluntary relocation of people from protected areas, we helped 370 families voluntarily move out of four PAs in the Western Ghats: Kali Tiger Reserve, Kudremukh National Park, Nagarahole Tiger Reserve and Wayanad Wildlife Sanctuary. In the Eastern Ghats the voluntary relocation process of 158 families from two villages in Kawal Tiger Reserve was initiated. We also continued to provide post-voluntary resettlement support, such as vocational training, health and education services to families who voluntarily relocated.

Combating poaching and illegal wildlife trade: WCS-India has scaled up its combatting wildlife trafficking (CWT) efforts. In September 2018 we initiated a new project wholly focused on combating the illegal trafficking of wildlife sourced from around India and trafficked through northeast India to neighboring countries. The team of staff from WCS-India that includes scientists, trained lawyers and retired forest department officials has extensive experience in dealing with wildlife crimes. Since Sept 2018, WCS-India has signed MOUs with numerous state and federal branches of the Government of India to train staff. WCS-India staff in the Western and Eastern Ghats landscapes continued to share useful information with the law enforcement agencies.



Highlights

Landscape-scale conservation: In Northeast India, WCS-India is working with the local communities to address the challenge of human-wildlife interaction. We contributed to the preparation of management plans for five Community Reserves in Ri-Bhoi district of Meghalaya for better management of wildlife. In Nagaland, WCS-India has been facilitating establishment of piggeries as an alternate source of protein and to reduce the dependence of communities on hunting wildlife for meat. In Assam where elephants use tea estates as corridors, WCS-India has been working with many tea estates to implement practical approaches like solar lighting around human habitats to mitigate conflict situations. In Maharashtra, our teams continued to work to spread awareness among the people living in proximity to leopards.

Science: Monitoring of tigers, leopards and their prey in the Wayanad Wildlife Sanctuary and Eastern Ghats was scaled up. In Wayanad, based on the data collected in 2017 the tiger density has been estimated to be 12.03 tigers per 100 km², and the overall population estimated to be 44 tigers. Primary prey density in the sanctuary has been estimated to be 62.2 animals per km². In Nallamala-Sheshachalam corridor in the Eastern Ghats landscape, during occupancy surveys in 2018, WCS-India working with the Telangana Forest Department recorded presence of tigers in 12 new grids comprising an area of 2,400 km². WCS-India was made the official partner for All India Tiger Monitoring in 2018 by the Telangana Forest Department during which period the second litter of a tigress near Kawal Tiger Reserve was recorded.

In Kaziranga National Park in Assam, the first photographic database of Asian elephants has been developed by our team. This photographic database, based on identifying individual elephants from their distinguishable morphological features under a rigorous sampling framework, allows us to estimate elephant densities in this protected area.



Ecological research and monitoring

Asian Elephants

WCS-India continued monitoring the elephant populations in Kaziranga National Park (KNP) in 2018. Using information from the photo database created in 2017 for KNP, WCS-India and the Forest Department have identified 135 male and 287 female elephants based on distinguishable morphological features, helping conservationists to estimate elephant densities in KNP. The manuscript reporting these findings has since been published in *Scientific Reports*—a peer-reviewed journal. The photographic database is being updated with data collected in 2018.

WCS-India has been contributing to the conservation of Asian elephants in the Mysore Elephant Reserve comprising Nagarahole, Bandipur, Biligiri Ranganaswamy Temple, Wayanad, and Mudumalai reserves. To address human-elephant conflict in this landscape, which supports the largest population of Asian elephants globally, surveys were conducted to map conflict incidences and identify mitigation measures. In 2018, we continued these surveys around Bandipur, Nagarahole, and Bhadra in Karnataka. At the same time, the survey was initiated around Biligiri Ranganaswamy Temple Wildlife Sanctuary (BRT) in Karnataka, and Wayanad Wildlife Sanctuary in Kerala. Additionally, a scientific manuscript on Asian elephant ecology co-authored by a WCS-India researcher (Devcharan Jathanna) was published in the journal *Ecology and Evolution*. This manuscript demonstrates the unreliability of dung-based techniques of elephant monitoring in comparison to line-transect based estimates.



Dhole

During the reporting period, the largest database of published dhole literature in the country was created, and a meta-analysis was conducted to understand human-dhole interactions. Dholes (across their range) were found to consume fewer livestock than previously believed. However, people's negative perception of dholes seems to be influenced by pack sizes, levels of livestock consumption, and the number of sympatric, conflict-prone carnivores. A scientific article based on these surveys in previous reporting periods was accepted for publication in *Nature Scientific Reports*.



Lion-tailed Macaques

The lion-tailed macaque is an endangered, endemic primate, restricted to rainforests of the Western Ghats. The species is threatened by habitat loss and fragmentation, as well as poaching in some parts of its range. Unregulated extraction of non-timber forest products (NTFP) could threaten the species by directly depleting its food resources and indirectly disturbing its habitat. As part of our lion-tailed macaque conservation initiative in 2018, 278 respondents from the communities living alongside lion-tailed macaque habitats were interviewed in Kerala and 446 respondents in Karnataka in order to document their perception of macaque presence, threats and conservation status.



Tiger Ecology

Scientific research and monitoring of tigers and their prey in Western Ghats has aided in better understanding of patterns, context and drivers of human-tiger conflict, human-induced and natural tiger mortality, immensely contributing to the overall conservation of tigers in India. During the year in review WCS scaled up monitoring of tiger populations in Wayanad Wildlife Sanctuary (Wayanad WLS) in Kerala and included new areas in the Eastern Ghats.



Western Ghats

In Wayanad, camera trap surveys were conducted between January to March 2018 for 48 days over 90 trap locations, while 27 line transect surveys were carried out between April and May 2018. During this survey, 87,155 images were obtained out of which 384 were tiger images and 485 were leopard images. These images are currently being used to estimate abundances in a spatial capture-recapture framework. Similarly, through the line transect surveys (traversing nearly 6,200 km) a total of 2,121 sightings of 11 species were obtained, including prey species such as chital, sambar, gaur and wild boar, and other mammals including elephants.

Simultaneously, spatially explicit analysis of the data collected in the year 2017 was conducted on carnivores and their prey species in Wayanad WLS, which estimated the tiger density to be 12.03 tigers per 100 km², and a population size estimate of 44 tigers in two main regions in the sanctuary. In case of the principal prey availability, the preliminary estimate in Wayanad WLS is 62.2 animals per km².



Eastern Ghats

WCS-India in collaboration with Forest Department (FD) expanded the efforts of tiger monitoring in Nagarjunasagar Srisaillam Tiger Reserve (NSTR) and included other tiger habitats in Gundla Brameshwaram Wildlife Sanctuary (GBM), Nallamala-Sheshachalam corridors, Kawal Tiger Reserve (KTR) and the adjoining corridors with Tadoba-Andhari Tiger Reserve (TATR) in Maharashtra.

The tiger numbers remain unchanged in NSTR from the last reporting period. In Nallamala-Sheshachalam corridor, an occupancy survey was conducted wherein tigers were recorded in 12 new grids comprising an area of 2,400 km² (area of each grid measured 200 km²). During a preliminary camera-trap exercise extending over a period of 45 days at 72 locations, 7 individual tigers were recorded of which 3 were identified from our database while 4 are new records.

WCS-India also became the official partner of the Telangana Forest Department for the All India Tiger Monitoring Phase IV in 2018.



Carnivore 'capture'

Phalguna's new litter: WCS-India assisted the Wildlife Institute of India in tiger monitoring in the corridor areas between Tadoba–Andhari Tiger Reserve and KTR. One of the highlights of this survey was the photo-capture of a female tiger 'Phalguna' along with her second litter. The four cubs from her previous litter have successfully dispersed to newer areas in the landscape.



Central India

WCS-India has been providing technical advice to scientists from NCBS on developing a spatial capture-recapture framework for monitoring tigers in Ranthambore National Park and sloth bears in Mount Abu, both in Rajasthan, using non-invasive techniques based on fecal genetic samples.

Northeast India

The forests between Kaziranga National Park and adjoining Karbi-Anglong area are connected through four demarcated wildlife corridors where WCS-India has been conducting camera trap surveys with the Assam Forest Department, particularly during the monsoon seasons when much of the wildlife habitats in Kaziranga get inundated. We repeated the camera-trap surveys across 15 locations in two of these four forested corridors during the monsoon season. A total of 28,280 photo captures were obtained of 16 species including tiger, leopard, elephant, rhinoceros, water buffalo, sambar, hog deer, barking deer, brush-tailed porcupine, jungle cat, capped langur, and other elusive mammals. The data is currently being analysed.

The leopards of Sanjay Gandhi National Park live in the heart of Mumbai, and given the conflict situation in the past, they have a very high visibility profile. WCS-India contributed to the camera trap surveys in the summer season of 2018 to identify leopard individuals and study their activity patterns. The data has since revealed 47 leopards across the landscape. The density monitoring and leopard movement in and around the SGNP was done in collaboration with the Chief Conservator of Forests, SGNP. The camera trapping was sampled in SGNP including the peripheral areas of Aarey Milk Colony, Bombay Veterinary College, IIT-Powai, Ghodbunder village and Nagla block. Approximately 140 sq. kms of area was covered in this exercise.



Data on leopards was also collected during the tiger monitoring surveys conducted in Wayanad WLS (Western Ghats), and NSTR, Kawal TR and other tiger habitats in Telangana (Eastern Ghats) in 2018. This information will be analyzed to estimate leopard populations in these PAs. Scientists and researchers from WCS-India are currently part of an international group involved in the IUCN's global assessment of the geographical range of the Indian leopard.

India lost 460 leopards in 2018 to numerous reasons, with hunting/poaching claiming most lives, followed by natural deaths, accidents and attacks by villagers. Leopard deaths have been on the rise in the last few years.



Wildlife inhabiting human-use landscapes

During the reporting period, staff from WCS-India conducted surveys around Bhadra and BRT in the Western Ghats to assess people's perspectives towards current and potential human-elephant conflict mitigation measures.

In Maharashtra, surveys were conducted to understand the patterns and socio-cultural factors driving leopard-human conflict. Based on previous studies, a scientific article entitled "*Species-specific spatio-temporal patterns of leopard, lion, tiger attacks on humans*" has been published in the *Journal of Applied Ecology*. Incidences of attacks on humans vary with each cat species, the area and duration of these being more in the case of lions, as compared to tigers or leopards.

This is one of the findings from a study, conducted in three countries, on variations across space and time in attacks on humans by the different cat species. Using the space-time scan method, the researchers analyzed spatio-temporal patterns of lions, leopards and tigers causing human death and injuries. The analysis used 908 confirmed cases of injuries and deaths to humans from the attacks in India, Nepal and Tanzania.

In another project in Maharashtra, the shrines dedicated to Waghoba are being documented – Waghoba is a big cat deity worshipped by communities in western and central India. Around 40 shrines have been documented in and around Sanjay Gandhi National Park (SGNP) and Tungareshwar Wildlife Sanctuary (TWLS) between November and December 2018. This data will help in understanding the co-existence of leopards in a human-dominated landscape.

WCS-India also conducted multiple awareness-building workshops and programs for various stakeholders, including school and university students, media personnel, and local communities in Maharashtra.



Landscape-scale connectivity prioritization

In an effort to facilitate and maintain connectivity in northeastern India for populations of highly threatened flagship species—elephants, tigers, etc. our teams were involved in various activities. Monitoring of the elephant movement in tea estates of the Kaziranga-Karbi Anglong landscape continued with help from ground staff of the tea estates.

Surveys were conducted in 29 villages along these corridors in Nagaland, followed by deployment of camera traps in select villages to detect signs of wildlife presence. This resulted in records of many threatened and flagship species including red muntjac, Himalayan serow, large Indian civet, Himalayan palm civet, crab-eating mongoose, yellow-throated marten, marbled cat, clouded leopard, Asiatic black bear, stump-tailed macaque, and Assamese macaque.

Additionally, 389 respondents in these villages were interviewed to obtain information on past and present occurrences of wildlife, and to assess people's willingness to participate in conservation efforts.



Marine Program

Scoping study on marine ecosystems and biodiversity in India

With a total coastline of 7517 km, an exclusive economic zone (EEZ) of 2.02 million km², and a continental shelf of 4,68,000 km² spread across 10 maritime states and 5 union territories, India is rich in terms of its marine biodiversity. However, rapid economic development coupled with the impacts of climate change has led to the growing degradation and loss of marine ecosystems. Taking cognizance of this, a scoping study was initiated with the aim of understanding the current status of marine ecosystems in India, their threats and emerging issues, and identifying the gaps in knowledge and conservation efforts. Basing on a review of over 500 published literature and other information on marine conservation in India, and rapid surveys of two marine protected areas (Malvan (Marine) Sanctuary, and Coringa Wildlife Sanctuary), 7 priority taxa viz. Sharks and Rays, Dugongs, Humpback whales, Dolphins and finless porpoise, Smooth coated otters, Sea cucumbers, and protected sea shells occurring in India, were identified for conservation focus. Additionally, 6 priority marine areas (Gulf of Kachch, Gulf of Mannar, Andaman and Nicobar Islands, Lakshadweep Islands, Sundarbans, Chilika Lagoon) were also identified for urgent conservation interventions. A comprehensive report has been synthesized encompassing the details and results of this scoping study.

We have since then upscaled the marine program at WCS-India with a major focus on addressing the most pressing issues including strengthening of marine protected areas in India, conservation of sharks and rays, etc. A new project to create a new MPA in Angria Bank – the largest submerged coral reef located off the western coast of India, has recently been initiated by WCS-India.

Conservation of sharks and rays

The increased demand of sharks and rays in the southeast Asian markets from the 1960's and increased mechanisation of its fishing fleets has put India among the top three shark-harvesters of the world. Elasmobranchs, specifically the threatened species like the hammerheads, thresher sharks, mantas and devil rays, are vulnerable to over-exploitation with a limited ability for recovery if fishing intensity is not managed. Keeping this in mind, a participatory approach involving the fishers along with surveys of landing centres in South Andamans was used to generate information on population assessments, and life history characteristics of the dominant sharks and rays landed. Through socio-economic surveys of the fishers, we also documented social and economic drivers behind the fishery and their perceptions to understand where future interventions are required. The project results are targeted towards filling knowledge gaps that can inform species-specific management practices and conservation of the populations and their habitats.



Field conservation interventions

Strengthening field protection and curbing local wildlife trade

Despite strict punishments prescribed by Indian Wildlife (Protection) Act, 1972, very few cases of wildlife-related crimes are reported in India and such cases have abysmally low conviction rates. The Forest Departments in most of the country suffer from shortage of trained staff, poor capacity and infrastructure, and paucity of data, impeding their efforts to curb wildlife-related crimes and combat illegal wildlife trafficking. WCS-India has been supporting the Forest Departments, particularly in the Western Ghats and Eastern Ghats, by reporting wildlife-related and other illegal activities in PAs, collaborating in patrolling activities, and training the frontline staff. Specific interventions made during this period are summarized below.

Field protection and curbing wildlife crime in Western Ghats

In the Western Ghats, timber smuggling, poaching, illegal mining including sand mining, encroachment and forest fires continued to challenge the protected areas and its wildlife during 2018. Our staff assisted the Forest Department in four cases of timber smuggling, 22 cases of poaching, eight cases of illegal mining including six sand mining cases, 10 cases of illegal encroachment, and 10 incidents of forest fires in 2018. These efforts led to arrest of 35 poachers and removal of 173 snares. We were also part of the successful rescue of live pangolins in three different instances, who were later released successfully into the forests while the poachers were arrested.



Field protection and curbing wildlife crime in the Eastern Ghats

In the Eastern Ghats, our teams assisted the Forest Department in conducting patrols and securing the forests in Gundla Brahmeshwara, Kawal Tiger Reserve, and corridors connecting it to Tadoba-Andhari Tiger Reserve in Maharashtra. They helped in removal of over 430 snares in Gundla Brahmeshwara and Kawal Tiger Reserve, and 150 live electric wires in the Kawal and Tadobha-Andhari Tiger Reserve corridor area. In the past year, 12 cases of poaching around Kawal Tiger Reserve were reported, leading to arrests in all cases. Encroachments at over 41 locations were also reported, leading to retrieval of forest lands and filing of legal cases in 25 locations. Additionally, 25 cases of timber smuggling were reported in the Eastern Ghats, leading to arrest of three smugglers. During this reporting period, WCS-India and the Telangana Forest Department initiated monitoring of wildlife and related threats using the SMART software developed by the SMART Consortium in Kawal TR and surrounding corridors. This has contributed in strengthening the enforcement activities.



Combatting Wildlife Trafficking



To deal with the large illegal trade in wildlife, WCS-India initiated the Combatting Wildlife Trafficking program in India in 2018. We have been working closely with government agencies to clamp down on wildlife trafficking. Formal MoUs were signed with Wildlife Crime Control Bureau of India, State Forest Departments of Nagaland, West Bengal, Telangana and the Border Security Forces (BSF). The program also has seen strong support from the Forest Departments of Assam, Manipur, Mizoram, the Sashastra Seema Bal (SSB), Customs and the Directorate of Enforcement. A simplified and interactive module for training frontline staff of Forest Departments, Customs and security forces is ready. Manuals on identification of commonly trafficked wildlife species, parts and products as well as an illustrated investigation manual, have been put together for frontline staff. We also have trainers from the Directorate of Enforcement who conduct sessions on financial investigation into wildlife crimes. Sensitization workshops also extend to the judiciary and public prosecutors who play a key role in CWT. A manned helpline (99575 67525) to assist government officials with CWT cases has been set in place, supported by a network of 23 lawyers who are volunteering their time pro-bono. A CWT smartphone app is under development and we plan to introduce the i2 software to help manage CWT data analysis. The team is undertaking a study to understand trade routes and hotspots of commonly trafficked wildlife species. A study is also being undertaken to understand conviction rates of wildlife offences and identify primary reasons for it being low.

Support to voluntary resettlement programs and land purchase

Conservation monitoring and influencing policy.

WCS-India helped initiate voluntary relocation efforts in new areas as well as to build on existing efforts in Wayanad Wildlife Sanctuary (Western Ghats) and Kawal Tiger Reserve (Eastern Ghats). We contributed with partner organizations to the efforts of the department in preventing illegal activities inside the protected areas and safeguarding the last remaining natural habitats.

During the year, WCS-India also contributed to the forest department efforts for voluntary resettlement of 370 families out of core forest areas in four PAs i.e. Kali Tiger Reserve, Kudremukh, Nagarhole, and Wayanad. Similarly, in the Eastern Ghats WCS-India is supporting the government-funded voluntary relocation of four villages in Kawal Tiger Reserve (KTR). In the first phase, two villages are going to be shifted out of the Kawal Tiger Reserve involving 158 families. This will consolidate 300 km² of crucial tiger habitat in Kawal Tiger Reserve and will also be the first such voluntary relocation effort in the Eastern Ghats landscape.



Voluntary Resettlement

For the many thousands of families living inside remote parts of forests, daily life is a challenge - caught between lack of facilities and the dangers of encounters with wildlife. The government's voluntary relocation program equips the families to move out using the funds provided under the same. WCS-India on its part has been working to equip the people in the post-relocation period by training them in livelihood options, health and education opportunities.

In the past year, post-relocation support was provided to over 400 voluntarily relocated families in agriculture, horticulture and silviculture activities, and in providing healthcare and educational support. A training workshop on soap-making was organized for 17 women relocated outside Kali Tiger Reserve. An additional 332 relocated people learned skills in agriculture and horticulture related activities through multiple trainings organised by WCS-India in 2018.

Alternate livelihood support was also provided to more than 700 voluntarily relocated families in 2018 through distribution of seeds and saplings of commercially important crops including maize, pepper, tomato, green chilli, chia and brinjal, and tree species including coconut, silver oak, coffee, mango, cashew and areca nut. Fertilizers, insecticides, and agricultural equipment were also provided to several voluntarily relocated families.



These voluntarily relocated families were supported in marketing their agricultural products. In Nagarahole TR, WCS-India helped the voluntarily relocated families obtain adequate health care facilities. In the past year nearly 2,170 voluntarily relocated individuals across the Western Ghats received access to treatment for various minor ailments, medical laboratory testing, immunizations, and health scans. In 2018, a voluntarily relocated female farmer from Nagarahole Tiger Reserve was awarded the 'Progressive Farmer Award' by a leading local newspaper 'Vijaya Karnataka'. She was also honored in the 'Kannada Rajyosthva' function. This is an example of how voluntary relocation has benefitted people.



Land purchase for consolidating wildlife habitats inside Protected Areas in Western Ghats

In 2018, WCS-India facilitated the purchase of land from four families living within Kali Tiger Reserve under Compensatory Afforestation Scheme. In Karnataka, under this scheme user agencies seeking de-notification of forest land for their projects outside the Protected Areas need to surrender an equal amount of land inside the Protected Area. In this case, Bangalore Metro Rail Corporation Limited compensated four families holding 10.3 acres of land and this land was added to the Kali Tiger Reserve.



Community initiatives

Wildlife -friendly land-use

Elephants move through tea estates, sometimes leading to human-elephant conflict. Northeast India is home to the second-largest Asian elephant population in the world and this population is centered on the Kaziranga Tiger Reserve and the neighboring Karbi-Anglong Reserve Forests. Between Kaziranga and Karbi-Anglong is a strip of lands under human use. WCS-India has been working in the Kaziranga–Karbi Anglong landscape in partnership with the tea estate staff to create a network of ‘wildlife-friendly’ tea estates that can facilitate elephant movement with minimal conflict.

To decrease the accidental encounters with elephants, we have installed solar-powered street lights near human habitations that elephants frequent. This discourages elephants from coming near people's houses at night, while we simultaneously ensure that there are dark areas in the estates that the elephants can move through. During the period between November 2017 and June 2018, 87 solar lights have been installed in eight tea estates across this landscape, benefitting approximately 5,000 people living in the vicinity of these well-lit areas. Our teams assessed an additional 10 tea estates in the landscape for installation of these solar lights, wherever deemed necessary. Simultaneously, we disseminated information on behaviours, in response to elephant presence, that aggravate or alleviate conflict through posters and awareness programs.

Additional to these efforts, members from these tea estates have been identified to act as ‘*Elephant Guardians*’ who are ensuring that wildlife-friendly measures are undertaken that are effective in the long term. The ‘*Elephant Guardians*’ take on different responsibilities—for instance, restriction of crowding around elephants in tea gardens, allowing free passage for elephants through tea estates - in their neighbourhood.



The forested tracts in the hill states of Northeast India—Nagaland, Meghalaya and Arunachal Pradesh are primarily managed by local communities. As part of community-oriented conservation initiatives in these landscapes, WCS-India staff contributed to preparing the management plans for five Community Reserves notified in the villages of Ri-Bhoi district in Meghalaya.

Some of these villages have come together to form a society for conservation of community-owned forests with their flagship species—the Endangered Western Hoolock Gibbon. WCS-India has been supporting the community in their endeavour. We also facilitated sensitizing and exposure trips for local community members including their chieftains in 2018 to Kaziranga National Park in Assam.

In Nagaland, WCS-India has been setting up piggeries as an alternate source of protein for the local communities and to reduce their dependence on wildlife for food.



Eco-tourism carrying capacity

WCS – India conducted a study on the “Assessment of the ecotourism carrying capacity in four protected areas in Kerala” as a collaboration between the Kerala Forest Department, M/s Stesalit Systems Limited and the Wildlife Conservation Society – India. The Kerala Forest Department is perhaps the first to attempt to estimate carrying capacity for ecotourism in its protected areas. This is a challenging task since many of the ecological impacts of ecotourism are unknown or unrecorded and methods for measuring these are even less known. This being the case, the first such study was limited to four protected areas which represent the range of problems that one is likely to encounter while trying to estimate carrying capacity.

The study was carried out during the period of July 2018 – April 2019. The parks chosen for the pilot study were Periyar Tiger Reserve, Chinnar Wildlife Sanctuary, Eravikulam National Parks and Shola National Parks. Carrying capacity and recommendations regarding the proper management of the park was carried out by looking at ecological factors as well as management aspects by conducting stakeholder meetings. The final report with the park-wise and activity-wise carrying capacity was submitted to the Kerala Forest Department for further implementation.



Turtle Conservation

Our partner Turtle Survival Alliance-India has been working in northern India and here is a summary of their work for the period.

Chambal Batagur nest protection Project

Nest protection programme for *Batagurs* across MP and UP was completed with over 300 nests totalling over 6500 eggs being protected from February to April. Over 5000 hatchlings were released back into the wild, with 100 retained for head-starting at the project field station at the end of the hatching season at the end of May. After approximately six months, individuals were released in two batches during December.

Sonic transmitter telemetry of Red Crowned Roofed Turtles (*Batagur kachuga*) tagged with sonic transmitters was conducted in December along a roughly 70km upstream stretch of the Chambal River in the Madhya Pradesh section.



Terai Long-Term Population Assemblage Monitoring

Long term Mark-Recapture studies were continued in March, May, June and October under the Terai Project along the Ghaghara-Sarju River, resulting in a capture effort of nearly 750 animals representing 10 turtle species.

Reproductive ecology study of the elusive Crowned River Turtle (*H. thurjii*) was continued in October, where 42 females were radiographed, with nine females found to be gravid (carrying eggs). A total of 68 eggs were incubated at a special breeding facility.

A few sites along the Sarju River were isolated for capture-recapture sites for the Crowned River Turtle.

A total of 25 fishermen were interviewed in the month of November to understand better the current threat status due to accidental drowning. The fishermen survey was also used to gather secondary information on potential wild populations and locations of research sites.

Kukrail Conservation Breeding Project

Ten eggs of the Red Crowned Roofed Turtle (*B. kachuga*) were obtained from the assurance colony being developed at the KGRC in February.

15 Crowned River Turtles (*H. thurjii*) eggs were hatched at the KGTRC (Kukrail Gharial and Turtle Rehabilitation Centre) towards the end of April 2018, where four eggs were artificially incubated while the remaining 11 were incubated mimicking natural conditions.

74 Spotted Pond Turtles (*Geoclemys hamiltonii*) hatched at the KGRC in April.

A total of 85 Spotted Pond turtles, both hatched and rescued ones, were subsequently released into the Ganga River as part of World Turtle Day 2018 celebrations on 23rd May.

75 Gharial (*Gavialis gangeticus*) juveniles captively bred at KGRC were tagged and hard released in the Girwa River in Katarniaghat Wildlife Sanctuary towards the end of March. A total of 19 eggs from six nests of the Tricarinate Hill Turtles (*Melanochelys tricarinata*) were found in October and shifted to the incubation facility on the same day after morphometric measurements were taken. A 7.3 ft long adult female Gharial (*G. gangeticus*) rescued from the Sharda Canal, Mohanlaalganj, Uttar Pradesh in 2016 was introduced to the existing breeding stock of Gharials at the KGTRC in April 2018.



Combatting Illegal Trade

A calipee consignment was confiscated in March from an illegal trafficking operation in collaboration with Special Task Force (STF) during March. Seizure of 130 kg of softshell turtle 'calipees' was found to be mostly taken from the Indian Softshell turtle (*Nilssonina gangetica*), Indian Peacock Softshell turtle (*Nilssonina hurum*) and few from the Indian Narrow-headed Softshell Turtle (*Chitra indica*).



A consignment of 13 Star Tortoises (*Geochelone elegans*) was seized by the Wildlife Crime Control Bureau from Chennai en route to being smuggled to North India in November. Confiscated animals were brought to the KGRC where the project team, under the supervision of officers and staff of the UPFWD, provided a thorough health check-up. The entire project team took part in the triage and rehabilitation of over 1500 Indian Flapshell turtles (*Lissemys punctata*) which were rescued in November via a joint collaboration between the UP Special Task Force and UP Forest and Wildlife Department. The project team travelled to Fatehpur to assist the UPFD with the triage of over 747 softshell turtles rescued from an illegal trade consignment in December.



During August a Muggar Crocodile (*Crocodylus palustris*) was successfully rescued from a residential home by the project's rescue team and released after a check-up.

Northeast Project (Assam): Nature Discovery Centre

Several upgrades were made to the Nature Discovery Centre being developed on Biswanath Ghat. Temporary transit facility constructed at the NDC to house turtles rescued or handed over by local students or villagers.

Conservation Breeding of Giant Asian Tortoise

Giant Asian Tortoise (*Manouria emys*) conservation breeding project was initiated with a list of North Eastern Zoos. A total of 28 Asian Brown Tortoise (*Manouria emys*) hatched in July as part of the first conservation breeding programme in northeast for the species. The 10 survivors from the batch are currently thriving.

Sundarbans Northern River Terrapin Field Project:

A breeding enclosure dedicated to Batagur baska was inaugurated at Sajnekhali (Sundarbans park headquarters) in early March. Four gravid females shifted in March to newly constructed breeding enclosure and tagged with PIT tags for genetic management in future.

Trainings and Capacity building

Training on Aquatic Wildlife Monitoring and on how to use the SMART programme was conducted for frontline staff and officers of the Madhya Pradesh Forest Department at the Deori Centre in Madhya Pradesh during February. A capacity building and training workshop was conducted by the northeast team for 22 chelonian keepers from selected north eastern zoo states in April at the Nagaland Zoological Park, Dimapur. A turtle identification and illegally traded animal husbandry training workshop was conducted for participants from the UPFWD in Allahabad in May. Turtle identification, rescue and rehabilitation workshop was held for frontline staff at the KGRC in Lucknow twice during the year. One day training at the Sundarbans Tiger Reserve and three satellite locations was conducted in early March for 15 staff members on animal husbandry and management for the Northern River Terrapin. A talk and associated training was provided to airport staff on how to identify smuggled chelonians during security checks during an event organized by Interpol in Dhaka, Bangladesh.



Reptile Husbandry and Handling Training programme was organized for 35 zoo keepers representing seven North Indian States at the Etawah Safari Parks during November.

First School in Aquatic Biology and Conservation

A week-long training workshop was organized at National Chambal Sanctuary in March, designed to equip researchers, conservationists, forestry department officials and students with the necessary skills required to conduct scientifically robust studies in an aquatic environment.

Community Conservation Awareness programmes

A biodiversity awareness programme was held at the Sandhi Bird Festival in February for school children from the district. The project team set up a stall at the International Bird Festival held at Dudhwa National Park during February.

All projects celebrated various important days from the Conservation Calendar, and most importantly World Turtle Day (23rd May), engaging in several activities such as river clean up campaigns, quiz and painting competitions, educational games and talks, film screenings, etc reaching approximately over 2000 people from various social and economic backgrounds. A Wetland Adoption initiative was undertaken in February to promote the conservation of wetlands.

IFS Workshop on Voluntary Relocation

Around 15 IFS officers from across various cadres participated in a “One-week compulsory training on voluntary relocation for Tiger Reserves” jointly organised by WCS-India and the Ministry of Environment, Forest and Climate Change (MoEFCC) during November 2018. Lodged at River Tern Jungle Lodges near Bhadra Tiger Reserve, they were, during the workshop, taken through the story of the Bhadra voluntary relocation, often cited as a model for voluntary relocation of people from protected areas. Beginning with a classroom session for half a day where key players in the Bhadra voluntary relocation addressed the audience and shared their experiences, to field visits and interaction with the people who had moved out, the workshop gave the officers a complete picture of how the voluntary relocation was initiated and carried out in just six months, after initial delay and fears.

The participating officers were taken around the Bhadra landscape to understand the conservation context of the voluntary relocation. They went around the Lakkavalli range of Bhadra Tiger Reserve to see some of the flora and fauna in the landscape. The participants visited Basur Kaval Community Conservation Reserve, forest and grasslands stretching across 1800 acres and home to endangered animals like blackbuck, wolf, Indian fox and many rare species of birds. After the classroom presentations, they were taken to the site of rehabilitation at M C Halli where they met and interacted with the residents. A drive along the Kemmangundi-Muthodi road allowing a view of the resplendent forests, sholas and grassy peaks culminated in a visit to the Muthodi and Hebbe ranges of the reserve where the villages of Hebbe and Hipla had been located. The visit provided a good overview of the difficulties the people faced living inside the remote parts of the forest with no health, education or transport facilities. A visit to the world’s first certified wildlife-friendly coffee estate culminated the workshop.

The participants were all praise for the way the workshop was structured and carried out in a planned manner. From “laudable” to “best structured training in three decades of my career” the feedback on the training program was positive. Participating IFS officers who are currently working with voluntary relocation projects welcomed the training as providing timely and useful inputs for their work.



Building regional and local conservation capacity

Wildlife conservation, particularly conservation of large mammals such as tiger, elephants and leopards attract significant efforts as well as funds from the government agencies. However, the frontline staff in the Forest Departments and other governmental agencies often lack technical and scientific capacity to effectively execute their well-meaning conservation efforts. WCS-India has been working with the department in building national capacity in wildlife conservation. We have increased focus on the frontline staff of Forest Departments and other enforcement agencies, offering training and guidance in field monitoring and assessment techniques as well as in improving their enforcement capacities against wildlife-related crimes. WCS-India conducted training workshops and capacity-building activities for multiple stakeholders.



Besides continuing with the core conservation and research activities, WCS-India has also expanded work to new landscapes and conservation initiatives. We continue to help address the main challenges of wildlife conservation affecting the country i.e. habitat fragmentation, human-wildlife conflict and illegal wildlife crime and trade by adopting various conservation strategies. As we expand into new areas like marine species conservation and explore closer collaborations with other organisations working for conservation, we hope to protect wildlife and wild places through a combination of conservation actions, science, education and inspiration.



Scientific publications

Gardner, B., Sollmann, R., Kumar, N. S., Jathanna, D., & Karanth, K. U. (2018). State space and movement specification in open population spatial capture–recapture models. *Ecology and evolution*, 8(20), 10336–10344.

Majgaonkar, I., Bowden, Christopher G., Quader, Suhel. (2018) Nesting success and nest-site selection of white-rumped vultures (*Gyps bengalensis*) in western Maharashtra, India. *Journal of Raptor Research*, 52(4):431-442

Ahrestani, F., Kumar, N.S., Vaidyanathan, S., Hiby, L., Jathanna, D., Karanth, K.U. (2018) Estimating densities of large herbivores in tropical forests: Rigorous evaluation of a dung-based method. *Ecology and Evolution*. DOI: <https://doi.org/10.1002/ece3.4227>

Athreya, V., Pimpale, S., Borkar, A., Surve, N., Chakravarty, S., Ghosalkar, M., Patwardhan, A., Linnel, j. (2018) Monsters or Gods? Narratives of large cat worship in western India. *CATnews*. Spring 2018

Jumani, S., Rao, S., Kelkar, N., Machado, S., Krishnaswamy, J., & Vaidyanathan, S. (2018) Fish community responses to stream flow alternations and habit modifications by small hydropower projects in the Western Ghats biodiversity hotspot, India. *Aquatic Conservation: Marine and Freshwater Ecosystems*. <https://doi.org/10.1002/aqc.2904>

Kshetry, A., Vaidyanathan, S., & Athreya, V. (2018) Diet selection of leopards (*Panthera pardus*) in a human-use landscape in North-Eastern India. *Tropical Conservation Science*, Volume I: 1-9

Srivathsa, A., Puri, M., Kumar, N.S., Jathanna, D., Karanth, K.U. (2018) Substituting space for time: Empirical evaluation of spatial replication as a surrogate for temporal replication in occupancy modelling. *Journal of Applied Ecology*. 55: 754–765 DOI: <https://doi.org/10.1111/2041-210X.12892>

Ghodke M., Chandi M, Patankar V. (2018) Yellow-banded Mangrove Snakes (*Cantoria violacea*) Consume Hard-shelled Orange Signaler Crabs (*Metaplex elegans*), *IRCF Reptiles & Amphinbians* • 25(1):50–51.

Tyabji Z. & Patankar V. (2018) Entanglement of a Juvenile Olive Ridley Turtle in a Ghost Net in the Andaman Islands, *Indian Ocean Turtle Newsletter*, 1 (26), 5-7.

Patankar V., Paranjape A., Tyabji Z., Wagh T., Marathe A. (2018) Occurrence and distribution of Tetraodontiform fishes of the Andaman and Nicobar Islands, India. *Check List* 14 (3): 529–537 <https://doi.org/10.15560/14.3.529>

Bopardikar I., Sule M., Jog K., Paankar V., Sutaria, D., Klinck H. (2018) Description and classification of Indian Ocean humpback dolphin (*Sousa plumbea*) whistles recorded off the Sindhudurg coast of Maharashtra, India. *Marine Mammal Science*, <https://doi.org/10.1111/mms.12479>



MoUs signed

WCS-India believes in the power of collaboration. In this regard, we have signed up significant number of agreements with various players, including government bodies, educational institutions and other players in the field of conservation. We are also thankful to those who have funded some of our work.

The Objective of this MoU is to facilitate productive, long term collaborative work between the WCCB and WCS-India, to promote enforcement of India's Wildlife(Protection) Act, to strengthen wildlife crime investigation and effective prosecutions through a systematic scientific approach by building the technical capacity of the enforcement agencies dealing with wildlife crime through training and awareness generation aligning with objectives of the 'parties'

Wildlife Crime Control Bureau

To facilitate productive long-term collaborative work between Border Security Force(BSF) and Wildlife Conservation Society-India, to jointly strengthen wildlife crime detection and subsequent procedures through a systematic scientific approach and to build the technical and managerial capacity of both parties to combat illegal wildlife trade across India.

Border Security Force

This project was to estimate carrying capacity for different eco-tourism activities offered at four project sites (Periyar TR, Eravikulam NP, Chinnar WLS and Shola NP) based on the formula provided in the 2011 MOEFCC-Guidelines for Eco Tourism in and around Protected Areas. It was meant to provide an evaluation of the ecological health of the four PAs, present level of ecotourism activities, and conduct training for stake holders in assessing the carrying capacity. (Completed)

Eco Tourism Carrying Capacity with Stesalit - Kerala

To jointly promote enforcement of India's Wildlife (Protection) Act 1972, to strengthen wildlife crime investigations and effective prosecutions through a systematic scientific approach, and to build the technical and managerial capacity of both parties to combat illegal wildlife trade across India

Government of West Bengal

Develop policy statements/documents/awareness material/analyses of data aimed towards facilitating effective ecological monitoring conservation planning and management implementation related to wildlife species wildlife crime control and wildlife forensics

NCBS(Dr. Uma Ramakrishnan)



Meetings and Discussions



Experts met and deliberated on an action plan for identifying, protecting and maintaining grasslands in the country. WCS-India is leading the project.



WCS-India team met with the Inspector General, and Deputy Inspector General at Kolkata as part of the partnership with the BSF to combat wildlife trafficking on India's borders.



Household materials like utensils, blankets, soaps, sanitary napkins, footwear, sleeping mats, etc collected from WCS staff were distributed among the affected families in Kerala by the forest department staff.



WCS-India team with the West Bengal Forest Department staff and WCCB officers



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