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Vishwamitri River — India's Urban Crocodile Haven and the Mugger Conservation Story

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SUBJECTS COVERED**ENVIRONMENT****GEOGRAPHY****CURATED & WRITTEN BY****Bharat Choudhary**

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WHY IN NEWS

A 2025 census recorded 442 mugger crocodiles within a 21-kilometre stretch of the Vishwamitri River flowing through Vadodara city, Gujarat — making it one of the world's most densely populated urban crocodile habitats and a unique model for human-wildlife coexistence in an urban setting.

THE VISHWAMITRI RIVER — GEOGRAPHY AND ECOLOGY

The **Vishwamitri River** is a relatively short, rain-fed river entirely within Gujarat:

Origin: Pavagadh hills (elevation ~762 m), **Panchmahal district**, Gujarat

Length: approximately **164 km**

Drainage: Flows through Vadodara city (the most remarkable section) before emptying into the **Gulf of Khambhat** (Gulf of Cambay), part of the Arabian Sea

Tributaries: Mohar, Dhadhar (nearby river system)

Type: Rain-fed (seasonal/flashy — high flow during monsoon, low in dry season)

Significance: The only major river flowing directly through Vadodara; provides the city's urban biodiversity backbone

The Vishwamitri is named after the Vedic sage Vishwamitra, whose ashram tradition is associated with the Narmada-Sabarmati region of Gujarat.

THE MUGGER CROCODILE — SPECIES PROFILE

Mugger Crocodile (*Crocodylus palustris*) is one of three crocodylian species found in India:

Feature	Mugger	Saltwater Crocodile	Gharial
Scientific name	<i>Crocodylus palustris</i>	<i>Crocodylus porosus</i>	<i>Gavialis gangeticus</i>
IUCN Status	Vulnerable (VU)	Least Concern (LC)	Critically Endangered (CR)
WPA Schedule	Schedule I	Schedule I	Schedule I
Snout	Broad, rounded	Largest reptile; broad	Very long, narrow
Habitat	Freshwater rivers, lakes	Coastal/brackish/marine	Freshwater rivers (Ganga system)
Diet	Fish, mammals, birds	Almost anything	Almost exclusively fish
Size	Up to 5 m	Up to 7 m (largest reptile)	Up to 6 m

Distribution of Mugger in India: Gujarat, Rajasthan (Chambal), MP (Chambal, Narmada), Maharashtra, Odisha (Bhitarkanika), Tamil Nadu (crocodile bank, Mahabalipuram)

Mugger conservation status:

CITES: **Appendix II** (trade regulated but not banned)

Global population: Estimated 5,000–10,000 individuals; fragmented across South Asia (India, Pakistan, Nepal, Sri Lanka, Bangladesh, Iran)

India's conservation effort: Crocodile Rehabilitation and Breeding Programme (launched 1975, concurrent with Project Tiger) — involved Madras Crocodile Bank Trust, BNHS, WWF-India; raised crocodiles in captivity for release into the wild

THE VADODARA URBAN CROCODILE POPULATION — WHAT MAKES IT UNIQUE

The **442 mugger crocodiles** recorded in 21 km of the Vishwamitri through Vadodara city (2025 census) is globally remarkable for several reasons:

Why crocodiles thrive in Vadodara:

Urban heat island effect maintains warmer water temperatures — crocodiles are ectotherms (cold-blooded); warmer water extends active feeding periods

Organic waste load in the river (urban runoff) increases fish populations → abundant prey

Embankments and storm drains provide basking sites and nesting opportunities

Reduced predation on eggs/juveniles: Urban areas paradoxically reduce natural predators (mongoose, monitor lizards) while human disturbance remains indirect

The human-wildlife coexistence challenge:

Vadodara's population: ~2.5 million; Vishwamitri runs through the city's residential and industrial zones

Crocodiles occasionally enter residential areas during floods or nesting season

Conflict management: Gujarat Forest Department rapid-response team relocates “problem” crocodiles; public awareness campaigns have built a degree of tolerance (“Vishwamitri na Magar” — the muggers of Vishwamitri — are a point of local pride)

Model for conservation policy: Urban co-existence, rather than exclusion, has allowed population growth

Historical population trend: Population crashed in the 1960s–70s from hunting and habitat destruction; recovered through the 1975 Crocodile Rehabilitation Programme and legal protection under WPA 1972.

INDIA'S THREE CROCODILIANS — COMPARATIVE CONSERVATION

Saltwater Crocodile (*Crocodylus porosus*) — Least Concern, but Threatened in India

World's largest reptile; found in Andaman & Nicobar Islands and Bhitarkanika, Odisha

Aggressive and can be dangerous to humans

Protected under WPA Schedule I; CITES Appendix II

Population recovering in India's Protected Areas

Gharial (*Gavialis gangeticus*) — Critically Endangered

Most endangered crocodylian in the world; found only in freshwater rivers of the Ganga-Brahmaputra system

Distinctive: extremely long, narrow snout adapted exclusively for fish-catching

Virtually incapable of walking on land (weak limbs)

Population: Estimated **1,000–2,500** adults globally; majority in India

Key habitats: **National Chambal Sanctuary** (MP, Rajasthan, UP), **Katarniaghat** (UP), **Gandak** (Bihar)

Threats: River damming (loss of sandbars for nesting), sand mining, fishing nets (bycatch)

Gharial Conservation Programme (Project Gharial): CWS + WII + state governments; captive rearing at Kukrail Gharial Rehabilitation Centre (Lucknow)

Critical distinction for UPSC: The “Ghara” (pot) at the tip of adult males' snouts is a sex-specific feature used in vocalisation and display — not a nostril (common misconception)

WILDLIFE (PROTECTION) ACT, 1972 — SCHEDULE SYSTEM

All three Indian crocodilians are protected under **Schedule I** of the WPA 1972 — the highest tier of legal protection:

Schedule	Protection level	Examples
Schedule I	Absolute protection; hunting/trade = 3–7 years jail	Tiger, lion, elephant, gharial, mugger, saltwater crocodile, great Indian bustard
Schedule II	High protection; limited hunting with state sanction	Jackals, wolves
Schedule III/IV	Limited protection; vermin status removed	Nilgai (removed from Schedule V in some states)
Schedule V	Vermin — can be hunted	Common crow, fruit bat (in orchards), mice
Schedule VI	Plant species with trade regulated	Red sanders, cactus orchid

WETLANDS AND RIPARIAN ECOLOGY — UPSC CONCEPTS

Riparian ecosystems (riverbanks and floodplains):

Buffer zones between land and water: absorb agricultural runoff, reduce erosion

Highest biodiversity density per unit area of any terrestrial ecosystem

India's riverine ecosystems under stress from: sand mining, damming, urban encroachment, effluent discharge, invasive species (Water Hyacinth)

Urban rivers as conservation corridors:

Rivers flowing through cities can function as biodiversity corridors

Examples: Vishwamitri (Vadodara), Chambal (cross-state), Tungabhadra (Hampi)

Key challenge: Urban development pressure vs. ecological function — requires urban biodiversity mainstreaming in city master plans

UPSC RELEVANCE

Mugger crocodile (Crocodylus palustris); IUCN Vulnerable; WPA Schedule I; Vishwamitri River (Vadodara, Gujarat; Pavagadh hills; Gulf of Khambhat); 442 muggers in 21 km; Three Indian crocodilians (Mugger, Saltwater, Gharial); Gharial (IUCN CR; long narrow snout; fish-only diet; Chambal, Gandak, Katarniaghat); National Chambal Sanctuary; Crocodile Rehabilitation Programme (1975); CITES Appendix II (mugger); Urban heat island and crocodile ecology.

Urban wildlife conservation; human-wildlife coexistence models; Schedule I species; WPA 1972 schedule system; gharial conservation — genetic rescue, corridor connectivity; riparian ecosystem services; biodiversity mainstreaming in urban planning.

★ FACTS CORNER — KNOWLEDGE PEDIA
VISHWAMITRI RIVER:

Flows through: **Vadodara city, Gujarat** (urban river)
 Origin: **Pavagadh hills, Panchmahal district** (elevation ~762 m)
 Length: **~164 km**; drains into **Gulf of Khambhat** (Arabian Sea)
 Rain-fed; seasonal; named after sage Vishwamitra

MUGGER CROCODILE (*CROCODYLUS PALUSTRIS*):

2025 Census: **442 individuals** in **21 km** stretch of Vishwamitri
 IUCN: **Vulnerable (VU)**; WPA: **Schedule I**; CITES: Appendix II
 Snout: Broad, rounded; prey: fish, mammals, birds
 Size: up to 5 m
 Distribution: India, Pakistan, Nepal, Sri Lanka, Bangladesh, Iran
 India conservation: Crocodile Rehabilitation Programme (**1975**)

INDIA'S THREE CROCODILIANS:

Mugger: *Crocodylus palustris* — **Vulnerable** — freshwater
 Saltwater: *Crocodylus porosus* — **Least Concern** — coastal/Andamans/Bhitarkanika
 Gharial: *Gavialis gangeticus* — **Critically Endangered** — Ganga system only

GHARIAL (CRITICALLY ENDANGERED):

Snout: Very long, narrow (fish adaptation); “ghara” = pot-like growth on male snout tip
 Habitat: National Chambal Sanctuary, Katarniaghat WS, Gandak River
 Project Gharial; Kukrail GRC (Lucknow)

WPA SCHEDULE I SPECIES (EXAMPLES):

Tiger, lion, elephant, leopard, snow leopard
 All three crocodilians
 Great Indian Bustard, Bengal Florican, Forest Owlet
 Gangetic dolphin, Irrawaddy dolphin

OTHER RELEVANT FACTS:

Bhitarkanika National Park (Odisha): largest nesting site for saltwater crocodile in India; also a Ramsar site
 Chambal River: flows through MP, Rajasthan, UP; joins Yamuna; cleanest river in northern India; gharial, gangetic dolphin, mugger, Indian skimmer — all in one river system
 Urban biodiversity: Cities can support wildlife if riparian corridors and green infrastructure are maintained — Vadodara model

Sources: Drishti IAS, WWF India, Wildlife Institute of India, Insights on India

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