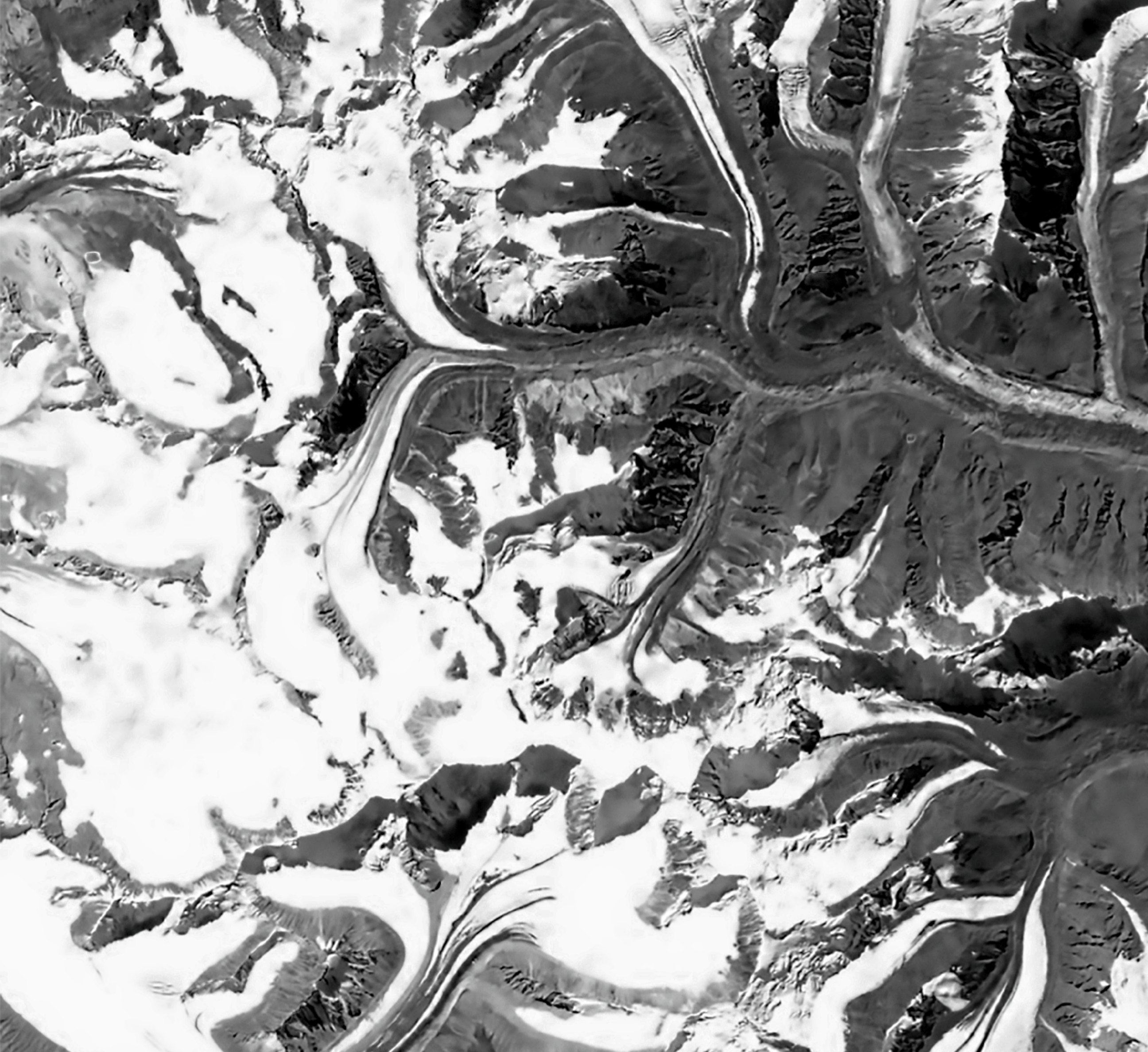


Rowing Down
The
ganges



Rowing Down
the Ganges





Gangotri Glacier as seen from space. (Open source map. SAS. Planet Version)



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सत्यमेव जयते

प्रधान मंत्री
Prime Minister

Message

Rivers have always been revered and associated with pride across civilizations. Maa Ganga is the holiest river on the sub-continent. Its life-sustaining waters have nourished our civilization, beliefs and spirituality. Home of rich biodiversity, the Ganga is our cultural and economic lifeline.

The endeavour by National Mission for Clean Ganga and Wildlife Institute of India to beautifully present the majestic journey of the Ganga through a Coffee Table Book, titled 'Rowing Down the Ganges' is remarkable. To capture the biodiversity and cultural vibrancy along the riverscape in the form of captivating images and document them with description would surely make the book an interesting and enlightening read.

As is the title of the book, comprehensive efforts have been made towards ensuring swachhata, aviralta and nirmalta of the Ganga. Rejuvenation of the river is a shining example of our cooperative federalism.

To strengthen various government efforts and activities towards pollution abatement, conservation and rejuvenation of the Ganga, emphasis is also being given for greater mass awareness and people's participation.

May the book inform and educate people, particularly the younger generations about the river and its splendid diversity. My best wishes to the publication for all success.

(Narendra Modi)

New Delhi
भाद्रपद 10, शक संवत्, 1942
1st September, 2020



Gajendra Singh Shekhawat

Minister for Jal Shakti
Government of India

Maa Ganga, whose currents sustain the body and soul of some half a billion population of our country, has been one of the holiest rivers of the country since time immemorial. The river has remained an inherent part of our ancient civilization and many a folklore is woven around her. The National Mission for Clean Ganga (NMCG), through Namami Gange, has been in the forefront to maintain the *nirmalta* and *aviralta* of the river and also to ensure the historical and cultural identity of river is not lost sight off This effort by the Wildlife Institute of India (WII) to pictorially capture the beauty of the sacred river, in collaboration with NMCG, is another step in this direction and is indeed commendable.

The book "Rowing down the Ganges" symbolizes the merger of the science and art of our culture at its best. The short descriptions provided along with the vibrant photos will give curious readers a prevue into the fascinating cultural and traditional linkages, factual information and folklores associated with the river. I applaud the photographers for their generous contributions and the team at the Wildlife Institute of India for putting this book together.

Gajendra Singh Shekhawat



Rattan Lal Kataria

Minister of State for
Jal Shakti and Social Justice & Empowerment
Government of India

"Rowing down the Ganges" is one of the most revealing and spectacular portrait of our holy river. It brings together the many facets of this mighty river - biodiversity, human society, culture and religion, to tell a succinct story of Ganga Riverscape through more than 250 photographs and illustrations. I am thankful to the Wildlife Institute of India (WII) for coming out with such a beautiful and informative publication, in association with National Mission for Clean Ganga (NMCG). I am also thankful to the photographers from across the country and beyond, whose contributions made this book colourful and interesting.

Rattan Lal Kataria

Messages



**U.P. Singh
Secretary**

Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation
Government of India

Our national river, the Ganga, is in need of continued conservation support now more than ever. The changing climate regime and the ever-increasing pressure from the human communities endanger the Ganga and its aquatic wildlife. This picturesque book is a testament to the rich biodiversity and cultural vibrancy of the river Ganga. As evident from its title "Rowing down the Ganges", the book portrays the journey of the Ganga from its glacial roots to its culmination. I congratulate the Wildlife Institute of India for the effort to bring forth Ganga's biodiversity and cultural vibrancy in the form of an interesting and enlightening book.

Upendra Prasad Singh



**Rajiv Rajan Mishra
Director General
National Mission for Clean Ganga**

Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation
Government of India

Cities and civilisations have flourished along the banks of Maa Ganga, taking forward the mutual interdependence between man and nature. Cleanliness of Ganga river has a direct impact on crores of people living in these cities. The Namami Gange programme, piloted by the National Mission for Clean Ganga (NMCG), ensures rejuvenation of this river keeping in mind its historical significance, the rich cultural heritage, bio-diversity etc.

The book "Rowing down the Ganges" by the Wildlife Institute of India (WII) explores the biological and cultural diversity of the Ganga River system. Alongside the lively pictures of the river and its numerous components, are unique stories, compiled from a plethora of literature and local traditional knowledge, and folklore. The Wildlife Institute of India (WII) has done a tremendous job of conceptualizing the story, compiling the photographs and depicting the story of our most revered river. I sincerely congratulate the team and thank the photographers for capturing these moments in time beautifully.

A picture is worth a thousand words. A lot of information on Maa Ganga has been conveyed through the beautiful photographs in this compilation. NMCG is happy to be a part of such an inspiring initiative by WII.

Rajiv Ranjan Mishra





Panoramic view of Gangotri Glacier showing Shivling and Bhagirathi Peaks as seen from Tapovan Viewpoint.



हरिपदपाद्यतरङ्गिणि गङ्गे हिमविधुमुक्ताधवलतरङ्गे ।
दूरीकुरु मम दुष्कृतिभारं कुरु कृपया भवसागरपारम् ॥३॥

वरमिह नीरे कमठो मीनः किं वा तीरे शरटः क्षीणः ।
अथवा श्वपचो मलिनो दीनस्तव न हि दूरे नृपतिकुलीनः ॥११॥

Ganga stotram - Adi Shankaracharya

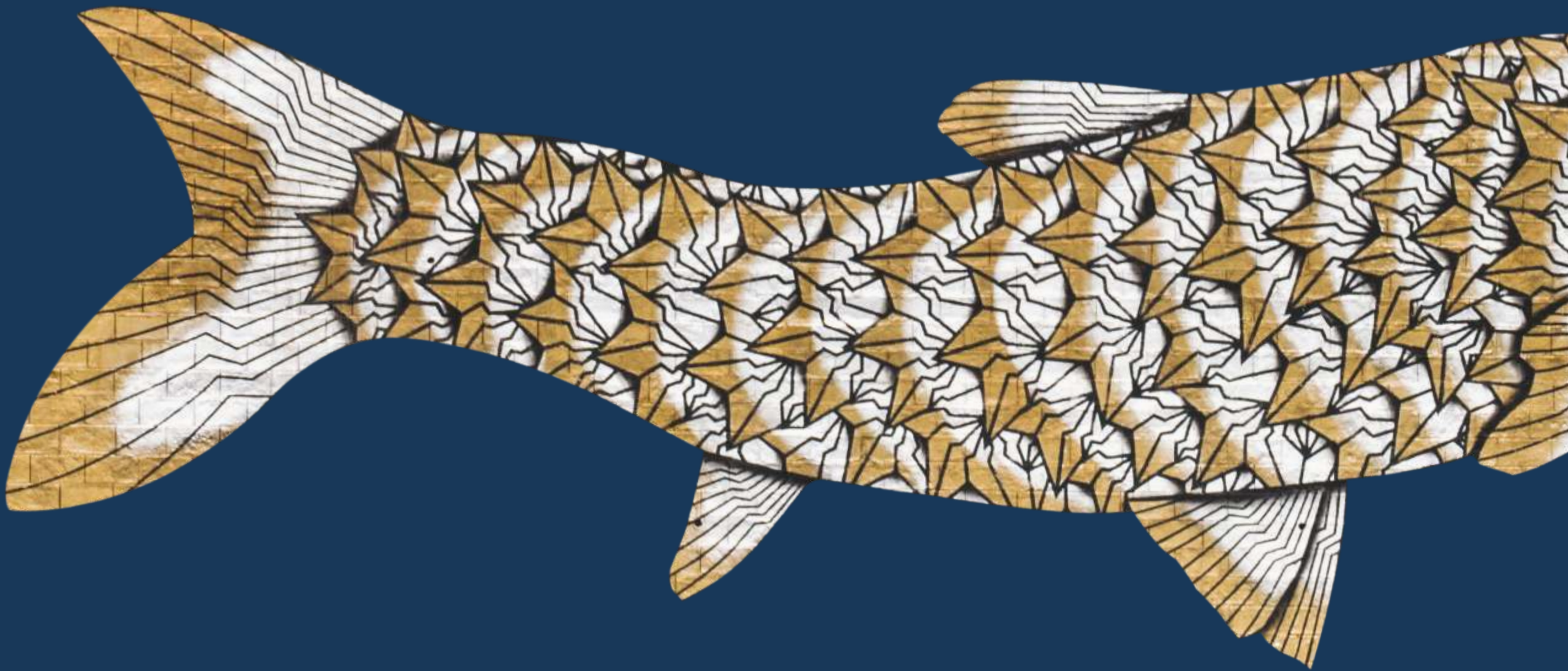
Originating from the feet of Hari, and flowing down with pure white waves resembling the whiteness of frost, the whiteness of moon, as well as the whiteness of pearl. Please remove the burden in my mind created due to evil deeds, and by your grace make me cross the ocean of worldly existence (samsara).

It is better to live in your water like a turtle or fish, or in your bank like a feeble chameleon, or be an unclean and miserable, rather than be a king or high born but being far away from You.



Shiva releasing Ganga from his locks, *Ganga visarjanamurti*, a Deccan trap rock-cut structure from the Rashtrakuta period (700-799 CE). The photo was taken from Cave 16 Kailasa of the Ellora caves, Maharashtra.

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PROLOGUE

The Ganga River is one of the most revered rivers in the world. In the Mahabharata, it is described as the 'best of rivers, born of all sacred waters' and is personified as a goddess. It originates from the Gangotri glacier at Gaumukh, one of the largest glaciers in the Himalayas. Mythology posits that "Goddess Ganga" was brought down to earth from heaven in the form of a river by king Bhagiratha. Henceforth, she came to be known as Bhagirathi at her source. Further downstream, after travelling for about 205 km, through narrow, steep, mountainous valleys and human habitations, she is joined by the Alaknanda River at Devprayag to form the Ganga River. From here on, the river flows down through steep mountains until it reaches Rishikesh, where the river prepares to leave the Shivalik Hills and flows into the Gangetic plains. As it does, the ecosystem transitions forms an ecotone resulting in diverse and rich assemblages of flora and fauna.

In the Gangetic plains, the river is wide and forms braided and sinuous channels. This region is highly fertile due to alluvial deposits carried down by the water currents from the Himalayas. One of the most famous confluence, known as the Triveni Sangam, is located at Prayagraj where the Ganga merges with the Yamuna and a third mythical river known as Saraswati. The Ganga is joined by its tributaries such as the Ramganga, Gomati, Ghaghara, Gandak and Kosi rivers, which are of Himalayan origin and join the north bank of the river, and Yamuna and Son rivers, join the left bank. In the stretch between Allahabad and Varanasi the river shows asymmetrical meandering and the highest sinuosity. After covering a vast length across the Gangetic plains, the Ganga bifurcates to form the Hooghly and Padma Rivers. Hooghly flows through West Bengal before merging into the Bay of Bengal, and Padma, considered as the main branch enters Bangladesh. Throughout its journey, the Ganga covers three biogeographic zones, viz. the Himalayas, Gangetic Plains and Coast.

This Coffee Table book titled 'Rowing down the Ganges' is an attempt to merge the biodiversity and culture of the Ganga River. It consists of pictorial presentations of its various elements along with brief descriptions to provide readers a glimpse into the vibrant life of the river. It conceptualizes the story of the Ganga as what one would see when one rows down from Gaumukh, its origin, to Ganga Sagar, the last point before it enters the sea.







ते गत्वा दूरमध्वानं गतेऽर्धदिवसे तदा।
जाह्नवीं सरितां श्रेष्ठां ददृशुर्मुनिसेविताम्॥१.३५.७॥

तां दृष्ट्वा पुण्यसलिलां हंससारससेविताम्।
बभूवुर्मुदिता स्सर्वे मुनयस्सह राघवाः॥१.३५.८॥

अथ तत्र तदा रामो विश्वामित्रमथाब्रवीत्॥१.३५.११॥
भगवन् श्रोतुमिच्छामि गङ्गां त्रिपथगां नदीम्।
त्रैलोक्यं कथमाक्रम्य गता नदनदीपतिम्॥१.३५.१२॥

Valmiki Ramayana

After travelling a long distance, at noon, they saw Jahnavi,
the best among the rivers, worshipped by ascetics.

On seeing the sacred waters with swans and cranes floating,
all the sages including the sons of Raghu were delighted.

Then Rama said to Viswamitra "O venerable one,
I wish to know why Ganga is flowing in three directions,
occupies three worlds before entering the sea, the lord of rivers"



A stone-cut structure from the Vedic period ca 1500-1599 CE, at the Virabhadra Temple in Lepakshi, Andhra Pradesh representing Goddess Ganga on Makara, Her *vahana* or vehicle. Makara is an ancient mythological symbol that possesses features of various animals that collectively take the form of a crocodile.







GANGOTRI GLACIER

The Gangotri Glacier, enveloped by Bhagirathi and Shivling peaks, is made up of bedrocks of granites, garnet mica schist and gneiss. The snout of the glacier located at the base of the Shivling peak, Gaumukh, is the source of the Ganga River.



BHAGIRATHI PEAKS

The three soaring peaks of the Bhagirathi, one of the most prominent and imposing cluster of mountains enveloping Gangotri Glacier. The peaks were named after the mythical king Bhagiratha, who performed an excruciatingly harsh penance to bring down the celestial Ganga River to the earth so that he may perform a ceremony to break Sage Kapila's curse on his ancestors.





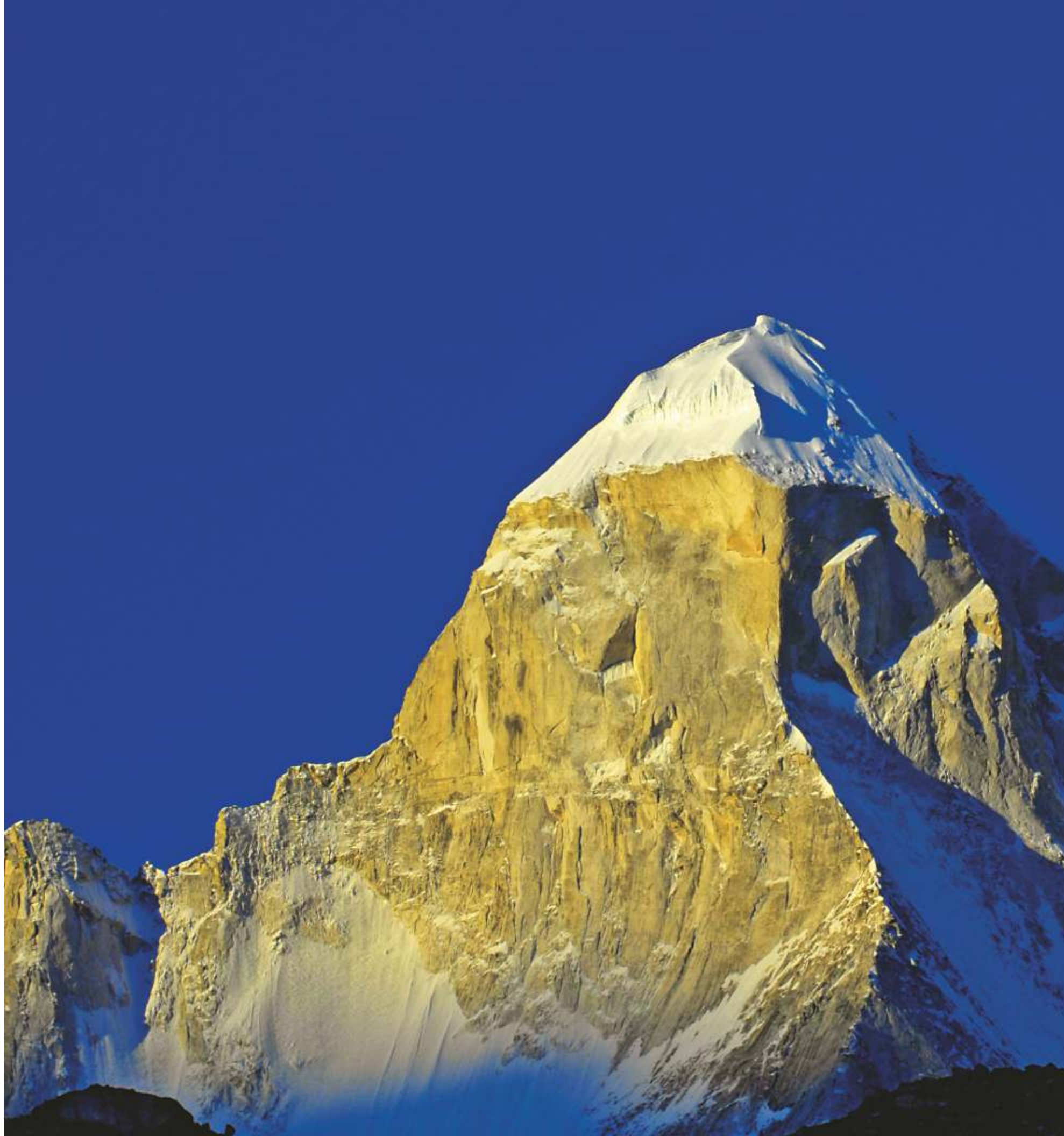




MERU PEAK

Sunrise on the colossal Meru peaks. The peak, shaped like a shark's fin, stands upright between Thalay Sagar and Shivling peaks. Meru is also known as golden mountain and is believed to be the centre of the universe. Mythology suggests that the celestial Ganga River descended upon Meru before flowing in four different directions.







SHIVLING PEAK

The Shivling Peak as seen from Gaumukh, is one of the most majestic and sacred peaks in the Gangotri group of peaks. It overlooks the sprawling meadow of Tapovan and is traversed by several small streams. According to mythology, the peak divinely symbolizes Lord Shiva. Known for its tough terrain, the Shivling has been called ‘Matterhorn of Himalayas’ due to its close resemblance to the peaks in the Swiss Alps.





GAUMUKH

The snout of the Gangotri Glacier and the source of the Bhagirathi River, the Gaumukh is situated at an astounding height of 4,023 m asl. The Bhagirathi River, here at the source, is characterised by rapid waters with boulders scattered with pieces of broken snow, along with the hard clayey snow of the glacier. Climate scientists have emphasized that the snout is rapidly moving backwards and has retreated 1 km in just 70 years.





SHIVLING FROM KIRTI

The Shivling Peak stands tall as seen from the Kirti Glacier, combining the grandeur of the glacial world with lush green meadows and alpine scrub. Due to the diversity of landscapes, marked by deep gorges, craggy glaciers and high ridges and the rich biodiversity, the area is protected as the Gangotri National Park. The Park is named after the Gangotri Glacier, the source of the Ganga River located inside the Park. The Park has a typical high altitude ecosystem, physically and biologically influenced by the trans-Himalayan elements to a greater extent. The rocky substratum has abundant lichen and herbaceous plants such as Rock Jasmine (*Androsace sarmentosa*) with bright purple flowers along rocky slopes at elevations between 3,000–4,000 m asl.





SNOW LEOPARD

Panthera uncia

The Gangotri National Park is home to the magnificent Snow leopard, a Vulnerable species inhabiting cold and dry habitat of the Himalayas. It is listed in Schedule I Part I of the IWPA, 1972. Rarely sighted due to its camouflaged habit, they are one of the most mysterious cats in the world. Being opportunistic feeders, they prey on a wide range of mammals, but prefer blue sheep and Ibex.

Snow leopards are usually found between 3,000 and 5,400 m asl. Their distinctive camouflage skills and stealthiness is essential for their survival in these unsheltered, mountainous habitats.







IBEX

Capra sibirica

A male Ibex walking along snow-capped Gangotri National Park. They tend to occupy steep, rocky habitats at elevations between 2,000 – 4,600 m asl. The large bow-shaped horns with transverse ridges are a characteristic feature of the species. Ibex is one of the preferred prey species of the Snow Leopard. It is listed in Schedule I Part I of the IWPA, 1972.



BLUE SHEEP

Pseudois nayaur

Blue sheep or Bharal, are sheep-like caprines that are actually more closely related to goats (genus *Capra*) than to sheep (genus *Ovis*). The species inhabits open grassy slopes in high mountains from 2,500-5,500 m asl. Its stocky body and stout legs make it an excellent climber. It is one of the principal prey species of Snow leopard. It is listed in Schedule I Part I of the IWPA, 1972.





HIMALAYAN TAHR

Hemitragus jemlahicus

A Himalayan Tahr in its characteristic habitat of rugged hills and mountains slopes. The species occurs in subalpine and alpine regions from 3500-4500 m asl. The Himalayan Tahr's other counter part Nilgiri Tahr (*Nilgiritragus hylocrius*) occurring in the high mountain ranges of the Western Ghats, is a geographically disjunct species, which is intriguing to science. The Himalayan Tahr is listed as Near Threatened by the IUCN Red List and in Schedule I Part I of the IWPA, 1972.



RED FOX

Vulpes vulpes

Red Foxes are one of the most widely distributed species inhabiting diverse habitats including high mountains ranging from 2,934–7,410 m asl. These nocturnal animals are extremely adaptable and are known to be highly resourceful. Owing to its widespread distribution and dense, soft, silky fur, the red fox is hunted extensively for its fur. It is listed in Schedule II Part I of the IWPA, 1972.



HIMALAYAN MONAL



Lophophorus impejanus

The Himalayan Monal, the state bird of Uttarakhand, inhabits upper temperate oak-conifer forests interspersed with open grassy slopes, cliffs and alpine meadows between 2400 and 4500 m. The species shows distinctive sexual dimorphism with the males being slightly larger and brightly coloured. It is listed in Schedule I Part III of the IWPA, 1972.





DRUMSTICK PRIMROSE

Primula macrophylla

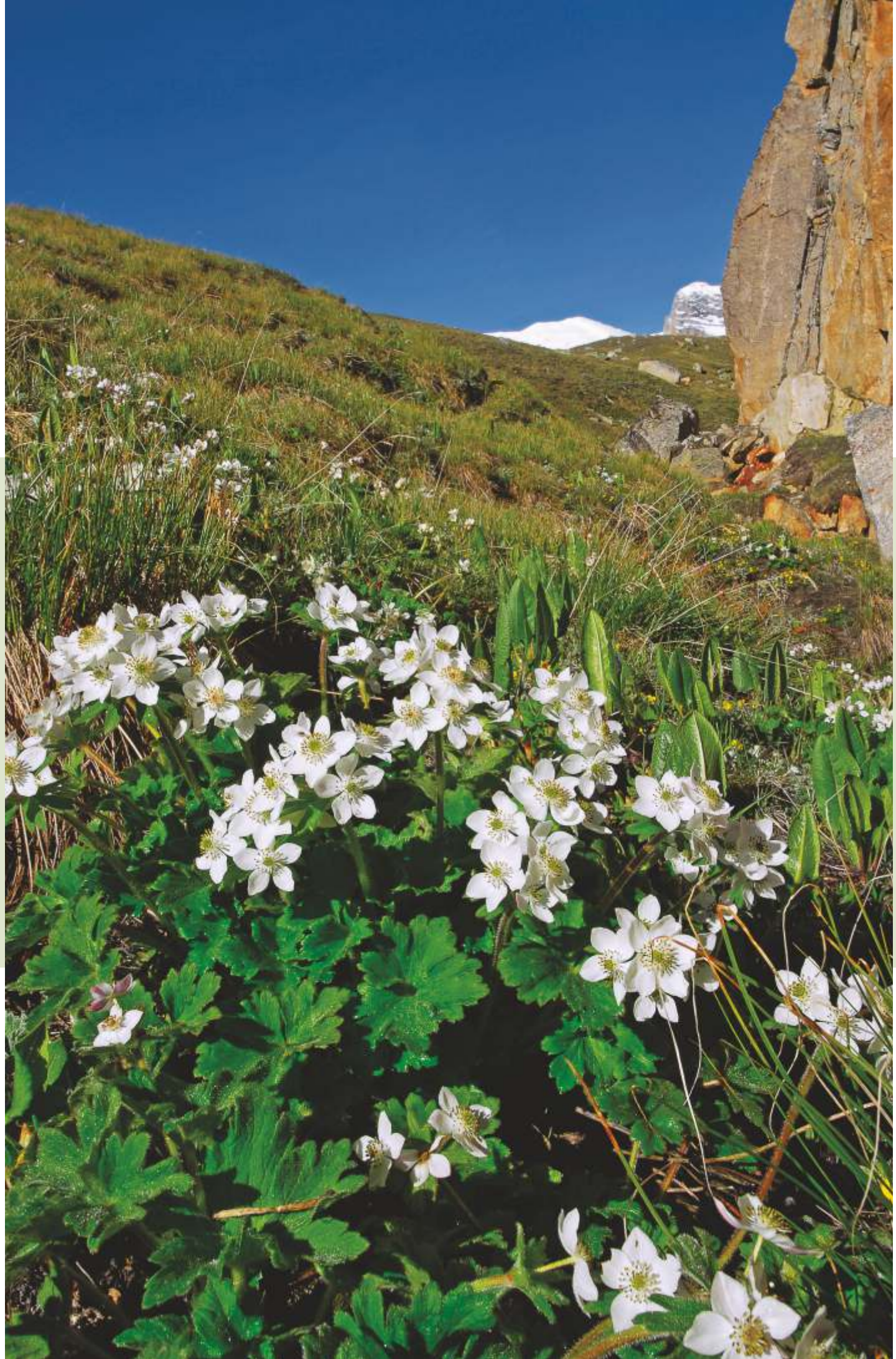
A perennial Himalayan herb with pretty purple to mauvish-blue flowers inhabiting sub-alpine areas between 1500-4500 m. They are extensively used as ornamental plants. There is never a dearth of colour during the brief growing season in the alpine Himalayas.



ANEMONE

Anemone sp.

An avalanche slope radiant with wildflowers amidst the backdrop of Gangotri's towering peaks. Anemones (*Anemone* spp.) decorating open grassy slopes of the sub-alpine Himalayan region.





MERGING NATURE WITH CULTURE

Apart from its breathtaking glacial peaks and rich biodiversity, Gangotri holds a special place in the culture history of India. It is also considered sacred by pilgrims and spiritual seekers.





GANGA'S CELESTIAL JOURNEY

With the onset of winter, when the Gangotri glacier freezes, Mother Ganga travels to her winter abode, Mukhwa, on the auspicious day of Yama Dwitiya or Bhai Duj which falls in the month of November. She travels back on Akshay Tritiya which falls in the month of May, a tradition with a recorded history of at least 700 years and is accompanied by elaborate rites and rituals. The annual procession back to Gangotri is believed to be the celestial journey of the Ganga. During the procession, the icon of the Goddess Ganga is placed on top of a palanquin, adorned with an embellishment of ornaments and flowers.





Procession of Goddess Ganga from
Gangotri to Mukhwa across steep
mountain tops covered with
Deodar forests.



DHARALI LANDSCAPE



Serenity precedes over Dharali, the first notable town on the banks of the Bhagirathi River, surrounded by snow-capped Himalayas and the tranquil Bhagirathi below. It is believed that it is at this place where King Bhagiratha meditated to bring the celestial Ganga out of the Heavens to flow into the Earth.





The Bhagirathi at Dharali flows at an astounding height of 2680 m and is home to several species of conservation significance.







TIGER'S MILK SPRUCE

Sapium insigne

Locally known as “*Ainkhar*” or “*Balodhar*”, Tiger’s milk spruce is a medium-sized, fast growing deciduous tree of the lower Himalayas and Shivaliks with horizontal branches that exude a toxic milky sap. The twigs are used during Bandhan rituals, and as fuel and fencing, while leaves are used as fish toxics. The Bhagirathi river is at the backdrop.



MUKHWA



The quaint Mukhwa village with picturesque landscape of Deodar forests is located on the banks of the Bhagirathi River. Mukhwa is known to be the winter shrine of Goddess Ganga.



The Gangascape at Mukhwa

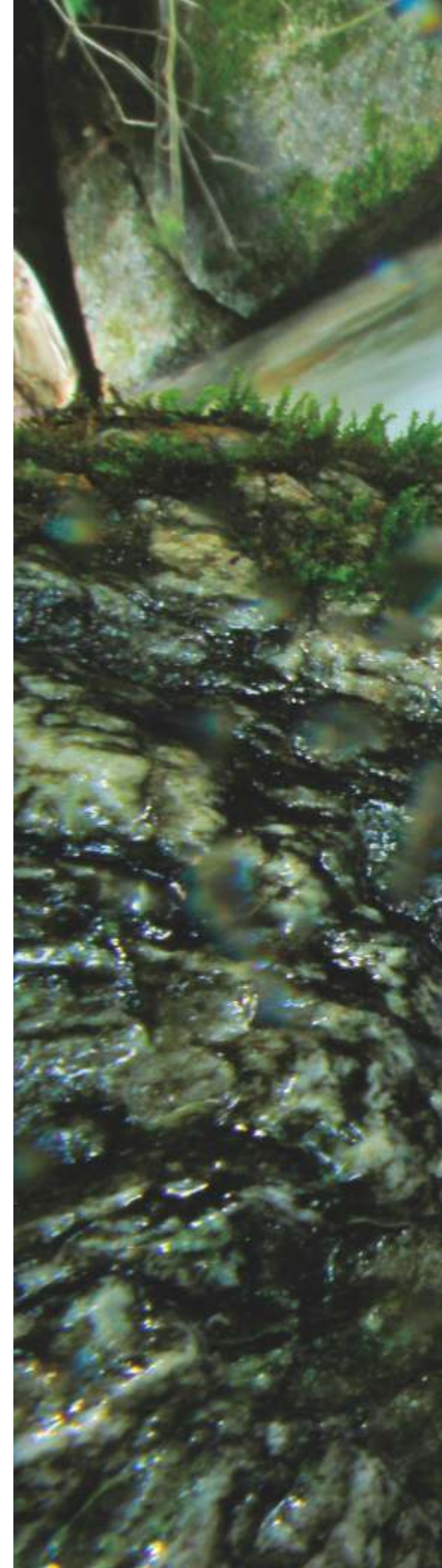




HIMALAYA PAA FROG

Nanorana vicina

A large obligate stream frog inhabiting torrential Himalayan streams at mid- to high elevation. The species prefers pools in a stream habitat. It is listed in Schedule IV of the IWPA, 1972.





CASCADE FROG

Amolops formosus

A beautiful cascade frog distributed in the undisturbed fast-flowing streams of Western Himalaya. The tadpoles of this species have specialised ventral suckers that help them adhere to rocks in torrential waters. The populations of this species are becoming increasingly vulnerable due to stream modifications such as rock extraction, construction of dams, and pollution.





KASHMIR AGAMA

Laudakia tuberculata

A male Kashmir Agama at the end of the breeding season. These saxicolous lizards are fairly distributed along Ganga on open rocky areas between 790-3900 m asl.



WILLOW-LEAVED SEA BUCKTHORN

Hippophae salicifolia

A deciduous, thorny willow-like plant species of the Himalayas found at elevations of 2000-3700 m asl. It serves as a measure of biodiversity and soil conservation, as well as a food, fodder and fuel species. The tender branches, leaves, and fruits contain bio-active substances which are used to produce a high-quality medicinal oil.





RHODODENDRON

Rhododendron arboreum

Rhododendron or “*burans*” has great significance for the local people in this region as it contributes to the local economy. They harvest the blood-red flowers to make “*burans juice*” which represents the region’s unique aura.



HARSIL

Harsil, is a rustic town along the Bhagirathi River. Located roughly 22 km from Gangotri, Harsil is one of the most important pilgrimage sites with a spectacular view embossed by the snow-capped mountains, forests of Deodar and pine, and the Ganga River. The region is sparsely populated and is untouched by development.





GANGNANI

Gangnani is small town located 30 km from Harsil. It is a peaceful town, surrounded by the beautiful Himalayan mountains. It is famous for its thermal water springs known as Rishikund.





A miniature forest on a stump of tree - a rendition of a typical lower elevation forest of the landscape with both Deodar and Oak trees with a moss covered forest floor.



HIMALAYAN CHERRY TREE



Cerasus cerasoides

The local people perform cultural rites and rituals on the wild Himalayan Cherry Tree as a mark of reverence to nature. Vibrant red and yellow clothes and horns of sheep and goat are seen hanging on the tree as an offering.





Amolops jaunsari

A small semi-aquatic frog endemic to Western Himalaya. The species is named after the *Jaunsar* tribe of Uttarakhand. It is found in small hill-streams at an elevation of about 1,062 m asl. Threats to this species are unknown. It is a Data Deficient species according to the IUCN Red List.

JAUN SAR STREAM FROG





HIMALAYAN HORSETAIL

Equisetum diffusum

A perennial plant known for its high silica content. It has medicinal and commercial applications. It is reported to be toxic to livestock.



HIMALAYAN PEAR

Pyrus pashia

The Himalayan Pear is a beautiful flowering tree, with white flowers during spring (March-April). Found at altitudes of 750-2700 m asl with white flowers around March-April. The fruit is rich in minerals and ripens in November-December. Its large thorns make it a popular choice for cultivation as a live fence.







IBISBILL

Ibidorhyncha struthersii

The Ibisbill is found in shingle-bed river valleys between 1,700 and 4,400 m, although, it may descend as low as 100 m during breeding season. They tend to frequent river valleys with very little vegetation and gentle slopes to ensure a slow flow of water. It is named so because of its long, red, downward curved bill. It is listed in Schedule IV of the IWPA, 1972.



SPOTTED FORKTAIL

Enicurus maculatus

The Spotted Forktail forages on moss-covered, wet slippery rocks, plunging underwater to catch prey. A small bird found between 1200-3600 m along mountain streams, waterfalls and small shaded forest puddles, it descends to about 600 m in winter. It is listed in Schedule IV of the IWPA, 1972.





WHITE CAPPED REDSTART

Phoenicurus leucocephalus

The species is representative of the Himalayan stream avifauna and breeds along rocky rivers, streams, and waterfalls. It can be seen from foothills up to the highest elevations between 1800 and 5000 metres, but usually occurs between 2400 and 4200 metres. It is listed in Schedule IV of the IWPA, 1972.





SILVERY GENTIAN

Gentiana argentea

A typical forest floor of the Himalayas, covered with small perennial herbs, mosses and signs of animal presence. The blue flowering herb is Silvery Gentian found in the region at altitudes of 1600-4400 m.





UTTARKASHI

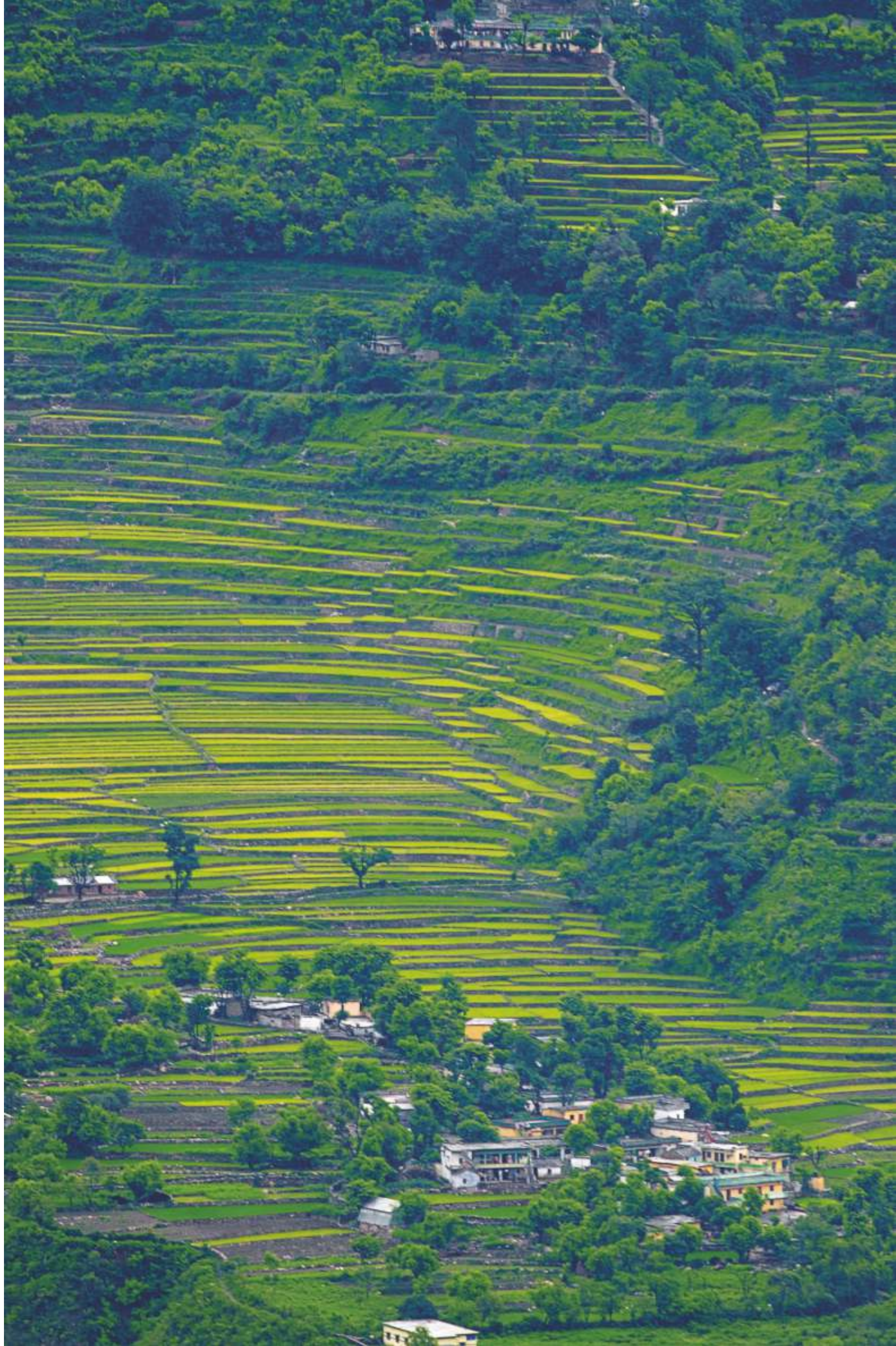
The picturesque town of Uttarkashi, known as the Kashi of the north, lies on the sloping hill sides of the Himalayas. The terrain is mountainous consisting of high rise ridges at an altitude of 1158 m asl. A chain of sparsely populated settlements can be seen interspersed with terrace cultivation. The valley is a stream bed dominated by highly fertile alluvial soil.





TERRACE FARMING

Terrace farming is a common practice in these steep hilly or mountainous terrains of Uttarkashi. The practice decreases erosion and surface runoff due to the graduated nature of the terrain. It is used to cultivate water-intensive crops, such as rice.



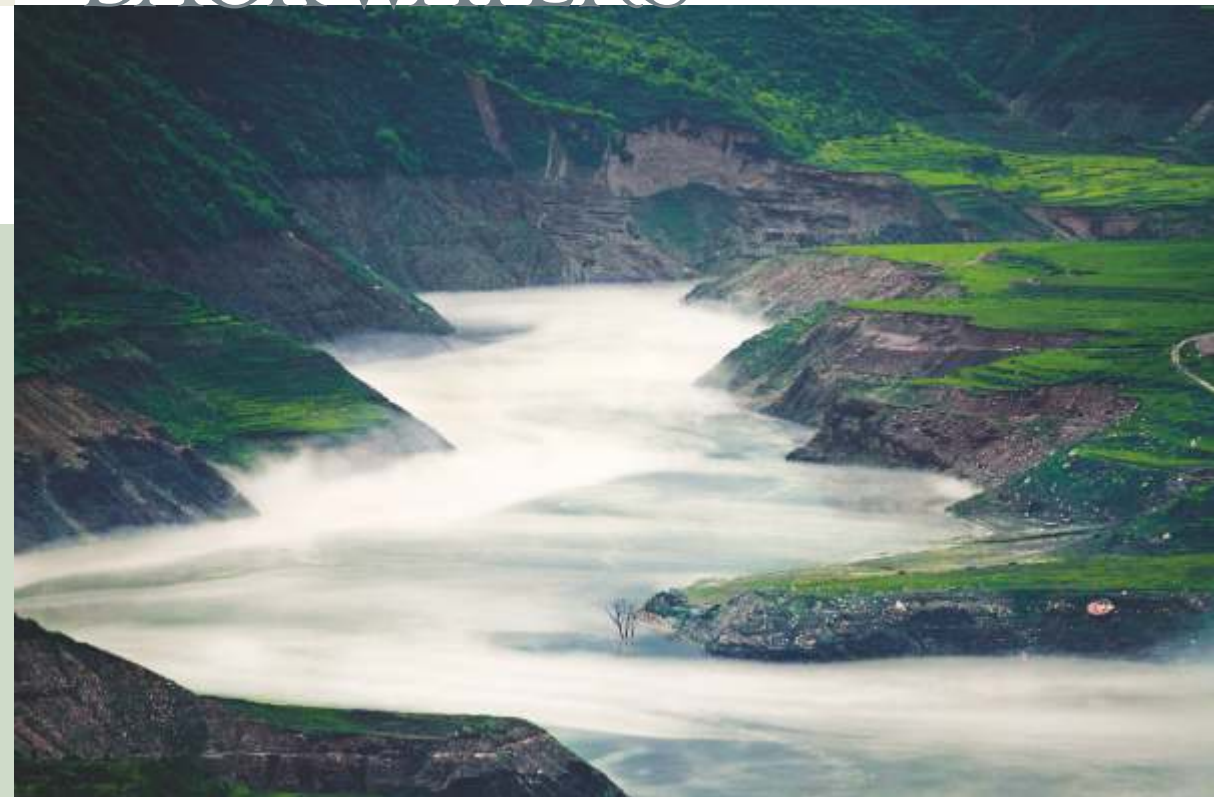
TEHRI DAM

A more recent, human-made addition to the landscape is the Tehri dam at the confluence of Bhilangna and Bhagirathi rivers. It is one of the world's biggest hydel projects drawing water from two great rivers of the Himalayas. It produces 1000 MW of hydroelectricity powering eight major states of north India. As the region is located in the foothills of the Central Himalayan Seismic gap, the stability of the dam is highly debated.



TEHRI DAM BACKWATERS

The serene backwaters of the Tehri dam spread over an area of 52 sq km. Around 24,000 people have been displaced from the area to nearby towns such as Haridwar as a consequence of the dam construction.





ROYLES SPURGE

Euphorbia royleana

A flowering succulent found in the drier slopes along the river, at an elevation of 1000-1500 m asl. These plants play an important role in maintaining soil stability and are also used in hedging and medicinal purposes.







PANCHPRAYAG

SANGAM AT DEVPRAYAG

Devprayag, revered as the confluence of the mind and soul, is where the restless Bhagirathi meets with the calm Alaknanda originating from Alkapuri and forms the Ganga River acquiring a beautiful turquoise colour. It is the starting point of the Panch Prayag Yatra.

The first of the *Panch Prayag* or holy confluences. Thousands of pilgrims from all over the country visit to seek blessings during the Char Dham Yatra. Other *prayags* include Rudraprayag, Nandaprayag, Karnaprayag and Vishnuprayag that along the Alaknanda River.





ASIATIC BLACK BEAR

Ursus thibetanus

Asiatic Black Bear, also called Himalayan Black Bear is a forest dwelling bear of the Himalayas and hibernates, albeit for a short time, in the upper Himalayas. It has suffered major population decline due to loss of its forested habitats. The species is listed as Vulnerable by the IUCN Red List and Schedule II Part II of the IWPA, 1972.



LEOPARD

Panthera pardus

The Leopard is listed as a Vulnerable species in the IUCN Red List. It is the most adaptable of the four big cats in India, occupying diverse habitats varying from pristine forests to peripheries of human-dominated landscapes. It is listed in Schedule I Part I of the IWPA, 1972.





HIMALAYAN GORAL



Naemorhedus goral

It is found across the Himalayan region between altitude of 600 m to 2,500 m. After foraging in the morning, it rests on a rock ledge throughout the day, as seen here. It is frequently sighted on rocky areas along the river while rafting. It is listed as Near Threatened in the IUCN Red List and in Schedule III of the IWPA, 1972.

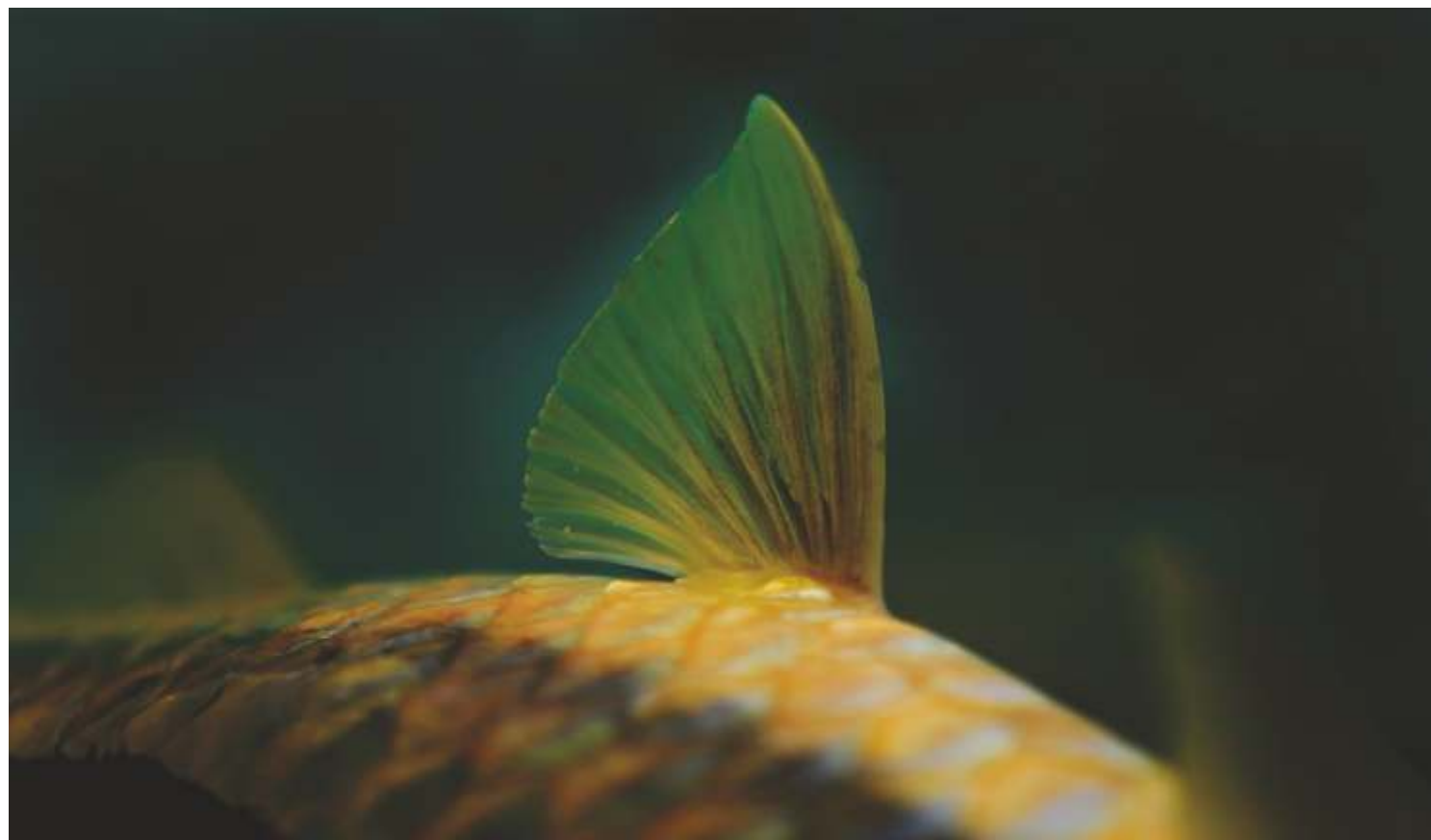




GOLDEN MAHSEER

Tor putitora

The Golden Mahseer is an omnivorous species that inhabits hill streams with deep pools and rocky substrate. It is listed as Endangered in the IUCN Red List. The threats to the species include habitat alteration, habitat destruction, and over fishing.



MARBLED BALLOON FROG

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## *Uperodon systoma*

A fossorial species that has a very short breeding season during June - July, along the Gangetic floodplain. These frogs are specialised in having burrowing structures called metatarsal tubercles in their hind feet. When threatened, they gulp air and appear like a colourful patterned balloon, hence the common name of the species.







## CORAL BEAD VINE

### *Abrus precatorius*

A high-climbing, twining or trailing woody vine with bright coloured seeds. The seeds are toxic as they contain abrin, a natural poison, and are used as beads in jewellery and in percussion instruments.







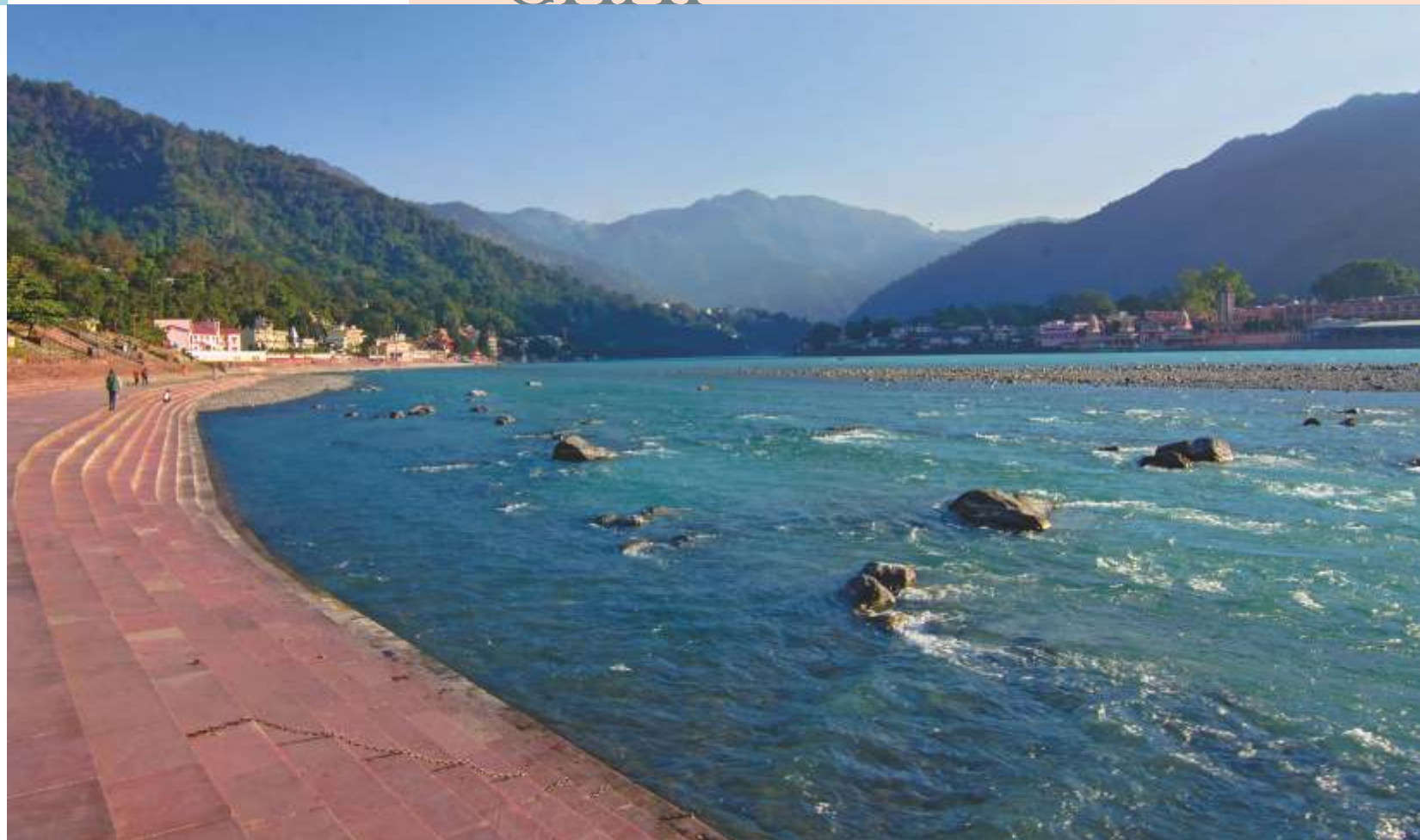


# RISHIKESH

Rishikesh is not just famous for its temples and spiritual significance, but also offers adventure sports such as river rafting. Bestowed with the gurgling Ganga and its tributaries, rafting in the rapids of the Ganga in Rishikesh is an enthralling experience. Although it provides livelihood for local communities, over the years the rafting camps have mushroomed affecting the integrity of the riverbanks.



# TRIVENI GHAT



Triveni Ghat is the largest and most venerated ghat in Rishikesh. It is believed that the ghat was visited by Lord Krishna when he was injured by Jara's arrow. The Ghat is an important cultural centre with famous temples such as Gita Mandir and Lakshminarayan Temple along its banks.











## RIVER LAPWING

*Vanellus duvaucelii*

A flock of river lapwings on the banks of the Ganga at Rishikesh. They are known to prefer slow rivers with sand or gravel bars. The species has been placed in the Near Threatened category in the IUCN Red List due to its declining population and in Schedule IV of the IWPA, 1972.



## GANGA AARTI

The vibrant *Ganga aartis*, held at several ghats on the banks of the River every day, is a form of paying tribute to the Goddess, and holds deep cultural and spiritual significance. Floating leaves with *diyas* and flower petals, released by the of devotees in the Ganga is a sight to behold.









# RAJAJI NATIONAL PARK

The divergence of the Ganga river from the Shivalik landscape and into the Indo-Gangetic Plains as it flows through the Rajaji National Park. The river bifurcates the Park into its eastern and western parts. Harbours diverse wildlife habitats, often Smooth-coated Otters and Gharials are sighted basking on the riverbanks inside the Park.



## SAMBAR

*Rusa unicolor*

A mating pair of Sambar. The breeding season of the species occurs during early September to January. The males are very defensive and territorial during this season. An adult male Sambar develops a harem of about 8 females that he will be able to successfully mate with. It is one of the preferred prey species of the Tiger. Sambar is listed as Vulnerable by the IUCN Red List and is a Schedule III species in the IWPA, 1972.







# ASIAN ELEPHANT

## *Elephas maximus*

The majestic Asian Elephant is a common sight within the Rajaji National Park. These pachyderms often come to the Ganga River to quench their thirst. It is listed as

Endangered in the IUCN Red List due to massive declines of its populations owing to habitat destruction and poaching for ivory. It is a Schedule I Part I species according to the IWPA, 1972.



# BENGAL TIGER

## *Panthera tigris*

The territorial Bengal Tiger has its largest population in India. The species has been listed as Endangered by the IUCN Red List due to poaching, habitat fragmentation and human-wildlife conflicts. Efforts to restore the corridor between the Ganga and Yamuna rivers are being implemented for the long-term conservation of the species. It is a Schedule I Part I species according to the IWPA, 1972.





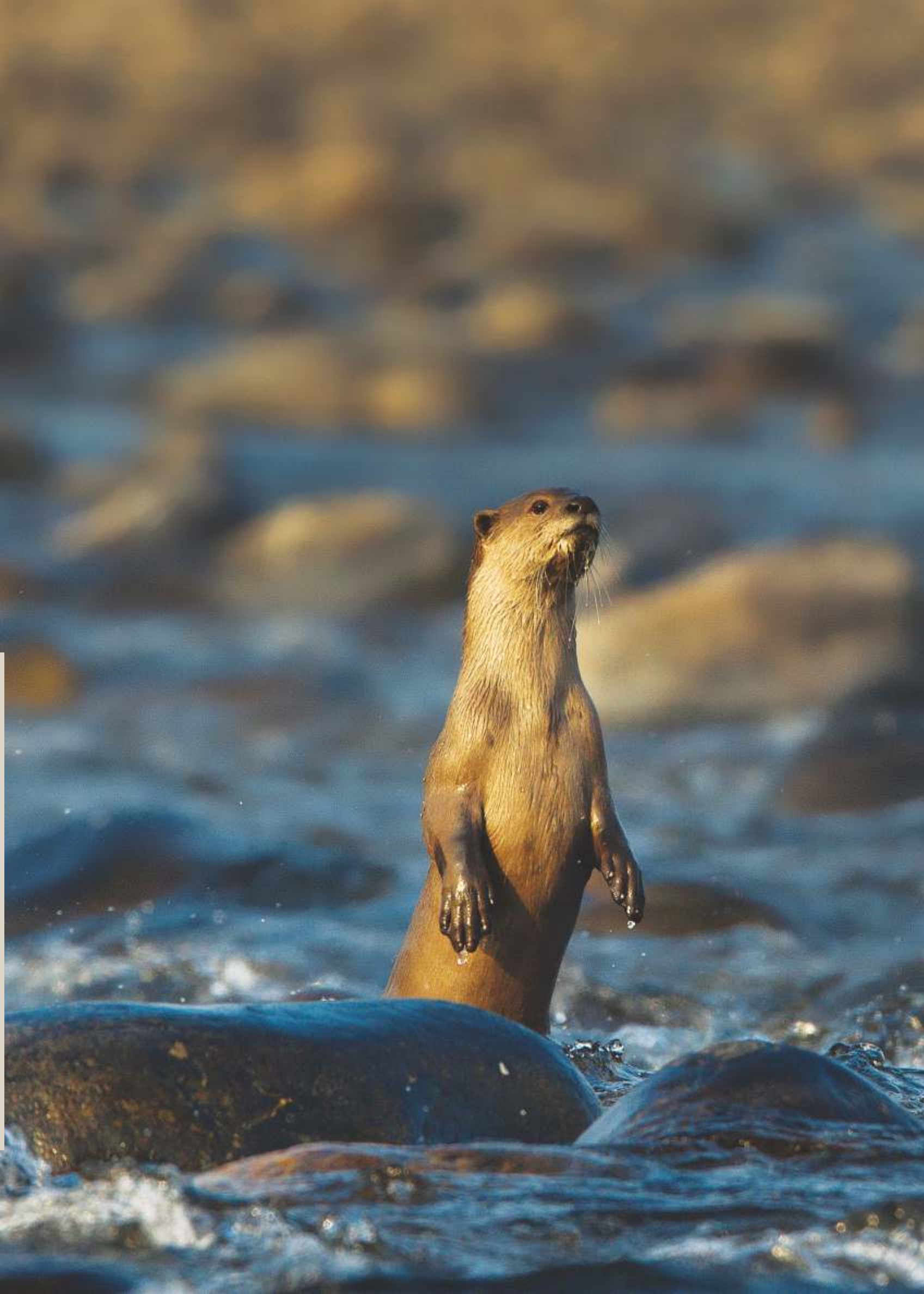




# SMOOTH- COATED OTTER

## *Lutrogale perspicillata*

Smooth-coated Otters are the largest of Asia's otters identified by a very smooth, sleek pelage, with large and well-webbed paws. They like areas where freshwater is plentiful - large rivers, lakes, and even peat swamp forests, coastal mangroves, estuaries and rice fields, provided there is ample bankside vegetation for cover and escape. These otters are strong swimmers and forage in water for fish. Threatened by poaching, habitat destruction and prey base depletion, the species has been listed as Vulnerable by the IUCN Red List and in Schedule II Part II of the IWPA, 1972.







Smooth-coated otter's bigger and rounder head and flat tail are some of the clear traits differentiating it from the Eurasian and Small-clawed otters. Their diet largely comprises of fish, thus they experience serious and widespread conflict with aquaculturists and fishermen.







## SONG RIVER

An aerial view of one of the largest rivers draining the Doon Valley, the Song River, originates as a spring-fed stream in the southern slopes of Mussoorie ridge of the Himalayan Range. It is a tributary of the Sooswa River, a tributary of the Ganga.



## HARIDWAR

Nestled at the base of the Himalayas, here at Haridwar, the Ganga River leaves the hilly terrain of the Shivalik Hills and enters the Gangetic plains of Northern India, thus also known as Gangadwára.

The city has an elevation of 315 m asl and from here on, the river expands in width, forms numerous braids and there is a gradual increase in the alluvial content.











Haridwar has deep cultural significance for the local people as well as spiritual seekers from abroad. The ghats are filled with lively colours, as people come to pray and participate in religious ceremonies throughout the year.







Built by the Birlas in 1938, the Ghanta Ghar at Har ki Paudi in Haridwar has been a witness to lakhs of devotees every day. Under the "Haridwar Mural Project" this iconic tower has got a revival through art by artist Harshvardhan Kadam.





A mixed flock of water birds on the rocky banks of the river. The flock is dominated by Goosander or Mergus merganser, a piscivorous duck. These gregarious birds are also known as 'sawbills' due to their long, narrow bills with saw-like 'teeth' which helps them in gripping fish.













Devotees waiting for the Ganga Aarti at Haridwar. A ritual performed every dawn and dusk to pay homage to the River for its services. It is celebrated in the three holy centres along the Ganga river, viz., Rishikesh, Haridwar and Varanasi.











## CHANDI GHAT

The 700 m long ghat is a visual pleasure for pilgrims and tourists alike. The Chandi Ghat was constructed by the National Mission for Clean Ganga (NMCG) in line with the Namami Gange programme. The brightly coloured turtle mural, painted by the Mexican artist, Senkoe, signifies the clean Ganga and its biodiversity.







*middle ganga*







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क्वचित् स्थमितगम्भीरां क्वचिद् वेगसमाकुलाम् ।  
क्वचिद् गम्भीर निर्घोषां क्वचिद् भैरवनिःस्वनाम् ॥२.५०.१७॥

शिंशुमारैश्च नक्रैश्च भुजङ्गैश्च समन्विताम् ।  
शंकरस्य जटाजूटाद् भ्रष्टां सागरतेजसा ॥२.५०.२५॥

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*Valmiki Ramayana*

At some places the river is calm and deep, while at other places it bursts with speed, at some places one can hear the sound of her deep (silence), while at other places one can feel the silence within her terrible flow.

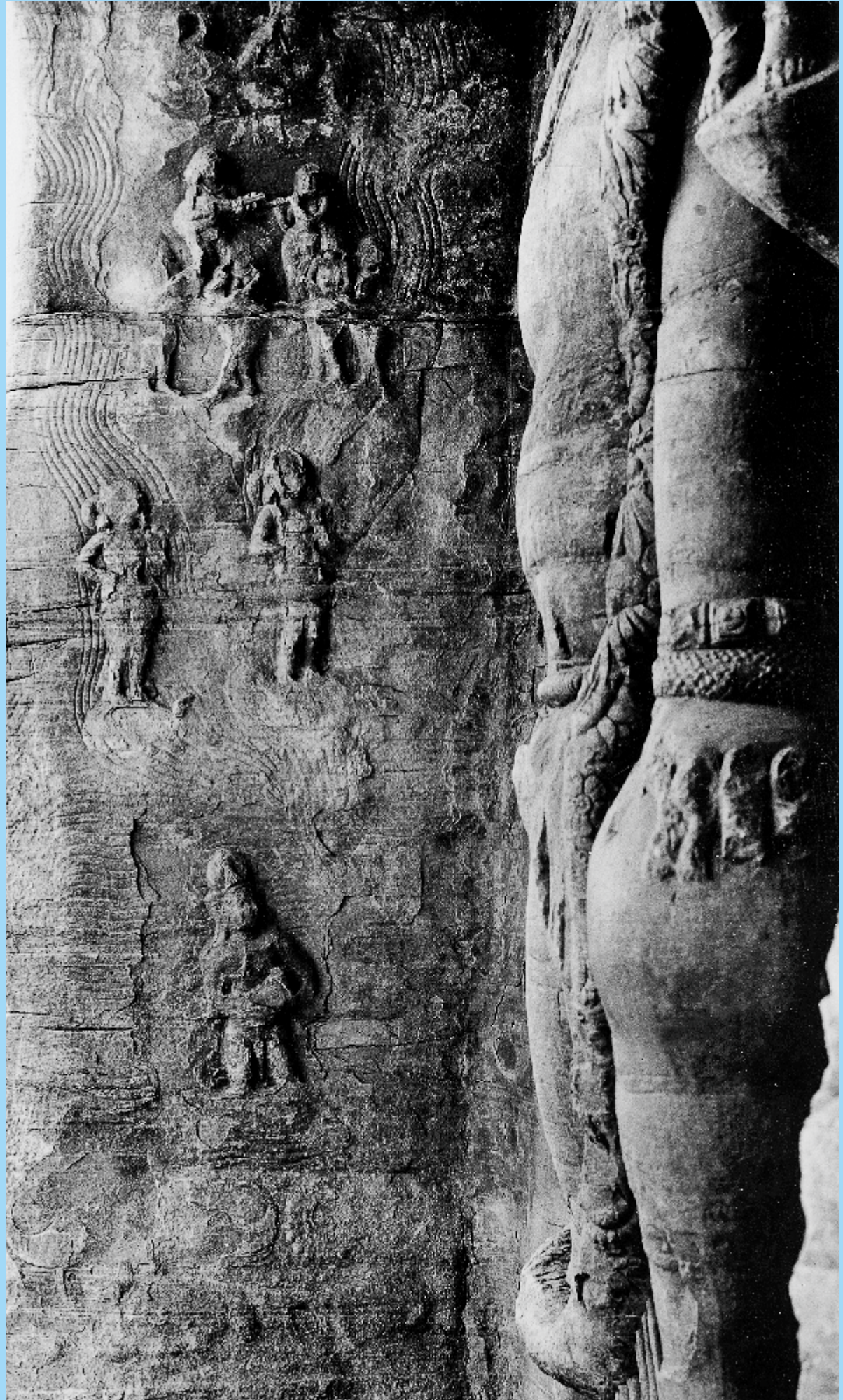
The river is filled with porpoises, crocodiles and various serpents, the river has fallen from the matted hairs of Lord Shiva, and is filled with the power of penance of King Sagara and his descendants.

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A rock-cut cave shrine from early 5th Century A.D. of Triveni Sangama, the confluence of Ganga, Yamuna and Saraswati rivers, personified as goddesses with their highly signifying associated attributes, emanating from varied archaeological, historical, and architectural contexts.







As the Ganga enters the Gangetic plains, where the gradient abruptly changes, the decreasing river current deposits sediment load alluvial fan near Haridwar and downstream. The river metamorphoses into a multi-stranded braided channel, separated by channel bars and islands, stabilized at places by riparian vegetation.





# SWAMP DEER

## *Rucervus duvaucelii*

A typical sight in Jhilmil, a herd of Swamp Deer or Barasingha. Jhilmil is the last piece of Terai marshland to survive untouched in Uttarakhand. It was declared as a Conservation Reserve in 2005 to protect the representative ecosystem of the Terai region. The Swamp Deer are primarily grazers, active during both day and night. They are listed as Vulnerable in the IUCN Red List and Schedule I Part I of the IWPA, 1972.

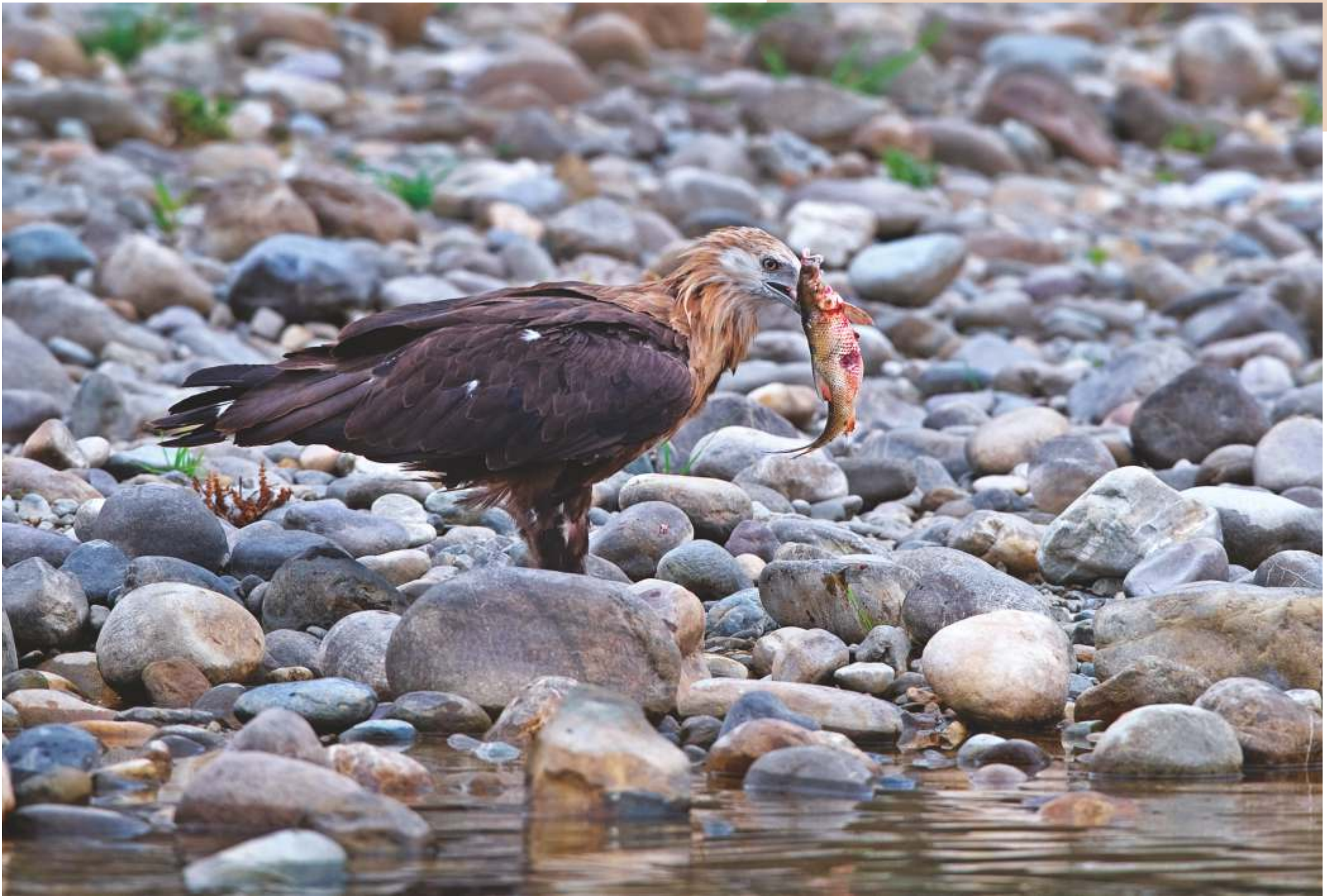




# PALLAS'S FISH EAGLE

*Haliaeetus leucoryphus*

The Pallas's Fish Eagle seen feeding on the banks of the Ganga. It is placed in the Endangered category in the IUCN Red List as the global population is estimated to be less than 2,500 individuals. It is rare and isolated throughout its range and may not breed in large areas of it. The spread of invasive species such as water hyacinth probably makes finding prey difficult for this species.







## RUDDY SHELDUCK

### *Tadorna ferruginea*

A flock of Ruddy Shelduck wintering in the Ganga River. The distinctive waterfowl is a common winter visitor in India where it arrives by October and departs by April. They are usually found in pairs or small groups and rarely forms large flocks. The species has been placed in Schedule IV of the IWPA, 1972.









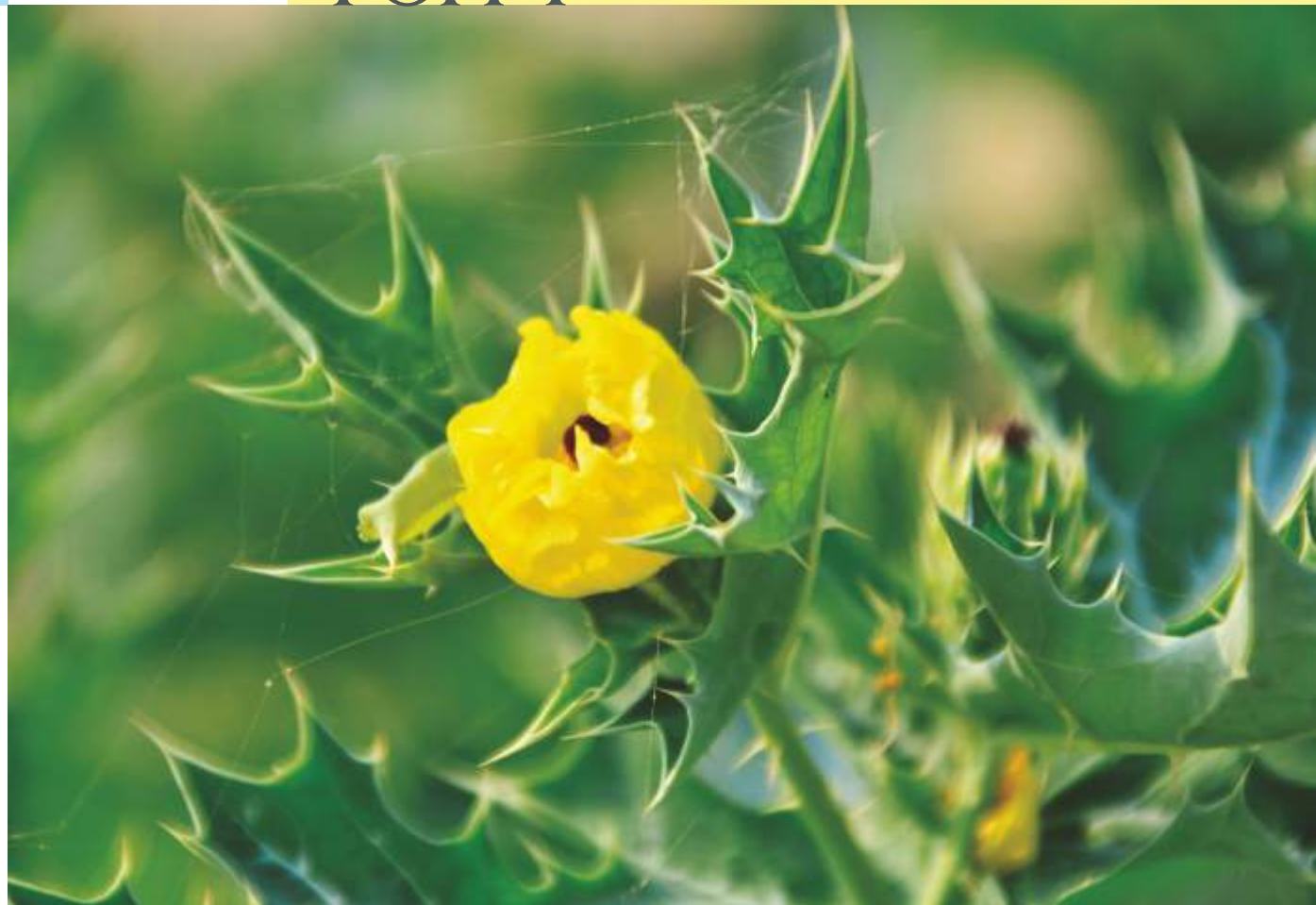
## GREAT CORMORANT

### *Phalacrocorax carbo*

A widespread species that migrate south in winter along any water body that is well-supplied with fish. It preys mostly on bottom-dwelling fish, occasionally also taking shoaling fish in deeper water; noticeably select larger torpedo-shaped fish in winter to increase efficiency. It is often seen nesting in colonies on trees near wetlands, rivers, and sheltered inshore waters.



## MEXICAN PRICKLY POPPY



### *Argemone mexicana*

An extremely hardy pioneer plant which is tolerant of drought and poor soil. It is poisonous to grazing animals, but has medicinal uses. It has cultural significance in India, as it is used during the colourful festival of Holi.





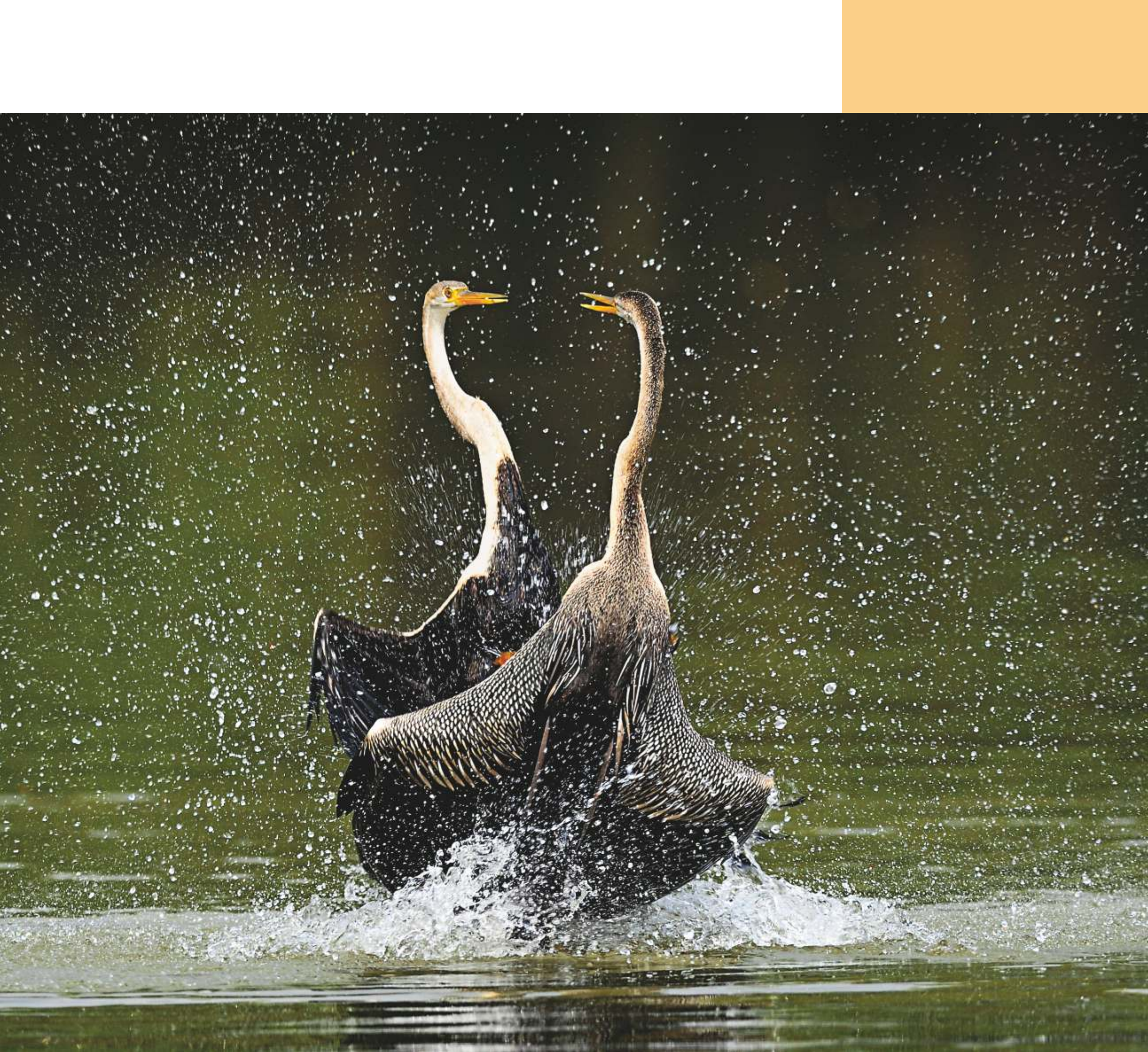




Upstream of the Bijnor Barrage, the river shows anastomosing pattern and forms large channel islands, with individual channels meandering. A fishermen is seen seine-haul fishing in the river.









# ORIENTAL DARTER

*Anhinga melanogaster*

A breeding pair of Oriental Darter. A waterbird with a very long, slender, snakelike neck, often seen fishing underwater with its dagger-like bill with only its neck and head visible above the water. They nest in mixed species heronries by building a stick platform on a tree, usually surrounded by water. They are listed as Near Threatened in the IUCN Red List and Schedule IV of the IWPA, 1972, due to the declining population trend owing to modification of its natural habitat.



*Anser anser*

The ancestor of most domestic geese, they are the largest and bulkiest of the grey geese. In winter, they migrate to the Gangetic plains. They have mottled and barred grey and white plumage and orange beak and pink legs. They are listed in Schedule IV of the IWPA, 1972.

# GREYLAG GOOSE





# EURASIAN SPOONBILL



## *Platalea leucorodia*

Distinctive, large wading bird with a spatula-like bill. They nest on the banks of freshwater islands or alternatively in dense stands of emergent vegetation. They also frequent sheltered marine habitats during the winter such as deltas, estuaries, tidal creeks and coastal lagoons. They are listed in Schedule I Part III of the IWPA, 1972.





# GHARIAL

## *Gavialis gangeticus*

The Gharial is endemic to the Indian subcontinent. It inhabits sandy river banks. the species was on the verge of extinction in the 1970s. Since the inception of the Project Crocodile in 1975, the Gharial population has been revived to some extent in India. The threats to this species include construction of dams and barrages leading to habitat fragmentation, habitat loss and degradation caused by extensive water and sand extraction, and incidental mortalities in fishing gear. It is listed as Critically Endangered in the IUCN Red List and in Schedule I Part II of the IWPA, 1972.











## MUGGER

### *Crocodylus palustris*

The Marsh Crocodile or Mugger is one of the top predators in aquatic ecosystems it inhabits. It is sympatric with the Gharial and in few coastal areas also overlaps with the saltwater crocodile's distribution. There are increasing incidents of human conflict with this species due to encroachment by humans into the species' natural habitats. It is listed as Vulnerable in IUCN Red List and Schedule I Part II of the IWPA, 1972.



## CROWNED RIVER TURTLE

### *Hardella thurjii*

The species is endemic to South Asia. It is found in the watersheds of the Ganga, Brahmaputra, and Indus rivers. It exhibits sexual dimorphism, with mature females being three times the size of mature males. It is listed as Vulnerable in the IUCN Red List.









# GANGA BARRAGE AT NARORA

## TURTLE TRACKS

Turtles often come out of the water to bask or to lay eggs by digging a hole in the sandy river banks. While doing so, their tail and flippers or limbs leave drag marks forming a trail along the banks. These tracks are a frequent sight along such sandy shores of the Ganga.



The Ganga Barrage diverts most of the water of the Ganga into the Lower Ganga canal, which means very little water flows downstream in the drier months. The diverted water also goes for thermal power generation at the Narora Atomic Power Station.





# LESSER WHISTLING DUCK

*Dendrocygna javanica*

A flock of Lesser Whistling Ducks ready for flight. The distinctive waterfowl is a frequent sight in the Upper Ganga Ramsar Site. Atypical for rivers, the 265 km stretch from Brijghat to Narora Barrage of Ganga was declared as a Ramsar site in 2005, to protect the avian diversity in the area. The species is listed in Schedule IV of the IWPA, 1972.







## BAR-HEADED GOOSE

### *Anser indicus*

Migratory waterbirds, bar-headed geese migrate over the Himalayas to spend the winter in the Ganga river basin and other parts of South Asia. It is one of the world's highest-flying birds. It has been suggested as being the model for the *Hamsa* of Indian mythology. The species is listed in Schedule IV of the IWPA, 1972.











## RAJGHAT AT NARORA

A famous ghat along the Ganga near Narora in Bulandshahr. Local communities take up permanent residence in the Ghat in small huts to sell prayer materials and other products to the devotees who come to take a dip in the Holy River.





## BLACK BELLIED TERN



### *Sterna acuticauda*

A Black-bellied Tern nesting on a sandy river island along the Ganga. Owing to its scarce population, it is listed as Endangered in the IUCN Red List. Increasing anthropogenic activities, including feral dogs pose a threat to its breeding and foraging habitats.



## ASIAN OPENBILL STORK



### *Anastomus oscitans*

A large wading bird found foraging near inland water bodies. Groups forage together in close proximity in shallow water or marshy ground on which they may walk with a slow and steady gait. The species is listed in Schedule IV of the IWPA, 1972.







# INDIAN TENT TURTLE

## *Pangshura tentoria*

The species gets its name from its tent-like carapace. A semi-aquatic species, it occurs in rivers and associated wetland habitats. It is distributed in India, Bangladesh and Nepal and is poached for flesh and for the illegal pet trade.



An Indian Tent Turtle, basking on the sandy shores of the Ganga at Narora. Giant twin cooling towers of the Narora Atomic Power plant are seen on the opposite bank. The Narora Atomic Power Station services the northern power grid of India. The Environmental Stewardship Programme of NPCIL focuses on scientific studies and conservation of nature within and around nuclear plants.

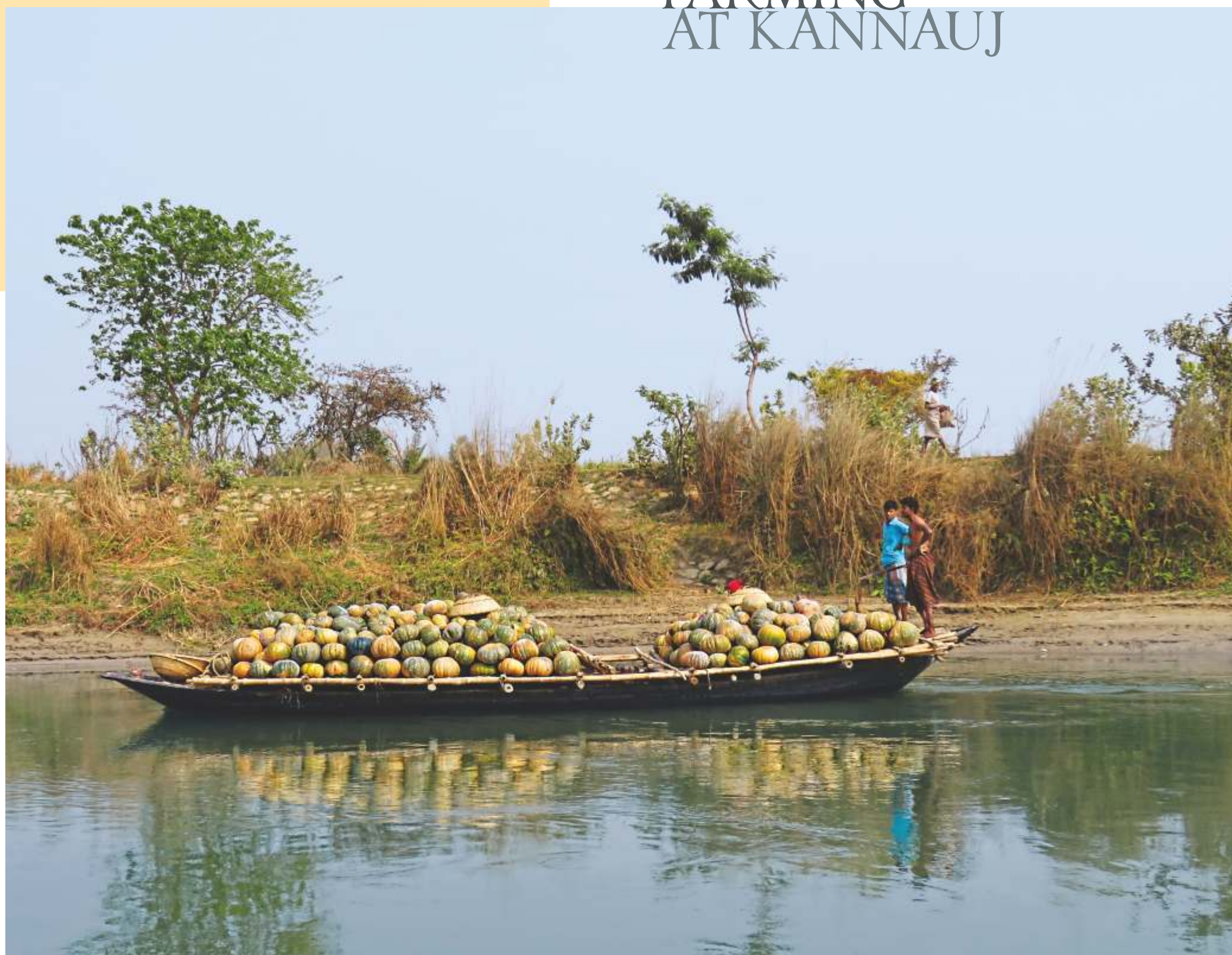






Local farmers bringing their harvest from riverbed cultivation or *diara* land farming near Kannauj. This is a very ancient practice of growing cucurbitaceous vegetables, on *diaras* formed and subjected to fresh silt and clay deposits every year during monsoons. This is a characteristic of perennial Himalayan rivers.

## DIARA FARMING AT KANNAUJ







Local people crossing the Ganga after a day's hard work on the fields. Riverbed cultivation or *diara* land farming seen in the backdrop.







## SARUS CRANE



### *Antigone antigone*

A large non-migratory crane inhabiting the lowlands of India along the Gangetic plains. The tallest flying bird in the world with a predominantly grey plumage and a bright red head, which becomes brighter during the breeding season. These birds are known to mate for life and are always found either in pairs or in small groups of 3-4 individuals. The species is listed as Vulnerable in the IUCN Red List due to the threats it faces, such as loss and degradation of wetlands, hunting and egg collection. It is currently listed in Schedule IV of the IWPA, 1972.



# NORTHERN PINTAIL

## *Anas acuta*

The graceful Northern Pintail is a dabbling duck, with a pointed tail characteristic of its name. It mainly feeds on the surface in shallow waters, thus making it naturally susceptible to drought conditions and encroachments due to conversion of wetlands and grasslands to arable lands. Their habitats, the wetlands, are increasingly threatened by pollution, habitat degradation, and climate change. It is listed in Schedule IV of the IWPA, 1972.







## RED-CROWNED ROOFED TURTLE

*Batagur kachuga*

A young Red-crowned Roofed Turtle is seen crawling out of the river to bask on the sandy bank.





The Red-crowned Roofed Turtle (*Batagur kachuga*) is a Critically Endangered species of freshwater turtle endemic to South Asia. They are one of the most threatened freshwater turtles in India, with populations drastically reduced due to poaching for meat and shells, accidental trapping in fishing gear, water pollution, hydroelectric projects, sand mining, and egg predation. The red longitudinal lines on the nape are a characteristic feature of adult males. The species is jeopardized due to changes in river flow dynamics and nesting beaches due to anthropological pressures. The species is listed in Schedule I Part II of the IWPA, 1972.





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A flock of Northern pintails (*Anas acuta*) flying above the waters of the Ganga. These birds are known to be less sensitive to human disturbance and are often found in areas with high human activities.





INDIAN NARROW-HEADED SOFTSHELL TURTLE

Chitra indica

A large species of softshell turtle found along the rivers of Northern India. It feeds on fish, frogs, crustaceans and molluscs, which it ambushes. Females of the species require sandy or sandy loam beaches to dig nests and lay eggs. It is listed as Endangered in the IUCN Red List and in Schedule IV of the IWPA, 1972.





INDIAN BULL FROG

Hoplobatrachus tigerinus

A large pre-monsoon breeder known for their secondary sexual dimorphism, wherein males assume yellow colouration during breeding season. They prefer freshwater lentic waters such as rain pools for breeding. It is a Schedule IV species listed in the ITPA, 1972.



STICKY NIGHTSHADE

Solanum sisymbriifolium

The bright coloured perennial herbaceous plant that contains “solasodine” which makes the plant very resistant to pests and diseases. This makes it an ideal species to be used as a trap crop to protect potatoes from potato cyst nematode. It can also be used as a hedge plant to keep animals away from the garden, as it is covered with prickles.



DENSE FLOWER KNOTWEED

Persicaria glabra

A widespread annual or perennial herb with red, ascending, swollen stems and a dense raceme of pink flowers.



PRAYAGRAJ

A typical scene in Prayagraj, a major city along the river where three rivers - Ganga, Yamuna, and Saraswati meet to form the Triveni Sangam. Saraswati is a mythical river, believed to have dried up more than 4,000 years ago. It is one of the places where the Kumbh Mela is held once every 12 years.







The Ganga River flanks the northern part of Prayagraj while the southern limits are bordered by the Yamuna. A little downstream toward east of the city, both the rivers meet. Upstream of the confluence, the river bed is aggraded by the deposition of the debris carried by the river. Downstream of the confluence, water volume increases and the river displays degradational nature and entrenches the banks, forming escarpments along the valley sides.





INDIAN SKIMMER

Rynchops albicollis

A colourful bird with a black cap and a vibrant orange bill. Their bills are unique in that the upper mandible is shorter than the lower one which resembles a knife. The lower mandible is flexible, which is skimmed through the water surface to pick up the prey. The IUCN Red List have placed the bird in the Vulnerable category due to its declining population.





The unique feature of the Indian Skimmer, its bill is special in that the upper mandible is shorter than the lower one which resembles a knife. The lower mandible is flexible, which is skimmed through the water surface to pick up prey. The species occurs primarily on larger, sandy, lowland rivers, around lakes and adjacent marshes. The IUCN Red List has placed the bird in the Vulnerable category due to its declining population.

It is a social bird that nests in colonies and roosts in flocks on sand bars and marshes. Earlier known to breed only along the Chambal River, nesting colonies have recently been found near Prayagraj. Most of its colonies along the River are unprotected.







TERAI TREE FROG

Polypedates teraiensis

An obligate grassland species endemic to the Terai region of India. Its breeding biology is poorly known and its survival perhaps depends on ecological integrity of grassland habitats.



RUSSELL'S VIPER

Daboia russelii

Named after Patrick Russell, a Scottish herpetologist, the Russell's Viper inhabits plains and coastal lowlands mostly near human habitations. The species is one of the Big Four snakes of India, responsible for human deaths due to envenomation. It can be identified by triangular head, short and stout body and diamond-shaped patterns on the body. It is listed in Schedule II Part II of the IWPA, 1972.



KUMBH MELA

A procession of Akharas marching over a makeshift bridge over the Ganga River on the occasion of Kumbh. Each akhara houses followers of similar religious customs. Considered an integral part of the Kumbh, they were formed by Adi Shankaracharya during the 8th century to unite organisations of ascetics to protect the *Sanatan* way of life.









The founding myth of the Kumbh Mela is attributed to the Puranas. According to it, the gods and demons fought over the pot (*kumbh*) of elixir of immortality (*amrita*) which came from their joint churning of the milky ocean. During the fight, few drops of the elixir fell on the Kumbh Mela's four earthly sites *viz.*, at Haridwar on the Ganga, at Ujjain on the Shipra, at Nashik on the Godavari, and at Prayagraj.





The rivers are believed to turn back into the primordial nectar or elixir at the time of the Kumbh, giving pilgrims the chance to bathe in the essence of purity and auspiciousness. It is believed that bathing in the rivers during this time washes away all sins and frees one from the cycle of life and death and move towards a heavenly realm, which knows no suffering or pain.









Kumbh 2019 had an interesting new addition as a trained cadre known as *Ganga Prahari*. They assisted the organisers by executing cleanliness campaigns and biodiversity rescue operations throughout the Kumbh.





CHUNAR FORT, MIRZAPUR

Chunar is an ancient town, 40 km from the holy city of Varanasi. It is situated on an extension of the Vindhyachal range of mountains, with the Ganga River flowing near its base.

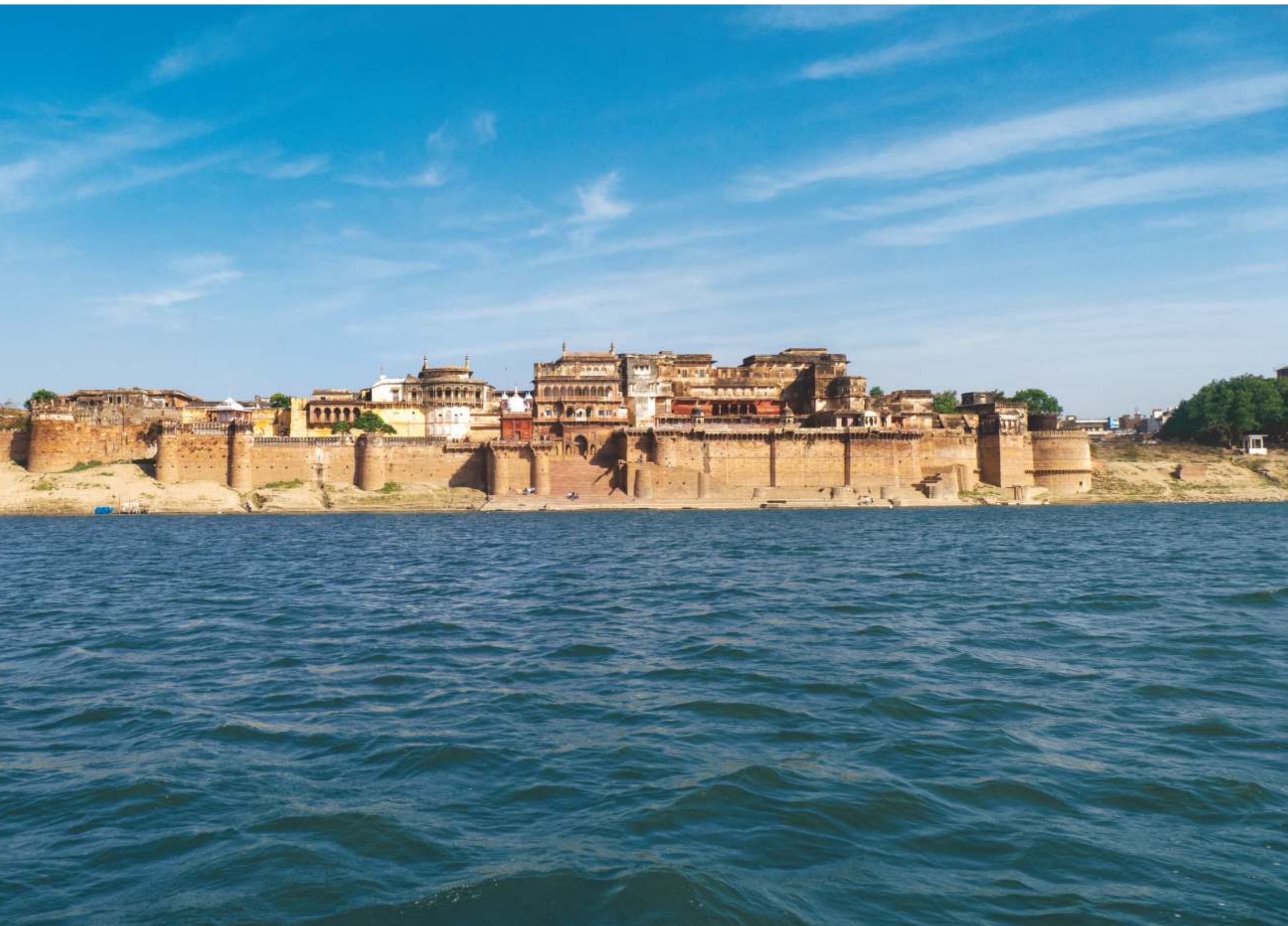
The Chunar Fort as seen here, is linked to many legends and is believed to have divine aspect. The fort is impregnable because of its steep slope, as it was built on a rocky detached part of the Vindhya Range.



RAMNAGAR FORT

Exhibiting striking aura, the Ramnagar Fort is a work of art, situated at a distance of 14 km from Varanasi, Ramnagar Fort overlooks the bank of Ganga River. The quaint fort was constructed using red sandstone by Maharaja Balwant Singh in the 18th Century.









MIRZAPUR OJHALA BRIDGE

The Ojhala Bridge on the Punyajala River, constructed by Mahant Parshuram Giri in 1772, is an exemplary architectural spectacle.

The water of this river is believed to be as holy as the Ganga River. The bridge connects the cities of Mirzapur and Vindhyachal.



VARANASI

“Benaras is older than history, older than tradition, older even than legend and looks twice as old as all of them put together. ”

Mark Twain





A symbol of cultural renaissance, Benaras or Varanasi is one of the world's holiest and oldest inhabited cities where pilgrims come to take a holy dip in the sacred waters of the Ganga, which is believed to wash away their sins.





PANCHGANGA GHAT, VARANASI

It is believed that the saint poet Tulsidas composed the famous Vinay-Patrika at the Panchganga Ghat. The magnificent Alamgir Mosque which is believed to have been constructed by Aurangzeb adorns the background. The amalgamation of the Hindu and Persian architectural structures, showcase the rich artworks of ancient India and symbolise unity in diversity – the very crux of our nation.



BRAHMA GHAT

The Brahma Ghat received its name from a mythological tale, according to which, when Lord Brahma came to Varanasi, he first settled in this Ghat. Narayana Diskhita, in 1742, reconstructed the ghat into a *pucca* structure. The murals on the walls of the ghat depict the cultural and biological significance of the Ganga.



INDIAN SOFTSHELL TURTLE

Nilssonia gangetica

A large softshell turtle found along the Ganga, Indus and Mahanadi rivers. It is placed in the Vulnerable category in the IUCN Red List and Schedule I Part II of the IWPA, 1972.. They are predominantly carnivorous, but are often seen scavenging on dead bodies floating in rivers and thus, keeping it clean. The Turtle Sanctuary at Varanasi was created primarily for the conservation and rehabilitation of this species.



BLACK HEADED GULL

Larus ridibundus

These migratory birds fly several miles from Central Asia (Mongolia, Eastern Russia, Kazakhstan) to winter in warmer climate along the Gangetic belt. Their congregation attracts tourist from across the region who visit the ghats of Varanasi for bird watching.



INDIAN MOTTLED EEL

Anguilla bengalensis bengalensis

The eels inhabit deep rock pools of rivers at a depth range of 3–10 m but migrate to the sea for breeding. It is a valued food fish and highly prized because of its nutritional value. The mucus of this eel is used in a medicine for arthritis.



THREE-STRIPED ROOF TURTLE

Batagur dhongoka

Being a river turtle, the species is highly susceptible to major hydrological projects and their impacts on river flow dynamics, degradation of nesting beaches, and water pollution. It is Critically Endangered according to the IUCN Red List.





The calm among the hustle and bustle of daily life. The ghats of Varanasi are a colourful experience, immersing culture and tradition with the vibrant world of the river and its aqualife.







As an example of balancing biodiversity conservation efforts with the livelihoods of the local communities, the *Jalaj* sails along the ghats of Varanasi selling locally made products to tourists and others. The local people (*Ganga Praharis*) involved in the *Jalaj* were trained on how to make and market these products, and at the same time sensitise the visitors regarding the conservation and cleanliness of the river.



Rowing along the river, the scene changes and the river comes alive, from the devout taking a dip, the birds flocking near the boats, to the funeral pyres at the next ghat.



Varanasi is also known as the cultural capital of India as philosophy, culture, religion, arts and crafts have flourished here for centuries. Many exponents of Indian dance and music have come from Varanasi. Sarnath, where Buddha preached his first sermon after enlightenment is located here.



Maintaining their tradition of carrying out the procession for 'Shahi Darshan' after the culmination of the Kumbh Mela at Prayagraj. Naga sadhus associated with Panch Das Naam Juna Akhada took out a procession and gathered at the Hanuman Ghat in Kashi.





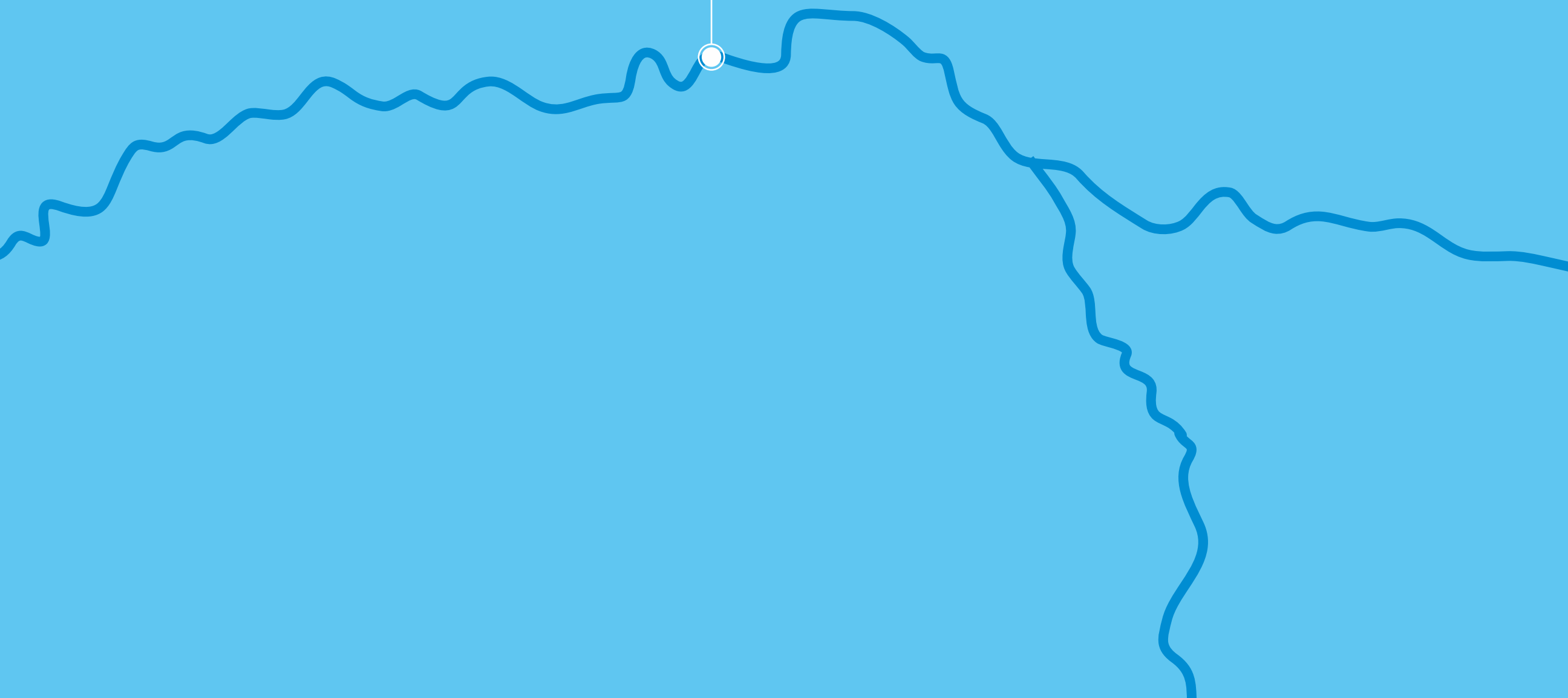


Ganga aarti at Dashashwamedh Ghat of Varanasi. Thousands of devotees gather every dusk to watch the vibrant affair, performed as an offering of gratitude and praise to the Holy River.





Lower Ganga



कल्पलतामिव फलदां लोके प्रणमति यस्त्वां न पतति शोके ।
पारावारविहारिणि गङ्गे विमुखयुवतिकृततरलापाङ्गे ॥६॥
क्वचित् तीररुहैर्वृक्षैर्मालाभिरिव शोभिताम् ।
क्वचित् फुल्लोत्पलच्छन्नां क्वचित् पद्मवनाकुलाम् ॥ २.५०.२० ॥

Ganga Stotram-Aadi shankaracharya

You bestow fruits to the worlds like the *kalpalata* (wish-fulfilling creeper); he who reverentially bows down to you does not fall into grief, you flow into the ocean with the sportiveness of a young maiden turning away with side glances.

At some places, trees adorn the river banks like a garland, at some places it is covered with blooming lotuses, while at other places it is filled with lotus groves.



Ganga as Suranimnaga or under the heavenly Kalpa tree from Circa 12th Century A.D. at Mahanad, West Bengal. Kalpa tree, the divine tree of life, is venerated because of ancient beliefs which associate a strong connection to the divine and fulfilling of people's wishes.



DIGHA-SONPUR BRIDGE AT PATNA

A Digha–Sonpur rail-cum-road bridge across the Ganga, connecting Patna and Saran, constructed to provide easy roadway and railway link between northern and southern parts of Bihar. This 4.5 km long bridge is the second longest bridge in India, after Bogibeel Bridge in Assam.



GHAT AT BHAGALPUR

Along the way, after passing through several towns and cities, the river begins to flow southeast at Bhagalpur. Situated along the banks of the Ganga, the city was once considered as a important trade centre in eastern India. It had a large harbour on the Ganga at Champanagar, now known as Champanala.





NILGAI

Boselaphus tragocamelus

A Nilgai crossing the river at Bhagalpur, a frequent sight along the stretch is a perfect example of human-wildlife co-existence. This species is protected by Schedule III of the IWPA, 1972.



LESSER ADJUTANT

Leptoptilos javanicus

A large stork with an upright stance and bare neck and head. It is often found in mangroves, mudflats, flooded grassland and rice fields. It is listed as Vulnerable in the IUCN Red List and Schedule IV of the IWPA, 1972.



PIED AVOCET

Recurvirostra avosetta

A striking white wader with a boldly pied plumage, long bluish-gray legs, and long, slender, up-curved bill, with curve stronger on females. Feeds while wading in shallow water, sweeping its bill side to side. Large flocks of these birds can be seen wintering along the shallow parts of Middle and Lower Ganga.



GREAT CRESTED GREBE

Podiceps cristatus

A medium sized waterbird known for its distinct long, sharp pink bill and chestnut coloured ruff with black tips, winters along the Middle and Lower Ganga River. They mainly feed on fish as well as small eels, crustaceans, molluscs, amphibians and some plants. It displays an interesting mating ritual, where both male and female dance in the water before they mate.



© Subharanjan Sen

INDIAN ROOFED TURTLE

Pangshura tecta

A freshwater turtle, inhabiting streams, canals, oxbows, ponds, man-made water tanks and brackish coastal waters. It is predominantly a herbivorous species, threatened by habitat degradation and loss, as well as the illegal pet trade. It is listed in Schedule I Part II of the IWPA, 1972.



Local *diara* farmers with their cucurbit harvest from riverbed cultivation. These riverine islands or *diaras* are also the breeding sites of the several island nesting birds, thus impacting their survival along the river.





GANGETIC DOLPHIN

Platanista gangetica

The Gangetic Dolphin is seen as it comes up for air. Once distributed throughout the Ganga-Brahmaputra-Meghna and Karnaphuli-Sangu river systems, the mammal is now restricted to parts of the Ganga River and its tributaries. The Vikramshila Gangetic Dolphin Sanctuary was notified in 1991 for the conservation of this Endangered species and is the only riverine protected area along the Ganga river.





Inhabiting one of the most densely populated regions of the world, this species is highly threatened by habitat loss due to the construction of dams and irrigation projects that restricts their movement.



INDIAN SOFTSHELL TURTLE

Nilssonia gangetica

A young Indian Softshell Turtle basking on the shore. Most of its habitats are heavily mined for sand, which interferes with their basking and egg laying habits. These turtles are poached for meat. This species is listed as Vulnerable in the IUCN Red List and Schedule I Part III of the IWPA, 1972.





BROWN ROOFED TURTLE

Pangshura smithii

A freshwater turtle endemic to South Asia. They are omnivorous and are mainly found in freshwater habitats with riparian vegetation.



An underwater view of a stand of aquatic ecosystem with diverse floating as well as submerged plants. An Indian Flapshell Turtle and a fish swimming among aquatic vegetation.



INDIAN COBRA

Naja naja

An Indian Cobra getting ready to devour an Asian Common Toad (*Duttaphrynus melanostictus*). They give mock attacks initially but can bite in fury to deliver its neurotoxic venom that damages the nervous system of the prey, paralyzing and killing it. Revered in Indian mythology and culture, it is protected under Schedule II Part II of the IWPA, 1972.



PIED KINGFISHER

Ceryle rudis

The Pied Kingfisher is a distinctive bird with a black-and-white plumage, giving it a speckled appearance. It feeds exclusively by hovering over water and plunging down to catch its prey, making it easy to spot and identify. Usually found in pairs, it has a straight rapid flight with a maximum speed of 50 km/h.



ROSY PELICAN

Pelecanus onocrotalus

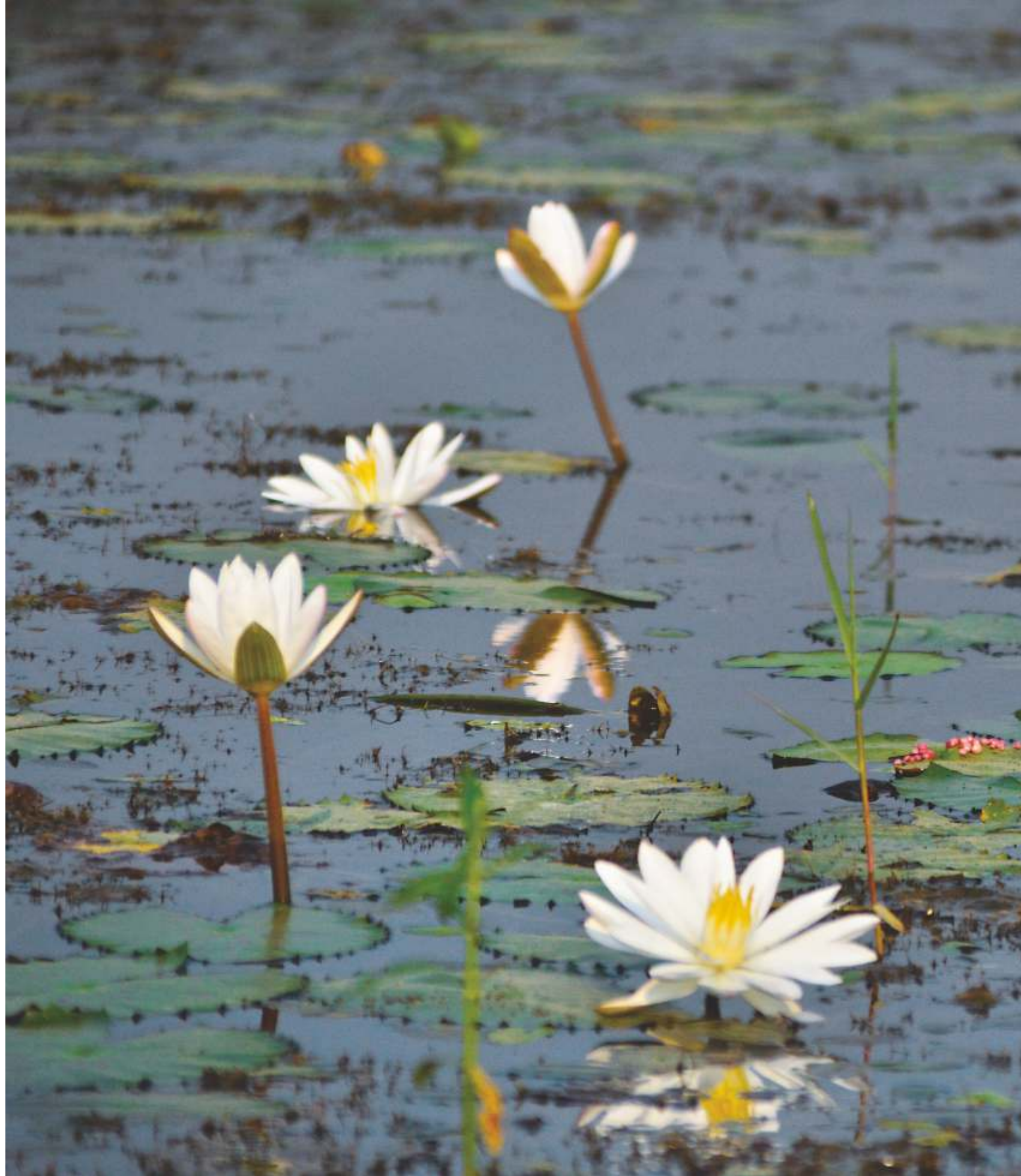
A huge elegant soaring bird, with the one of the largest wingspans among extant flying animals. Its flight consists of a few slow wingbeats followed by a glide. It has an enormous pink and yellow bill and a dull pale-yellow pouch.



TURPETH

Operculina terpeethum

A perennial herbaceous plant with hairy vines, endemic to India. Fruits of the turpeth plant appear as a capsule with conspicuous enlarged sepals and thickened pedicles as seen here.





A quintessential feature of daily life along the middle Ganga, a herd of domestic cattle crossing the sacred river.



WHITE WATER LILY

Nymphaea alba

An aquatic flowering plant inhabiting freshwater areas of 30–150 cm depth. It contains active alkaloids, nupharine and nymphaeine, the petals and other flower parts being the most potent. The root of the plant was used by monks and nuns for hundreds of years as an aphrodisiac, being crushed and mixed with wine





CHHATH PUJA

Chhath is an ancient Hindu Vedic festival, celebrated along the banks of the Ganga River in the states of Bihar, Jharkhand and Uttar Pradesh. This *puja* is a way of paying tribute to the Sun for bestowing bounties on earth. *Chhath* does not involve any idol worship, rather includes holy bathing, fasting and standing in the river for long periods of time, and offering *prasad* (prayer offerings) and *arghya* to the setting and rising sun. The main worshippers, called *Parvaitin* are usually women. Environmentalists claim that *Chhath* is the most eco-friendly Hindu festival.





KAHALGAON

Here in Kahalgaon, the river meanders and changes its direction towards the north. The three islands (Tapas Dham) in the middle of the river is a centre of attraction. A half-constructed rock-cut temple identified as Jahnu Rishi's Ashram, is situated on the southernmost islands. The history of this temple is related with the fascinating mythology of the descent of the Ganga from heaven and her subsequent journey towards the sea.



PAINTED STORK

Mycteria leucocephala

A large wader found along inland waters south of the Himalayas. The distinctive pink tertial feathers of the adults give them their name. They are non-migratory and only make short distance movements within their range. They are listed as Near Threatened in the IUCN Red List and Schedule IV of the IWPA, 1972.



TEMMINCK'S STINT

Calidris temminckii

The species is a full-migrant often seen foraging along wetland edges. The species favours vegetated freshwater habitats, also on brackish marshes, mudflats and tidal lagoons. The species is listed in Schedule IV of the IWPA, 1972.





The Ganga River flows through Sahibganj district in Jharkhand. Set within the lush green floodplains, the district has a predominantly tribal population that is highly dependent on the river's resources.





Here the Ganga River symbolizes its intimate relationship with the human communities living on its banks. Teeming with color, vibrancy and life, the river personifies its human element.





SPOTTED POND TURTLE

Geoclemys hamiltonii

A freshwater turtle endemic to South Asia. It is highly threatened by modifications of its natural habitats and pollution, and is listed as Endangered in the IUCN Red List and Schedule I Part II of the IWPA, 1972.



GREY-HEADED LAPWING

Vanellus cinereus

This gregarious bird is a regular winter visitor along the banks of the Ganga River. It prefers wet grasslands, rice fields and marshland edges. It has grey head and neck, and grey breast with diffused black border, and black tail-band. Usually found in small parties or flocks of up to 50 birds. It is listed in Schedule IV of the IWPA, 1972.



LITTLE PRATINCOLE

Glareola lactea

A small wader, resident in India. Its short bill is an adaptation to aerial feeding. It is often seen near water in the evenings hawking for insects. It is a Schedule IV species according to the IWPA, 1972.



FOAM-NEST FROG

Chiromantis sp.

Foam-nest frogs are arboreal frogs, associated with forested habitats near wetlands. They breed in pools and construct foam nests over or, in contact with, seasonal pools. The foam coating protects the developing embryos and juveniles against dehydration, predation, and microbial degradation, also acting as mini-incubators to facilitate rapid development of eggs and tadpoles.





DOG-FACED WATER SNAKE

Cerberus rynchops

A mildly venomous snake, commonly found in mangroves, mudflats, streams, ponds, tidal pools, on algae patches, and has even been found burrowing into the mud. It is an aquatic species, also tolerant of saltwater habitats. It is listed in Schedule II Part II of the IWPA, 1972.



WILD SUGARCANE

Saccharum spontaneum

A perennial polymorphic aquatic grass growing up to 3 m tall, with creeping rhizomes. It is known to colonise exposed silt plains created each year by the retreating monsoon floods, forming pure stands on the floodplains.



FARAKKA

The Farakka Barrage seen at the backdrop. Created in 1975 to divert water from the Ganga river system to the Brahmaputra-Hoogly river system. Critics have raised concerns over receding water flow in the Ganga and increasing silt deposits due to the Farakka Barrage causing floods in Bihar.







INDIAN FLAPSHELL TURTLE

Lissemys punctata

The Indian Flapshell Turtle inhabits freshwater habitats such as rivers, streams and lakes. The species is poached for meat and eggs and is also threatened by habitat degradation and loss. It is listed in Schedule I Part II of the IWPA, 1972.



A post monsoon scene depicting the humdrum of daily life along the river in West Bengal. Wild sugarcane in full bloom at the backdrop, a sign of the end of monsoon showers.



BENGAL FLORICAN

Houbaropsis bengalensis

The Bengal Florican, also called Bengal Bustard, is one of the rarest bustard species. It is Critically Endangered according to the IUCN Red List as only two disjunct populations exist in the world today, one in the Indian subcontinent and the other in Cambodia. This species prefers open tall grassland habitats with scattered bushes. It is also listed in Schedule IV of the IWPA, 1972.





RED CRESTED POCHARD

Netta rufina

A large diving duck with a large head. Sexes are distinct, with males having a large rounded orange plumage around the head and red beaks. They occur in large rivers, deep freshwater lakes and lagoons with abundant shoreline vegetation. They are widespread winter migrants and form large flocks in winter. It is listed in Schedule IV of the IWPA, 1972.



INDIAN PEACOCK SOFTSHELL TURTLE

Nilssonina hurum

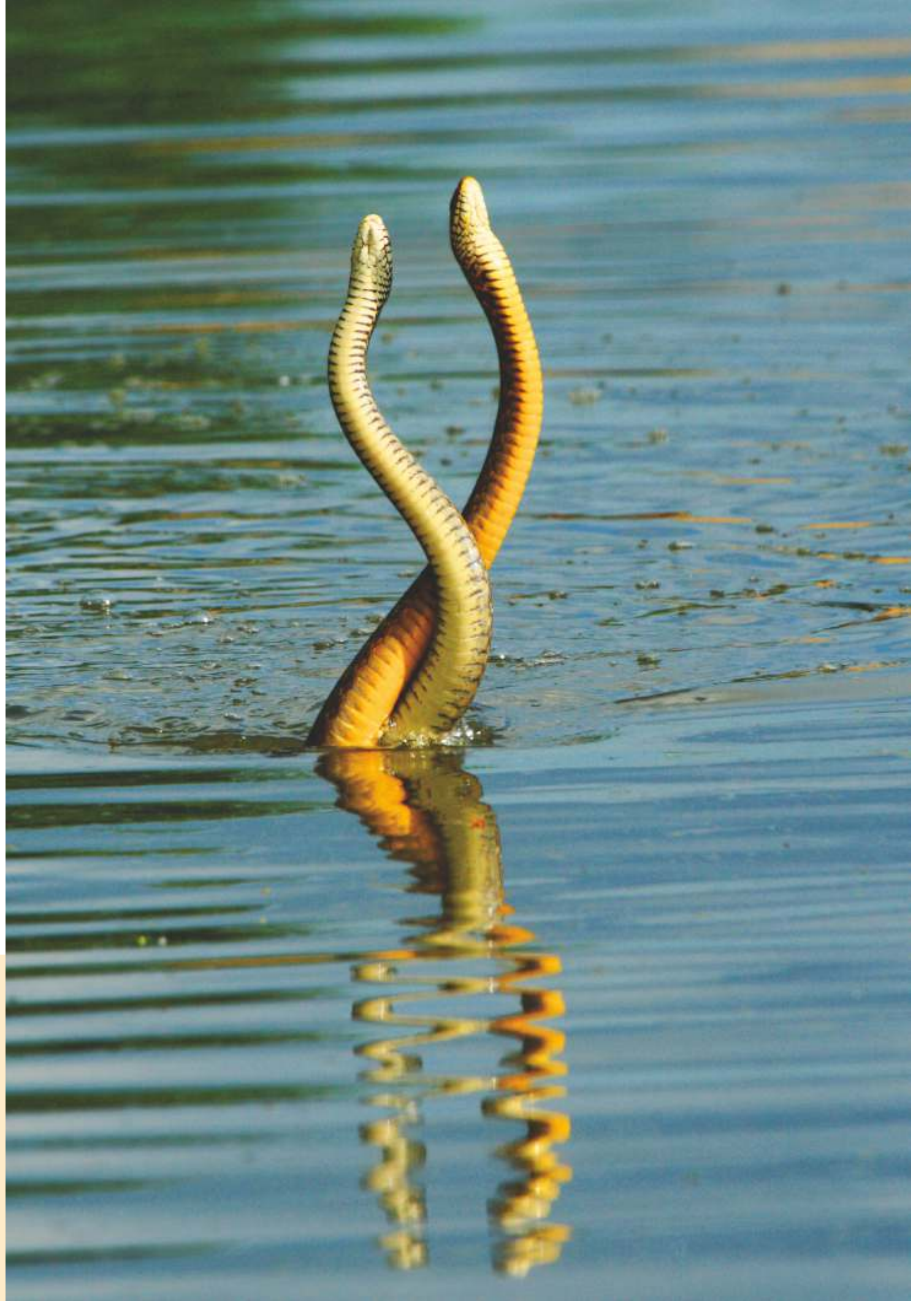
A Vulnerable species of turtle according to the IUCN Red List. The species is associated with freshwater habitats such as rivers, lakes, and ponds. It is threatened by poaching for meat and collection of eggs. It is listed in Schedule I Part II of the IWPA, 1972.



ORIENTAL RAT SNAKE

Ptyas mucosa

A non-venomous snake, occurring in a variety of habitats, such as, wetlands, paddy fields and suburban areas. Combat dance has often been observed in male Rat Snakes, during which they twist and coil their bodies around each other, as seen in the picture. The species is hunted for its skin, which is illegally exported. It is listed in Schedule II Part II of the IWPA, 1972.



TYTLER'S POND FROG

Hylarana tytleri

The species is associated with a variety of aquatic habitats such as pools, lakes, and marshes. While foraging, the species frequents on land and is found among short grasses. It is listed in Schedule IV of the IWPA, 1972.



INDIAN LOTUS

Nelumbo nucifera

The Indian Lotus's ability to unfold perfectly clean leaves out of muddy waters is considered as a sign of its divinity and hence it is considered sacred. It has a very long history (c. 3,000 years) of being cultivated for its edible seeds and is the national flower of India.



A family of fishermen in the Ganga River in a remote town of West Bengal. Fishing communities in the region, known as *Kaibartas*, have distinct socio-cultural governance structures, and traditional practices. Fishing is a major industry in the region as is in most coastal states.



Freshwater prawn farming has grown rapidly in the country. In 2016, India became the largest exporter of shrimps, overtaking Vietnam and exports are expected to double by 2022.







KOLKATA

An aerial view of Kolkata, the capital of West Bengal centred on the east bank of the Hooghly River, once the main channel of the Ganga River. It is located about 154 km upstream from the head of the Bay of Bengal. The port city developed as a point of transshipment from water to land and from river to sea. A city of commerce, transport, and manufacture, Kolkata is the dominant urban centre and cultural hub of eastern India.



HOWRAH BRIDGE

The Howrah Bridge as seen at dusk. The bridge joins the twin cities of Howrah and Kolkata in West Bengal. It is the sixth longest cantilever bridge in the world built over the Ganga's distributary, Hooghly River.

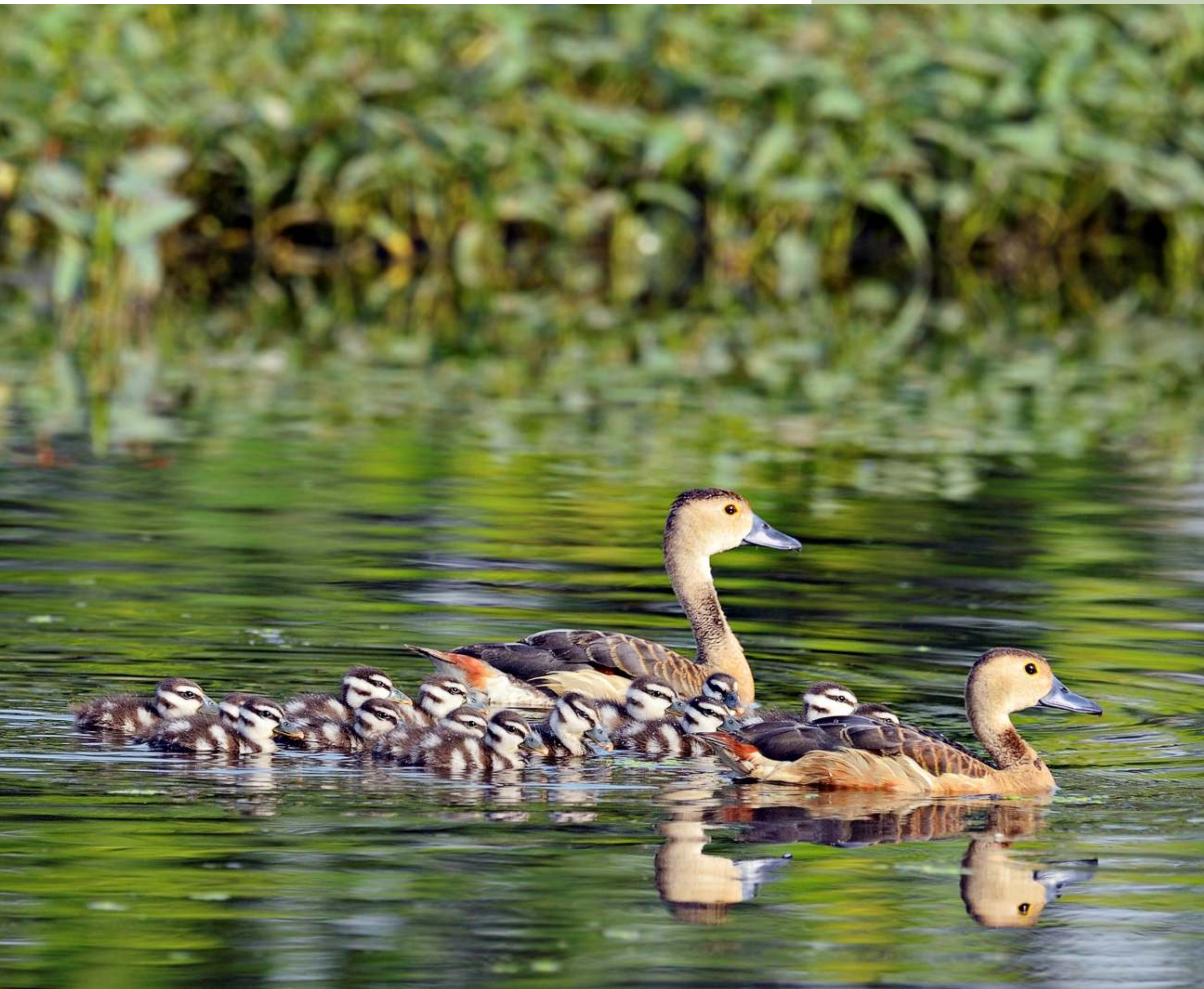




Home-grown and trained *Ganga Praharis* near the Howrah Bridge. They represent a cadre of local youth trained in various activities for Ganga River conservation, including ecological assessment, handling and monitoring of aquatic species, and sensitisation of communities.

GANGA PRAHARI





LESSER WHISTLING DUCK

Dendrocygna javanica

A gregarious duck, found in flocks around lakes and wet paddy fields. Large numbers are seen in urban wetlands such as in Kolkata particularly during winters. Large clutches have been noted, which may be indications of intraspecific brood parasitism. Young birds may sometimes be seen being carried on the back of the parents. This species is protected in Schedule IV of the IWPA, 1972.



Pelargopsis capensis

A large kingfisher, about 35 cm in length. They prefer well-wooded habitats near rivers or other water bodies. It nests in river banks, decaying trees, or tree termite nests by digging. It is territorial and often inconspicuous despite its size. It is listed in Schedule IV of the IWPA, 1972.

STORK-BILLED KINGFISHER





COFFEE SENNA

Senna occidentalis

A slender shrub with the ability to spread in a wide range of habitats. Its ability to grow in disturbed areas makes it a good indicator of ecologically compromised habitats. It can be used as a coffee substitute, but the seeds are reported to be toxic to cattle. It has medicinal and insect antifeedant properties.



WATER HYACINTH

Eichhornia crassipes

A free-floating perennial hydrophyte. It was introduced in West Bengal for its conspicuously attractive flowers, but turned out to be a highly problematic invasive species, draining oxygen from water bodies, resulting in the death of fish and other aquatic organisms due to anoxic conditions. This caused fish scarcity in the region and as fish constitutes a major supplement food in Bengal, it came to be known as "Terror of Bengal"



KACHNAR

Bauhinia variegata

A small to medium-sized tree, popular for its ornamental value and importance of its flowers in traditional Indian cuisine.



DURGA VISARJAN



Durga Puja celebrations on the banks of the river in West Bengal. During the *visarjan*, which marks the end of the festival, lavish processions take place with idols of the goddess for immersion in the Ganga River.

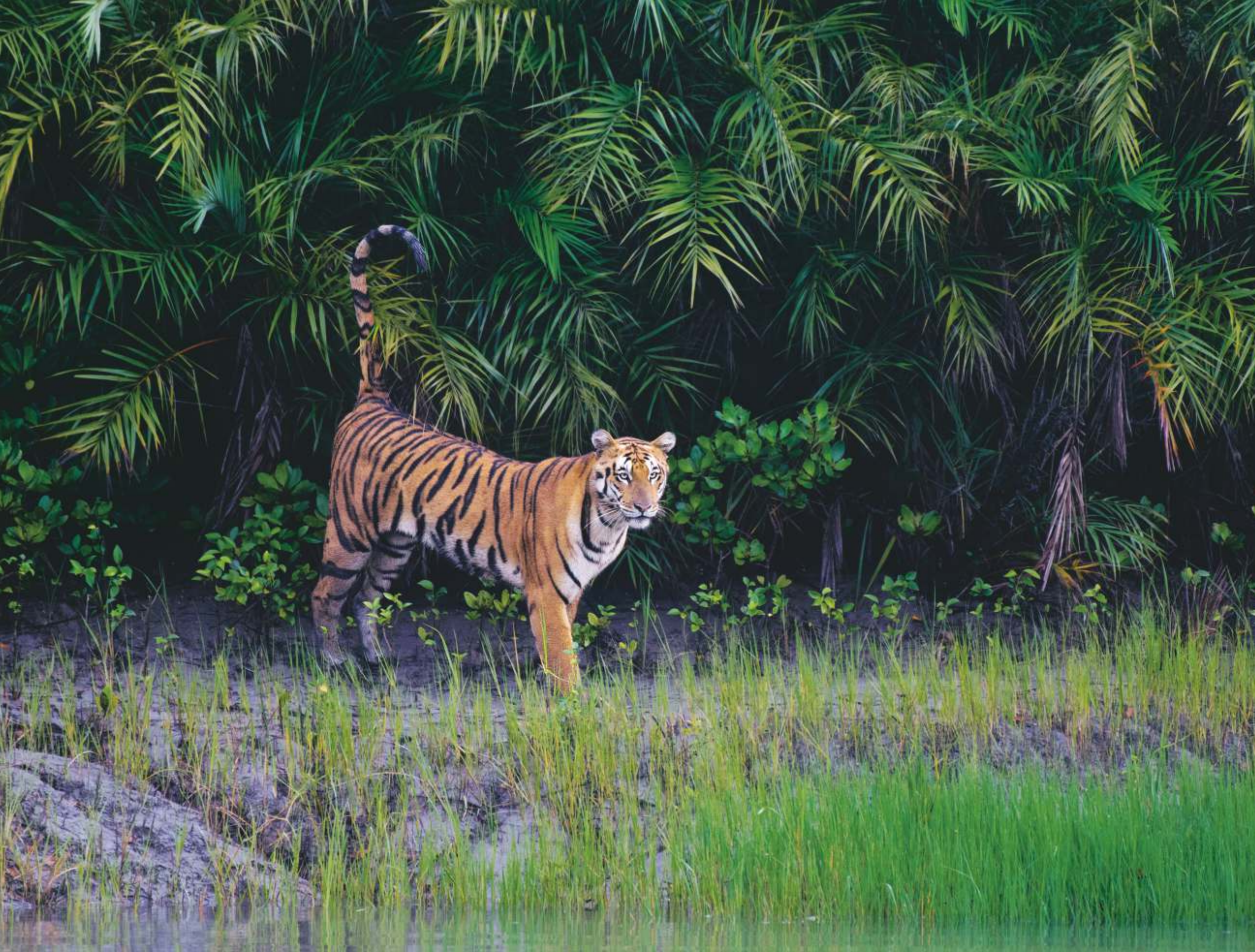




SUNDARBANS

Chitals crossing a creek at Sundarbans, one of the largest mangrove forests in the world. Locally known as Badabon, it was declared as Sundarbans Biosphere Reserve in 1989 under UNESCO's Man and Biosphere Reserve (MAB) programme. This place comprises not only of mangrove and tidal mudflats, twisting rivers and creeks, but also a mystifying panorama of millions of trees creating a lush green canopy. It is an estuarine phase, where Ganga and Brahmaputra river systems meet forming the largest delta in the world.







BENGAL TIGER

Panthera tigris

Sundarbans is the last mangrove habitat where tigers are found. Almost 22% of the Bengal Tigers found globally inhabit these mangrove forests. These tigers are smaller and slimmer than those elsewhere in India but remain extremely powerful.



Having adapted to the unique habitat of the Sundarbans, the tigers are skilled swimmers. They leap across the river within minutes with their noses barely above the surface of the water.



IRRAWADDY DOLPHIN

Orcaella brevirostris

The Irrawaddy Dolphin is an insufficiently known euryhaline endangered cetacean. They are shy of boats, not known to bow-ride, and generally dive when alarmed. They are relatively slow moving but can sometimes be seen spyhopping and rolling to one side while waving a flipper, and occasionally breaching. In waterways of the Sundarbans, their distribution shifts downstream and upstream according to high and low freshwater flow, respectively. It is listed in Schedule I of the IWPA, 1972.





Crocodylus porosus

SALTWATER CROCODILE

Saltwater Crocodile or saltie is a large opportunistic hyper-carnivorous apex predator inhabiting saltwater habitats and brackish wetlands. Generally very lethargic, a trait which helps it survive months at a time without food. They generally spend wet seasons in freshwater swamps and rivers, moving downstream to estuaries in the dry season and sometimes travelling far out to sea. They ambush their prey and then drown or swallow it whole. The species is listed in Schedule I Part II of the IWPA, 1972 .



ASIAN SMALL CLAWED OTTER

Aonyx cinereus

The Asian Small-clawed Otter is one of the most elusive species known. The species predominantly feeds on invertebrates such as crabs and molluscs. The picture depicts the species in its typical habitat in the Sundarbans. This Vulnerable species is listed in Schedule II Part II of the IWPA, 1972.





The smallest of the world's otters, the small-clawed otters are found in undisturbed stretches of the Ganga with good vegetation cover and high prey abundance. This species is predominantly an invertebrate feeder. As apex predators, the otters function as key links in cycling nutrients between aquatic and terrestrial systems, and also have strong influences on prey communities.





JUNGLE CAT

Felis chaus

Despite its name, the species is associated with wetlands, scrubland, and reedbeds along rivers and lakes. They are well adapted to human presence, and have been observed in different types of agricultural and forest plantations. These cats are excellent swimmers, and have been observed diving into shallow water for fish. They are listed in Schedule II Part II of the IWPA, 1972.



RED TAILED PIT VIPER

Trimeresurus erythrurus

The Red-tailed Pit Viper is a venomous snake distributed along the Indo-Malayan realm. In India, the species is found in the Northeast and Gangetic delta of West Bengal (also described as type locality). The loreal pits located midway between the eye and the nostril function as thermoreceptors for detecting warm-blooded prey.





WHITE BELLIED SEA EAGLE

Haliaeetus leucogaster

This resident, diurnal bird of prey can be readily distinguished by its striking appearance with contrasting crisp-white and ashy-grey plumage. Despite its name, it is not only confined to coastal areas, but also is regularly recorded along larger inland rivers and at freshwater swamps and lakes. The species is territorial and monogamous, with pairs remaining together until one bird dies, after which the surviving bird quickly seeks a new mate. It is listed in Schedule I Part III of the IWPA, 1972.





BROWN FISH OWL

Ketupa zeylonensis

The Brown Fish Owl is always found near water as it feeds mainly on fish, frogs and freshwater crabs. It hunts by stationing itself on a rock overhang or hanging perch over water, or by wading into shallow waters from where it swoops down and seizes prey. It is a Schedule IV species according to the IWPA, 1972.

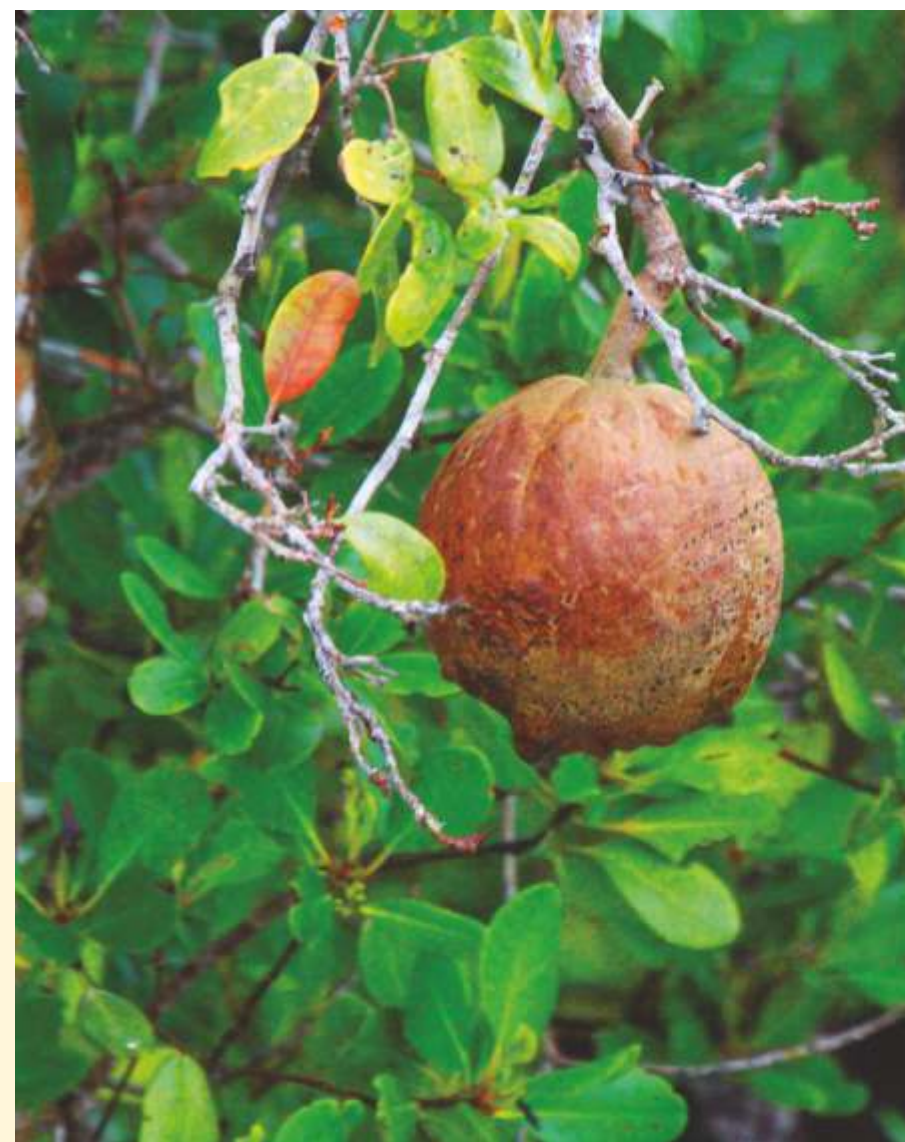




LARGE-LEAVED ORANGE MANGROVE

Bruguiera gymnorhiza

The name gymnorhiza comes from two Greek words 'gymno' naked and 'rhiza' root, naked root, which refers to the exposed knee roots emerging from the ground. The spindle-shaped fruits of this species are viviparous and develop a shoot on the mother tree.



CANNONBALL MANGROVE

Xylocarpus granatum

The Cannonball Mangrove gets its name from its large cannonball-shaped fruit. The species has medicinal properties as the roots are used in the treatment of cholera and dysentery. The oil extracted from the seeds is used as an illuminant and hair oil.



WHITE BURMA MANGROVE

Bruguiera cylindrica

The White Burma Mangrove has small flowers that are pollinated by day-flying insects and butterflies. The petals of the flower hold loose pollen. When probed at the base, the petals unzip to scatter a cloud of pollen over the head of the visiting insect.



Mangroves are halophytic species that fringe muddy creeks and tidal estuaries. Physically, they serve as a buffer between marine and terrestrial communities and stabilize the shoreline by reducing erosion from storm surges, waves and tides. The intricate root system of mangroves also make these forests ideal habitats for fish and other organisms seeking food and shelter from predators.





Batagur baska

One of Asia's largest freshwater and estuarine turtles. It prefers riverine habitats, but moves to brackish river mouths or estuaries in the breeding season. The species is highly threatened due to habitat loss and degradation, and hunting for meat and collection of eggs. It is classified as Critically Endangered by the IUCN Red List and Schedule I Part II of the IWPA, 1972.

NORTHERN RIVER TERRAPIN

HILSA

Tenualosa ilisha

A pile of *hilsa* in the local market. *Hilsa* or *ilish* is a popular and sought-after fish in Bengal. *Hilsa* is a euryhaline, anadromous species that breeds mainly in rivers. The catches of this species in India have declined rapidly owing to overfishing, pollution, and restriction in movement due to dams, which impacts the species' spawning migration.





Bonbibi is a unique deity bringing together Hindus and Muslims residing in Bengal's Sundarbans. These communities believe that if their god does not discriminate when it comes to protecting humans based on religion, they should not too. It is believed that she was sent from the heavens to fulfil a duty to help the people of Sundarbans against a dangerous man-eating tiger and a demon king Dakkhin Rai. Mostly the honey collectors call upon her before entering the forest for protection against tigers. Villagers believe that she guards them and her reign in the forest continues.

BON BIBI

GANGASAGAR



Gangasagar, is the largest island of the Indian Sundarbans. The island is the last human habitation as the Ganga River merges with the sea. The island is famous for the Gangasagar Mela, held every year on the island's southern tip, at the confluence of the Ganga River and the Bay of Bengal.











Every year on Makara Sankranti, in the month of January, hundreds of thousands of Hindus gather to take a holy dip at the Gangasagar and offer prayers in the Kapil Muni Temple.



RED GHOST CRAB

Ocypode macrocera

These bright coloured crabs are known to add colour to the sandy beaches they inhabit. Characterised by thick and elongated eyestalks, box-like body and one claw being larger than the other. The species constructs burrows that are used by a single individual. Burrowing has been considered as a major bioturbation, affecting the physical and chemical processes in the ecosystem.







Nurturing life and culture along its
course, the Ganga River finally
reaches its destination by merging
with the Bay of Bengal.



EPILOGUE

The Ganga River and its surrounding landscape is an epitome of India's biological and cultural diversity. The river exhibits diverse geological, biological, and cultural features as it flows down from the mighty Himalayas to the serene Bay of Bengal. However, these diversities are eroding due to increased anthropogenic pressure and unsustainable resource use practices. The National Mission for Clean Ganga has intensified biodiversity conservation efforts in the Ganga Basin to restore the integrity of the river by involving multiple stakeholders. These efforts are being reflected in the variety of life, both aquatic and associated terrestrial species, which the river sustains on its way to the sea. Let us strive towards conserving this natural heritage and cultural hub by supporting the Namami Gange programme.

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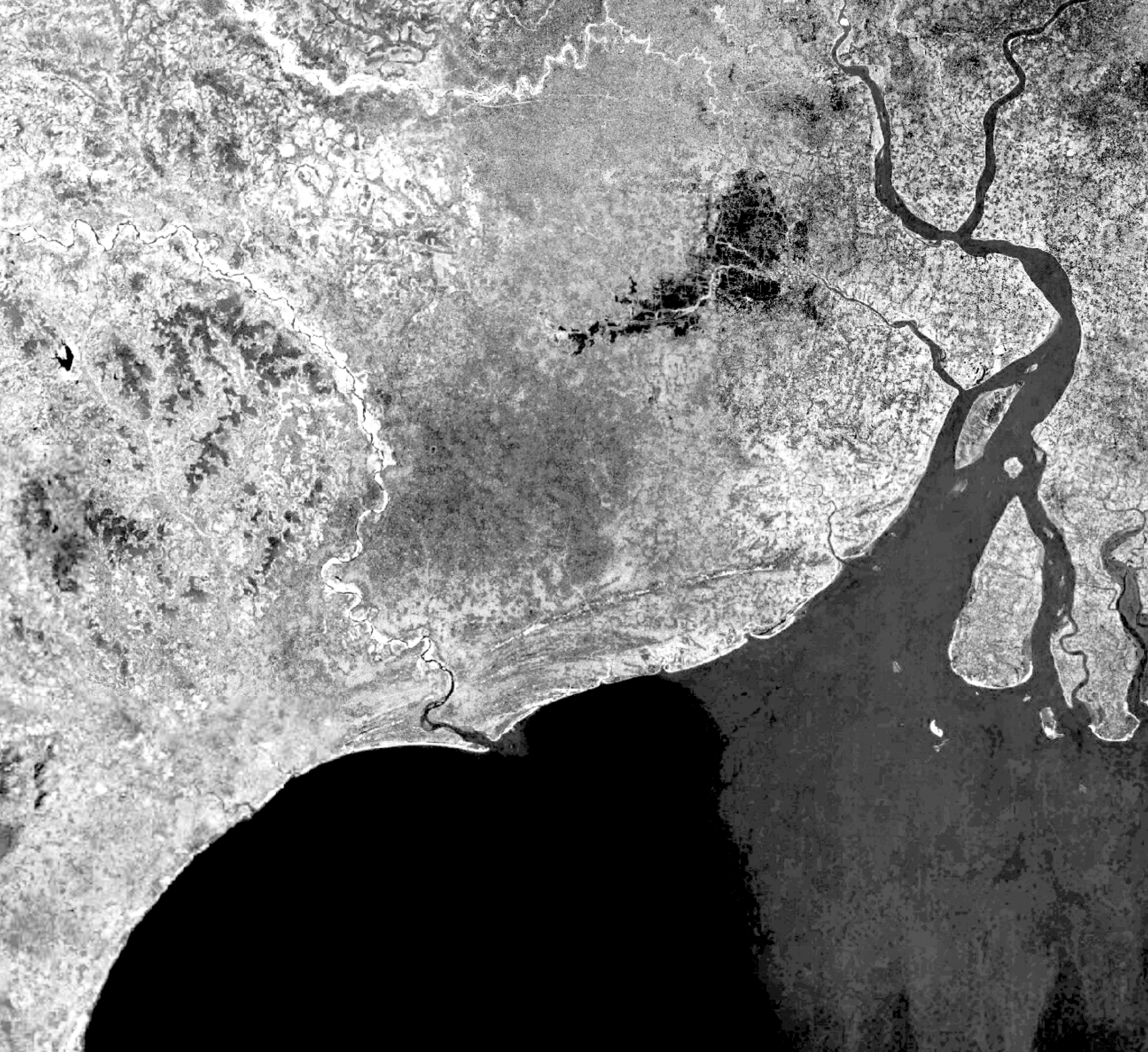
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Sundarban Delta as seen from space. (Open source map. SAS. Planet Version)

