



Gharial Ecology Project

Madras Crocodile Bank Trust



Project progress report January 2024 – October 2025

Project Overview

The Gharial Ecology Project (GEP) is currently in its 18th field season (2025), having commenced in 2008 in response to the significant mortality event of Gharial (*Gavialis gangeticus*) during the winter of 2007-08. Our research endeavors, supported by the international zoo community, funding from the Astral Foundation CSR, and private donations, operate under the auspices of the Madras Crocodile Bank Trust (MCBT), an NGO. The GEP initiatives are facilitated through collaborations with the State Forest Departments of Uttar Pradesh, Madhya Pradesh, and Rajasthan, as well as the Ministry of Environment, Forests, and Climate Change, Government of India, who provide the necessary permits.

Gharials, classified as Critically Endangered (=CR), possess a global population of approximately 650-700 mature adults, out of which over 550 reside within the confines of the NCS. The execution of project activities is carried out by a compact core team consisting of 5 to 6 Indian biologists/naturalists, with additional guidance provided by Professor Jeffrey W. Lang, our Senior Scientific Advisor.

The primary objectives of the GEP encompass three key goals:

- To conduct a comprehensive assessment of gharials within the National Chambal Sanctuary (NCS).
- To identify and preserve the critical riverine habitats which is essential for the species' survival.
- To mitigate the threats and challenges that pose risks to the continued existence of the species.

Project Progress

Catch-Tag Operation Jan 2024 Update:

In January 2024, we conducted the first-ever tagging of 13 adult wild gharials in the upstreammost section of the National Chambal Sanctuary, between Palighat and Bagdiya. Among them, 10 individuals were fitted with satellite transmitters. Observations during the breeding and nesting seasons revealed limited movement, with gharials primarily shifting between Palighat and Bagdiya sites. However, during the monsoon period, some individuals were recorded moving upstream from Palighat into the Chambal.

Unfortunately, two of the tagged individuals—a juvenile and a sub-adult male—were found deceased due to entanglement in illegal fishing nets, with their radio transmitters subsequently recovered. At present, we continue to monitor the remaining 11 gharials using both manual tracking and satellite telemetry.

Gharial population survey:

In late January-early February 2024, our assessment of the gharial population within the National Chambal Sanctuary (NCS) estimated a total of 1,734 individuals. This included 171 males, 539 females, 508 subadults, 315 juveniles, and 201 yearlings. Like previous years, the gharial population in the upstream and midstream sections continues to decline. This trend is



Gharial Ecology Project

Madras Crocodile Bank Trust



primarily driven by escalating human-induced pressures and the ongoing loss of suitable habitats, whereas the downstream region remains relatively more stable in comparison.

In the upstream region, approximately 237 gharials were recorded, with a dominance of adults and subadults—20 males, 140 females, and 37 subadults—while the younger age groups comprised 40 individuals, including 22 juveniles and 18 yearlings. The midstream section harboured 321 gharials, composed of 28 males, 143 females, 81 subadults, 48 juveniles, and 21 yearlings. The downstream stretch supported the largest concentration, with 1,176 gharials documented. This included 123 males, 256 females, 390 subadults, 245 juveniles, and 162 yearlings.

Gharial Hatching success:

In 2014 post-hatch survey, we documented a total of 436 gharial nests across approximately 425 kilometers of the National Chambal Sanctuary. Of these, 348 nests successfully hatched, while the rest were lost due to natural predation and fluctuations in temperature. Our post-hatch survey estimated around 7,221 hatchlings.

During the 2025 survey, we recorded 492 gharial nests across approximately 425 km of the National Chambal Sanctuary. Of these, 418 nests successfully hatched, while the remaining were lost to natural predation and temperature fluctuations. The post-hatch assessment estimated about 9,793 hatchlings.

Monsoon movement:

Our radio-tagged female gharials continued their seasonal monsoon movements between upstream and downstream regions. The female tagged as 24-30 from Nadigaon traveled approximately 40 kilometers upstream into the Mej River before returning post-monsoon and eventually settling in the Kuno River. Notably, within Kuno, females were observed gathering earlier than usual during the breeding season, suggesting that mating occurred within this river. During the nesting period, we documented around 30–35 trial nests approximately 2 kilometers upstream from the Chambal-Kuno confluence, further supporting evidence of breeding activity in Kuno as a result of sand mining disturbance in Nadigaon.

We maintained close monitoring of all tagged individuals through our field trackers and satellite telemetry. Similar to last year, the female tagged with 26-55 radios from Dang Basai exhibited the most extensive movement, covering nearly 380–400 kilometers. She traveled upstream from Dang Basai near Dholpur, Rajasthan, to the Yamuna-Chambal confluence, moved further into the Yamuna, and later returned to Dang Basai post-monsoon for breeding and nesting.

Upstream vs. Downstream recent focus

Our surveys have identified distinct habitat variations across different sections of the National Chambal Sanctuary. The upstream region, characterized by rocky terrain and fragmented habitat pockets, contrasts sharply with the midstream and downstream stretches, which are dominated by extensive sandy banks and meandering river channels.

Based on our latest population assessment, we estimate that the sanctuary supports approximately 1,734 gharials, spanning juveniles, subadults, and adults. Of these, about 14% are concentrated in the upstream section (Palighat to Dangbasai), while the remaining 86% are distributed across the midstream and downstream areas (Dangbasai to Pachnadha) (GEP 2024 Population Survey). Nesting data further highlights this disparity, with 166 nests (33%) located



Gharial Ecology Project

Madras Crocodile Bank Trust



in the upstream stretch and 270 nests (67%) in the midstream and downstream regions (GEP 2024 Nesting Survey).

These findings underscore the fact that the upstream habitat is already limited and increasingly threatened by illegal sand mining and unregulated fishing activities. Given our extensive research focus on the downstream region for over a decade, we have now shifted our efforts toward the upstream stretch, starting in early 2024. This includes deploying telemetry and behavioral studies while actively collaborating with the Rajasthan and Madhya Pradesh Forest Departments to implement conservation measures aimed at restoring and safeguarding the upstream habitat of the National Chambal Sanctuary.

Research Publication:

Our latest research on acoustic communication in adult male gharials has been published as an open-access article (<https://doi.org/10.1111/joa.14171>). This study provides a detailed account of a newly identified, non-vocal underwater acoustic signal - the "gharial POP" - which is exclusively produced by mature ghara-bearing males in specific behavioral and social contexts. Additionally, we are in the process of publishing further research findings in international peer-reviewed journals. One of our upcoming submissions, conducted in collaboration with Dr. Karthikeyan Vasudevan's lab at CCMB-LaCONES, will focus on genetic analysis to investigate paternity in gharial colonial nesting sites. Furthermore, few additional manuscripts are in preparation for publication later this year, covering population trends of gharials in the Chambal and their chemical signaling mechanisms.

Survival of post-monsoon hatchlings:

In October 2024, we tagged 19 gharial hatchlings that had survived the monsoon floods along the upstream stretch between Palighat and Rameshwar Ghat. We tracked all individuals until December 20th, after which we began recovering some radio transmitters away from the shoreline. This suggested that hatchling mortality was linked to illegal fishing activities. To date, we have retrieved 12 out of 19 tags—eight were found approximately six meters inland, while four were buried deep in the mud, likely having detached naturally. The remaining seven hatchlings are currently unaccounted for, and efforts to locate them are ongoing.

Catch-Tag Operation Jan 2025

In January 2025, we carried out an adult catch-and-tag operation between Palighat and Nadigaon, conducted in two phases: the first covering Baroli to Nadigaon and the second spanning Palighat to Bagdiya. A total of 26 gharials were tagged, including one male that was translocated to the Son Gharial Sanctuary as part of a breeding recovery initiative for that population. We deployed 13 satellite transmitters, which are now providing fine-scale movement data on adult gharials during the breeding and nesting seasons. Following this wild catch-tagging effort, we also tagged 20 head-started gharials released by the Madhya Pradesh Forest Department at Palighat. This will help assess the effectiveness of the head-start program in supporting gharial survival in the upstream region.

Another Transfer of large breeding male to Son Gharial Sanctuary

As part of the Gharial Breeding Recovery Project in the Son Gharial Sanctuary, we collaborated with the Madhya Pradesh Forest Department to translocate a large breeding male from the National Chambal Sanctuary. This initiative follows a previous translocation conducted in



Gharial Ecology Project

Madras Crocodile Bank Trust



2021, which successfully initiated breeding, leading to the hatching of four nests within the Son Gharial Sanctuary.

However, the first translocated male later dispersed into the neighboring state of Bihar and eventually reached the Gandak River due to jurisdictional challenges. To prevent a recurrence of this issue, we worked on strengthening coordination between states before proceeding with another translocation.

Later as part of our catch-and-tag operation in January 2025, we successfully relocated another large breeding male to Son Gharial Sanctuary. This individual is expected to contribute to breeding efforts later this year, reinforcing our ongoing gharial conservation and recovery efforts to this sub-population.

IUCN – Crocodile Specialist Group Meeting, Darwin April 2024:

The Gharial Ecology Project took an active role in the IUCN Crocodile Specialist Group (CSG) meeting, presenting its ongoing research and conservation initiatives. Dr. Jeffrey W. Lang, Senior Scientific Advisor, and Jailabdeen A., Project Director, delivered oral presentations focusing on recent discoveries related to acoustic and chemical communication in gharials. A notable highlight of the event was Jailabdeen A. securing second place in the student category for his oral presentation.

Capacity building program for Veerangana Durgavati Tiger Reserve frontline staff:

The Gharial Ecology Project was invited to conduct a specialized capacity-building program for the frontline staff of Veerangana Durgavati Tiger Reserve in Madhya Pradesh's Sagar district. The program featured six technical sessions covering key topics such as rescue and release protocols for muggers and snakes, survey methodologies, and the use of advanced research equipment. Approximately 80 personnel, including forest guards, foresters, and range officers, actively participated in these sessions.

On the Brink season 2 – Gharial episode:

We are delighted to share that Gharial, an episode from Season 2 of On The Brink, has been awarded the 70th National Film Award for Best Non-Feature Film Promoting Social and Environmental Values. The documentary highlights the dedicated efforts of GEP researchers, including Pankaj Kumar and Jailabdeen A, as they study the behavior of the Critically Endangered gharial in its last remaining stronghold—the Chambal River. The film is available for viewing on YouTube ([Watch Here](#)). The entire Gharial Ecology Project and Madras Crocodile Bank Trust team sincerely thank all our supporters, whose unwavering commitment has contributed to this remarkable achievement.

Sawai Madhopur Field Laboratory:

A new field laboratory has been established in Sawai Madhopur in partnership with the National Centre for Biological Sciences (NCBS), Bangalore, to expand our research efforts into the upper reaches of the National Chambal Sanctuary. This facility is being equipped for basic DNA extraction and serves as an additional workspace for field staff from both the Gharial Ecology Project and NCBS.



Gharial Ecology Project

Madras Crocodile Bank Trust



New Collaborations:

We have initiated collaborative efforts with the Forest Departments of Rajasthan and Madhya Pradesh to address habitat degradation in the upstream sections of the NCS.

Fast-Tracking Head-Starts:

The Gharial Ecology Project along with Rajasthan Forest Department to fast-track the head-starting protocol by capturing healthy hatchlings at creches that form at hatching time at colonial nesting sites and rearing these newly hatched young during the pre-monsoon and monsoon months (July-August-September) when mortality is very high (~90%), under optimum captive conditions (warm temperatures and abundant food), free from predation. Then, at equivalent sizes to their wild counterparts, these "head-started" young will be released into favorable habitats at 4 months.

River Watch:

The Gharial Ecology Project and Madhya Pradesh Forest Department proposes River Watch program to engage village community program to protect the critical sand habitat from illegal sand mining. This involves in working in grass root level to talk with community people through trained community people as river watchers to leverage them and avoid mining in the 200m-500m from the shoreline. In addition to their protection efforts, the river watchers actively plant *Tamarix* sp. (Jahu) on suitable islands and along shorelines which plays a crucial role in enhancing sand sedimentation, contributing to habitat stabilization and restoration. (Auerbach et al., 2015). This protected stretch acts as critical nesting and breeding habitat not only for gharials but also for Indian Skimmers, turtles, and other river faunas.

Early 2025 - Loss of Nesting Sites/Habitats in Upstream due to sandmining and Fishing Net Threats:

During our monitoring of the upstream stretch, we observed a concerning rise in sand mining activities across nearly all sandy habitats as the monsoon waters receded. While currently localized, if left unchecked, this could escalate into large-scale industrial operations, further degrading critical gharial habitats. Similarly, illegal fishing continues unabated, occurring around the clock and posing a significant threat to gharials and turtles, particularly juveniles and subadults. These increasing anthropogenic pressures highlight the urgent need for intervention. In response, we have recently launched conservation initiatives in collaboration with new partners. While still in the early stages, we remain hopeful that these efforts will yield positive outcomes in the near future.